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Origins of institutional change: Brazilian alcohol fuel program between 1975 and 2000

Ossi I. Ollinaho

Aalto University

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Origins of institutional change: Brazilian alcohol fuel program between 1975 and 2000

Ossi I. Ollinaho

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Abstract

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Abstract

In this dissertation, I study the origins of institutional change. In organizational institutionalism institutional change is seen as being triggered either by exogenous shocks or by endogenous factors. I propose to see the origins of change instead through the dichotomy of cognitive versus material. One rationale for this is that, when addressing more broadly dispersed societal practices, the distinction between endogenous and exogenous loses its meaning. Another reason is that without taking materiality into account in a more comprehensive manner, institutional theory is toothless against the vast material fluxes that human activity, patterned as established practices, produces and consumes. Human activity is transforming the very basis of its foundation: raw material sources, ecosystems and even the climate of the planet. Not only does human activity have an impact on the planet, but the materiality in which we live, has its impact on our activity. I argue that changes in materiality affect our habitualized activities depending on how these changes are produced. This setting requires a more comprehensive relating of material and cognitive processes, something that I attempt to elucidate in this dissertation. I ground my conceptual development in the German sociology of knowledge, foremost in the writings of Alfred Schütz and Thomas Luckmann.

Established practices related to fossil fuels are central with regard to the adverse impacts of human activity. I study arguably the most successful attempt to deviate from these patterns: Proálcool. This ambitious Brazilian biofuel program was launched in 1975. Although alcohol was generally argued to be the definitive Brazilian solution and alcohol cars dominated the scene in the 1980s, by the end of the 1990s the program had lost its legitimacy and was seen as baggage to be done away with. I reconstruct the evolution of the program from 1975 to 2000 as a detailed narrative based on some 4000 news articles published in a major newspaper in Brazil, Folha de São Paulo. I analyze the reasons behind the major transformations and the attempts to transform the program. As a result of the empirical analysis, I propose a new concept, a new type of disruption. This "accumulative disruption" will help us to better understand our societies. In my view, the bulk of material changes in our contemporary world is, by nature, accumulative, as it is a result of established practices consuming and producing materiality in various forms. As established practices gain legitimacy through the process of being reproduced, so too do the material fluxes that these practices beget gain legitimacy. For this, even though accumulation transforms our material environment, it is apperceived as being natural rather than disruptive. Overall, institutionalization should be seen not only as a ubiquitous process by which meanings become reified, but also as a process in which material fluxes and material accumulation are inherent.

Keywords institutional change, renewable energy

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Tiivistelmä

Tässä väitöskirjassa tutkin institutionaalisen muutoksen alkulähteitä. Kirjallisuudessa nämä jaotellaan perinteisesti ulkoisiin ja sisäisiin häiriöihin. Ehdotan, että häiriöitä tarkasteltaisiin tämän sijaan aineeton-aineellinen –jatkumossa, koska tarkastellessa laajamittaisia hajaantuneita käytäntöjä ulkoisen ja sisäisen ero menettää merkityksensä. Tärkeimpänä syynä tähän jaotteluun on kuitenkin se, että sen avulla aineellisuus saadaan paremmin integroitua institutionaaliseen teoriaan. Väitän, että aineellisuus pitää ottaa paremmin huomioon selittäessämme ihmisten toimintaa nyky-yhteiskunnissa, joita tavanmukaistuneiden käytäntöjen muodostamat ainevirrat kasvaessaan muuttavat. Ihmisen toiminta muuttaa omaa perustustaan, raaka-ainevarantoja, ekosysteemeitä ja jopa planeettamme ilmastoa. Vaikutamme aineelliseen ympäristöömme, mutta toisaalta ympäristö vaikuttaa toimintamme. Näen, että tapa millä aineelliset muutokset aiheutetaan vaikuttaa systemaattisesti käytäntöihimme. Tilanteen ymmärtäminen vaatii aineellisuuden ja aineettoman suhteen syvempää tarkastelua. Täten yksi pyrkimykseni tässä väitöskirjassa on integroida aineellisuus paremmin institutionaalisiin prosesseihin. Perustan ymmärrykseni tiedonsosiologien, ennen kaikkea Alfred Schützin ja Thomas Luckmannin kirjoitusten pohjalle.

Fossiilisiin polttoaineisiin liittyvät käytännöt ovat keskeisiä ihmisen kestämättömässä toiminnassa. Tutkin otaksuttavasti onnistuneinta yritystä poiketa näistä käytännöistä: Brasilian hallituksen vuonna 1975 käynnistämää biopolttoaineohjelmaa, lempinimeltään Proálcool. Vaikka sokeriruokoetanolin väitettiin olleen pysyvä ratkaisu ja alkoholiautot dominoivat 1980-lukua Brasiliassa, viime vuosituhannen loppuun mennessä ohjelma oli muuttunut painolastiksi, josta haluttiin eroon. Kuvaan ohjelman kehityksen vuodesta 1975 vuoteen 2000 yksityiskohtaisena kertomuksena, jonka perustan maan suurimman sanomalehden, Folha de São Paulon, noin 4000 uutiseen. Analysoin syitä ohjelman muutosten ja muutosten yritysten takana. Empiirisen analyysin tuloksena luon uuden käsitteen 'kumuloituva häiriö'. Tämä uusi häiriötyyppi valottaa muutosta nyky-yhteiskunnissamme. Näen, että materiaalinen muutos on niissä suurimmaksi osaksi luonteeltaan kumuloituvaa eli tavanmukaistuneiden käytäntöjen vaatiman ja tuottaman materian aiheuttamaa. Kun käytännöt vakiintuessaan saavat 'oikeutuksen', myös niiden tuottama aineellisuus on ymmärrettävyydessään oikeutettu. Vaikka tällainen materiaalinen muutos muuttaisi voimakkaastikin ympäristöämme, ei sitä tämän vuoksi päällimmäisenä nähdä häiritsevänä vaan pikemminkin luonnollisena. Instituutioitumista ei pitäisi nähdä ainoastaan kaikkialla läsnä olevana prosessina, jonka varrella merkitykset muuttuvat itsestäänselvyyksiksi, vaan prosessina, jossa myös ainevirrat ja materian kumuloituminen ovat olennaisia.

Avainsanat institutionaalinen muutos, uusiutuva energia

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to Isabela, minha companheira

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It has not been a continuous pleasure to write this dissertation. Although dense with moments of understanding, this phase of my life has not been marked with much spontaneous happiness. Instead, it has touched the deeper spheres of my mind. For me, the main result of this all is that I have been able to perceive my own motivations, purposes and other contents of my mind as well as those of other people around me in a way that I was hardly expecting. I learned much about our societies and the ways we construct them. I have begun to wake up.

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> I have avoided too many expressions of hesitancy and uncertainty, but nothing in what follows pretends to be final, and I shall have fulfilled my purpose if my results are found suggestive. If they are also found provoking, so much the better; in that case there is some hope that, out of the ensuing clash of opinions, the proper solutions of the problems here raised will become apparent. (Toulmin 2003/1958: 1)

1. Introduction

Human activity is destroying our planet. At least we are changing our environment with increasing speed. Indeed, economic growth and capitalism, as manifested in increasing industrial production, trade and the extraction of natural resources, have led us not only to consume the planet's raw materials, but also to damage its climate as well as flora and fauna. Yet, in our societies these changes seem rather natural. It is often perceived to be just as natural for airplanes to make noise and lines in the sky, for cars to create traffic jams, and for the climate to be undergoing massive changes as it is to have birds singing, the sun always rising, and the rain always falling. We live in a naturalized human world in which not only the natural is natural, but so is the social and everything that it produces; or, if not completely naturalized, then one in which at least everything social is being naturalized.

If this perception is accepted, obvious questions emerge: How do we prevent this adverse development from continuing? And, how do we disrupt these established patterns of activities? This dissertation is my answer to these questions. Examples of institutional change are plentiful in contemporary society. However, whereas patterns of energy generation and consumption are central to the destructive patterns of human activity, successful large-scale disruptions are few, especially with regard to practices involving fossil fuels. In this dissertation, I empirically analyze arguably one of the most successful attempts to deviate from established patterns of consuming fossil fuels. I study an ambitious biofuel program in Brazil, launched at the end of 1975. This program, nicknamed Proálcool, subsequently revolutionized the national transportation fuel configuration in Brazil. For some time, it looked as if the Brazilian transportation system would be able to cease to use oil altogether.

In my view, just as human activity in general, the destructive patterns of human activity are, for the most part, a question of institutionalized practices and their diffusion. Institutional theory provides insights for investigating established practices that through their reproduction become taken for granted and gain centrality in the socially constructed reality (Berger and Luckmann 1966). Not only practices gain taken for grantedness through their reproduction, but also those who benefit from them gain substantial subject positions in this reality (Schütz and Luckmann 1973; Phillips et al. 2004). There are various institutional theories, but to my knowledge organizational institutionalism (Powell and DiMaggio 1991; Greenwood et al. 2008) offers the most elaborate conceptualizations of these phenomena and is founded upon a social constructionist view of reality (Schütz 1962; Berger and Luckmann 1966).

Studies addressing institutional change from the perspective of organizational institutionalism have proliferated in recent years. However, similarly as institutions themselves, institutional change has been perceived in various distinct ways. Institutional change was first conceived as a diffusion of established practices, that is, as isomorphic institutional change (DiMaggio and Powell 1983; Hasselbladh and Kallinikos 2000). Gradually, however, scholars of institutional change have shifted their attention to scrutinizing changes in the contents of institutions, that is, changes in the established practices (Barley and Tolbert 1997; Zilber 2002). Thus, whereas scholars used to study how institutions "spread," more recent studies have addressed how they "stick" and come loose (Colyvas and Jonsson 2011). Here, the focus is on the latter, that is, on the processes through which established practices, constituted by patterns of action and attached typical meanings, are transformed (Lounsbury and Crumley 2007; Maguire and Hardy 2009).

Apart from a few exceptions (e.g. Morrill et al. 2003; Hond and Bakker 2007) the existing literature views institutional change as being triggered by either external shocks or endogenous factors[1] (Seo and Creed 2002; Greenwood and Suddaby 2006; Meyer and Rowan 2006; Creed et al. 2010). The endogenous explanations for institutional change have been increasing rapidly in recent years. Scholars have begun to use concepts such as institutional contradictions (Seo and Creed 2002; Farjoun 2002), institutional entrepreneurship (Garud et

[1] This distinction does *not* refer to exogenous and endogenous with regard to the conceptual plane, that is, what theories include in their explanations and what they leave outside it. It refers to the factors in the empirical plane.

al. 2002; Lamberg and Pajunen 2010), theorization (Greenwood et al. 2002; Munir 2005), competing institutional logics (Marquis and Lounsbury 2007), disruptive institutional work (Maguire and Hardy 2009), identity work (Creed et al. 2010), boundary work (Zietsma and Lawrence 2010), routines (Rerup and Feldman 2011), improvisations (Smets et al. 2012), and field-configuring events (Lampel and Meyer 2008; Hardy and Maguire 2010) to explain how institutions change.

As exogenous shocks, both in empirical and conceptual senses have been classically argued as the principal source of institutional change (Beckert 1999; Clemens and Cook 1999; Dacin et al. 2002; Greenwood et al. 2002), this seems not to be the case anymore. It seems that exogenous shocks remain principally in the literature to stimulate research on endogenous factors (Schneiberg 2007). On the conceptual plane, exogenous shocks are seen to disrupt practices only by way of theorization (Munir 2005). However, when investigating broad or dispersed (Schatzki 1996) practices that do not have clear organizational, geographical or demographical limits, it becomes altogether problematic to offer meaningful insights when perceiving of disruptions as either endogenous or exogenous. In other words, if institutions are perceived as "supraorganizational patterns of human activity" (Friedland and Alford 1991, 243), the internal and external become confused. It begs the question: What is external and what is internal to the system of capitalism, to democracy, to sustainable development, to a religion?

Whereas I do accept the insights offered by the rapidly increasing literature on endogenous sources of institutional change, my concern is not so much with the endogenous-exogenous axis as with the cognitive and material. In saying this, obviously not all exogenous shocks are material and not all endogenous factors are cognitive. For example, "outside driven deinstitutionalization" (Maguire and Hardy 2009) seems far from being a "sudden and unprecedented event" (Meyer 1982), that is, a material exogenous "jolt." Although organizational institutionalism covers a broad range of empirical phenomena, with some exceptions (e.g. Hoffman 1999; Wittneben 2007; Maguire and Hardy 2009; Sine and Lee 2009) empirical studies have concentrated on phenomena in which materiality (as seen here) is tangential. When addressing issues such as refugees (Hardy and Phillips 1999), French "cuisine" (Rao et al. 2003), a rape crisis center (Zilber 2002), corruption (Misangyi et al. 2008), and marginal identities (Creed et al. 2010), the material fluxes required and produced by the

corresponding practices are negligible with regard to the importance of cognitive issues.

Regardless of the ascent of virtual worlds, anthropogenic material fluxes on a global scale are on the increase. In particular, when broader-level, dispersed practices such as energy generation and consumption are of interest, then the material fluxes inherent in these practices cannot be neglected. The material scale of these practices has become so vast that their impacts qualitatively change the material settings in which they are embedded. Sometimes material impacts transform the surrounding materiality in a way that directly disrupts the reproduction of the very practices that produce them. Think of industries that extract raw materials. The cognitive and material elements and outcomes are interrelated because our minds determine how we act towards our material surroundings and the material surrounding delimits our experiences within it (Schütz 1962). Materiality becomes indispensable particularly when we study change (Leonardi and Barley 2008).

By focusing our attention on both material factors and cognitive issues, as opposed to giving separate attention to each of them (which is what is typically done), we enhance our understanding of institutional change and institutional processes in general. Even if we were to map all of the material fluxes in the world, they would not tell us why the particular patterns of social interaction that produce and use these material fluxes and not others take place. If the meanings that are related to the material fluxes are ignored, it is not evident how we can influence the social interaction that begets these material fluxes (Schiller 2009). On the other hand, if we were to concentrate solely on cultural or cognitive issues as a way of discovering the reasons for social interaction, this would in no way provide a complete picture of social interaction because, out of necessity, social interaction occurs within materiality (Reckwitz 2002a; Orlikowski 2007). Not only does social interaction require and produce materiality, thus influencing its own environment, but the changes in the material environment as well have an impact on social interaction and its patterns.

Materiality here is conceived of as an oppositional pair for what, overall, is attributed to the concepts of cognition and symbolic (Schatzki 1996). Materiality is manifest in social life as physical and biological entities, their physical-chemical compositions, and the material fluxes that pass through them (Schatzki 2010). Yet, the social and the natural are always intermingled (Orlikowski 2007). I do not attempt to tackle the entire issue of materiality in social theory, but instead focus on one manifestation of it, that is, the biological and physical

flows that pass through practices (Schatzki 2010). Thus, I do not aspire to provide an account of the material "stratum" of social life (Deleuze and Guattari 1987; Reckwitz 2002a) in its entirety. My aim in this dissertation is to suggest a way to relate material fluxes, that is, the biological and physical flows that pass through practices (Schatzki 2010), to the cognitive dimension of institutional processes. With material fluxes, I refer to atoms and molecules, which are moved and transformed through the actions of humans and other living beings, and which obviously are moving for other reasons as well.

Certainly, organizational institutionalism does not ignore materiality. It is conceived mainly as "material practices," as "substantive practices," "resources", or as "routines" (e.g. Thornton and Ocasio 1999; Seo and Creed 2002; Machado-da-Silva et al. 2006; Lounsbury 2008; Armstrong and Bernstein 2008; Misangyi et al. 2008; Lok 2010; Lepoutre and Valence 2012). Actually, Friedland and Alford insisted that institutions "must be reconceptualized as simultaneously material and ideal" and defined them as "patterns of human activity by which individuals and organizations produce and reproduce their material subsistence and organize time and space" (Friedland and Alford 1991, 243). Regardless, organizational institutionalism does not conceive of materiality as fluxes that are formed through institutionalization and the diffusion of practices. I find that the current view is not sufficient when seeking to provide a more complete foundation for analyzing the changes in our societies.

Institutional theory is not alone in its difficulties related to materiality; "social theory frequently abstracts away from material entities and empirical enquiry often does not focus on them" (Beunza et al. 2006, 724). Overall, materiality seems to be forgotten; "social theory has hitherto consisted in its reification of the subject and of (collective) human mind as its point of departure for social analysis" (Reckwitz 2002a, 211; see also Fischer-Kowalski 1998; Barad 2003; Orlikowski 2007; Schatzki 2010). As the divide between the materialism and idealism is typically and erroneously perceived of as a choice between deterministic and voluntaristic accounts (Barley 1998; Leonardi and Barley 2008), I am not arguing for any type of material determinism here. Quite the contrary; strictly speaking, I find that "everything external is refracted by the interpretation of the actor" (Meyer 2006, 726).

One way to understand the role of materiality in institutional change is to understand how its changes are perceived at the individual level. I do not, however, make an argument for methodological individualism. On the contrary, I find that actors are fundamentally embedded

in their institutional environment and materiality, and thus their values, purposes, and knowledge in general are mainly constituted through social interaction (Schütz and Luckmann 1973). This social interaction, for its part, is largely determined by the position of the individual within a society (Berger and Luckmann 1966). Nonetheless, each individual has unique experiences within these interactions (Luckmann 2008). I ground my conceptual development in the sociology of knowledge, foremost in the writings of Alfred Schütz and Thomas Luckmann. I derive materiality from subjective-level processes, that is, from situations that individuals continuously master, while most often not being aware of it.

Based on the perspective of conceptual development, I argue that institutionalization should be seen not only as a ubiquitous process through which practices and meanings become translated and sedimented, but also as a process where material fluxes are inherent and *material accumulation* is typical. The simplistic notion that human practices require and produce materiality can be combined with the main thesis of institutional theory: that human activity becomes patterned over time and results in predictable rather than unpredictable (cf. Sewell 1992) material fluxes and their accumulation. As a result of the conceptual development, I consider attempts to change, that is, disruptions, in cognitive and material dimensions that differ in their manifestations and in terms of their disruptiveness. I argue that the distinct nature of the cognitive and material disruptions is significant for understanding the origins of change and that, moreover, the way material change is produced affects its disruptiveness.

Materiality is strongly present in the empirical case that I use to derive a more comprehensive relating of material and cognitive processes with regard to institutional change. I analyze the Brazilian alcohol program, Proálcool, from the standpoint discussed above. The Brazilian National Alcohol Program was launched in 1975 and has since transformed the Brazilian transportation fuel configuration radically. For the first time since World War II, oil was seriously being challenged as a fuel source. For a time, it looked as if the alcohol car, introduced at the end of the 1970s, would definitely push the gasoline car and oil in general into extinction in Brazil. Alcohol production was viable both in economic and ecological terms and its use greatly reduced urban carbon monoxide pollution. Although the program was certainly a success at the aggregate level, this was hardly the case at the level of production units.

The alcohol was produced by sugar and, subsequently, alcohol producers that were the largest entities in rural Brazil. The alcohol program principally incentivized alcohol production through highly subsidized loans, which ended up almost exclusively going to the already rich in the most central and affluent agricultural regions of Brazil. As an obvious result, the already large income gaps, both inside and between regions, were exacerbated as alcohol production expanded. Partly for these reasons, the alcohol program, rather than seriously challenging oil, was very close to being shut down. At the end of the 1990s, the alcohol car faced its own demise as a result of a severe alcohol shortage that had occurred at the beginning of the decade. What is more, the alcohol program was not in line with the dominant ideology, neoliberalism, the adherents of which attempted to abolish the rest of the program. If it were not for the flex-fuel car, introduced in 2003, it is possible that the Brazilian transportation system would no longer use alcohol at all as a fuel source.

I analyze the reasons behind the evolution of the alcohol program and attempt to explain how and why it took the course it did rather than an alternative course. I scrutinize Brazilian societal discourse from the preparation of the program until the very end of the twentieth century. Using a total of 4,126 newspaper articles that discuss the program, I reconstruct the evolution of the program in a detailed narrative. Then, I analyze the main disruptions that either changed or attempted to change the direction of the program. Thus, the purpose of the empirical analysis is not only to scrutinize those processes through which established practices become transformed, but also, importantly, the *attempts* to transform them. Arguably, there are many more seeds of change than just those that manifest themselves as successful changes. Without scrutinizing these seeds, it is impossible to understand how change originates.

The empirical material reveals the cumulative character of and the materiality in the process of institutionalization. It both confirms and adds to the conceptual development of institutionalization. Whereas it confirms the plausibility of regarding disruptions in cognitive and material dimensions, it adds an essential insight about the types of disruptions that can occur. As a result of the theorization, which is based on the empirical analysis, I conceive of three elementary types of disruptions. Besides the two "basic" elementary types, that is, cognitive and material disruptions, the empirical material suggests a hybrid type of disruption: an *accumulative disruption*. This novel type of disruption explains in particular the facility to

reproduce the established practices, regardless of how radically they change the material conditions in which they are embedded. In other words, accumulative disruption helps to explain the naturalized character of material change in our contemporary societies.

Structure of the dissertation

In the following section, I lay out the structure of the dissertation by discussing the role of each of the six remaining chapters in supporting the argument. I begin each chapter with a quote that both introduces the main topic of the chapter and describes the central point that will be made in it. In addition, the opening quotes are employed to provide structure to the dissertation. In Chapter 2, I provide a critique of the conceptual advances of the organizational branch of institutional theory, neoinstitutionalism. As various "new institutionalisms" have been identified, organizational institutionalism is closest to phenomenology because it emphasizes that the values, identities, and knowledge of social actors are constructed through their experience within their institutional environment (Meyer 2008a).

The organizational branch of institutional theory provides elaborate accounts of the processes of institutionalization and deinstitutionalization. It is, however, a "big tent" that accommodates a broad range of approaches (Colyvas and Powell 2006), some of which are even contradictory. In this dissertation, I focus on a processual approach, something that has been gaining in popularity within neoinstitutionalism in the last decade (Suddaby et al. 2010). Overall, according to the "green book" of organizational institutionalism:

> institutionalization has become accepted as a process whereby things become institutionalized, which, in turn, simply means that things are more or less taken for granted. (Greenwood et al. 2008, 15)

The formidable number of writings, conceptualizations, theories, and models of neoinstitutionalism are argued to build on the seminal treatise of social constructionism: Berger and Luckmann (1966). A typical citation to this classic is, however, often offered more as homage than as guidance on concrete theoretical, conceptual, or methodological questions (Meyer 2008b), and thus neoinstitutionalism has been distant with the new sociology of knowledge that builds directly upon Berger and Luckmann (1966) (Meyer 2006). Nevertheless, conceptual developments within neoinstitutionalism have been advancing

rapidly in this millennium. As a part of this, the social constructionist stance has gained new force via a discursive institutionalization model (Phillips et al. 2004; Phillips and Malhotra 2008; Maguire and Hardy 2009). Another important issue is that studies have focused increasingly on micro-processes (e.g. Creed et al. 2010; Rerup and Feldman 2011), the lack of which had previously been criticized (Colyvas and Powell 2006; Battilana 2006; Barley 2008).

Possibly the most important development in recent years has been that the role of actors in institutionalization has been dramatically increased through the introduction of institutional entrepreneurship, institutional work, and identities (Garud et al. 2002; Lawrence and Suddaby 2006; Lok 2010). The institutional theories, however, still lack something, without which it is not possible to adequately comprehend human activity at a broad-level. This something is the notion of material flux. Although I take into account various advances in the theory of neoinstitutionalism in Chapter 3, I also return to the foundations of phenomenological accounts of sociology of knowledge (e.g. Schütz 1962; Schütz and Luckmann 1973), to better integrate the concept of materiality within the conceptual framework. The epigraph to Chapter 3 is taken from Alfred Schütz;[2] most of the sociology of knowledge as we know it is based on his work:

> the individual living in the world always experiences himself as being within a certain situation which . . . has two principal components. The one originates from the ontological structure of the pre-given world. . . . The other component . . . originates from the actual biographical state of the individual, a state which includes his stock of knowledge in its actual articulation. (Schütz 1966, 125)

This quote describes the starting point for the conceptual development presented in this dissertation, that is, situations in which individuals find themselves in each moment of their lives. All of these situations are defined by the material conditions and the subjective stock of knowledge of the particular individual. In a case in which the situation cannot be routinely mastered, either one of these two components (or both) must pose a "novelty" (Schütz and Luckmann 1973). It is this subjective level of scrutiny that leads me to distinguish between the cognitive and material dimensions of reality. Obviously, this distinction, rather than being new, is an ancient one; it dates back to Greek philosophy (Foster 2000). Nevertheless, it has not

[2] Although "Schütz" is typically written "Schutz" in the English language literature, I will continue to write Schütz in this dissertation, since it is his real name.

been advanced to address the material *accumulation* that takes place within our societies, and much less to discuss its implications for institutional theory. In Chapter 4, I attempt to make the epistemological grounds of the dissertation more solid. In the epigraph I quote Thomas Luckmann, the most central figure in the contemporary sociology of knowledge:

> A social science that is committed to the empirical study of social reality must take systematic account of the intersubjective construction of the reality which it investigates. The methodology of social science is therefore necessarily two-layered. The first layer is reconstructive and the second explanatory. Both layers are necessary in the scientific study of social reality. (Luckmann 1989, 159)

I used the guidelines of this quote directly in my research design. In Chapter 5, I *reconstruct* the evolution of the Brazilian alcohol program and in Chapter 6 I *explain* how it changed. Chapter 4 elucidates the methods for the data collection and its analysis. This includes a description of the data and its source, Folha de São Paulo, a major national level newspaper in Brazil. Accordingly, I collected a main part of articles that observed, criticized, or simply told about the program from its very preparation to the end of the last millennium, that is, between 1975 and 2000. Then, in Chapter 5, I construct a detailed chronological narrative, thereby attempting to reconstruct the evolution of the program. I borrow a quote from Folha de São Paulo, in which a renowned economist, Antonio Barros de Castro, criticized Proálcool:

> The seven sins, which the alcohol program can commit are: compete with food production, . . . increase the number of "bóias-frias," concentrate the land and income even more, accentuate the imbalances between regions, pollute, let foreign capital enter into the sector of sugar and alcohol, . . . permit the continuance of a model that prioritizes individual transport and the interests of the car industry - thus prejudicing options which would be beneficial for the whole of Brazilian society. (Folha de São Paulo, November 4th, 1980, my translation)

The quote illustrates the at times controversial nature of the alcohol program. Indeed, Proálcool committed all of the sins that the newspaper accused it of committing. Nonetheless, the most ambitious biofuel program of its time transformed the entire transportation fuel configuration of Brazilian society. Brazil amazed the world by introducing cars that ran on alcohol and claiming an end to the era of oil at the beginning of the 1980s. The alcohol program was a point of national pride because the alcohol production was entirely based on

domestic technology and producers. Whereas alcohol had been used in gasoline in Brazil since the 1930s, its more intensive use due to the alcohol program significantly reduced pollution in large cities. What is more, small private producers were at the time unprecedented in the energy sector.

Whereas alcohol producers were small in comparison with the state-owned energy companies, they were the largest entities in rural Brazil. Thus, as Proálcool offered highly subsidized loans to producers, they bought the neighboring lands of the small farmers who typically cultivated food crops. As a consequence, the program resulted in the concentration of land and income in the hands of the few and caused the types of social problems that it was explicitly designed to alleviate. In addition, controversy between food for the poor and fuel for the rich was inherent in the program. The program was a part of the rural politics labeled as "conservationist modernization," which supported large and export-oriented producers and neglected small farmers working in typically adverse conditions. This dualism has been present in Brazil since colonial times (Furtado 1967, Rangel 1979).

However, unlike most contemporary biofuel attempts, alcohol production in Brazil was a success both from an economic and an ecological standpoint. Nonetheless, it was transformed from a definite and, indeed, the only solution to the oil crisis into excess baggage that contradicted the dominant neoliberalist ideology at the end of the century. In Chapter 6, I analyze the evolution of the program, attempting to explain, in addition to other issues, the reasons for this transformation. I inspect the most relevant disruptions that changed or attempted to change the direction of the program. Not all disruptions result in relevant changes; they remain *attempts* at change. Chapter 6 begins with a quote from Alfred Schütz:

> All problems arise on the background of what had been given as unquestionable (it is the latter which in the proper sense of the word becomes questionable) and all solutions of problems consist in transforming, by the very process of questioning, that which has become questionable into something new which now in turn appears as unquestionable. (Schütz 1966, 119)

The starting point for institutional change is an established practice, which, by definition, is (to some extent) unquestioned. According to the conceptual development presented here, the reasons for questioning a particular practice can be perceived in two dimensions: material and cognitive. In Chapter 6, I construct categories for disruptions and apply them to the empirical

observations. As a result of this categorization, besides cognitive disruption, I propose two distinct types of material disruptions. It is apparent that surprising material "jolts," and those material changes that are the result of established practices, are distinct in terms of their disruptiveness. I attempt to integrate this novel finding into the existing literature in Chapter 7. Since materiality emerged as an indispensable dimension in the process of institutionalization, I open the chapter with a quote from Karl Marx, a man who needs no introduction:

> The subject of our discussion is first of all *material* production. Individuals producing in society, thus the socially determined production of individuals, naturally constitutes the starting point. (Marx 1971, 16 italics in the original[3])

In neoinstitutionalism, the emphasis has been "on how people actively construct meaning within institutionalized settings through language and other symbolic representations" (Meyer and Rowan 2006, 6). Especially when scrutinizing broad, societal-level practices, such as economic growth and capitalism, it seems evident that materiality has to be given a larger explanatory role in contemporary societies, where material production takes place on a planetary scale. In essence, this means that both the material input that the practices require and the material that the practices produce cannot be absorbed by an immune system; rather, they materially change the system, our planet. Giving a more central role to materiality does not mean subscribing to any type of material determinism. Thus, I am equally far from subscribing to deterministic notions as Marx himself, who was anything but a mechanist (Foster 2000).

[3] In this dissertation I copy quotes without modifying them and I do not mention separately whether the emphases were included in the original or not (if they were, I use them, if they were not, I do not use them) – this particular quote is obviously an exception.

> institutionalization has become accepted as a process whereby things become institutionalized, which, in turn, simply means that things are more or less taken for granted. (Greenwood et al. 2008, 15)

2. Neoinstitutionalism and institutional change

The focus of this dissertation is on change and its origins, which is a general-level issue in the study of social systems; it has been studied in various streams of social scientific research. Considering that the organizational branch of institutional theory is the supposed heir to the sociology of knowledge in contemporary social sciences (Meyer 2006), and that it is one of the most prominent schools of organization research to elaborately theorize on stability and change (Beckert 2010; Suddaby 2010), it seems reasonable to review this ample body of research for the purposes of this dissertation. What is more, it is the stream of literature to which I will be contributing. Hence, the main purpose of this chapter is to provide a cutting-edge understanding of neoinstitutionalism.

The underlying motive for this literature review is to know what has been studied before and how it has been studied, so that it will be possible to contribute to it in the future. Since contributions typically come in the form of "filling in the gaps" in the existing literature, another way is to problematize the assumptions upon which the studies in the existing literature are built, and thus, to make more room for understanding neoinstitutionalism (Alvesson and Sandberg 2011). I attempt to do both of these things in this dissertation. First, in this chapter I situate the concept of neoinstitutionalism within the existing literature and discuss its main characteristics. Then, I shift to the particular approaches of neoinstitutionalism by focusing on how the approaches deal with the issue of change. Finally, I provide a summarizing critique of it, paving the way for my own conceptual development by discussing the issues knowledge, agency, structure, and materiality in neoinstitutionalism.

Neoinstitutionalism in a nutshell

Institutional theory has become one of the most central theories in social sciences over the

past couple of decades (Greenwood et al. 2008; Morgan et al. 2010). However, there is no one institutional theory; rather, there are various institutionalisms. Besides the "old" institutionalisms and organizational (or phenomenological or sociological) institutionalism that is under scrutiny in this dissertation, other distinct institutionalisms have been identified: rational choice, historical, discursive, constructivist, habitual, and network institutionalisms (Rhodes et al. 2006; Schmidt 2008; Gronow 2008; Buhari-Gulmez 2010). The latter have mostly been employed in political science and economics. From now on, I will simply call the organizational branch of institutional theory *neoinstitutionalism.*

Rational choice institutionalism is strictly realist (or even positivist), that is, the interests of the actor come before the social setting within which they act (Meyer 2008a; Buhari-Gulmez 2010); but the other, latter institutionalisms typically are subject to realist assumptions as well (Meyer 2010). Curiously, the connection between neoinstitutionalism and the other institutionalisms is nearly non-existent. From a neoinstitutional point of view, references to other institutionalisms, when made, are most often not included in their conceptual development. The same can be said for other types of institutionalism that refer to a neoinstitutional viewpoint. When exploring *discursive* institutionalism, Schmidt (2010), for instance, makes no reference to the *discursive* institutionalization model developed by Phillips et al. (2004) or to any other discursive work in neoinstitutionalism. Thus, to say that the existence of other institutionalisms is, *at most*, acknowledged in both camps is to exaggerate rather than understate the link between them.

A notable exception to this pattern is John Meyer, who often discusses institutional theory in its entirety (e.g. Meyer 2008a, 2010) and who also seems to be the scholar that the other camp refers to most often (e.g. Buhari-Gulmez 2010; Morgan et al. 2010). In this dissertation, even as I acknowledge the existence of these other institutionalisms, to a large extent I neglect the theoretical conceptualizations made in them. It is not only the conceptualization of institutions that differs between the different types of institutionalism, but also the assumptions about consciousness, awareness, and the rationality of actors differ as well (Meyer 2010). Simply put, I choose to neglect the other types of institutionalism in this dissertation not because of the physical limits of the present study, but because of the incommensurability of the presuppositions made for the other institutionalisms with regard to those that I employ in this study.

Nevertheless, it should be noted that, like in neoinstitutionalism, the focus of the other institutionalisms has been shifting from stability to change (Morgan et al. 2010). Traditionally, change has been attributed to exogenous shocks and attempts to understand the endogenous origins of change have been made in studies of other types of institutionalism (e.g. Schmidt 2010). The notions about realism mentioned above refer to conceptualizations about actors whose interests have ontological priority over the institutional setting in which they are embedded (Buhari-Gulmez 2010). This is far from the perspective taken by critical realists (e.g. Archer 1995), where the social interaction is not founded on prior interests and in which scholars make no assumptions about the absolute interests of the social actors involved. While most of organizational institutionalism subscribes to the viewpoint that institutional systems construct actors as well as their activities (Meyer 2010), this is not to say that research on organizational institutionalism does not often escape to the "institution-free conception of interest and power" (Friedland and Alford 1991, 244; Phillips et al. 2006).

Characteristics of neoinstitutionalism

Scholars typically argue that the "orange book", edited by Powell and DiMaggio (1991), set the program for neoinstitutionalism (Hirsch and Lounsbury 1997). It attempted to consolidate the previously heterogeneous field and distinguish between the "old" and "new" institutionalism by gathering together previously published seminal articles (e.g. Meyer and Rowan 1977; Zucker 1977; DiMaggio and Powell 1983) and introducing some new articles, some of which (e.g. became seminal in their own right (e.g. Friedland and Alford 1991). As discussed above, only one type of "new institutionalism," *neoinstitutionalism* as it is called here, was founded as a result of the "orange book." Whereas neoinstitutionalism has formed a rather distinct school since this seminal publication, the classic debate in the social sciences between interest-driven explanations and ideational explanations has been manifest also in neoinstitutionalism (Hinings and Tolbert 2008), and it "has lacked agreement about several of its core concepts" (Colyvas and Powell 2006, 306).

Whereas the focus of organizational institutionalism has clearly been on organizations, it entails a large variety of interests. In particular, organizational or institutional fields have been central to both conceptual and empirical interests. Besides organizational issues, neoinstitutionalism covers a wide variety of societal phenomena typically not conceived of as

organizational, such as refugees (Hardy and Phillips 1999), environmental problems (Maguire and Hardy 2009), diseases (Maguire et al. 2004), and social movements (Lounsbury 2007). The list is by no means exhaustive: scholars have also added French "cuisine" (Rao et al. 2003), clean development mechanisms (Wittneben 2007), environmentalism (Hoffman 1999), a rape crisis center (Zilber 2002), and corruption (Misangyi et al. 2008) to the list, to name just a few other possibilities.

Scholars argue that neoinstitutionalism is built on the foundations of social constructionism, that is, Berger and Luckmann (1966). However, according to Meyer, reference to this classic work and its authors is "often made in passing and is more frequently a tribute paid to their overall contribution to the field than as guidance in concrete theoretical, conceptual or methodological questions"(Meyer 2008b, 519). It seems that instead of grounding their conceptual development in the classic aspects of social constructionism, scholars base it instead on the "orange book." However, as the arguably most influential of the articles in the "orange book", DiMaggio and Powell (1983), do not even cite Berger and Luckmann (1966), it is understandable that other scholars neglect social constructionism when discussing neoinstitutionalism (Phillips 2003). This is even true in light of Mizruchi and Fein's (1999) observation that all of the research emphasis has gone to the "mimetic isomorphism" of DiMaggio and Powell (1983), which lies far from the realist track and closer to the constructionist stance (Meyer 2008a).

In 2008, Greenwood et al. (2008) produced another important study on institutionalism as an attempt to consolidate the proliferating stream of literature on the topic and to return to the *organizational* approach: according to them, "Our interest is in understanding organizations" (Greenwood et al. 2008, 1). This "green book" provides a sound critique of neoinstitutional literature by centrally arguing that neoinstitutionalism has forgotten its micro-sociological roots (Powell and Colyvas 2008; Hinings and Tolbert 2008; Barley 2008). According to Battilana, this is problematic since neoinstitutionalism has been concentrating on explaining organizational and field-level phenomena "that implicitly involve individual behaviour without providing a basis for the construction of a theory of individual behaviour" (Battilana 2006, 670). The field-level concept of "legitimacy" in particular seems to commit this error.

Neoinstitutionalism has concentrated on explaining the diffusion of particular organizational forms by accounting for legitimacy, which their adoption enhances (Meyer and Rowan 1977).

Legitimacy in neoinstitutionalism is "the major prerequisite for organizational survival and success" (Hasselbladh and Kallinikos 2000, 699), and "[n]o concept is more central to institutional theory than legitimacy" (Barley 2008, 506). The main idea behind the prominence of legitimacy is that the structure does not directly control activity, but is a reflection of the institutional prescriptions of the wider environment (Suchman 1995; Meyer 2008a).

The "green book" also argues that institutional theory has remained close to positivist organizational research and that scholars have developed the theory with reference to rational choice theory, contingency theory, and resource dependency theory in order to enhance the notion of *prediction* (Cooper et al. 2008). Hinings and Tolbert observe that, "organizational institutionalism has been in a theoretical retreat from issues of interests, power, conflict, domination and exploitation" (Hinings and Tolbert 2008, 481) For their part, Cooper et al. argue that institutional theory is "conservative insofar as it inclines to naturalize the status quo and shies away from (critical) theories that, in contrast, problematize the status quo as oppressive" (Cooper et al. 2008, 674). I would suggest that neoinstitutionalism, if it were to take on human form go to work, would wear a suit and a tie.

Nature of institutions

The concept of an institution is obviously central to any institutional theory. Even within organizational institutionalism, an institution has been defined in various different and even contradictory ways (Greenwood et al. 2008). Often it is not defined at all (Phillips 2003). Typically, institutions have been conceived of as structures, as forms, or as practices or activities, and not according to their typical meanings, that is, their *typifications* (Zilber 2006, 2008). In some variations of neoinstitutionalism, particularly in institutional logics, scholars commonly view institutions as material practices *and* their accompanied shared meanings enacted by individuals (Friedland and Alford 1991; Zilber 2002; Misangyi et al. 2008).

Scholars have typically treated institutionalization as a qualitative state: structures are either institutionalized or they are not (Tolbert and Zucker 1996). The main focus has been on the diffusion of institutions or the effects of institutionalization rather than on the process of institutionalization (Barley 2008; Colyvas and Jonsson 2011), although institutionalization as a process has gained ground in recent years (e.g. Phillips et al. 2004; Green 2004; Maguire and Hardy 2009; Green et al. 2009). The debate has not only been about whether institutions are

properties or processes (Scott 1987), but also about whether sanctions and other coercive systems are a part of them (as in Scott 1995, Lawrence, and Suddaby 2006; Maguire and Hardy 2009) or not (as in Phillips 2003; Phillips and Malhotra 2008; Meyer 2010).

Most scholars of neoinstitutionalism seem to agree with the essence of perceiving institutions as "codified social arrangements, norms of conduct, or cognitive structures that provide understanding and give meaning to social arrangements" (Suddaby and Greenwood 2009, 176). DiMaggio and Powell (1983) first identified these three dimensions and the three mechanisms through which institutional isomorphic change occurs: coercive, mimetic, and normative isomorphisms. Scott (1995), in his influential book, recapitulated this approach as the "*tripartite conception of institutions*"; according to him, institutions are supported by three types of elements: regulative, normative, and cognitive. Among other things, this view attempts to account for materiality in the institutional perspective (Hinings and Tolbert 2008). Finally, for empiricist demands the contemporary use of the concept typically involves a rather specific reference to a "little institution" (Hinings and Tolbert 2008; Suddaby and Greenwood 2009).

Origins of institutional change in the literature

Alhtough in recent decades, there has been a proliferation of organizational institutionalism addressing institutional change; the earliest moments of change have been neglected in the literature (Smets et al. 2012). However, similarly as with institutions, scholars have perceived of institutional change in distinct ways. Since institutional change was first conceived as a diffusion of established practices, that is, as isomorphic institutional change (DiMaggio and Powell 1983; Hasselbladh and Kallinikos 2000), scholars of institutional change have been gradually shifting their attention to scrutinize changes in the contents of institutions, that is, how established practices change (Barley and Tolbert 1997; Zilber 2002). Also institutional processes have been disentangled with each other. Diffusion and institutionalization, for instance, are now seen as distinct processes (Green 2004, Colyvas and Jonsson 2011)

Traditionally, scholars have seen institutional change as being triggered by either external shocks or endogenous factors (Seo and Creed 2002; Greenwood and Suddaby 2006; Meyer and Rowan 2006; Scott 2008; Creed et al. 2010). Endogenous explanations for institutional change have been rapidly increasing in recent years. Concepts such as institutional contradictions

(Seo and Creed 2002; Farjoun 2002), institutional entrepreneurship (Garud et al. 2002; Lamberg and Pajunen 2010), theorization (Greenwood et al. 2002; Munir 2005), competing institutional logics (Marquis and Lounsbury 2007), disruptive institutional work (Maguire and Hardy 2009), identity work (Creed et al. 2010), boundary work (Zietsma and Lawrence 2010), routines (Rerup and Feldman 2011), improvisations (Smets et al. 2012), and field-configuring events (Lampel and Meyer 2008; Hardy and Maguire 2010) have emerged to explain how institutions change.

Consequently, whereas scholars have traditionally argued that exogenous shocks, both in the empirical and conceptual sense, are the principal source of institutional change (Beckert 1999; Clemens and Cook 1999; Dacin et al. 2002; Greenwood et al. 2002), this seems not to be the case anymore. However, although endogenous explanations are rapidly increasing, this does not say anything about the importance of the disruptions that occur in the empirical reality. Although this might seem evident, the increase in studies addressing the endogenous origins of institutional change should be principally seen has having to do with the evolution of the existing literature and with changes in the empirical reality. The main argument here is that the difference between the endogenous and exogenous dimension does not have to do with what can be explained with the theory and what remains outside it. Rather, the difference refers to the real difference between the distinct locations of the origins of change with regard to institutionalized practices on the empirical level.

Processual approaches

When desiring to reach a more comprehensive understanding of the origins of institutional change, it is important to understand how scholars have conceived of the processes of change in the existing literature. In the following section, I briefly review the evolution of processual approaches in neoinstitutionalism. Until the end of the twentieth century, scholars rarely focused on change in the neoinstitutional literature. However, there was a steady flow of studies on institutional change (e.g. Tolbert and Zucker 1983; Bartunek 1984; Barley 1986; Leblebici et al. 1991; Oliver 1992; Greenwood and Hinings 1996; Tolbert and Zucker 1996; Barley and Tolbert 1997; Hirsch and Lounsbury 1997; Hoffman 1999). The mounting interest in the topic was reflected in a special issue of the Academy of Management Journal on institutional change (Dacin et al. 2002). In general, neoinstitutionalism has gradually shifted

toward change and deinstitutionalization (Vogel 2009; Suddaby 2010; Powell and Colyvas 2008; David and Bitektine 2009), and also gradually towards non-managerial situations (e.g. Hardy and Phillips 1999; Maguire and Hardy 2009).

Since there are manifold conceptualizations of how institutions work, there can be no one conceptualization of institutional processes. Thus, identifying different triggers for change in the existing literature by simply listing the phenomena, which other scholars have done as a means of understanding the triggers for institutional change, does not in fact enhance our understanding. I concentrate on processual models of institutionalization and attempt to gather insights about antecedents to deinstitutionalization. These approaches study the stabilization and transformation of practices, that is, the process of institutionalization and deinstitutionalization. Institutionalization is often associated with self-regulation or self-reproduction (Armstrong and Bernstein 2008), with "something that sticks" as opposed to "something that spreads," that is, diffusion (Colyvas and Jonsson 2011). Most often, scholars perceive of historical change in stage models, where change occurs as a sequence of different stages, for example as shock, theorization, disruption, deinstitutionalization, and mobilization (Greenwood et al. 2002; Schneiberg and Lounsbury 2008; Purdy and Gray 2009). These stage models are ultimately punctuated by equilibrium models; in other words, there is a rather stable equilibrium that is punctuated by rather rapid shocks (Delbridge and Edwards 2008).

Thus, the age-old "Kurt Lewin's (1951) three-stage process of change involving 'unfreeze–change–refreeze' remains a popular model for understanding" the processes of change (Nayak and Chia 2011, 286); this holds partly true for neoinstitutionalism as well. Closely connected with this, a divide between isomorphic and non-isomorphic change (Delbridge and Edwards 2008) is already conventionally perceived of as being salient in terms of institutional change. Most often, it is argued, echoing the broader currents of management literature, that the latter radical or discontinuous change is less understood (Vogel 2009). One of the main challenges has been to integrate both continuous and discontinuous change into the same model; that is, any explanation of change should also be valid for explaining a lack of change, and *vice versa*. In other words, these models attempt to account for both stability and change (Seo and Creed 2002; Phillips et al. 2004; Campbell 2010).

Gradually, the view of institutional processes has changed to accommodate ubiquitous processes instead of states. In an earlier seminal article, Barley and Tolbert (1997) developed

a process model for institutionalization; most of the subsequent contributions build upon this model. Munir (2005) revised the stage-model by seeing "theorization" as a *process* and not as one of the phases of change. Munir (2005) contended that the perception that change is triggered by external shocks conflicts with social constructionist assumptions. Through theorization, external events that are possibly disruptive are enrolled in the prevailing discourse; in this way, the events not only come to our notice, but their significance, scope, and relevance are constructed as well. Processual models are able to provide concrete guidelines for action: they identify the concrete tasks necessary for creating, maintaining, and disrupting institutions (see Lawrence and Suddaby 2006). Processual approaches attempt to understand how the patterns of human activity are formed along the lines of social interaction and how these patterns change; they typically lean on the *mutual constitution* of agency and structure.

Institutional work

Lawrence and Suddaby defined the concept of "institutional work" in the following way: "the purposive action of individuals and organizations aimed at creating, maintaining, and disrupting institutions" (Lawrence and Suddaby 2006, 215); in other words, it fulfills the task that was mainly seen as belonging to institutional entrepreneurs. The focus is on the processes themselves and not on the more stable "creation, maintenance, and disruption of institutions" (Lawrence et al. 2009, 10). The aim of Lawrence and Suddaby (2006) was to provide a framework that would connect the previously disparate accounts of institutional entrepreneurship and deinstitutionalization. They conceive of institutional work as the "creative and knowledgeable work of actors which may or may not achieve its desired ends and which interacts with existing social and technological structures in unintended and unexpected ways" (Lawrence and Suddaby 2006, 224).

Institutional work seems to be built upon similar assumptions of agency as institutional entrepreneurship, that is, Lawrence and Suddaby assume the presence of "culturally competent actors with strong practical skills and sensibility who creatively navigate within their organizational fields", so that "the study of institutional work would highlight the awareness, skill, and reflexivity of individual and collective actors" (Lawrence and Suddaby 2006, 225). This sounds very close to the notion of heroism in institutional entrepreneurship, and thus undermines the constructionist foundations of institutional theory. Individuals do not

start to become aware of the taken–for-granted typifications or act reflectively only because the model states that they should. Fortunately, they drop this superheroic stance in subsequent writings (e.g. Lawrence et al. 2009; Maguire and Hardy 2009; Lawrence et al. 2011).

Institutional work is an attempt to concentrate on the processual nature of social interaction. However, the pragmatic concept of work easily leads scholars to study concrete activities and thus forget the cognitive aspects of institutions. Although some scholars argue that institutional work brings an understanding to the micro-level processes, Gomez and Bouty argue that this school of thought has "not yet convincingly bridged the gap between the micro and macro levels of analysis" (Gomez and Bouty 2011, 924). However, it does seem to be gaining momentum and the concept of institutional work has already been used in various studies (e.g. Maguire and Hardy 2009; Zietsma and Lawrence 2010). The next section will focus on the discursive institutionalization model (Phillips et al. 2004) and the deinstitutionalization branch of thought.

Discursive institutionalization model

In my opinion, the most important advance in neoinstitutionalism in recent years, both conceptually and methodologically, has been the discursive institutionalization model introduced by Phillips, Lawrence, and Hardy (2004). They had been developing the model for some time (e.g. Hardy and Phillips 1999; Phillips and Hardy 2002; Phillips 2003). The model conceives of institutions as cognitive entities and emphasizes the communicative nature of institutions in the same way that Berger and Luckmann did: "institutionalization occurs as actors interact and come to accept shared definitions of reality, and it is through linguistic processes that definitions of reality are constituted" (Phillips et al. 2004, 635). The return to the origins of the model is clear in every respect; the first citation in their article is to Berger and Luckmann's original 1966 treatise.

Phillips et al. (2004) centrally argue for and assume a mutually constitutive relationship between discourse, text, and action. In this mutual constitution, the shared discursive meanings emanate from the social, communicative, and interactive spheres, which are given meaning through discourse, thereby constituting the social world. Not only are meanings and patterned activity created in this way, but so too are *subject positions* in particular (Phillips

2003). In the model, institutions are seen as being primarily constructed through the production of texts, rather than "directly" through actions. To be more exact, "institutions are constituted by the structured collections of texts that exist in a particular field and that produce the social categories and norms that shape the understandings and behaviors of actors" (Phillips et al. 2004, 638); this is not to say, however, that all institutions are created through texts. These structured collections of texts arise not from every type of action or activity, but from those actions that produce the types of texts that are disseminated, consumed, and interpreted by other actors: texts that leave traces. According to Phillips et al. (2004), the actions that achieve these things are either novel or surprising actions, which therefore require significant organizational sense-making or actions that affect an organization's legitimacy.

The discursive institutionalization model has corrected the path taken by neoinstitutionalism by returning to the cognitive perception of institutions, to their communicative construction, and to institutionalization as a *process*. However, Phillips et al. (2004) argue that it is not action *per se* that provides the basis for institutionalization, but instead the texts that describe and communicate those actions. Moreover, Phillips et al. state that they "are not interested in all actions but in those that are more likely to produce texts that, in turn, are more likely to influence discourse" (Phillips et al. 2004, 640). In other words, they begin with action and *not* with the knowledge which the actions are based upon. Nonetheless, the main issue Phillips et al. left for subsequent research is that of *change*. Even though the model paved the way for scholars to analyze microprocesses, it did not elaborate upon how institutional change takes place through these microprocesses. While they did note that, "changes in discourses outside the field, or tangential to it, affect discourses more central to the field" and that institutional entrepreneurs can produce "influential texts that change the discourses on which institutions depend" (Phillips et al. 2004, 647, 648), they clearly left the issue of institutional change for later contributions to address.

Deinstitutionalization

Studies on deinstitutionalization have been rather rare (e.g. Oliver 1992; Davis et al. 1994; Ahmadijan and Robinson 2001); while they are still rare, there has been more interest in the topic recently (e.g. Dacin and Dacin 2008; Delbridge and Edwards 2008; Hiatt et al. 2009;

Maguire and Hardy 2009). Even though studies of change in neoinstitutionalism have recently proliferated (Suddaby 2010; David and Bitektine 2009), deinstitutionalization has typically only played a walk-on part in studies of institutional change and institutional entrepreneurship (e.g. Greenwood and Suddaby 2006; Koene 2006; Misangyi et al. 2008) and scholars have conceived of it using the tripartite conception of institutional change. According to this view, the three supporting pillars, that is, the regulative, normative, and cognitive pillars, of institutions have to be undermined in order to deinstitutionalize institutions (e.g. Hiatt et al. 2009; Maguire and Hardy 2009; van Gestel and Hillebrand 2011).

Scholars view deinstitutionalization as a necessary phase within the broader context of institutional change, because "new practices cannot be adopted unless the old ones are left behind" (Ahmadijan and Robinson 2001, 622). Scholars have used the notion of deinstitutionalization to refer to the weakening and disappearance of one set of beliefs and practices (Scott 1995); they have also used it to refer to the process whereby the legitimacy of the previously institutionalized practices has been eroded and the continuance of such practices has been interrupted, that is, abandoned (Oliver 1992; Maguire and Hardy 2009). To be exact, Oliver referred to deinstitutionalization as "the delegitimation of an established organizational practice or procedure . . . or the failure of organizations to reproduce previously legitimated or taken-for-granted organizational actions" (Oliver 1992, 564). Oliver even uses delegitimation and deinstitutionalization as reciprocal processes, thus doing little to clarify this fundamental process.

According to the model provided by Oliver: the political, functional, and social pressures, together with organizational entropy and inertia, "determine the probability of dissipation or rejection of an institutionalized organizational practice" (Oliver 1992, 567). Dissipation, according to Oliver, is a gradual deterioration in the acceptance and use of a particular institutionalized practice, whereas rejection is a more direct assault on the validity of an established practice. In the framework provided by Oliver, the discontinuity is a result of the deinstitutionalization that follows from dissipation or rejection. However, it is not clear just what the difference between these phases is. Nonetheless, the model provided by Oliver has been influential; for instance, Dacin and Dacin (2008) reproduce it in the "green book." Oliver also sought to distinguish between the external and internal antecedents of deinstitutionalization and argued that the established practices are fragile and easy to change

because "even limited opposition" may be sufficient to destabilize them (Oliver 1992, 582).

I would not argue that Oliver's study (1992) gave rise to an analytical impasse, but the fact remains that there are few studies in neoinstitutionalism that address deinstitutionalization and especially *delegitimation* as compared with the most central concept of neoinstitutionalism, that of legitimation (Deephouse and Suchman 2008). Whether or not the reason for this lack of interest in deinstitutionalization derives from the vast majority of neoinstitutional scholars tending to naturalize the status quo (Cooper et al. 2008), on the "negative side" the conceptual map of institutionalization has until recently remained conceptually shallow. Maguire and Hardy (2009) changed this when they developed the most elaborate model of institutional change to date.

Disruptive institutional work

Disruptive institutional work was defined by Lawrence and Suddaby as "attacking or undermining the mechanisms that lead members to comply with institutions" (Lawrence and Suddaby 2006, 235). Maguire and Hardy further elaborated that it takes place through texts that problematize existing practices such as claims, arguments, stories, examples, anecdotes, and methods that "substantiate and dramatize the ineffectiveness and injustice of existing practices" (Maguire and Hardy 2009, 151). Maguire and Hardy adopt a discursive approach. They argue that in outsider-driven deinstitutionalization, "the abandonment of practices results from their problematization, which, through a subsequent process of translation, changes the discourse about practices in ways that undermine the institutional pillars supporting them" (Maguire and Hardy 2009, 168). Maguire and Hardy thus remain loyal to the tripartite conception of institutions (Scott 1995), that is, the three pillars where established practices find their legitimation and have to be problematized in order to be deinstitutionalized. These problematizations and their effects should be sought in discourses.

Within this context, Maguire and Hardy conceive of the disruptive institutional work as problematizing "practices by (a) asserting their negative impacts, (b) categorizing them as unethical, undesirable, or inappropriate because of their negative impacts, and (c) calling for regulatory change to mitigate their negative impacts" (Maguire and Hardy 2009, 168). This work results in an increase in the number of texts that problematize practices and contradict previously taken-for-granted meanings. Maguire and Hardy (2009) argue that the

problematizations that go through a process of translation destabilize the existing discourse; it becomes less "structured" and less "coherent." In other words, as institutions are "constituted by the structured collections of texts that exist in a particular field and that produce the social categories and norms that shape the understandings and behaviors of actors" (Phillips et al. 2004, 638), this structure is shaken through disruptive institutional work.

This discursive destabilization requires the development of new subject positions and the creation of new "bodies of knowledge that normalize certain ways of believing, speaking, and behaving" (Maguire and Hardy 2009, 151). Since outsiders are unlikely to have enough power in the field to successfully challenge the insiders who defend the existing practices from their central position in the field, they have to gain subject positions that provide them with the right to speak and act (Maguire et al. 2004). The normalization of problematizations goes through a process of "translation" in which some problematizations survive, some are modified, and some are even subverted. If they do not survive, but are successfully refuted via defensive institutional work, "deinstitutionalization will not occur, and practices will not be abandoned" (Maguire and Hardy 2009, 171).

Though Maguire and Hardy (2009) have developed the most elaborate account of institutional change and backed it up with a proficient method and vast empirical data, it still remains rooted in the tripartite concept that confuses the processes involved. However, within the context of the tripartite conception, the concept of institutional work is fitting because it can be used for gathering together the types activities that are needed to change the three distinct elements entailed in the conception. At the outset, the concept of "*work*" includes various types of activities that might even be of a quite different nature. What is more, the passive tone of the problematizations obscures the system in which the meanings are transmitted, and thus, for example, the media become neutral ether where the problematizations live and die.

Another conceptual issue in the model that needs clarification is the issue of problematization itself. Maguire and Hardy (2009) use arguments found in a particular book, *Silent Spring* by Rachel Carson, as examples of problematizations and then analyze how these problematizations go through a process of translation. It has to be noted that the problematizations against chemical pesticides found in the book were not the first such problematizations, but the book represented the first large-scale success of its kind (Hoffman 1999). I suggest that one should see Carson's book as a part of the *process* of problematization.

Although in the particular case of Maguire and Hardy (2009), Carson's book worked to a significant degree due to its popularity, I would not suggest generalizing the method of using arguments from one source and tracking their evolution over time; rather, I suggest concentrating on problematizations as a process in which a problem that emerges in opposition to established practices becomes legitimized.

Finally, the model presented by Maguire and Hardy (2009) exclusively concentrates on the *impacts* of practices. Even though Maguire and Hardy (2009) mention "injustice" and the idea of a practice being "unethical" in their paper, and though it criticizes neoinstitutionalism in general, the model still neglects the questions of oppression, exploitation, and domination inherent in any established practice (Cooper et al. 2008). Their focus on impacts, which will be discussed in the next chapter, leads me to analyze one type of institutional change, but not all possible types. Overall, Maguire and Hardy's article (2009) shines a bright light on our understanding of institutional change and combines the discursive institutionalization model, institutional change, and agency in an elaborate manner.

Conclusion and summarizing remarks

A seminal article by Barley and Tolbert suggests a before and after design and the need to "target events that maximize the probability of institutional change" (Barley and Tolbert 1997, 103). This may have led to subsequent research settings that has been concentrating on the characteristics of change, and not on the genesis of change, which extant research has neglected (Smets et al. 2012). In other words, the interest has been on how change takes place, not *why* it takes place. Nonetheless, scholars have identified various endogenous triggers of change, such as institutional contradictions (Seo and Creed 2002; Farjoun 2002), institutional entrepreneurship (Garud et al. 2002; Lamberg and Pajunen 2010), theorization (Greenwood et al. 2002; Munir 2005), competing institutional logics (Marquis and Lounsbury 2007), disruptive institutional work (Maguire and Hardy 2009), identity work (Creed et al. 2010), boundary work (Zietsma and Lawrence 2010), routines (Rerup and Feldman 2011), and field-configuring events (Lampel and Meyer 2008; Hardy and Maguire 2010).

Often however, endogenous explanations are based on a strong sense of agency, which explicitly assumes that individuals are autonomous with regard to institutional rules. However, "institutional theory gains little by making unleashed actors the drivers of

institutional change" (Powell and Colyvas 2008, 277). In general, the object of scrutiny in organizational institutionalism has oscillated between the "structure where actions take place" and the "action which takes place in the structure" (Lawrence et al. 2009). Within this setting, change is permitted by assigning qualities to actors and to structure, that is, by allowing for more conscious actors, a fragmented structure, conflicting processes, or imperfect institutionalization, so that actors in different dresses keep playing their given scripts on different stages.

Knowledge in neoinstitutionalism

A clear call has been echoing in organizational institutionalism for a better understanding of institutional processes at the micro level (Meyer 2006; Powell and Colyvas 2008). According to Battilana, this neglect is problematic because neoinstitutionalism has been concentrating on explaining organizational and field level phenomena "that implicitly involve individual behaviour without providing a basis for the construction of a theory of individual behaviour" (Battilana 2006, 670). Institutional work has answered this call by concentrating on examining "the concrete practices employed by actors in relation to institutions" (Lawrence et al. 2009, 11) in its attempt to bridge the gap between the micro and the macro levels (Lawrence and Suddaby 2006). Of late, much effort has been put into explaining microprocesses (e.g. Greed et al. 2010; Rerup and Feldman 2011), resulting in insights with respect to institutional change in particular.

Just as DiMaggio and Powell's structural camp has dominated neoinstitutionalism (Suddaby 2010; Beckert 2010), Parson's legacy with respect to norms and sanctions remains strong in terms of the tripartite conceptualization of institutions (Scott 1995). It seems that Giddens, in whom DiMaggio and Powell (1991) put much trust, did much to confuse neoinstitutionalists with his arcane concepts. He, for instance, contends that *the control of diffuse anxiety* is "the most generalized motivational origin of human conduct" (Giddens 1984, 54, cited in DiMaggio and Powell 1991, 23). Subsequent research has not adequately problematized (see Alvesson and Sandberg 2011) these original manifestos, prompting Barley to observe that, "institutionalists have devoted little attention to ethnomethodology, to social construction, or for that matter, to micro-sociology of any kind" (Barley 2008, 492). As another consequence, the term "knowledge" has had an insignificant role in the later development of

neoinstitutionalism and, it seems, it still does.

Overall, the current conceptual toolbox of neoinstitutionalism seems to neglect the concept of *subjective stock of knowledge*. Yet, knowledge was the primary concept for Berger and Luckmann (1966) and the other sociologists of *knowledge*. Of the earliest neoinstitutional works, only Zucker (1977) can be said to address the concept of "knowledge," she mentions it twice. Meyer and Rowan (1977) mention knowledge only once, and in a minor descriptive role. DiMaggio and Powell (1983) mention it twice; but they do it in reference to transaction-cost theory, which has little to do with the concept of "knowledge" as it is conceived here. In fact, because the two foundational articles stayed close to phenomenology and ethnomethodology, Barley (2008) and DiMaggio and Powell (1983) did not mention either of them in their works. In their introduction to the "orange book," DiMaggio and Powell (1991), when addressing the theory of action, leaned strongly upon Parsons and Giddens and criticized Berger and Luckmann (1966) for not adequately understanding social structure.

Actually, if we take a rapid look at the literature, we can see that the term "knowledge" is little used, or at least there are a large number of salient articles that do not even *mention* the word "knowledge" (see Table 1), much less employ "knowledge" in a conceptual discussion. Neoinstitutional articles frequently mention the word "knowledge" once or twice when describing something, but they rarely focus on it in terms of raising concrete theoretical or conceptual questions. This evidence, as shown in Table 1, of course is not enough to demonstrate that neoinstitutionalism has forgotten "knowledge." Nonetheless, it can be used as an indicator that at least part of neoinstitutionalism has forgotten or ignores it. This piece of evidence is not irrelevant since scholars typically argue that neoinsitutionalism employs "knowledge" (see Vogel 2009).

Naturally, however, many neoinstitutional studies *do* employ the term "knowledge," some of which refer to "knowledge" in the same way that the sociologists of knowledge conceived of it. For instance, Ranson et al. (1980), Holm (1995), Barley and Tolbert (1997), Zucker (1987), and Battilana et al. (2009) speak of "stocks of knowledge" or the "sociology of knowledge." In addition, some articles employ the concept of knowledge in their conceptual discussion (e.g. Kraaz and Moore 2002; Phillips et al. 2004; Cooper et al. 2008; Maguire and Hardy 2009). Meyer (2006, 2008b) has attempted to connect the sociology of knowledge and neoinstitutionalism, but she observes that the two streams of literature are distant from one

another. Part of this, I argue, is due to the fact that "knowledge" has been forgotten in neoinstitutionalism. As a consequence, the solid surfaces of agency and structure are not easily penetrated.

Table 1 Frequently of the term "knowledge" employed in some neoinstitutional articles

no mentions	Tolbert and Zucker (1983); Davis et al. (1994); Rao et al. (2000); Ahmadijan and Robinson (2001); Lawrence et al. (2001); Lounsbury (2001); Dorado (2005); Orlikowski (2007); Briscoe and Safford (2008); Suddaby (2010); Beckert (2010); Lok (2010); Lawrence et al. (2010); Lawrence et al. (2011)
once	Meyer and Rowan (1977); Benson (1977); Scott (1987); Kraaz and Zajak (1996); Dacin et al. (2002); Glynn and Abzug (2002); Seo and Creed (2002); Munir (2005); Garud et al. (2007); Misangyi et al. (2008); Scott (2008); Deephouse and Suchman (2008)
twice	DiMaggio and Powell (1983); Leblebici et al. (1991); Suchman (1995); Ruef and Scott (1998); Hoffman (1999); Lawrence et al. (2002); Schneiberg and Lounsbury (2008); Czarniawska (2009); Battilana et al. (2009); Hiatt et al. (2009); van Gestel and Hillebrand (2011)
three times	Zucker (1987); Jepperson and Meyer (2011); Zilber (2002); Rao et al. (2000); Rao et al. (2003); Purdy and Gray (2009)

To the extent that it is plausible, the claimed lack of "knowledge" is both serious and not that serious. It is serious because without understanding how subjective knowledge is acquired, used, and transmitted in social interactions, and how it is used to create meanings, change in particular cannot be rendered intelligible in terms of social constructionism. I do not suggest that neoinstitutionalism should be forever limited to exclusively scrutinizing the microprocesses of this "knowledge," but I do insist that the conceptual development and models that neoinstitutionalism builds upon should have the "correct" understanding of such "knowledge." On the other hand, the lack of such knowledge is not that serious since neoinstitutionalism deals with the *structures* of knowledge rather than with "knowledge" itself.

Structure in neoinstitutionalism

Instead of addressing "knowledge" directly, it seems that neoinstitutionalism works exclusively at the level of structure, that is, it focuses on the "typificatory schemes" that social stocks of knowledge provide (Berger and Luckmann 1966). Accordingly, structural approaches are typically constructed by aggregating "knowledge" (and thus hiding the term) as various types of structures, such as "knowledge structures" (Walsh 1995; Greenwood and Hinings 1996), "scripts" (Barley and Tolbert 1997), "schemata" (Bartunek and Moch 1987), "interpretive schemas" (Ranson et al. 1980; Bartunek 1984; Rerup and Feldman 2011), and

even "institutional logics" (Friedland and Alford 1991). These at times are synonyms for knowledge, but typically they do not refer to the subjective level knowledge, but rather to "knowledge structures that organize past and future experiences" (Rerup and Feldman 2011, 578).

These structures seem to refer to the same issue, "the indispensable cognitive schema that map our experience of the world, identifying its constituents and relevancies and how we are to know and understand them" (Ranson et al. 1980, 5). Said another way, this structure refers to the socially constructed pattern of practices, beliefs, and rules by which individuals produce and reproduce their material subsistence and assign meaning to their social reality (Thornton and Ocasio 1999). To change these structures is to change activity patterns, both individual and organized activities (Ranson et al. 1980; Gray et al. 1985; Greenwood and Hinings 1996). The relationship between these structures and activity is seen as interdependent; action depends upon structure and structure depends upon action (Barley and Tolbert 1997). They are mutually constitutive (Sewell 1992; Seo and Creed 2002).

Whereas the structure has become fragmented and appears as, at times contradictory, multiple logics, and whereas scholars acknowledge the emerging nature of structure (Barley 1986; Seo and Creed 2002; Lounsbury 2007), scholars also typically argue that actors remain captive to these structures. Indeed, many scholars often cite a question raised by Holm: "How can actors change institutions if their actions, intentions, and, rationality are all conditioned by the very institution they wish to change?" (Holm 1995, 398). Although this dilemma has been partly rendered obsolete, it cannot be fully dismissed if we want to remain at this particular aggregate level of scrutiny. Thus, if we come to understand that, "the meanings which make up our world are simply historically determined and continuously developing structure in which man develops and are in no sense absolute" (Mannheim 1954, 76), that is, if we acknowledge the nature of this structure, the matter this structure is made of and the way individuals are being socialized into this structure (Berger and Luckmann 1966), then there is no such paradox.

Agency in neoinstitutionalism

The central problem in neoinstitutionalism, as in social sciences in general (Archer 1995), is the dichotomy between agency and structure (Meyer 2010). To date, the structural camp has

held sway in studies on neoinstitutionalism (Suddaby 2010; Beckert 2010); however, the agency camp has been raising its head recently. Conceptual development focuses on agency either in terms of routinization and the taken-for-granted aspects of action or in situations where entrepreneurial action is triggered by external events (Delbridge and Edwards 2008, 198). The agency camp has focused on the role of agents who are aware, skilled, and knowledgeable and who have the ability to reflect and act in ways other than those prescribed by taken-for-granted social rules (Dorado 2005; Garud et al. 2007).

However, other scholars have argued that the ability of actors to create and transform institutions has been greatly exaggerated (Lounsbury and Crumley 2007; Meyer 2008a). What is more, an entrepreneurial stance encourages "foundational" studies of institutions and not their maintenance and transformation (Barley 2008). To solve this problematic heroism, Lawrence and Suddaby (2006) posited a new concept of institutional work. Dismissing the initial assumption of "culturally competent and aware actors," institutional work now suggests "neither determinism nor heroism" (Lawrence et al. 2011, 56). Microprocesses, such as trial-and-error learning (Rerup and Feldman 2011) and identity work (Creed et al. 2010), avoid the trap of heroism.

Recently, there have been empirical accounts of institutional change that scrutinize particular individuals whose actions change the field. The message from these accounts is that as "the powerful actors play a causal role in the emergence of new institutions" (Lamberg and Pajunen 2010, 815), they improvise and use their problem-solving activity based on the existing material at hand. Thus, rather than deliberately building and planning institutions from scratch, entrepreneurs build institutions from existing elements (Delbridge and Edwards 2008; Lamberg and Pajunen 2010; Gomes and Bouty 2011). In other words, practices get changed through problem-solving activity and trial-and-error learning (Lounsbury and Crumley 2007; Rerup and Feldman 2011). In this view, actions and cognitive structures are interactively constituted.

One central question has to do with amount of freedom individuals possess with regard to institutions. Agency and structure are in an antagonistic relationship with each other; they contradict each other, but nevertheless remain interdependent (Becker 1999). An essential part of autonomy is the awareness of individuals with regard to social norms, that is, the institutional setting. It is thus obligatory to understand how this awareness is reached in the

first place, since "the most intolerable conditions of existence can so often be perceived as acceptable and even natural" (Bourdieu 2001, 1). Indeed "one of the gravest obstacles to the achievement of liberation" is that reality "absorbs those within it and thereby acts to submerge human beings' consciousness" (Freire 1970, 51). As actors do what actors do, that is, act meaningfully, the focus of studies on change should be on "social interactions, in which change is accomplished" (Meyer 2006, 732).

Scholars of organizational institutionalism have offered explanations to surmount this paradox. Seo and Creed (2002) have provided one frequently cited explanation for how the awareness of embedded actors is enhanced. They argue that continuing experiences of contradictions can increase awareness. Such processes have been studied recently through identity work (Lok 2010), prompting scholars to focus on the microprocesses that can "trigger a shift in actors' collective consciousness that can transform them into change agents" (Creed et al. 2010, 1337). Another source of variance is the activities that individuals engage in to solve problems in particular situations (Lamberg and Pajunen 2010), or "resolve questions raised by disjuncture between espoused and enacted schemata" (Rerup and Feldman 2011, 578).

Materiality in neoinstitutionalism

Although the most common conceptualization of institutions, that is, the tripartite conception, addresses material aspects as a form of material coercion (Hinings and Tolbert 2008), this by no means can be seen as covering the entire materiality in which all human practices are embedded. Also, materiality as it is conceived in institutional logics, that is, most often as material practices or substantively embodied actions (Friedland and Alford 1991; Misangyi et al. 2008; Green et al. 2009) and resources (Thornton and Ocasio 1999, 2008; Lounsbury 2007), is not sufficient to account for the use and production of the materiality of established practices. Even if the conceptualizations would allow for such expansion, materiality *per se* has not been discussed in neoinstitutionalism.

Most of neoinstitutionalism typically ignores materiality in forms other than descriptions of resources, structure, action, or activity. This is done despite Friedland and Alford's suggestion that, "institutions must be reconceptualized as simultaneously material and ideal" (Friedland and Alford 1991, 243). It is rather ironic to note that materiality has not been adequately

treated in neoinstitutionalism, even if Zilber observes that, "most empirical studies of institutionalization in the last 30 years focused on structures and practices" (Zilber 2008, 154), that is, their "materiality" aspect (see also Green 2004; Zilber 2006; Green et al. 2009). This aspect of materiality is, however, different from what I have in mind and will clarify in this dissertation.

I welcome the recent emphasis on symbolic and cognitive elements in studies of neoinstitutionalism (see Suddaby et al. 2010), but it cannot come with the cost of pushing materiality to the margins when institutional theory has never conceived of materiality in its more comprehensive sense in the first place. Even though the focus on institutional microprocesses is nothing new, it does not offer adequate grounds for beginning conceptual development precisely because the focus on institutional microprocesses tends to neglect materiality. Certainly, the phenomenological accounts of sociologists of knowledge also tend to ignore materiality (Fischer-Kowalski 1998). However, I find them suitable for just this purpose. Thus, I will craft theoretical lenses that can be used in the empirical analysis and which are based on the sociology of knowledge. Relevant insights in neoinstitutionalism will be clearly employed in the conceptual development.

> The individual living in the world always experiences himself as being within a certain situation which . . . has two principal components. The one originates from the ontological structure of the pre-given world. . . . The other component . . . originates from the actual biographical state of the individual, a state which includes his stock of knowledge in its actual articulation. (Schütz 1966, 125)

3. Origins and structure of institutional change

Where have we ended up here? Neoinstitutionalism has advanced by great leaps in this millennium. The discursive institutionalization model (Phillips et al. 2004) permits us to dig into the microprocesses, and the disruptive institutional work (Maguire and Hardy 2009) offers insights into the patterns of change. The institutional fields of singular logics have been transformed into dialectical battlefields of convergent and divergent forces (Seo and Creed 2002; Farjoun 2002); they have been invaded by multiple underlying logics (Lounsbury 2007; Schildt 2011) and entail symbolic and material dimensions (Misangyi et al. 2008). Institutional—"superhero"—entrepreneurs have been buried and re-born is the might of collectivity (Schneiberg and Lounsbury 2008) and the force of microprocesses (Creed et al. 2010). Nonetheless, the finely constructed accounts, however, lack materiality.

In essence I see that the origins of institutional change although under a scrutiny in recent literature (Green et al. 2009, Creed et al. 2010, Rerup and Feldman 2011) still remain inadequately elucidated. In this, the social constructionist nature of institutions has to be taken seriously, as Phillips and Malhotra (2008) argue. I do this by elaborating the central processes of institutional theory—institutionalization and deinstitutionalization—before inspecting the origins of institutional change. Phillips observes the contingent nature of institutional patterns: "Sometimes institutional forces stabilize, sometimes they create strong pressure for change; sometimes institutional entrepreneurs may act to create change, sometimes to buttress existing arrangements" (Phillips 2003, 227). As a result, in this Chapter I provide explanations for this "sometimes". To understand this, we have to understand the meaningfulness of both individual-level action and social-level interaction.

When meaningfully changing something, one has to have a "reason to change" it. I argue here, similar to the sociologists of knowledge (e.g. Schütz and Luckmann 1973) that this reason comes in the form of a *problem* (see as well Norbäck 2011). Moreover, "institutions are sustained, altered, and extinguished as they are enacted by individuals in concrete social situations" (Powell and Colyvas 2008, 276). Accordingly, I argue that we should inspect the origins of change at the level of *subjective knowledge* (Schütz and Luckmann 1973), even though such knowledge may remain outside the reach of any empirical research methods (Flick et al. 2004). To do this, we have to follow the sociologists of knowledge and dive into the microprocesses where individuals face and master practical situations using their knowledge. At the individual level, I suggest two elementary origins based on the subjective "mastering of situation" (Schütz 1966). When shifting our scrutiny to social systems, in essence I suggest that we should distinguish between cognitive and material disruptions.

I argue that the cognitive versus material distinction is more general than the conventionally used exogenous versus endogenous distinction because the system under analysis does not have to be delimited as either internal or external. Especially when treating broader societal practices, the distinction between external and internal dimensions fades. I purport that by inspecting disruptions in the cognitive and material dimensions (or on a continuum), we can better understand the disruptions themselves, which then allows us to better understand the dynamics of the system. Before exploring the origins of institutional change, I first provide a brief ontological note. After this, I give an account of the "positive" processes, that is, habitualization and legitimation. Then, I discuss practices, that is, something established that changes. Third, I give an account of the "negative" processes, that is, deinstitutionalization, perturbation, and problematization, and map the central processes. Finally, I elaborate upon how change originates at the subjective level and subsequently at the social level.

Some ontological notes

Just as some things in our reality, such as rocks and books, have an "ontological existence" so that we cannot *wish* them away (Luckmann 2008), this ontological existence does not tell us how we should act toward these objects. The sociology of knowledge insists that "action is not determined by anything external to the actor, but that instead everything external is refracted by the interpretation of the actor" (Meyer 2006, 726). These refractions are typically made

automatically and not consciously thought about (Schütz and Luckmann 1973); most of our activity is habitual (Gronow 2011). What we *can* wish away are the various meanings that we have for things and occurrences. Of course, it is anything but simple to wish away meanings that are sedimented in our mind, especially those that we are unaware of.

The concept of meaning is not at all simple for the sociologists of knowledge. On the contrary, it can simply be stated that individuals work with typical meanings—*typifications*—of actions, roles, and situations that are generated via interaction and communication (Schütz 1962). As a result of our past experience, all of our current experiences, particularly those that occur in everyday reality, contain automatic appresentations of a relevant type, a typification (Luckmann 2008). According to Luckmann, the most primitive source of any kind of meaning is located "in the automatic constitution of themes as typical 'objects', whether these are perceptual, recollective, fictive, logical, judgemental, etc." (Luckmann 2008, 289); this process takes place in our consciousness. For this, the meanings for the things and occurrences that we encounter as part of our experience are constructs of a highly complicated nature. The meanings involve not only particular forms of time-successions and space relations so that they can be constructed as sense-objects, but also require imagination, that is, hypothetical sense presentations (see Schütz 1962).

The subjective knowledge with which we derive meanings for phenomena originates from our experiences in actual life situations (Mannheim 1954; Schütz 1962). Subjective knowledge refers not only to the contents of our mind or consciousness, but also to all kinds of physical knowledge, for example to the coordination of our body and various other skills. The subjective stock of knowledge is closely related to the concept of personal identify (see Creed et al. 2010). This knowledge is not merely the objective accumulation of information about facts and their causal connections; all of our actions depend upon our knowledge, whether we are conscious of it or not. The body of individual experiences, and thus knowledge, in societies is structured according to the specific location of the individual within the social order (Schütz and Luckmann 1973). Individuals are born into a society where all the *alter egos* structure the society through their habitual activities and their shared typifications (Luckmann 2008).

Not only are the meanings of habitualized activities and concepts *objectivated*, that is, made available as a common element both to its producer and to others (Berger and Luckmann 1966), but so too are the meanings of ontological objects, the materiality in which all human

activity is embedded. The sociologists of knowledge speak of social stocks of knowledge, systematic repositories of past objectivations, and the acts of interpretation, which supply individuals "with the typificatory schemes required for the major routines of everyday life, not only the typifications of others, but typifications of all sorts of events and experiences, both social and natural" (Berger and Luckmann 1966, 58). The intersubjective reality of everyday life is not only filled with objectivations, it is only *possible* because of them.

It is essential to note that, despite the fundamental priority of the subjective acquisition of knowledge, "the social stock of knowledge may in no way be understood as the 'sum' of subjective stocks of knowledge" (Schütz and Luckmann 1973, 263). Actually, any "social stock of knowledge contains not only 'more' than the subjective, but also 'more' than the 'sum of them' and still social stock contains 'less' than any particular subjective stock of knowledge" (Schütz and Luckmann 1973, 264). This is possible because not all—in fact, very little—knowledge about the social stocks of knowledge is acquired by any single individual. Even less of an individual's experiences, even if objectivated, end up sedimented in the social stocks of knowledge. The subjective knowledge is personal and social, "personal because it is acquired, structured and restructured through the specific experience of each agent; and social because experience takes place in the social world" (Gomez and Bouty 2011, 925).

Importantly, "experience" can be both communicative and non-communicative and it has meaning only to the extent that we interpret it (Schütz 1962; Heiskala 2011). Discussion with one's dissertation supervisor counts equally much as an experience as does solitary mountain climbing or watching a Japanese anime. The subjective stocks of knowledge strongly overlap even in global terms because we share numerous experiences of living on this planet, having been born and grown up on it, having learned how to walk and run, having felt hungry, thirsty, and sleepy and—hopefully—having satisfied all of these needs. We feel the gravitational pull of our planet, breathe its air, drink its waters, feel the warmth of its sun, and express awe at the moon that orbits it. Finally, there are no free detached brains running around; rather, the whole subjective stock of knowledge also entails bodily knowledge, that is, *habitus* (Bourdieu 1990). However, along with the proliferation of mass media, more objectivated knowledge is being shared all the time, even in global terms.

Institutionalization and deinstitutionalization

The objective of neoinstitutionalism has oscillated between studying the "structure where action takes place" and the "action which takes place in the structure" (Lawrence et al. 2009). Regardless of various conceptual articles, scholars have drawn few processual maps of the processes involved in institutionalization (see Barley and Tolbert 1997; Lawrence et al. 2001; Phillips et al. 2004). They typically do not distinguish between the subjective and social levels (but see Scott 1995). Pictures of change have also been rather rare (see Lawrence et al. 2001; Greenwood et al. 2002; Seo and Creed 2002). I would argue that existing maps of the processes do not adequately account for the ubiquitous processes in our human realities. Hence, I will present such a map in this chapter. To begin with, I clarify the fundamental processes on the "positive" side of social construction.

Institutionalization: habitualization and legitimation

For the most part, the focus of neoinstitutionalism has been on institutionalization and legitimation as opposed to deinstitutionalization and delegitimation, although the focus has recently been shifting. Despite sound foundations (i.e. Berger and Luckmann 1966), even institutionalization "is not a concept that is well defined in the institutional theory literature. In fact, it is seldom defined at all" (Phillips 2003, 227). While Green (2004) and Colyvas and Jonsson (2011) argue that the processes of diffusion and institutionalization should be disentangled, the same seems to apply to institutionalization and legitimation, as they have even been used interchangeably (Suchman 1995). These processes, however, are distinct. I start with the fundamentals in order to disentangle the latter two concepts and clarify the nature of these processes.

According to Berger and Luckmann (1966), *habitualization* precedes any institutionalization. In other words, institutionalization is grounded in habitualization: it is "a process by which frequently repeated actions become a pattern" (Berger and Luckmann 1966, 70). This pattern refers, of course, primarily to a *cognitive* rather than to a behavioral pattern. Habitualization, furthermore, is a subjective process and is fundamentally based on subjective knowledge constructed as solutions to recurrent problems. When facing the types of unproblematic situations that individuals routinely master with their existing stock of knowledge, their activity becomes patterned (Schütz and Luckmann 1973). When the inherent knowledge in

these patterns is made objectively available, we can speak of *legitimation*.

Through legitimation, one provides explanations and justifications for particular solutions. More generally, legitimation makes "objectively available and subjectively plausible the 'first-order' objectivations" (Berger and Luckmann 1966, 110). Along with the continuity of this recurrent activity of solving problems and objectivating the knowledge inherent in them, individuals come to agree on solutions through social interaction. As a result, reciprocal typifications of the patterned activity are constructed (Berger and Luckmann 1966). Whereas each individual can have their "own" solution to a definite problem, the objectivations of these solutions are exposed to comparison through social interaction. Thus, typically one or a few solutions prevail and are subsequently reproduced and diffused throughout the system. Thus, institutionalization and diffusion should also be seen as distinct (see Green 2004; Colyvas and Jonsson 2011). This process of selection and diffusion is, of course, a matter of empirical investigation in each particular situation.

Most objectivations and legitimations take place in language. Just as language, which is a system for typifying the schemata of experience, "rests on idealizations and anonymizations of immediate subjective experience," knowledge that is shared with others is detached from immediate subjectivity (Schütz and Luckmann 1973, 233). Along with the uninterrupted repetition and reproduction of a particular solution, the validity of the knowledge inherent in the solution is further confirmed. Moreover, other options are rendered unthinkable and the solution becomes reified so that its origins become unquestioned (Berger and Luckmann 1966). Seen in this way, habitualization and legitimation become clearly distinct processes. In essence, habitualization is a *subjective-level* process and legitimation a *social-level* process. Hence, institutionalization involves both individual- and social-level processes. This means that the forms of knowledge inherent in habitualization and legitimation are of a different nature because the former encompasses subjective knowledge whereas the latter deals with objectivated knowledge.

Institutionalization is a *ubiquitous* process in ongoing human activity, as Berger and Luckmann explicitly state: "all actions repeated once or more tend to be habitualized to some degree, just as all actions observed by another necessarily involve some typification on his part" (Berger and Luckmann 1966, 75). Just as habitualization rules out alternative options, it entails a "psychological gain," freeing energy for the further processing of the construction and

expansion of the institutional order (Berger and Luckmann 1966, 71). Just as the institutional order might involve nearly any kind of activity within a social system, the observed "regularities inherent in arbitrary condition tend to appear as necessary, even natural, since they are the basis of the schemes of perception and appreciation through which they are apprehended" (Bourdieu 1990, 53).

Also, legitimation is ubiquitous. In fact, Berger and Luckmann argue that all language is legitimation: "incipient legitimation is present as soon as a system of linguistic objectification of human experience is transmitted" (Berger and Luckmann 1966, 112). Thus, fundamental legitimating explanations are built into the very vocabulary of language. Legitimation always involves a process of legitimating the practices of specific institutional orders; it cannot be decontextualized (van Leeuwen 2007). It takes place through the ongoing production, transmission, and reception of legitimating formulas, which explains the descriptive content and justifies the normative nature of the institutions: this is how the things are done (Berger and Luckmann 1966).

Overall, habitualization and legitimation, which combine to build up institutionalization, lead to regularities in human activity; that is, they lead to the "patterns of human activity by which individuals and organizations produce and reproduce their material subsistence and organize time and space" (Friedland and Alford 1991, 243). These regularities can be of any type and their validity can be found at any point along a continuum, the extremes of which range from patterns that are "taken for granted" to those that are "questioned." In order to understand how these regularities are modified or abandoned, it is not enough to understand the social processes through which they gained their reified status; we have to scrutinize the individual-level processes through which the knowledge inherent in regularities is modified or even abolished.

Essentially, these regularities are not guided by a single homogeneous "structure," but by a multiplicity of them: "there are various institutional logics, sets of material practices and symbolic constructions" (Friedland and Alford 1991, 248). These multiple types of constructions, through and by which we orient our actions, might even be contradictory (Benson 1977). The coexistence of contradictory structures or logics is mainly made possible due to the unconsciousness of people with regard to these contradictions (Mannheim 1954). Institutional logics are also insulated within social systems so that they might not bump up

against one another (Reay 2010). However, only after individuals become aware of these inconsistencies, do they start to question them (Wright 1981; Seo and Creed 2002). These structures, however, do not reside in a void; instead, they reside in the concrete materiality of our planet.

Materiality in social theories

The mounting evidence of anthropogenic-induced changes to our planet, such as climate change, has forced social scientists to take nature, and materiality in general, into account (Fischer-Kowalski 1998). However, social scientists are typically at odds with this task because "social theory has hitherto consisted in its reification of the subject and of (collective) human mind as its point of departure for social analysis" (Reckwitz 2002a, 211). This means that the social sciences have almost exclusively, though in many forms, focused on cognitive issues and neglected materiality (Schatzki 2010). Ad Barad puts it: "Language matters. Discourse matters. Culture matters. But there is an important sense in which the only thing that does not seem to matter anymore is matter" (Barad 2003, 801). Some social scientists have noticed that natural scientists and biologists are more concerned with the environment and its changes and have attempted to introduce their perspectives on materiality into social theory, however, “sociologists are unwilling to be disturbed by the voices of natural scientists” (Lever-Tracy 2008, 454).

Whatever the case, a clear call has been put out to better understand matter in social theory (Reckwitz 2002b; Redclift 2009). The ways in which scholars have answered this call can be grouped according to two basic types of approaches. One stream of research treats human activity as constitutively and causally tied to material objects, that is, it treats material entities as components of social phenomena (Schatzki 2010). In doing this, Reckwitz (2002a) argues that the social order and its reproduction can be adequately understood only when we realize that such an understanding is both incorporated within human bodies and made manifest in the form artifacts. A prominent embodiment of this approach is the actor-network approach (Latour 1991), which also sees nonhuman objects as “actants” in their own right, that is, as essentially similar to humans themselves. This aspect of Latour's theorizing in particular has been criticized by other scholars (e.g. Bloor 1999).

The other approach has taken the form of a "study of interactions between society and

environment" (Dunlap and Catton 1979, 251), where the aim is to explain how symbolic systems influence material systems, and *vice versa* (Fischer-Kowalski 1998). This interactionists stream contends that society and nature are distinct realms that interact with one another (Schatzki 2010). Central to this approach is the concept of a "society's metabolism" addressing "material and energetic process within the economy and society, vis-à-vis various natural systems" (Fischer-Kowalski 1998, 61), thus integrating "material flow analysis" into social theories. The concept of flow has been popular (Ayres 1994; Baerlocher and Burger 2009; Daniels 2010) to the extent that society has been conceived of as an entity constituted by flows (Spaargaren et al. 2006).

Practice-theory, as spelled out by Schatzki (2010), contends that there is a complex mutual meditation and dependence among human practices, technology, and materiality, and that together with practices, materiality forms practice-arrangement nexuses, that is, it forms the site of the social. Scholars (e.g. Lounsbury and Crumley 2007), however, have criticized the proponents practice theory for exclusively investigating micro-level processes; therefore, in this dissertation, I will focus on the material fluxes that a broad range of practices beget through the concept of practice.

Practices

The regularities inherent in social reality have been labeled, for example, as institutional logics, institutions, habitualized activities, and institutionalized or established practices. Here, I employ the term "practice" to refer to the array of habitualized human activities through which our reality is produced and reproduced (Sandberg and Dall'Alba 2009). Practice is the fulcrum of knowledge (Archer 2000); it is the primary site of the social (Schatzki 2010). Practice is best understood as a kind of institution, and it involves both cognitive and material aspects (Lounsbury and Crumley 2007). I follow Schatzki, who conceives of "practice" broadly as "a temporally unfolding and spatially dispersed nexus of doings and sayings" (Schatzki 1996, 89). Practice does not exactly refer to "an activity 'system', a community of actors who share a common object for their activity" (Miettinen et al. 2009, 1318), but, rather, to an array of activities that might involve individuals who in fact do not share a common object for their activity.

The doings and sayings that constitute a practice can be linked through understanding those

involved, through explicit rules and precepts, and through other structures such as purposes, tasks, and emotions (Schatzki 1996). At the broader social level, these links typically consist of knowledge of various types, thus ordering and giving meaning to activity within practices (Lounsbury and Crumley 2007). Thus "one" practice might involve various individuals who have distinct objects of activity and who are not necessarily conscious of the others in the "same" practice. In essence, this is to say that practices can be vast. Think, for example, of oil-producing practices, in which various types of social actors are involved in different phases of production and in different ways due to their varying roles in the supply chain or within the organizations that are a part of these practices. Thus, here practice is not "the shared behavior patterns of those individuals who populate the practices" (Kilpinen 2009, 101); rather, it is an entity of connected habitualized actions and roles, which initially were intended to resolve a relevant problem within a social system (Berger and Luckmann 1966).

Even though the definition has a clear functional tone to it, this is not to restrict practices to merely production practices. The functionality is *real* in the sense that practices originate in order to resolve a recurring problem. However, whereas I accept Dewey's notion that we are practical beings and that "practice constitutes at first both self and the world of reality" (Dewey 1953, 154, cited in Miettinen et al. 2009, 1313), in the present study priority is always given to *knowledge* rather than purer practice approaches (e.g. Archer 2000; Gronow 2011). Thus, as Sandberg and Dall'Alba argue, our unique biographies "originate from the social world" so that we *are* essentially others (Sandberg and Dall'Alba 2009, 1357); here, I follow the Schützian tradition and see a fundamental difference between the ego and the alter-ego (Luckmann 1978). Whatever we do, we do it as ego, not as alter-ego, no matter how similar and intertwined we might otherwise be. The consciousness of the alter ego is unreachable.

Whereas I prioritize the concept of *knowledge*, I employ the idea of "practice" to make clear that I speak about actions and activity. Above all, I employ practice in order to introduce a central analytical notion in terms of ongoing human action. This is a Marxian notion that "all human production involve[s] the transformation and conservation of matter" (Foster 2000, 176). It is derived from Epicurean philosophy: "nothing comes from nothing" (Foster 2000, 5). Hence, *all practices produce something*. Although this notion is implicit in the existing literature, it is not explicitly stated and its implications are not adequately theorized in neoinstitutionalism. In order to explore this idea more in depth, I analytically distinguish

between two dimensions of practices—cognitive and material—just as the existing literature often does (e.g. Lounsbury and Crumley 2007; Misangyi et al. 2008). Simply put, the *material* dimension refers to concrete activities and to all the matter that are a part of them, whereas the *cognitive* dimension refers to all kinds of meanings that are attached to these activities and to the matter they move.

It is impossible to think of purely cognitive or purely material human practices. These dimensions are always intertwined in reality and "*every* organizational practice is *always* bound with materiality" (Orlikowski 2007, 1436). Even the most cognitive practices involve some materiality; even Buddhist monks have to eat and drink sometimes. On the other hand, even the most material practices involve cognition, no matter how unconsciously this occurs. These two dimensions have distinct characteristics in terms of the notion that "all practices produce something." Simply put, in the purely cognitive dimension of practices this production comes in the form of the *meanings* with which we order our lives. Through the reproduction of practices, these meanings are reified and become sedimented in the social stock of knowledge (Berger and Luckmann 1966), and they cause the activities, whatever they are, to be perceived as a natural part of the life-world (Schütz 1962; Bourdieu 1990).

Materiality of practices

Within the purely material dimension, practices always require some material as input and they also produce something material: an output. Through the reproduction of practices, they form material fluxes. Material production was the very starting point for Marx: "The subject of our discussion is first of all *material* production. Individuals producing in society, thus the socially determined production of individuals, naturally constitutes the starting point" (Marx 1971, 16). One of Marx's central points of emphasis had to do not just with capital and its accumulation (Lefebvre 1968), but also with the accumulation of knowledge (Marx 1971). Marx's materiality has been treated in such a variety of ways (Foster 2000) that the present account of material accumulation does not necessarily converge with any of these views. Rather, I take as a starting point the view discussed by Foster (2000) and employ it for the purposes of this dissertation.

A central, although basic, point concerning materiality in the present study has to do with the reproduction of practices; the material fluxes that they beget *accumulate* if they are not

entirely absorbed by the system within which this activity is embedded. Typically, our systems are not fully open, so that accumulation, or rift in Marxist vocabulary (Foster 2000), takes place; think, for example, of pollution, waste, or carbon accumulation (Clark and York 2005), or even of the accumulation of cars in cities. Whether a material flux accumulates or not is often a question of a process such as decomposition, decay, or even a product's life span. In the existing literature, the notions of accumulation almost always refers to that of capital, resources, or knowledge, and not to materiality in general, and thus such notions of accumulation are not directly applicable here. Sewell, however, discusses a more general type of accumulation when arguing that if "schemas are to be sustained or reproduced over time . . . they must be validated by the accumulation of resources that their enactment engenders" (Sewell 1992, 13). This is discussed more profoundly in Chapter 7.

Consequently, we can conceive that practices, through their repetition, produce both the (reification of) meanings and the (fluxes of) material. Over time, these two types of output take on a distinct nature in terms of change. Whereas the reification or sedimentation of meanings tends to stabilize the corresponding system, the accumulation of material fluxes, or the opposite (i.e. drain), directly changes the material system. This point is examined more deeply in Chapters 6 and 7. In Chapter 7, I use these notions to question some of the findings of the existing literature. I do this especially to discuss the dynamics of change as conceived by Seo and Creed (2002) and Farjoun (2002), some parts of which are not in line with the basic propositions of institutional theory as I see them.

It is obvious in the present account that material activities and their material impacts, even if we take them to be "objective" and "real," are meaningful only through the meanings we attach to them. These meanings and the process of interpretation can, evidently, be something rather non-existent in social interactions where materiality is prominent. It might be that these meanings are based on primary knowledge, that is, on having direct experience with the corresponding activities, or then on secondary knowledge, that is, that the meanings have already been objectivated and interpreted through communicative interaction. When practices become diffused throughout social systems via social interaction, regardless of whether some type of translation takes place (Czarniawska 2009), the activities themselves not only spread; the material dimension of the practices in terms of inputs and outputs also begins to form material fluxes, which become woven together within the corresponding activities and

meaning-structures. In the words of Schatzki: "Organisms and matter-energy flow through practice-arrangement nexuses regardless of whether and how labor and technology channel, shape, or capture the flows involved" (Schatzki 2010, 138). This is illustrated in Figure 1 below.

With time, practices form complex networks where they are both dependent on the material fluxes of other practices and the other practices are dependent on their material products. Some materiality, in particular that which is due to agricultural practices and practices that extract natural resources, comes directly from the material environment in which the practices are embedded. What is more, the type of materiality that human practices produce is often *not* used as an input for other practices, but accumulates in the material environment as waste. Obviously, various other types of material flow (e.g. Boyden 2001; Hashimoto and Moriguchi 2004; Zhang et al. 2012) and the relationship between society and nature have been explored (e.g. Glaser 2006), and "real" material fluxes are being assessed as we speak and published in various journals, such as Journal of Industrial Ecology.

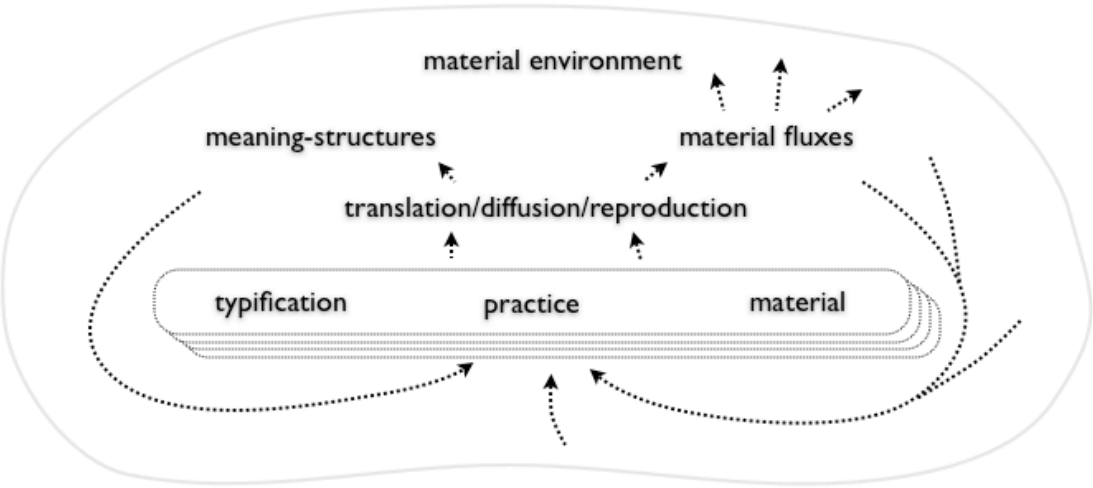

Figure 1 Practices that produce meaning-structures and material fluxes

Nonetheless, even if we could map all the material fluxes, they would not tell us why particular social interactions take place, and thus how we can influence material fluxes. This is not to say that material fluxes, or their "objective" information, would not matter. On the contrary, since material fluxes today are vast, individuals cannot directly observe or access them in everyday life, and thus they should be illustrated to help demonstrate the overall impact humans have on the planet. However, attempting to map the meanings that individuals attach to material

fluxes would be a considerable task, since "there is no one-to-one relationship between an institution and the meanings carried by the practices associated with it" (Friedland and Alford 1991, 255). Thus, it is essential to ensure that these material flows are situated in a meaningful way inside different meaning-structures, which determine how practices and the attached material flows are perceived.

Essentially, this construction is held together by knowledge and *not* by material flows. Knowledge not only gives meaning to the material flux, but above all, supplies relevance and motivation to the activity that creates these material fluxes. The knowledge involved is not only that which refers directly to the material fluxes, but indeed, often that which does not. This latter type of knowledge can be referred to as "higher forms of knowledge." It is knowledge that is detached from its immediate act-context (Lefebvre 1968; Schütz and Luckmann 1973). In other words, this type of knowledge is concerned with the *relations* between meanings and thus makes possible the separation between knowledge and action (Schütz 1966). One should thus see the construction of knowledge as a process in which the cognitive dimension is much denser and deeper than the material dimension, which is, of course, also a complex of our earthly systems.

Furthermore, all these meaning-structures and accompanying material fluxes are structured as solutions to problems, or at least they originally emerged as such (Schütz and Luckmann 1973). In fact, practice *is* a solution to a recurrent problem. A centrally important point is that all practices can be also seen as a problem, that is, any solution can be conceived of as a collective action problem (Holm 1995). To illustrate this important point, let us think about economic growth. It is typically argued that economic growth is *the* solution for improving quality of life. We can turn this solution into a (collective action) problem by asking how we can best organize the economy to attain or reach an improved quality of life. What is more, "any solution by an institution has the potential to generate new problems that further invite innovators to offer new solutions" (Farjoun 2002, 851). Thus, practices over time typically create tensions, which can be problematized and, when legitimate, we can attempt to solve them.

Consequently, chains of problem-solution-problem-solution are formed over time as recurrent problems that become entrenched and, as such, they must be repeatedly solved. These chains are obviously not fully based on rationality, but instead all the problems and solutions to them

are interpretations objectivated within ongoing social interaction (Meyer 2006). Most of the "original" reasons for the problem fade away with those persons (i.e. subjective stocks of knowledge) who in the first place faced the problematic situation and objectivated their solutions, which then became diffused and translated through social interactions. Even if we were to agree that all practices emerge as solutions to problems, it would be impossible to unambiguously know about these problems and their solutions within the subsequent social reality. This is the elementary structure of practices in the analytical plane, but it is equally inaccessible as such in empirical research as is subjective knowledge (Schütz 1966).

To summarize, the concept of *practice* was adopted here as something enduring and I will scrutinize its changes below. I will do this mainly to account for material accumulation, although I do not agree with prioritizing activity over knowledge (as in Schatzki 1996; Sandberg and Dall'Alba 2010; Gronow 2011). The priority of action has been argued in various ways. One pragmatist argument is that "it is difficult to theorize habits that do not initially have an interpretation in consciousness" (Gronow 2008, 360). The main message seems to be that if the mind comes first, then action and activity, which is often unconscious, cannot be easily understood. Here, an understanding of the nature of subjective knowledge is indispensable: most often persons are not aware or conscious of their knowledge. The main reason for the mind-first approach here is the *higher forms of knowledge* through which knowledge and action become (quasi-) detached from each other.

While I agree that, analytically, all knowledge must *ultimately* "lead to concrete undertakings in and against the concrete world" (Kilpinen 2008, 228), I see that the link between knowledge and action is often so long and thin that their detachment from one another is nearly absolute. This detachment has mostly been addressed in neoinstitutionalism as "loose coupling," which typically refers to the detachment of legitimacy from action (see Meyer 2008a). Abstract-level practices such as ideologies and religions are difficult to perceive through activity; they are both analytically and empirically more accessible through knowledge. I am afraid that when ontological and analytical priority is given to activity—whether habitualized or not—over knowledge, one necessarily runs into dead-ends in terms of the abstract issues that proliferate within contemporary societies. Regardless, the scene is set for scrutinizing how enduring regularities change.

Deinstitutionalization: perturbation and problematization

As discussed above, the subjective process of habitualization and the social process of legitimation, when put together with institutionalization, lead to the establishment and continuance of certain regularities of activity within social systems, which can be labeled practices. The corresponding "negative" processes where the continuation of such regularities is disrupted are here labeled *perturbation* and *problematization* (see Figure 2). This illustration represents a synthesis of the cognitive processes involved in the central processes of institutional theory. It differs from other illustrations in the existing literature in that it deals with changes in the ubiquitous processes of human activity and distinguishes between individual and social-level processes.

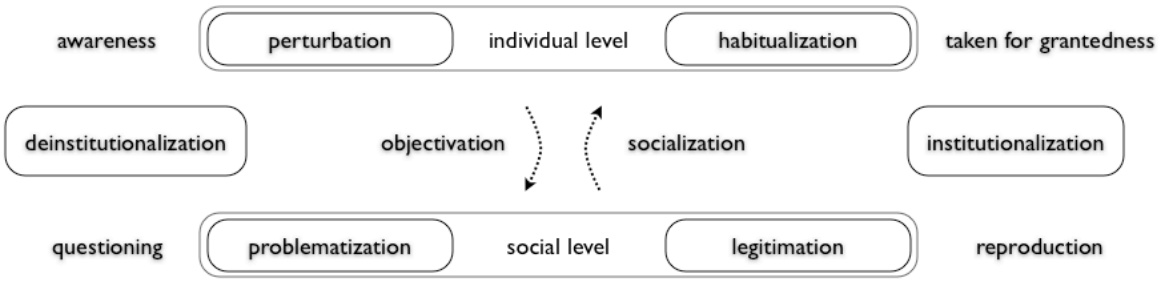

Figure 2 Subjective and social-level institutional processes.

Whereas Berger and Luckmann (1966) limited their treatment of change to "an appearance of a problem," other foundational accounts (e.g. Schütz and Luckmann 1973) have treated change more comprehensively. These insights are, however, not present in the contemporary conceptual developments of neoinstitutionalism. Since the terms "interruption" or "disruption" are typically employed to address the discontinuance of reproduction (Barley and Tolbert 1997; Maguire and Hardy 2009), I find "perturbation" to be a more adequate term at the subjective level due to its more active and individual connotation. I also choose to use the term perturbation because I want to grant an important role to "disruption" at the social level. Perturbation also refers "to a deviation of a system, moving object, or process from its regular or normal state of path, caused by an outside influence," and to "anxiety and mental uneasiness" (Apple Dictionary 2011). When dealing with these "negative" processes, the divide between the subjective and the social are even more important than with regard to the "positive" processes.

Figure 2 illustrates the distinctions between "positive" and "negative" processes as well as between individual and social cognitive processes. In the corners, the terms "awareness," "reproduction," "questioning," and "taken for grantedness" describe the characteristic features of these processes, not strict states or qualities. The individual-level processes, which are concerned with the subjective stocks of knowledge, involve the processes of habitualization and perturbation, which are opposite in terms of their continuance and the level of awareness. These processes are connected to the social dimension through objectivation. Thus, the social processes involved, problematization and legitimation, deal with objectivated knowledge, which for its part is linked to the subjective level through socialization. Just as with the "positive" processes, so too are the "negative" processes (in Figure 2) ubiquitous in human activity; they are immanent in both individual and in social interaction. In the following section, I concentrate on elucidating the "negative" processes and thus attempt to provide a comprehensible account of the process of deinstitutionalization.

Perturbations in the subjective stock of knowledge

Change requires something that changes. This, at the social level, is *practice*, as discussed previously. However, what ultimately changes is the knowledge that we find in our subjective stocks of knowledge. The corresponding social stock of knowledge is the origin of most of this knowledge and is inherently linked with activity in the corresponding social order (Schütz and Luckmann 1973). In other words, this social stock of knowledge entails such typifications whereby the regularities in the corresponding social system are appresented as natural and unproblematic and, moreover, this is done for the most part automatically (Luckmann 2008). As discussed previously, this knowledge is structured as "solutions to problems" that form a complex hierarchical thematic structure in which all the parts of subjective knowledge are connected (see Schütz 1966).

Most of our knowledge is practically motivated knowledge whereby we know how to, for example, dance, cross the street, and speak. However, in contemporary societies our subjective stocks of knowledge involve ever more abstract or de-pragmatized knowledge, which is detached from the immediate context of action and from the necessities of its use in concrete situations (Schütz and Luckmann 1973). This type of knowledge concerns relations or the meaning-structures that we use to understand and give meanings to issues that we could not

understand with knowledge based on our pragmatic first-hand experience. Furthermore, all the elements of knowledge are structured according to their relevance in our subjective stock of knowledge (Schütz 1966). Our knowledge is partly personal and partly social (Gomez and Bouty 2011).

We are interested in how this knowledge changes. For this, we have to acknowledge the ways in which this knowledge was acquired in the first place, that is, along the process of socialization in which the knowledge of others was assimilated through social interaction (Berger and Luckmann 1966). Whereas all the relevant typifications are available within the social stock of knowledge, through socialization our "own independent" interpretations of experiences also take place. Thus, it is possible that the typifications acquired through individual interpretation deviate from those available within the social stocks of knowledge, even within a close social group. The coherence of socially relevant knowledge between individuals in societies is, however, secured because most of it acquired through absorbing the implicit expectations (Gronow 2011) within social practices (Schatzki 1996). What is more, some elements of reality are irrevocably imposed on the individual (Schütz and Luckmann 1973); for example, think of the school system, language, and climate.

According to Schütz and Luckmann, at every moment of conscious life individuals find themselves in a given "situation" (Schütz and Luckmann 1973, 100). Every situation is determined by two issues: "the ontological structure of the pre-given world" (i.e. material conditions) and "the actual biographical state of the individual, a state which includes his stock of knowledge in its actual articulation" (i.e. subjective knowledge) (Schütz 1966, 125). Depending on how these two issues come into play, a situation might be appresented as a "routine situation," one which is routinely mastered with the existing stock of knowledge. In such situations, experiences elapse "unquestionably," and are not interpreted, and thus they introduce "nothing new" to the existing stock of knowledge (Schütz and Luckmann 1973, 124). Routine situations fit into the existing typifications, thereby confirming the validity of the existing elements of knowledge. Even if these situations appresent us with a "meaning," we are largely unaware of it because it is provided for us automatically via our subjective stock of knowledge (Luckmann 2008).

Although the term "situation" points to rather stable, photo-like imaginary, it should not be seen in that way. To the contrary, "situation" as it is used here refers to courses of action as

well. I use these two terms interchangeably. Since there are two issues that determine any given "situation," it is obvious that to change a situation from a routine to a non-routine situation, either one of these issues has to change. In the following conceptual discussion, I focus on those processes that are initiated due to changes in our material conditions on the one hand and due to changes in our subjective knowledge on the other. These processes are the two elementary types of the subjective-level origins of change. I label the one where the origin of change is the material condition as a "contextual perturbation" and the other as a "confrontational perturbation."

Contextual perturbation

Whereas most of the situations in our everyday life are unproblematic, in some of them "habitual knowledge appears to be unavailable, i.e. in situations whose 'novelty' is imposed by the world" rendering experiences problematic (Schütz and Luckmann 1973, 125). When an unusual, but relevant, course of action does not "fit the automatically appresented 'meaning'" (Luckmann 2008, 285), it constitutes a problem. If, according to the actual biographical state of the individual, this problem is relevant (Schütz 1966), then interpretive acts continue until the "problem" is adequately solved. Through these interpretive acts, "new" knowledge emerges and the previously taken-for-granted meaning available in the subjective stock of knowledge that is attached to the particular course of action or situation is then modified or even abandoned (Luckmann 2008).

Since a social stock of knowledge cannot include as much knowledge as individuals need in the entirety of situations that they enounter in each of their unique lives (Schütz and Luckmann 1973), individuals, by necessity, face situations where socially derived knowledge is incomplete to routinely master them, that is, "problematic situations." In earlier phases of the lives of individuals, when the stock of habitual knowledge is but a fraction of that of an adult, this kind of process—learning and change—is commonplace. On the other hand, because adults possess stocks of knowledge with which they can routinely master most of the everyday situations they find themselves in, their behavior is more patterned and foreseeable than is that of children; however, this notion is already rather far from the topic being addressed here.

Regardless, no matter how an interpretation was evoked, most of this independently acquired "new" knowledge is *never* objectivated, but remains uniquely in the original individual's

subjective stock of knowledge. Even the individual him- or herself might not be aware of this new knowledge, especially when it deals with bodily learning. Moreover, with regard to its origins and novelty, when objectivated most of this knowledge goes unnoticed by those who receive it. As a consequence, any subjective stock of knowledge is at the same time "smaller" than the social stock of knowledge, but also "larger" than it (Schütz and Luckmann 1973). No single individual can possess all the knowledge in the social stock of knowledge (especially in our contemporary societies), and no social stock can ever contain all the knowledge of any subjective stock of knowledge. Individual and shared knowledge are distinct by their very nature (Bakhtin 1993).

Strictly speaking, the above-mentioned origins of change can only disrupt the validity of knowledge that is not totally detached from action, that is, practically motivated knowledge. In other words, pure abstract knowledge cannot be disrupted by changes in the situation, only by other abstract knowledge. Hence, the more abstract the knowledge in question, the more difficult it is to disturb its validity through external impetus via first-hand experience. Think of, for example, religious or philosophical knowledge. This "contextual perturbation" is, by its very nature, reactionary or adaptive because it is related to mastering concrete situations and their changes. Although people can certainly conceive of alternatives in which there are no changes in the situation, typically a contextual perturbation is needed (Barley and Tolbert 1997).

Since this externally imposed change modifies meanings, it evidently also changes activity. For the most part, it is, however, a question of very subtle changes; adaptations, reactions, remediation, and improvements, which the existing literature has referred to as, for example, variation (Lounsbury and Crumley 2007). It should go without saying that the smaller the changes, the more frequently they tend to occur. Simply put, we deal daily with this type of change and its effects go for the most part unnoticed. Nonetheless, another elementary type of change has to be taken into consideration. This is a type of change through which one uncovers and becomes aware of the forces that formerly compelled one's behavior, that is, the previously taken-for-granted typifications in one's own subjective stock of knowledge (Mannheim 1954).

Confrontational perturbation

According to Schütz and Luckmann, one can become "cognizant of the incompatibility ('contradiction') between two elements of knowledge which until now coexisted in a taken-for-granted way in the stock of knowledge" (Schütz and Luckmann 1973, 202). In other words, it is possible to uncover situationally determined knowledge, the meaning-structures or relations in one's subjective stock of knowledge (Mannheim 1954). This kind of inner perturbation is closely related to the notions of emancipation and other concepts where individuals liberate themselves from social determinants. One of Paolo Freire's students illustrated this process perfectly: "I was naïve, and when I found out how naïve I was, I started to get *critical*" (Freire 1970, 35). This type of emancipatory change is based on Marxian notions; individuals can consciously attempt to change given conditions, but only after becoming aware of these conditions (von Wright 1981).

Confronting one's own subjective stock of knowledge comes close to the notion of exercising "reflexivity," where individuals considers themselves in relation to their social context and obligations, and vice versa (Archer 2010). Typically, one has to acquire the tools with which he or she can become conscious of his or her own perception of reality and deal critically with it. Freire argues that this *conscientization* requires "learning to perceive social, political and economic contradictions and to take action against the oppressive elements of reality" (Freire 1970, 35). In fact, the mere insight that the social world is not "a *given* reality which man must accept and to which he must adjust" (Freire 1970, 32), may ignite a process of a larger perturbation of one's subjective stock of knowledge. Whenever such a confrontational effort is made, previously taken-for-granted elements of knowledge gain thematic relevance (Schütz 1966).

Since this type of perturbation can easily be seen as being exclusively related to a process of becoming aware of social reality, any type of knowledge can be questioned through this confrontational process or through exercising reflexivity Thus, while these elements of knowledge might be related to concrete situations, they can also deal with abstract meaning-structures, which have little to do with a concrete situation, unlike what was the case with the "contextual perturbation" that was discussed above. At a more general level, we can say that this "confrontational perturbation" can deal with the relations between elements of knowledge as well as single elements of knowledge. It is a process through which one comes to "know

more about" this knowledge (Schütz 1966). The validity all kinds of knowledge can be perturbed by not holding "evaluations in abeyance but in confronting and examining himself" (Mannheim 1954, 43).

Scholars typically view awareness as being central to change; the "modification of an institution is more likely to require conscious choice than does reproduction" (Barley and Tolbert 1997, 102). In other words, a "reflective turn is required to see the relevancies themselves" (Schütz 1966, 135). Furthermore, according to Mannheim, a "centrally important point . . . is that in so far as the world does become a problem it does not do so as an object detached from the subject but rather as it impinges upon the fabric of the subject's experiences" (Mannheim 1954, 44). Thus, by confronting and examining one's stock of knowledge, relations which have become *problematic* in the light new interpretational acts are modified or abandoned. Those elements of knowledge that find approval after one has acquired insight into them might be embraced precisely because there are no reasons to change them.

The concept of a problem

In this account, I perceive the concept of problem as the elementary form of the *reason to change*. Agre (1982) described a problem as an objective undesirable situation, which may be resolved by some agent; it implies an awareness of a physical, social, psychological, or intellectual situation or object that is said to be a problem. One can *decide* that a problem exists. Agre states that, "it matters not whether a person who mistakenly believes that he has cancer has a tension or related mental or psychological manifestations, he does not have *that* problem. He may have a million of other problems but he doesn't have that one. What he feels is absolutely irrelevant" (Agre 1982, 124). I am squarely opposed this view. What one feels is essential for her or his subsequent actions, and thus absolutely relevant in the present account.

Dewey (1910) described his second phase of reflective thought as an "intellectualization of the difficulty or perplexity that has been *felt* (directly experienced) into a *problem* to be solved" (cited in Agre 1982, 123). I would say that Dewey's "difficulty or perplexity that has been felt" *is* problem for sociologists of knowledge. Thus, to say that it is a problem that perturbs one's consciousness is not to say that the person facing the problem would objectivate it as a

problem or that he or she even *could* objectivate it. Sociologists of knowledge conceive of a problem rather differently than does Agre (1982); I would refer to Agre's concept of a problem as an *analytical* problem. Whereas a person can decide whether or not to solve analytical problems, problems at the level of consciousness *must* be solved. A continuous interruption of consciousness is something that is unthinkable. While a problem might disappear when changing the "province of reality" (Schütz and Luckmann 1973, 126), here we remain in the province of everyday life.

Objectivations and the social stock of knowledge

Both types of change produce "new knowledge," which introduces changes to the existing subjective stock of knowledge. This knowledge, due to the biographical uniqueness of individuals, cannot be shared as such with others. When shifting our attention to the social processes that subsequently take place when an individual has resolved his or her problem and has an urge to share it, *objectivations*, that typically take place in language, are needed. However, language anonymizes immediate subjective experiences so that the types of problems that are intellectualized, theorized, or diagnosed are no longer subjective; rather, they are analytical problems. What is more, for everyone else they are from the outset *somebody else's problems.*

In terms of contextual perturbation, these subsequent objectivations are typically acts of interpreting a change or event within the common context of daily activity; they involve questioning what, how, and why something unexpected happened and sharing this within language. This sharing is, in essence, not a sharing of subjective knowledge; rather, it suggests an interpretation based on this knowledge. What is more, the same change in context might not be apperceived as "problematic" by *all* individuals within a given situation. It is a question of relevancies (Schütz 1966) and all the other elements in the subjective stocks of knowledge. An interpretation that objectivates a "reason to change" involves reasoning; it must possess certain qualities before it can be approved by others (for whom a contextual change was not "problematic"). It has to explain and justify the new interpretation, which in generic terms comes in the form of an analytical problem in the previously unquestioned situation.

A confrontational perturbation is more "theoretical." Through it, one might question the very foundations of the social settings in which individuals are embedded. Since individuals

perceive of reality through generally accepted typifications and typificatory schemas that they do even think about, in some cases to doubt their correctness is to doubt the correctness of the reality itself. The requirements for disentangling the previously accepted typifications, of course, vary in depth: "it takes severe biographical shocks to disintegrate the massive reality internalized in early childhood; much less to destroy the realities internalized later" (Berger and Luckmann 1966, 162). However, ontological considerations are not indispensable in confrontational change; confrontational change might simply take place in a situation in which one social actor dominates others and the previous acceptance of an idea or situation is changed to non-acceptance (Freire 1970).

Whether or not one wishes to share modified meanings with others depends on what kind of problematic situation or change in the subjective stock of knowledge gave rise to new knowledge and whether or not the problem was perceived, for example, as being definite or temporal, urgent or relevant. In order for others to approve of the objectivated problems, the problems have to be prioritized over other issues that might capture a person's immediate interest: "first things first," as Schütz and Luckmann put it (1973). Contextual and confrontational perturbations can "converge" in subsequent social activity; it is a question of diffusing these objectivations and their subsequent modifications, that is, translation (Czarniawska 2009).

Receiving problematizations

When introducing new problematizations (i.e. reasons to change) into social interaction, the receiver of these analytical problems treats them not as problems in the original sense (i.e. perplexity that has been directly experienced), but as an interpretation of the situation. Accordingly, the objectivations that the receiver has altered might interrupt his or her flow of consciousness; in other words, the situation might still remain a "routine situation" for the receiver. Actually, we can now deal with a ubiquitous process through which individuals—and now also masses—typically come to change their typifications, that is, as already interpreted. These already interpreted typifications, like all the other objectivations, are internalized or socialized through social interaction (Berger and Luckmann 1966).

Regardless, it is by no means a trivial matter to convince others to receive the novel meanings. This is mostly because habitus, the system of structured structuring dispositions rejects

"information capable of calling into question its accumulated information" (Bourdieu 1990, 60). Over time, established meanings not only become taken-for-granted, they also become more resilient to any inconsistencies (Bourdieu 2001; George and Jones 2001). Obviously, not only cognitive barriers hinder the diffusion of problematizations; conscious resistance due to some social actors defending their beneficial status even when its actual or perceived base is being questioned can also hinder the diffusion of problematizations (Hirsch 1990; Maguire and Hardy 2009). Insofar as new knowledge attempts "to reveal the mechanisms by which domination is produced and maintained" in ways that are unknown to most social actors (Golsorkhi et al. 2009, 782), it is a critical enterprise (Cooper et al. 2008).

Since new interpretations entail new "meanings" for a given situation (or course of action), thus causing other individuals to modify or even abandon the previously taken-for-granted typifications, the original individual is required to "objectivate" not only the new meanings, but essentially the *reasons to change* them as well. Since the interruption was conceived as a problem in the first place, it is intellectualized or diagnosed as an analytical problem, that is, as an explanation that functions as a reason to change the previous meanings. The existing literature on social movements calls this type of intellectualization "diagnostic framing" (Benford and Snow 2000). Diagnostic framing aims to explain and justify the changes, to legitimate them. Prognostic framing then attempts to conceive solutions for the problem that has been diagnosed.

When material change occurs in a common situation, it typically gives rise to various, not necessarily compatible, interpretations. Thus, whenever various interpretations are made, they have to compete for survival (Reay and Hinings 2009). This competition comes in the form of a legitimation struggle (e.g. Hardy 2004) or negotiation (Barley 2008). Because of the biographical uniqueness of subjective stocks of knowledge (e.g. interests, identity, subject position, relevancies, and urgencies), the "same" change or event might evoke various different types of "new explanations." Moreover, their objectivations are not necessarily directly linked to the change itself (Schütz and Luckmann 1973), but might be "colored" by, for example, the interests, feelings, or subject position of the specific individual. As Chomsky and Barsamian put it, "you don't say things you know" (Chomsky and Barsamian 2007, 2), you say things that are required for other purposes, be it for power or some other end.

Regardless, most changes take place incrementally and are not easily "visible" because they

might lapse in the blink of an eye or they might not be seen immediately in the actions of individuals (Powell and Colyvas 2008). Furthermore, the difference between your "own" new interpretations, which originated with an interruption to the flow of consciousness, and those that individuals have adopted through the objectivations of others is very subtle. Actually, interpretations are typically a combination of your "own" objectivations and those that have already been shared with others. The other individuals who receive these new interpretations are typically even more unaware of the origins of these interpretations. A tremendous majority of the objectivations, however, are never reproduced by others, even if the objectivations would influence their activity.

Social-level change: cognitive and material

The distinction between contextual and confrontational perturbations at the individual level cannot be taken as such at the social level. At the social (or discursive) level, we are not principally interested in how new interpretations originated at the subjective level; rather, we are interested in how practices and events are interpreted and transmitted through discourses and how they subsequently change meanings and related activities, that is, practices. Although we cannot tell definitely why, how, when, or where an occurring problematization originated, we can scrutinize those objectivations that attempt to problematize established practices, that is, we can scrutinize *on what basis* the established practices are problematized. Indeed, the *basis of problematization* in processes of problem legitimation counts here, no matter whether it is consciously or unconsciously "false" or not at all "false."

Arguments that explain and justify why established practices should be changed are inherent in this process. Texts that contain these arguments have been called problematizations (Maguire and Hardy 2009). We can think of two basic types of problematizations. First, there can be problematizations that question established practices because of a "changed situation." This should be seen as a changed *material* situation, in which an individual feels that established practices no longer solve the problem that they are supposed to solve. Another basic type of problematization is one in which an individual reinterprets a particular practice and argues that it is unwanted, inadequate, or inappropriate in an "unchanged" material situation. It is important to note that these types of problematizations, because they are analogous to subjective changes, are not changes *per se*, but disruptions, attempts to change,

that is, seeds of change. They do not always end up changing whatever it is that a particular individual or group or individuals were attempting change.

Evidently no one single objectivation suffices; it must be reproduced in the subsequent discourse (Phillips et al. 2004). It is a question of problem legitimation (Hannigan 1995), that is, explaining and justifying a problem having to do with the established status quo or practices. This process, whereby problematizations are objectivated in order to "disrupt the reproduction and continuation of an institutionalized line of reasoning" (Sandberg and Alvesson 2010, 10), is called *problematization*. I label those problematizations that argue against established practices based on a changed material situation as *material disruptions* and those that are based on alternative interpretations as *cognitive disruptions.* This distinction, evident at the analytical level, does not work in empirical considerations where the material and the cognitive are permanently melded (Schatzki 1996; Orlikowski 2007). While we can think of purely material and purely cognitive disruptions, they are hardly conceivable in empirical reality.

When discussing institutional change, the starting point is always something that is taken for granted, that is, "all problems arise on the background of what had been given as unquestionable" (Schütz 1966, 119). This unquestionable is something that is commonly apperceived as good or natural (Sandberg and Alvesson 2010), with typifications found in the corresponding social stock of knowledge. Accordingly, the previously unquestionable becomes questionable by the very process of questioning. It is always the meaning that becomes questionable, even if it is "directly" linked with an activity, that is, a typical objectivation of a practice or an activity.

Illustrating the types of disruptions

Let us assume that there are various individuals involved in a pattern of sayings and doings that make up a practice, for example fishing. The practice continues without interruption if there are no relevant changes in the material flow (e.g. the shoals of fish remain stable) or in the typifications (e.g. the attitude towards fish remains unquestioned). Subjectively problematic situations, insofar as they do not interrupt the routines of others, that is, they are not objectivated, can take place without disrupting the reproduction of a practice at the social level. A swarm of minor problematic subjective situations, and the process of resolving them,

ensures a flow of incremental changes in activities, so that, even if stable, the practice does not remain utterly unchanged (Rerup and Feldman 2011). Also, when an individual performs an action, the action also "creates" the individual (see Czarniawska 2009). In addition, the material accumulation that is often present in practices can gradually change some issues relevant to the practices, as discussed in detail in Chapters 6 and 7.

Let us think of the two basic types of change, that is, let us engage in a thought experiment (Shepherd and Sutcliffe 2011). First, there can be a change in the materiality in terms of a practice, for example a rapid decline in the shoals of fish. Since changes in material fluxes can directly affect practices, it is quite rare that a practice is abolished or even modified without any objectivations of interpretations, much less without subjective interpretations of a material change. Most typically, a material disruption has to be interpreted or theorized about before it can disrupt practices (Munir 2005). In addition, it might be the case that all of the individual actors inherent in a certain practice *can* apperceive a certain changed material situation as a "problematic situation." It might, furthermore, be the case that individual actors perceive the same problem and even solve it in the same way without any objectivations whatsoever. It should go without saying that this kind of social level change is very rare.

Typically, those involved in a certain practice, for example fishing, have a different perspective on the materiality involved, and thus the material changes entail different problems for different individuals. However, more important is the fact that individuals *communicate* between each other. Certainly, objectivations can be misleading or fail to have contact with the material reality. It might be that a material change evokes various interpretations and their objectivations, even from all the participants. Through social, typically communicative interaction, only one or a few of the interpretations explaining what and why something happened (diagnostics) ends up prevailing. For example, "angry gods" or "the neighboring village that did too much fishing" might end up being the prevailing reasons for shrinking fish shoals. The subsequent activity is obviously to a large extent determined by the established diagnosis. It is not a question of the most rational account; various other issues, such as social status, can be more decisive. This is always a question of empirical investigation.

The cognitive type of disruption differs from the material disruption on one analytical point, that is, the basis of reasoning. This typically makes all the difference in empirical situations. With material disruption, the change takes place for "everyone" since they are embedded—

although not in the same *way*—in the same material system. On the contrary, sharing a personal interpretation of a course of action (or situation) that differs from the commonly agreed upon interpretation is at the outset a different task. It makes no difference whether this personal interpretation has arisen as a result of a confrontation with one's subjective stock of knowledge or because it has been socialized from other sources (e.g. another social stock of knowledge). The individual remains forced to problematize the established typification by questioning, raising awareness, and unmasking these previously unquestioned meanings. For all the others, such problematization is from the outset perceived of as somebody else's problem (for an insightful account of somebody else's problem, see Adams 1979).

Returning to the example of fishing, we can think of one or more individuals of the social group involved in fishing or outside it starting to question some of the aspects of fishing. For example, they might argue that the fish are sacred and cannot be killed or that it is unjust or harmful that people eat fish. Certainly, the established meanings within a social group can also be altered when they are exposed to divergent meanings as a result of social interaction with another social group. Berger and Luckmann (1966) observe that in human history, it has rarely been the better argument, but rather the longer stick, which determines whose interpretation remains. However, when remaining inside one social group, any kind of issue can be questioned, such as the quantity of fish being caught or the ways in which people are catching the fish. It happens to be the case that the established activities are not only legitimate because they are established, but because there are social actors who benefit from them. It can be challenging to change these, by definition, unquestioned practices or beliefs without there being any concrete changes in the material situation.

Typically, a prognosis is presented at the same time as a diagnosis, that is, individuals discuss what to do in the new situation at the same time that they identify a problem with the old situation (Benford and Snow 2000). Since various solutions can be offered, those solutions that are best aligned with the most legitimate solution are the most legitimate. It is typically a question of simultaneous activity, that is, the problem and solution are mutually constituted during a process of negotiation. Thus, a one-way causality is not necessary for situations in which the problem is identified prior to any solution. This, however, is the case only in terms of the social processes, not in terms of the subjective-level considerations; with subjective-level considerations, the causality is strict: the problem always comes first (Schütz 1962).

What is more, because it is not theoretically necessary to achieve a consensus over changed material conditions, one interpretation typically becomes dominant. It is a question of empirical investigation, whether one is pressured by a chieftain of a social group or by the channels of mass media. It is not necessarily true that the meanings would be to a large extent agreed upon, but, rather, that there are various, distinct, coexisting logics (Reay and Hinings 2009) due to, for example, insulation (Reay 2010).

Features of the disruptions

Whereas I suggest taking established practices as the primary object of investigation and starting point of institutional change, disruptions should certainly be analyzed as well because they clearly differ in their disruptiveness. As discussed above, material and cognitive disruptions *can* yield the same type of subsequent activity, and furthermore, change. Generally speaking, however, the disruptiveness (or effectuality) of these two elementary types of disruptions should be seen to diverge. In terms of the effectuality of change in established practices, it makes a fundamental difference whether the material conditions, which are "same for all," or subjective knowledge, which is "distinct for all," changes.

Material change is "shared by all" who are embedded in the "same materiality," and such change is thus concrete and understandable from the beginning. To return to the example of fishing, let us imagine a rapid reduction in the shoals of fish. It is quite clear that the reduction can easily be apperceived as a problem, that is, the process of legitimating that a lack of fish is a problem should not be difficult given the proliferating observations of ever fewer fish. The reduction raises questions about previously unquestioned practices, that is, the unquestionable. In terms of cognitive disruption, the scene is at the outset very different. The observations are "the same" as they used to be, only now certain individuals are attempting to change their significance or meaning by problematizing something that used to be apperceived as natural.

Thus, it seems obvious that material disruption is more effectual than cognitive disruption with regard to subsequent changes in the established practices. For this, the impact of these two ideal disruptions on subsequent social interaction should be seen as distinct. Just as material disruption focuses on solving the rather immediately legitimated problem, cognitive disruption seems to focus more on problem legitimation itself. However, it might be that a

change in material conditions does not disrupt, but, rather, enhances the legitimacy of some practices. For example, a growth in fish shoals would seem to affirm whatever beliefs one has about the validity of fishing. Nevertheless, because material change can be "positive," "negative," or "irrelevant," the nature and effectuality of disruptions should always be inspected in light of the particular practice at hand. Thus, material disruptions can be scrutinized according to their closeness, unexpectedness, centrality, relevance, urgency, scope, and source *in terms of* those practices which are being analyzed.

In empirical realities, change in material conditions typically comes in the form of a changed price of a product or raw material. Also, changes in laws, taxes, and other juridical decisions should be seen as material disruptions, though they are continuously further from being pure material disruptions. Since material disruptions can take the form of past, present, or coming disruptions, it is most often the present or the future disruptions that are relevant. This can be seen in the large-scale trading that is done on stock exchanges and in the futures markets, which is based on an interpretation of changes in future material flows. Urgency and unexpectedness seem to be salient for the effectuality of material disruptions. Disruptions might spring from wholly external sources in relation to a practice, or then they might be inherent to the system at hand itself.

The latter typically takes the form of accumulation during the continuation of the practice, for example continuous fishing that reduces shoals. Accumulation due to particular practices might take the form of "normal" accumulation, for example pollution, or a reduction in the amount of raw materials due to their extraction. If material change takes place due to the impacts of practices, for example fishing that reduces shoals, it might be more difficult to legitimize this material change as a problem, since it is readily understood and thus has some legitimation at the outset due to the legitimacy of the very practices that cause the reduction. Actually, based on the present empirical material, I argue that this is indeed the case, that is, the source of material change systematically influences the effectuality of the change, as I explain in more detail in Chapters 6 and 7.

Material disruptions do not necessarily increase an awareness of particular practices; the typifications can remain unquestioned, because the corresponding activity is re-aligned with the new material situation. The essential aspect of material disruptions is that they can be produced by nature (e.g. an earthquake), "unintentionally" by consequences relating to

established practices (e.g. pollution), or "intentionally" by typically powerful social actors (e.g. a bomb). Material disruptions have been broadly discussed in the social movement literature (see Morril et al. 2003). Besides material disruptions, scholars have also focused on symbolic disruptions as forms of conflict or tactics that inflict institutional change (e.g. Morril et al. 2003; Hond and Bakker 2007). These approaches address how conflicts are conducted and typically side-step the initial reasons for these conflicts. Regardless, in social interaction it is always a question of interpretation and the meanings of material changes and *not* directly about "objective" material changes.

Disruptions in contemporary societies

An ideal cognitive disruption is one in which *no material* changes take place. Of course, the idea of "no material changes" is impossible in any situation that involves a lapse of time. Thus, by saying "no material changes" I am referring to a type of situation that remains, in essence, the same. For a course of action to remain in essence the same, it must fit the relevant meanings that are found in the corresponding social stock of knowledge (Luckmann 2008). The less *significant* role a material change that is attached to the problematization has, the closer a disruption is to the cognitive extreme. In fact, when following the given definition strictly, a cognitive disruption does not require a stable material condition; instead, it only requires that no references be made to those material changes. Although cognitive change might seem an abstract concept whose manifestations cannot be found much in empirical reality, this is far from correct view.

Our contemporary societies are filled with abstract knowledge, which can only be disrupted cognitively, and thus cognitive disruptions become more important every day, if and when we are interested in such change. Through "progress," societies have become increasingly specialized so that the share of specialized knowledge has increased up to a point where all individuals are dependent upon it; one can hardly survive anymore with only general knowledge without the help of specialists. Think of food and shelter, for instance. What is more, an increasing part of this ever more important specialized knowledge seems to be based on intellectual labor and is detached "from the immediate act-context and the necessities of its use in concrete situations" (Schütz and Luckmann 1973, 303; see also Lefebvre 1968). While this is not to say that all special knowledge is de-pragmatized, abstractions and "pure theory"

seem to be constructed at an increasing speed.

By definition, a material disruption, in its strictest sense, can *directly* disrupt only those practices that involve material activities. The less practices involve material activities and the more they are constituted by abstract knowledge that is detached from any direct activity, the less they can be directly disrupted by material changes. This should be seen as a central point in terms of change in our contemporary societies. Another thing is, of course, that the subsequent interpretations of these material changes can reach any type of practices. For example, practice has been seen as "what agents *actually do* in a given field, for a given situation" (Golsorkhi et al. 2009, 783); if a practice is constituted materially by (thousands of) individuals sitting in front of the computer and only moving their fingers, it is very difficult to disrupt such a practice materially, apart from attacking the virtual system where the activity "really" takes place. When it is a question of dispersed practices of reading, thinking, discussing, and writing, it is even more difficult.

In our contemporary societies, change most often takes the form of changes in interpreted meanings. Even the most radical material changes are rather distant for most individuals. Earthquakes, wars, famines, hurricanes, floods, tsunamis, bombs, riots, terrorist attacks, political uprisings, and most other material events do not have a material impact on the large majority of the individuals on the planet or even in a particular society. Since the majority of people hear about these events through the mass media, their scope or significance in general is constructed through language and images. Certainly one can argue that disruptions such as economic crises or climate change would disrupt the practices of the majority of people. However, the real material disruption that these disruptions inflict is again rather negligible for the majority of people (for climate change, see Ollinaho 2011). Although these issues are made concrete by their very transmission and interpretation (Munir 2005), the material part of these disruptions is typically insignificant in the lives of the large majority of people.

Summary and discussion

Overall, disruptions can be seen as being situated on a continuum, where one extreme has to do with pure material disruptions and the other extreme with pure cognitive disruptions. This is similar to the distinction made by Morril et al. (2003), who distinguish between symbolic and material forms of covert conflicts. They argue that the material forms of conflicts attempt

to subvert organizational technologies and resources, whereas the symbolic forms of conflicts attempt to subvert dominant meanings and discourses, and that these two forms of conflict are typically intertwined. However, the difference between the conduct of problematizations (as in Morrill et al. 2003; Hond and Bakker 2007) and the basis of problematizations, as scrutinized here, is fundamental. To concentrate on conduct is not the same as to dig into the reasons that triggered this conduct.

I addressed these elementary types of disruptions in a simple situation, that is, where there is only one dominant unquestionable meaning. Empirical situations typically present various established typifications with regard to established practices due to the specialization of societies (Schütz and Luckmann 1973) and to the level of insulation between social groups (Reay 2010). It is thus not the case that one coherent typical meaning would establish itself and change only when one single individual confronts his or her subjective stock of knowledge. Rather, there are various groups that have assigned their own meanings to established practices or the status quo. Thus, as Friedland and Alford (1991) suggest, various and even contradictory institutional logics can prevail. These various shared meanings might then be contested in various types of situations where the members of the two groups interact. It is then through a dialectical struggle that these different logics or meanings are reproduced and destroyed.

However, the conceptual treatment of these ideal types of disruptions is important. The most important insight that such a treatment offers is the different nature of the material and the cognitive in terms of change. In an ideal situation, which in the case for the type of *institutional* change that begins with unquestioned shared typical meanings, changes in the materiality are at the outset relevant or at least concern everybody. Think of an earthquake, for example. This is the total opposite in the case of a cognitive disruption; with a cognitive disruption the change starts not as a wave-like phenomenon, but as a process emanating from a single point. When an individual attempts to legitimize a problem due to changed cognition with regard to a practice, it is from the outset "somebody else's problem" for all others. The legitimation starts at a "different" point, so to speak. The corollary, cognitive disruption, when compared with material disruption, has to be seen as more ineffectual.

Although analytical, I argue that these elementary types of disruptions help us to understand the different patterns of change that take place in our societies. A centrally important point is

that every practice not only involves meaning-structures, but also an activity that always requires and produces something material. Irrespective of whether the disruptions are cognitive or material, in order to disrupt practices through disruptions, some sort of *problem* should be constructed that can be attached to them. While problems are uniquely subjective, the process of *problematization* is not. Problematization or problem legitimation is inherent in any disruption, no matter how brief it might be. However, those who receive problematizations do not perceive them as constituting a problematic situation. Problematizations entail analytical problems, which should not be seen as subjective problems, that is, as problematic situations that *must* be solved.

Accordingly, when addressing broader level societal changes in particular, the main aim of legitimizing a problem is not to make others solve it, but rather to explain and justify actions that are aimed at transforming established practices. If the reason for change is not explained, the change is not understood; if it is not justified, it is not approved. Certainly, through problem legitimation it might be the case that some people adopt the problem as their own so that they change their interpretations and thus their actions accordingly. The scale of change due to legitimate problems is related to the power of those who "own" them (Cowan 1986). Thus, those who "have" the biggest problems also have the greatest license for their actions, which they argue will resolve the problems. We can think of various issues from the past, for example the war against terrorism and the quasi-permanent flow of crises in the economy (Klein 2007).

How these analytical considerations can be observed and analyzed in empirical reality is a question that needs to be answered in its own chapter, the next one. These processes have to be sought in social interactions. In the case of human societies, this interaction is for the most part *communicative*. Accordingly, Phillips and Hardy argue that, "without discourse, there is no social reality, and without understanding discourse, we cannot understand our reality, our experiences, or ourselves" (Phillips and Hardy 2002, 2). If we are interested in change in the realm of discourse, we should "look for historical 'events', not in the sense of wars, the decisions or the deaths of kings, but in the sense of emerging problematizations of established regimes of practices" (Keller 2005, 6). Depending on the phenomenon that is under investigation, one can seek these texts in various forums. Here, the interest is on a society level phenomenon and thus the forum most adequate would be that of national-level discourse. This

level seems adequate since the "symbolic world can only be constructed theoretically at the institutional level" (Friedland and Alford 1991, 242). Since this, of course, can be done in various ways, in the next chapter I explain and justify the approach that I use in this dissertation.

> A social science that is committed to the empirical study of social reality must take systematic account of the intersubjective construction of the reality which it investigates. The methodology of social science is therefore necessarily two-layered. The first layer is reconstructive and the second explanatory. Both layers are necessary in the scientific study of social reality. (Luckmann 1989, 159)

4. Methodology: social constructionism and discourse analysis

The aim of the previous discussion was to elucidate the theoretical lenses through which the investigated reality and its social phenomena are perceived in the analysis. Nevertheless, the conceptual framework does not directly offer any specific methodological approach: it does not suggest how to investigate these processes in social realities and how to generalize the empirical findings. According to Luckmann (1989), the methodology of the social sciences has two layers: one reconstructs a phenomenon in the past empirical reality and the other explains it. For this, not only the plausibility of the explanations or claims has to be considered, but the plausibility of the grounds, that is, the reconstruction upon which these claims are based, must also be considered. This chapter discusses these issues.

Thus, the main task of this chapter is to describe and justify the empirical grounds of the argument and to make explicit the reasoning employed in this dissertation. To describe the empirical grounds, that is, how and with what data I reconstruct the empirical reality, I explain and justify the use of newspaper articles as empirical material in a single, historical case study by taking a constructionist stance. This includes not only providing detailed information on the data of the Brazilian alcohol program and the data collection process, but also on the features of the main and only data source, Folha de São Paulo. I make explicit the assumptions and motivations I have for the data. Then, I explain and justify how I assess this material and consider the reasoning that they employ so as to connect the empirical material with the arguments made in this dissertation.

It is important to justify one's reasoning in any scientific argument that is based on empirical analysis because there is an unavoidable logical gap between empirical data and theoretical

generalizations; induction is never waterproof (Toulmin 2003). What is more, there are no universally accepted principles, only conventions that govern the process through which researchers proceed from various grounds to various claims in an attempt to convince an assumed audience, especially in qualitative research (Ketokivi and Mantere 2010).

I ground my methodological discussion in various sources (e.g. Fairclough 1992; Wodak and Meyer 2001; Jäger 2001; Phillips and Hardy 2002; Toulmin 2003; Yin 2003; Flick et al. 2004; Keller 2005; Maguire and Hardy 2009; van Dijk 2009; Teubert 2010; Ketokivi and Mantere 2010). I have structured this chapter in the following manner. I first make some epistemological notes concerning the nature of data in the social sciences and the reasoning used in it. Then, I provide an overview of discourse analysis and situate my approach within it. After that, I clarify the features of the data, provide details about the data collection process and discuss the limitations and assumptions that have to be taken into account when coming to terms with such data. Finally, I discuss the principles used in the narrative construction and explain how I code and analyze the empirical data in the analysis in Chapter 6.

Some epistemological notes

Although the material world exists and is real, we have to acknowledge that human experience of it is fallible; issues or details that present themselves as facts may turn out to be illusory (Luckmann 1989; Archer 1995). In social constructionism, ontological realism is of a particular type. In addition to an "outside," reality that can be objectively observed, described, and explained, human reality has an "inside" component as well, one in which we find a world of individual subjects (Luckmann 2008). This signifies that the "objective" data of the social sciences originate in subjectively meaningful human activities (Luckmann 2008). The subjectively meaningful activities form a layer from which the natural sciences abstract is what constitutes social reality. It is precisely the layer that social scientists must investigate (Schütz 1962).

Objective reality is an intersubjective accomplishment of the entire human community that spans many generations; it is not absolute (Schütz and Luckmann 1973). There is widespread disagreement about whether social realities exhibit structures that exist *outside* individuals or not (Elder-Vass 2010). Here, strictly speaking, no social structure exists outside the collective mind (Luckmann 2008). However, as long as most of the individuals stick to their habitualized

activity and to their typifications (while most often being unaware of them) in the established material settings, patterns of activity are certainly produced and reproduced, thus forming an observable structure (Archer 1995). Whereas this social structure existed before us and will exist after we are gone, the material world wherein this structure is embedded exists prior to any social arrangements (Marx 1971). Nevertheless, there is nothing meaningful *per se* about this materiality.

As a result of social interaction, a series of common-sense constructions of reality, though-objects that determine the behavior of the individuals living therein, are constructed (Schütz 1966). The sociologists of knowledge call this construction a social stock of knowledge (Berger and Luckmann 1966), as discussed in the previous chapter. The social sciences, as Luckmann notes, "reconstruct as knowledge small parts as well as larger wholes in shorter as well as longer stretches of historical social worlds" (Luckmann 2008, 282). Thus, the social sciences study something that is already constructed as social reality by individuals living in it; all data in the social sciences is pre-interpreted, unlike data in the natural sciences (Schütz 1967; Soeffner 2004). Thus, social scientific understanding differs from everyday understanding in that the interpretative achievements do not happen in the "here and now" with reference to everyday understanding; rather, they happen with reference to the special knowledge of the researcher, the "disinterested observer" (Schütz 1962; Soeffner 2004).

By the time the researcher begins his or her research, the actions to which the reconstructions relate are gone forever and no longer repeatable. If the actions are still at all accessible to understanding, they are represented in particular traces and present themselves in the data as completed actions (Soeffner 2004). The methodology used in the social sciences is necessarily two-layered: the first layer is reconstructive and the second is explanatory (Luckmann 1989). The analysis of social realities begins with reconstruction, where the data is established, and proceeds to explain the achieved reconstruction of the social realities. Explaining, that is, claiming something based on reconstructed past actions, is another dilemma in which one uses reasoning of some sort.

According to Toulmin (2003), grounds, claims, and warrants are inherent in reasoning and in any argument. Within this framework, claims are "assertions put forward publicly for general acceptance" (Toulmin et al. 1984, 29); they ground the underlying foundation that is necessary if a claim is to be accepted as solid and reliable. Empirical material does not comprise the

grounds alone; conceptual development and theoretical premises are also a part of it. The task of this chapter is not only to assess the characteristics of the empirical grounds, but also to discuss the warrants of the claims (Toulmin et al. 1984). The warrants constitute the reasoning, which provides "the justification for bridging grounds to claims" (Ketokivi and Mantere 2010, 317).

According to the categorization used by Ketokivi and Mantere (2010), the reasoning through which I attempt to establish authenticity in my argument here belongs to the "contextualization" strategy as opposed to the "idealization" strategy. I seek to establish contextual authenticity in my reasoning mainly through providing maximal access to the empirical context, that is, through "empirical contextualization" in the vocabulary of Ketokivi and Mantere (2010). According to the same categorization, I employed "theoretical contextualization" in previous Chapter when justifying the cognitive-material continuum of disruptions and prioritizing it over the conventional exogenous-endogenous approach by deriving it from conceptual premises. Inference in contextualization embraces the notion of abduction, where scholars seek and justify the best explanation for a surprising observation (Paavola 2004).

Discourse and its analysis

The concept of "discourse" is a popular and broad concept that has been used to refer to various phenomena addressing communicative activity in social systems (Fairclough 1992; Richardson 2007). Scholars have conceived of discourse as a representation through which societies are described or as a means of constituting social worlds (Alvesson and Karreman 2000). The latter extreme, which sees language put together as discourses that naturalizes or *constitutes* social reality, is obviously the view to which I subscribe here. As seen here, discourses involve practices of producing, disseminating, and consuming texts (Phillips and Hardy 2002), which systematically form the object of which they speak (Foucault 1972). They produce the sets of concepts, values, ideas, and relationships that depend on the ongoing generation of texts of meaning and on making them accessible to others (Phillips et al. 2004).

Mass media and newspapers

Newspapers—as well as other forms of mass media—mediate discourse and have a public

nature: whereas it is individuals that create texts that form discourses transmitted by media, they are received by "everyone," that is, in principle, the interpretations are available to everyone. Whereas another, rather naïve principle holds that everyone has a voice in the discourse, "our modern society is neatly divided into those who are commissioned to produce texts for the media and the rest of us who consume them" (Teubert 2010, 1). In a similar vein, Gamson et al. observe that, "all the trends seem to be in the wrong direction - toward more and more messages, from fewer and bigger producers, saying less and less" (Gamson et al. 1992, 373).

Certainly in some sectors of our societies, the mass media has largely replaced the old institutions of truth and functions as the primary source for understanding the world (Talbot 2007). To put it differently, the secondary experience that is supplied by the mass media has "taken over the role that a person's own experiences and those of their friends and neighbors had for former generations" (Teubert 2010, 1). Thus, general knowledge has come to be dominated by the mass media, which thus generates the relevant "'problems', which require 'solutions', which generate 'problems', which require 'solutions'" (Luhmann 2000, 78), and so on; in other words, it as a whole functions as the main forum of legitimation struggles at the societal level. Although not all members of a society would necessarily receive texts transmitted by the media, they are received by a "mass" of people and reproduced by them, particularly in the case of dominant media, such as major newspapers.

While other media, such as television and the internet, have increased their share in this flow of communication, newspapers still play an important role in the construction of knowledge and reality (Gamson et al. 1992). In the time span of the present study, that is, from 1975 to 2000, the role of the newspaper in Brazil was arguably salient. However, newspapers are not merely objective mediators transmitting raw information; rather, "all forms of knowing and talking about reality require position-taking" (MacDonald 2003, 11). The mass media and the journalists who are a part of it have the "power to decide what issues to raise, which perspectives to take, whom to give voice to, which voices to marginalize, and what to leave unsaid" (Vaara et al. 2006, 794). The media does more than just report the news; it chooses to focus on particular issues and treat them as news. Generally speaking, news is an interpretation of an event that takes place in a given social reality.

Hence, just as production and transmission of the news is intimately linked with the actions

and interpretations of powerful individuals and social groups (Richardson 2007), these interpretations seem to be made within the dominant positions in societies and involve issues that are relevant to the dominant actors. What is more, the mass media, including those that are privately owned, are not only profit-making organizations, but also fundamentally political organizations (Tuchman 1991). The political alignment of a particular media source might range from political parties (e.g. Moufahim et al. 2007) to national interests (e.g. Li 2009). Although the social actors who have control over the structures of transmission are few in number, it is impossible to determine common meanings in a strict sense because people interpret what they read within the context of their own situation (Fairclough 1992; Jäger 2001). This is by no means to say that a manipulation of meanings would not be possible.

Of course, journalists are dependent upon the politics related to newspaper publishing, information sources, and their audiences. Typically journalists are dependent upon the particular journalistic practices to which they subscribe (e.g. Boykoff and Boykoff 2007). What is more, it is obviously beneficial for a newspaper to have plausibility or neutrality and to be perceived as "objective." In the present case, the Brazilian military regime imposed a different kind of constraint on journalists: censorship. As recently as 1975, a journalist was killed by the state because of his writings.

Discourse analysis

Discourse analysis is generally taken to be the analysis of, for example, written texts, spoken interaction, and the multimedia texts of television and the nternet, that is, "texts" in a broad sense (Fairclough 2005). There are no regulated approaches to discourse analysis that would determine how to conduct analysis because there are so many types of data and analysis (Parker 1992; Phillips and Hardy 2002). Since discourses can be explored by examining the texts that constitute them, in their entirety they are immense and, as such, they are out of reach of any empirical research (Fairclough, 1992). Social scientists, therefore, are forced to work with traces or pieces of them (Phillips and Hardy 2002). Discourse analysis is not only about interpreting texts, but also about analyzing the production of reality, which is performed by discourse (Jäger 2001). Discourse and language are carriers of various types of objectivated knowledge (Schütz and Luckmann 1973), which maintains its full validity at a certain place and at a certain time (Jäger 2001).

I borrow ideas and tools from critical discourse analysis (e.g. Fairclough 1992; Wodak and Meyer 2001; Richardson 2007). However, I do not assume a critical stance as such. Since critical discourse analysis is mainly interested in power, social inequalities, oppression, and the domination inherent in any social system, the tools for it can be used in various ways (Phillips and Hardy 2002). Within this context, Hardy argues that rather than analyzing who benefits and who does not from a particular discursively constructed social reality, "constructivist studies aim at understanding the intricate way in which discourses lead to the creation and reification of certain phenomena" (Hardy 2004, 416).

Following these lines, I attempt to provide a detailed exploration of the way in which a particular social reality was constructed through the organizing properties of discourse. This, of course, is not to say that I will not be *critical* in terms of unmasking the patterns of the actions that are taken. An essential component of constructionist discourse analysis is the notion that "no single text is sufficiently powerful to bring an object into being" (Phillips and Malhotra 2008, 713). In order for particular meaning-structures to enter into the social stock of knowledge and the symbolic order (Keller 2005), a sufficient number of texts should be produced and reproduced. As texts draw upon one another, they reify the social reality represented in the texts as factual. Therefore, constructionist discourse analysis does not simply concentrate on individual texts or discourse fragments, but, rather, one "must refer to *bodies* of texts since it is the interrelation between texts, changes in texts, new textual forms, and new systems of distributing texts that constitute discourses over time" (Phillips and Malhotra 2008, 712).

Diachronical and synchronical approaches

As a device of analysis or an analytically distinguished entity, discourse can be structured according to the "discourse planes" in which it takes place: newspapers, television, journals, or face-to-face interactions (Jäger 2001). Moreover, "levels" of discourse, for example all-comprising societal inter-discourse, specialized discourses, various sub-discourses, or "discourse strands," can be distinguished (Keller 2005). Of these structures of discourse, "discourse strands" are of interest to me. These "thematically uniform discourse processes" (Jäger 2001, 47) are reconstructed around certain themes. Discourse strands can be seen to have two timely dimensions: synchronic or diachronic.

The former, more common type of synchronic discourse found in social scientific research, refers to "snapshots" of discourse where a discursive event is analyzed by using texts produced at the "same" point in time (Flick 2004, 146). The latter type of discourse, diachronic discourse, refers to longer periods of time in which discourses are thematically analyzed. Whereas in the synchronic approach one typically gathers texts from various sources, in diachronic analysis the researcher can even concentrate on a single source of texts (Jäger 2001). My analysis here clearly belongs to the diachronical dimension because I analyze a relatively long discourse strand. Central to such an investigation is the plausibility of the continuance of the theme, that is, the linkage between the discourse fragments that constitute the strand (Wolff 2004). I look at one single newspaper and focus my data collection around one theme to ensure that the texts are interlinked.

Meaning and discourse

Whereas the interest here is in the longitudinal processes through which meanings evolve, we have to understand how meanings are constituted through social interaction. Every object is a thought-object entailing idealizations, categorization, and generalizations (Schütz 1962), as well as motivations, urgencies, and legitimations for action (Keller 2005). We can only understand these thought-objects, and thus institutions, if we understand their history (Barley and Tolbert 1997; Luckmann 2008). While some thought-objects (i.e. objects), such as rocks, airplanes, and books, have an "ontological existence" so that we cannot *wish* them away (Luckmann 2008), this ontological existence does not tell us anything whatsoever about how we should act toward these objects. Thought-objects that lack a concrete manifestation are called "concepts" (Hardy and Phillips 1999).

According to the sociology of knowledge, meaning "is the rock upon which the whole structure of common-sense thought is erected" (Schütz 1962, 3). Thought-objects are not a simple or "objective" characterization of a phenomenon, but rather a complex meaning-structure, which is ultimately based on a subjective stock of knowledge. However, knowledge that is routinely transmitted to "everyone" through discourses can be seen as constructing thought-objects of a general type, that is, "general knowledge" (Schütz and Luckmann 1973). The social part of subjective knowledge (Gomez and Boudy 2011) entails a complex web of meanings, which ultimately links historical, economic, social, and political phenomena to the individual lives of

people. As discussed in Chapter 3, this general knowledge has been de-pragmatized through the specialization of societies (Schütz and Luckmann 1973).

Since social obligations are constructed through various discourses and give ready-made meanings to our material environment, discourses are also fundamentally embedded in the material world. Certainly discourses have real effects outside the discursive sphere. It is, however, impossible to provide an infallible link between the discursive and the "real" (Ketokivi and Mantere 2010). Nevertheless, discourses evolve through the production, transmission, and consumption of texts. It is through negotiations (Barley 2008; Teubert 2010), or discursive struggle (Hardy and Phillips 1999), that the meanings of different lexical items are transformed. Some meanings prevail due to their superior arguments, the subject positions of their producers, or for other reasons (Toulmin 2003).

According to institutional theory, when the meaning of a phenomenon becomes evident, the explanations that previously came with it are gradually abstracted (Hardy 2004; Green 2004; Green et al. 2009). This gradual abstraction means that the issue becomes sufficiently familiar so that it is left unspoken; it is institutionalized. The opposite should be seen as taking place when meanings are transformed. As an already sealed meaning attached to an established practice is opened through questioning, this is manifested via the reappearance explanations, evaluations, and justifications. The process of deinstitutionalization should thus be seen as being manifested in the increased number of explanations and evaluative issues attached to the practices or the phenomenon in question. Moreover, these evaluations have a *negative* connotation whose negativity is the primary motivation for the increase in the number of explanations; somebody has a problem of some sort with the previously unquestioned meanings and attempts to problematize it (see Chapter 3).

Knowledge in discourse

The sociologists of knowledge distinguish between two types of knowledge: special and general. Although newspaper articles are not read by everybody, they are still routinely transmitted to the masses, that is, to "everyone." To put it differently, in principle it is possible for the layperson to follow them. Thus, the stream of interpretations coming from various mass media contributes to the general knowledge of the masses. Of course, this does not occur in all cases, in particular in the case of Brazil. Nonetheless, the knowledge produced and

transmitted in the media and newspapers is taken here as salient in terms of the production and reproduction of the social world.

This general knowledge is typically a result of interpretations where some sort of special knowledge is used. In other words, the "applications" and "consequences" of special knowledge are routinely transmitted to "everyone" via communicative construction in contemporary societies (Schütz and Luckmann 1973), mostly via the mass media. Thus, the parts of general knowledge available in newspapers can be seen as arising from the "applications" of special knowledge inherent in, for example, journalism and economics and other provinces of special knowledge that journalists use when writing the news. Even though they contain de-pragmatized or practical knowledge, newspaper articles provide exactly the same interpretation that they originally provided—irrespective of how our subjective stock of knowledge might have changed over time.

As a consequence in this particular research, the original interpretations published in the pages of Folha de São Paulo that I found in the archives are exactly the same objectivations that the individual Brazilians read at the time, when the articles were first published. Hence, the same articles that I analyzed contributed to the general knowledge in Brazil when they were originally published, read, and discussed. Evidently, all the other objectivations that took place in various types of social interaction and their subsequent translations are available only in subsequent articles and recorded texts. Overall, while I do not claim to be able to say anything about the way individual members of Brazilian society perceived the research object, I can arguably say something about the collective or social stock of knowledge and, in particular, about the ways in which this general knowledge changed.

Research design and data

The research setting for this dissertation is based on a single longitudinal historical case study aimed at theory building (Maguire 2002; Maguire and Hardy 2009), which investigates the role of materiality in the process of institutionalization and institutional change. The objective of the study was to analyze the patterns of change in the discourse strand that addressed alcohol fuel in Brazil. The discourse strand includes articles dealing not only with the Brazilian alcohol program, Proálcool, but also with the alcohol car, alcohol production, and alcohol consumption as well as with pollution, transportation, and agriculture, that is, the neighboring

discourse strands. I use one of the main national newspapers of Brazil, Folha de São Paulo (Folha from now on) as a single data source.

There is no doubt that the other national newspapers of Brazil, such as Jornal do Brasil and Estado de São Paulo, would have yielded a more fine-grained narrative pertaining to the discourse and the events that shaped the discourse. However, in the 1970s Folha de São Paulo emerged as "the most important forum for the national debate over the need for fundamental political, economic, and social changes" (Skidmore 1988, 174), and it has arguably maintained this position to date. What is more, newspapers typically borrow from one another, which means that the major newspapers rarely "miss" relevant events. The use of other newspapers would also have resulted in a number of articles beyond the scope of a single dissertation.

In Brazil, major newspapers, especially Folha, are arenas of debate where opinions might vary significantly. According to my view, the political stance of Folha in the 1970s and 1980s was pro political liberation and equality. Folha criticized the policies of the military regime. In the 1990s, Folha's editorials clearly shifted towards a neoliberalist stance and they frequently argued for economic liberation. This is understandable since, throughout the 1980s, Brazil remained very closed in economic terms (Fausto 1995). In my analysis, I avoid attributing individual voices to the discourse in order to reveal the more typical structures of meanings, thus taking a phenomenological stance (Howells 1998). My focus is on the construction of problems and solutions at a societal level (as in Norbäck 2011). Thus, instead of concentrating on how and what was said, I concentrate on what was *typically* said (Schütz 1962). I also take this approach to reduce the confusion that numerous names would introduce to the analysis.

Whereas the articles that I used are from various sections of the newspaper, the economic affairs section was by far the most important in terms of the alcohol industry. Also, editorials and columns addressed the program rather frequently. In the narrative, I only explicitly mention editorials when referring to them. Chronologically, the articles begin with the preparation of the alcohol program and continue until the end of the previous millennium, that is, between the years 1975 and 2000. I selected 1975 as the starting point since alcohol as a principal solution emerged in that year in the discourse. It would have been interesting to see how the problem of the trade deficit was legitimized as a problem in 1973 when the price of oil surged, but this problematization seems not to offer other insights than those that are analyzed in Chapter 6. However, it was necessary to begin from the launch of the program and

not during later phases of it in order to understand the patterns involving alcohol fuel.

Although it would have been opportune to inspect the discourse all the way through the present, the year 2012, this was impossible with regard to the time and effort available. Especially from 2007 onwards, the number of articles dealing with alcohol in Folha exploded so that the sheer number of articles made it impossible to scrutinize them within the given time and in the chosen manner. Larger number of articles could have prevented me to absorb well into the earlier material. This, in turn, might have prevented me from understanding some salient although not overly visible patterns in the discourse, for example the small-scale alcohol production and the questions having to do with land reform. The interest here, though, is in the evolution of the meaning over a rather long period of time and the chosen period provides sufficient material to satisfy the investigation. In addition, the major event that arguably had the most disruptive impact on the alcohol program took place in 1990.

Regardless, the pattern that Brazilian alcohol has been taking in this millennium is, as well, fascinating. After the catastrophic end to the millennium in terms of Proálcool, it was re-launched and enjoyed new-found success at the beginning of the 21st century, which has continued until the year 2011. The alcohol-fuel configuration began to accommodate flex-fuel cars, various technological advances, and new possibilities for exportation. Although the sector seemed to face an unproblematic future between 2006 and 2009, it has now been struggling with growth and high prices (Almeida and Veigas 2011). Actually, these problems share the same "root problems," which can be sought in the patterns of alcohol production, its demand and the system that these two are a part of. Thus, instead of focusing on the recent patterns of alcohol use, I found it more interesting both empirically and theoretically to inspect the foundations of the alcohol configuration in Brazil.

Data and its collection

The actual data collection was conducted mainly during the year 2010 in Brazil. It was by no means trivial, since the articles in electronic format for Folha (www.folha.uol.com.br) were available only from the year 1994 onwards. Thus, the process of collecting the articles before that year posed some practical obstacles; they had to be sought in the archives of the headquarters of Folha de São Paulo. In fact, I ended up conducting the actual data collection in three phases. I first collected the material in electronic format, from 1994 to 2000. I conducted

searches with various keywords in the database. Since the importance of the keywords varied according to the period of time under consideration, the three most important terms turned out to be the following: "sugarcane alcohol," "Proálcool," and "alcohol fuel." Altogether, these searches resulted in some 1050 articles for the period, thus a little more than 170 articles per year on average.

As in terms of the older material, I visited the headquarters of Folha, in São Paulo, in order to conduct a manual search of the archived material. I photographed the topical content of the newspaper from 1975 to the end of 1993, which resulted in approximately 2100 items that needed to be analyzed. The main body of these articles was sought in thematic folders, which were available in the archives, and thus the body had already been "selected." What is more, in order to better understand the motivations for the launch of the program, I extended my analysis to encompass the period before its launch. For this, I needed to read through the daily newspapers for the years 1973, 1974, and 1975 one by one because there were no thematic folders for these issues.

Nevertheless, this last investigation resulted only in contextual knowledge about the nature of the problems that Brazil was confronting and was something that was not explicitly included in the narrative. The thematic folders were not unproblematic to use in terms of the data they contained on the period 1975 and 1993, since the rigor with which these folders had been compiled varied throughout the period in question. Some periods were evidently better archived than others; I found various types of "holes" in the data, which I filled in using different strategies. For instance, for the period that was most evidently patchy, between the years 1986 and 1993, I conducted a separate search based on keywords in Folha's archives, since it was possible to do so for this particular period. Regardless, even after this, some parts of the data were obviously patchy.

A fortunate occurrence solved this problem: Folha opened an internet site at the beginning of 2011 in which it made available all the issues of Folha de São Paulo from the very beginning of its history. Thus, I was able to find more information for the most poorly represented years, especially 1986, 1987, 1992, and 1993. In addition, I used the novel site to validate the soundness of the previously collected data. However, the search engine in the novel site only worked page by page; it was not possible to search for individual articles. The searches of alcohol had to be made for the most part manually. Besides the inflexible search, the slowness

of the site and the bad scanning quality of some issues also hindered its use as a data source. Thus, it did not render redundant my "traditional" data collection in the dusty archives of Folha de São Paulo.

Nonetheless, the third and last phase resulted in more than 500 articles for the period that was most patchy. The additional material made some difference in my understanding of the patterns that the alcohol program took; some relevant issues were not found in data that I had originally gathered. In particular, the articles relating to the counter-shock of oil in 1986, which brought alcohol and its viability and the destiny of Proálcool explicitly to the forefront in the headlines, had largely been missing. Overall, for the period between 1975 and 1993 I on average found approximately 150 articles per year. For the entire period between 1975 and 2000, exactly 4,126 articles were used, with the average amount of articles being more than 150 per year. The lowest number of articles was 56 for the year 1988, whereas the highest number of articles was 380 for the year 1996. While these numbers might be used to explain something about the patterns of alcohol use, this is not done here. Rather, these numbers only tell us about the quality of the data.

It should go without saying that I did not gather together *all* the articles dealing with alcohol during the entire time period, and not even those published in Folha. In other words, no doubt there are some articles addressing alcohol that I did not find. This is, however, acceptable if we accept the fact that the main *body* of these thematic articles was established, an argument that seems plausible enough. Thus, I believe that there are no relevant or typical issues in terms of patterns of alcohol that would have totally escaped my search. This does not, of course, argue for the irrelevance of other types of source critique.

The source and its critique

I have to make various assumptions in order to be able to say something with my data. A major assumption is about the role of Folha de São Paulo in Brazilian society during the last four decades. Does it have such a role that its articles are not only being read, but that they also influence the social stock of knowledge, actions, and decision-making at the political level? Does the "thin" diachronical data provide enough of the "essence" of the discourse? Can only one, albeit major, newspaper plausibly reveal those traces and direction that the discourse and, moreover, the construction of the object, "Proálcool," took. Can I claim something about

how alcohol as a fuel was constructed by using the selected articles from one newspaper?

Folha de São Paulo and Brazil

Folha de São Paulo is a major newspaper in Brazil; it is written in Portuguese. Thus, I read the articles in Portuguese, and in the case of obscure meanings or expressions, I consulted native speakers, as I am not a native speaker of Portuguese. However, I translated the articles into English only when I wanted to cite an article directly. This is mainly done in Chapter 7. Nevertheless, it is to be noted that between the years 1975 and 2000, not only Brazil, but also the world changed tremendously. Technologically speaking, many technological devices that we now take for granted were non-existent. In 1975, there were no portable music players, no mobile phones, and no personal computers, not to mention the internet. Quite the opposite, almost everything—technologically speaking—that was in use in 1975 remains in use today: few artificial things have disappeared.

Cars had already become popular in some parts of Brazil; on the eve of the first oil crisis, the metropolitan area of São Paulo alone accommodated more than half a million cars. Oil was the dominant form of energy. Television was already confirming its domination, even if the print media had a much stronger relative role in the mass media then than it did in 2000. Pollution, especially air pollution, was one of the recurrent topics discussed in Folha. The fight between capitalism and communism was as fierce as ever, and the US dominated world politics, at least it dominated Brazil's foreign policy. A wave of industrialization was washing across the world, which is still the case today, except that it extends much further today.

The use of cars was quite similar to that of today, only with much fewer cars and roads, more pollution per car, and less security. In Brazil, the main fuel source was gasoline because individual diesel cars were prohibited. Reports and images of car accidents on the front pages of Folha were both normal and shocking. Gasoline was quickly becoming such an important commodity that the media heatedly discussed the issue of price increases whenever they occurred. Most parts of everyday life were very similar to those of today: family, work, car, house, and so forth. The advances in communication technology did little to change these basic features of everyday life. There is, however, a large and important issue to be noted about Brazilian society.

Brazil has one of the highest levels of social inequality of any country. Thus to start with, a

large part of the population had never read Folha (or any other newspaper), some because they never learned how to read, some because they did not have the money to buy newspaper, and some just because its contents did not appear relevant to their everyday life. Thus, the part of the Brazilians that read Folha cannot be taken as representative of the whole population. Even the secondary traces of the meanings available in the newspapers seemed to have little influence on the lives of the poor. Consequently, whatever type of evolution of meanings I analyze, as meanings cannot exist without subjects, I study these meanings in reference to a small part of the population, in a small part of a huge country, principally those living in São Paulo.

Moreover, as Brazil was governed by a military regime until 1985, newspapers as well as other media were being censored; thus, notions of neutral or somehow reliable objective perceptions can be dismissed outright. This radical lack of neutrality continued under the media that was owned by politically charged social actors. The rather visible role of the media in manipulating and securing its interests, interestingly, continues to this day and, for instance, was emphasized in the presidential elections held in 2010. Whatever the case, I will explain the limitations and how they were overcome in more detail in the following section.

Justification of the research design

Discourses are never completely coherent and cannot determine social reality even for that part of the population which "follows" or whose reality is directly or rather indirectly constituted by societal discourse. However, strictly speaking, I do not leave the discursive dimension *at all*. To the extent that there has to be a subject that interprets any meaning, it is the researcher, me. This is true even if I provide some explanations for the "observed" phenomena, that is, the activity with regard to alcohol use; however, I do this only as a means of presenting the contents of the newspaper articles because they typically refer to an event—simply, news—concerning the theme. Nevertheless, and again strictly speaking, I do not to claim any type of relationship between the newspaper discourse and the course of "concrete" actions.

This, of course, is something rather different from some "traditional" research in organization studies where the main interest is in building relationships between sometimes even ontologically different items. The purpose is to understand. This is not unproblematic since,

while remaining in the ideational sphere and analyzing the evolution of the meanings, there is absolutely no way to prove any of these relationships, that is, researchers (myself included) do not have any tool to get into the mind of a particular Brazilian, say, twenty years ago. According to Schütz (1967), it is even impossible to reach past subjective knowledge, strictly speaking. Hence, this would not be possible even through the most in depth of interviews. Thus, the social relations and social identities constituted through the discourse—the interpersonal dimension—are not tapped in any other way than to present the contents of the newspaper articles.

I go to some extent against the typical and even indispensable recommendation in discourse analysis: know the context (e.g. Wodak and Meyer 2001; Phillips and Hardy 2002). Especially in critical discourse analysis, the context might even be more important than the texts themselves. I am not, however, the only one to go against this type of approach; Wolff writes: "the analysis should proceed, in the first instance, from the self-sufficiency of the text and should exhaust the inherent analytical possibilities" (Wolff 2004, 289). In other words, when analyzing documents, there is "a great temptation to invoke contextual information to help with clarification in cases of doubt. However, this should be avoided as long as possible" (Ibid., 288). Taking the texts themselves objects *per se* of an investigation reduces the space for interpretations made elsewhere.

This is even more logical because I have little competence in the contextual dimension; the few years that I lived in Brazil in the recent past does not in any way overlap with the period being analyzed. Thus, while Hitzler and Eberle noted that the interpretation could not be more than an approximation, the quality of these interpretations depends on the "degree of familiarity with, and the 'temporal proximity' of, the particular alter ego in the consciousness of the interpreter" (Hitzler and Eberle, 2004, 69). I would not get far with such an approach with this data. I am not, however, repressed by these notions, but rather, turn them to my advantage. Thus, I read the contents of the discourse without any previously established meanings in terms of Brazilian alcohol, which I would be unconscious of and which could impede my constructionist aspirations.

More importantly, since the essential task of the social sciences is to understand how meanings arise, continue, and change (Schütz 1962; Berger and Luckmann 1966), even if the meanings have to have a subject who interprets the meaning, we can rather plausibly analyze

the evolution of the "objective" meaning through the processes elucidated in this and previous chapters. Indeed, the knowledge found in newspapers *is* an objectivated interpretation, that is, second-degree knowledge, exactly the same as the way the original individuals used to derive their meanings for alcohol. The bodies of the articles can thus be seen as contributing to the formation of a social stock of knowledge about alcohol.

Legitimation of a diachronic account

It is clear that when seeking to understand the *processes* of institutionalization "one needs a diachronic model … as well as longitudinal data" (Barley and Tolbert 1997, 99). Scholars do not often inspect as large and thin a (piece of) discourse strand as I do here, which is not to say that the present study is unique. Those discourse studies that I find to be close in terms of the research setting (e.g. Hirsch 1986; Maguire 2004; Hoffman 1999; Maguire and Hardy 2009; Zietsma and Lawrence 2010), have typically focused on scrutinizing synchronically two points in time, x and y, and then assessing "whether change in an interaction order has or has not occurred" (Barley and Tolbert 1997, 103). Again, this is not to say that these studies would have ignored what took place in between these points in time. However, the approaches in the existing literature seem more to scrutinize the changes that occurred in between these points in time through abduction; that is, they analyze the best explanation for the observed, often surprising change (Paavola 2004).

Barley and Tolbert argue that, besides being able to observe changes, "structuring a study around such events also has the desirable property of allowing the researcher to use a 'before and after' design" (Barley and Tolbert 1997, 104). It seems that these studies typically identify some disruptive events through which a punctuated evolution of institutions takes place (e.g. Hirsch 1986; Hoffman 1999; Schneiberg and Lounsbury 2008). This approach is, however, not unproblematic: it tends to freeze the system at these points in time and neglect what takes place "in between" them. According to previous theoretical considerations (e.g. Munir 2005), it is not just an event, but also a process along which typical meanings are transformed.

Another difficulty when observing two synchronic points is that the processes, which are of a smaller time-scale than the chosen points, cannot be discerned. In other words, we cannot envision changes that were smaller than the aggregate changes from point x to point y. It is not possible to detect something from x to z or from z to y, where z is a point in time between x

and y. I choose various moments in time (if not a flux in time) and inspect the paraphrases attached to a particular lexical item (see Teubert 2010) to scrutinize the nature of these underlying processes. One main motivation for this approach is to highlight *attempts* to change things rather than just the successful changes. Since most attempts at change remain at the level of attempts, to ignore them it is to ignore the processes that underpin the origins of change.

I am not claiming to be able to reveal any absolute truth or statistical significance (Polkinghorne 2005), but rather to systematically illustrate the phenomena I observe. I have three main reasons for selecting such a research setting. The first argument for having such a long and thin empirical data stream is the theoretical insight that, "it is in any case clear that generally relevant knowledge exhibits only comparatively slight, and then only extremely slow, changes" (Schütz and Luckmann 1973, 300). At the level of society, I consider a decade to be more a relevant length of time than a single year.

Second, an average individual mind over the course of time is not shaped by exposure to numerous articles from various newspapers; rather, it is more likely shaped by exposure to one or at most two newspapers. Naturally, there are other media and forms of social interaction that influence individuals. However, I assume that a major newspaper both influences other types of media and is informed by them, and that thus the "message" found in a major newspaper can be treated as an average "message" attained by an average individual, with certain reservations. At least this sliver of the discourse strand *informs* us about the social construction of social practices as an indicator of opinions (Maguire and Hardy 2009). Perhaps with a greater "density" of discursive data one might find richer and more intricate explanations for the phenomenon. However, whereas a greater "density" of data might not harm the analysis, the sheer amount of data would be beyond the scope of any single dissertation.

The third argument has to do with the lack of empirical studies that inspect periods of time when practices are undergoing various types of change. The typical empirical setting in neoinstitutional research either investigates the process of institutionalization or deinstitutionalization, but not both. What is more, it is rare to scrutinize *attempts* at change. Evidently, not only the context of the discourse strand changes, perhaps even radically, in the course of various decades, but the relative importance, political stance, and various other

issues are also exposed to sometimes radical alterations. Here, it might even be questionable to talk about deinstitutionalizing the same practice that was institutionalized previously precisely because it changed due to continuous incremental changes over time.

Constructing the narrative

Whereas the quantitative methodologies have established various types of legitimate and compact ways of presenting both their data and the results they derive from them, here the situation is not that easy. On the contrary, presenting the relevant qualitative aspects of a few thousand articles is anything but a simple task. Processes of change do not open themselves up to the reader via their thematic frequencies or the density of particular words that were commonly used at the time. Neither do more elaborate methods for scrutinizing the neighboring words in terms of the central word make the task any easier. This was the reason why I ended up choosing to reveal my data in the most straightforward way: by reconstructing a narrative out of it. A narrative is also an impeccable way of allowing the reader to understand the object of study.

As noted at the beginning of the chapter, there are no universally accepted and sound principles governing the practical reasoning process in induction, that is, when we proceed from particulars to generalizations. As discussed earlier, my reasoning strategy in this dissertation, both in terms of its conceptual development and empirical analysis, is in essence contextualization. I attempt to establish a contextual authenticity for my reasoning by providing a maximal access to the empirical context through the use of narrative. My strategy is thus "empirical contextualization," as it is termed by Ketokivi and Mantere (2010). Another issue is how these *grounds*, which I establish through the narrative, are linked with the theoretical claims or the central argument of the dissertation. I address this issue in more detail in the following section.

However, I want to lend a strong chronological touch to the narrative, since *time* is indispensable for the phenomenon that I am interested in (Barley and Tolbert 1997). Since articles dealing with distinct themes such as alcohol production, alcohol cars, or foreign capital were not published in rapid succession, but instead were interspersed throughout the time of the discourse, a chronological narrative is ideal format for exploring these themes. I could obviously have helped the reader by providing tables, figures, and graphs in order to

summarize, gather together, and simplify the data. This was something that I chose not to do because discursive categories do not remain the same over time. For instance, the alcohol car in 1978 is not the same thing as the alcohol car in 1990; thus, it is problematic to put them into the same table. The only feature that will help us follow the evolution of Proálcool is to report some "factual" numbers in between the text, such as the number of projects enrolled into the alcohol program.

Furthermore, to present the data in narrative form is also to argue that because of all the contextual issues, one simply cannot compare different periods of time with one another. It is not just that the price of oil or the president changes; indeed, it is that so many issues change that it is difficult, if not impossible, to label any similar issue appearing in two distinct periods of time as being the same. Besides the chronological aspect of the narrative, another principle is to keep as close to the texts as possible. This, of course, is not a simple task, because the texts have to be translated from Portuguese to English. The narrative must also serve as a preparation for the analysis.

Codification and analysis

While Chapter 5 will construct the narrative, Chapter 6 will explain, or analyze, it. In the analysis, I inspect the different types of disruptions that took place during the alcohol program. The process of problematization, as conceived in Chapter 3, is my point of departure in this empirical analysis. As discussed previously, problematization is inherent in any disruption. I seek to analyze whether my conceptually derived arguments have empirical support. In other words, I will assess whether the empirical material makes it possible to establish definite differences between cognitive and material disruptions, that is, whether these categories present similarity within them and dissimilarity between them (see Guérard et al. 2012). Obviously, I will scrutinize only the empirically and theoretically most important disruptions, although the material could have yielded many more.

These disruptions, manifested as various types of discursive events, are illuminated by using direct "proof quotes" (Pratt 2009), which are taken from a number of selected articles. The disruptions are compared through coding problematizations. Codification is not an attempt to capture everything that is going on, but rather it constitutes an attempt to help illuminate the

topic being studied.[4] Since the topic studied here is the difference between disruptions, it seems opportune to employ binaries "in which one member of the opposition is considered primary and while the other is made secondary" (Olson and Fox 2003, 78). Although I do not argue that the disruptions can be entirely reduced to the elegant logic of binary oppositions, binary codes are useful for analyzing the contrasts between disruptions. Instead of attempting to conduct a structuralist study, I employ binaries since "[e]ncoding by binary contrast is a common feature of language" (Brown 1979, 794). Binary opposition is a fundamental organizer of culture, philosophy, and language (Armentrout 2011).

I chose to employ binaries as first-order codes since they can be used to adequately capture the analytical dichotomies conceived of in Chapter 3. I use the essentialist nature of binaries in order to clarify the nature of the disruptions. Apart from making disruptions per se more understandable, I employ binaries to scrutinize the *differences* between disruptions. The selection of binaries is theoretically motivated. With them, I aim to systematically illustrate the theoretical topic that is the point of interest: the different origins of institutional change. Albeit of a general character, these binaries are suited to the current empirical analysis by moving back and forth between theory and the empirical material. Thus, the codes are not only inferential, but descriptive as well (see Miles and Huberman 1994).

As opposed to the bottom-up approach, such as grounded theory (Strauss and Corbin 1990), which is most common in inductive studies (Shepherd and Sutcliffe 2011), I do not let the data speak entirely freely (see Corley and Gioia 2004). It is simply unavoidable *not* to approach data through preconceptions (Kilduff et al. 2011). Besides being "an active reasoner" (Strauss 1987), I harness data via coding, which I derive from the conceptual discussion in Chapter 3, that is, I approach the case via a theory-informed stance (e.g. Segal and Lehrer 2012). Although I explain the use of binaries more thoroughly in Chapter 6, I introduce them here because of their theoretical motivation. According to the conceptual development in Chapter 3, codification should illuminate the *materiality, expectedness,* and *effectiveness* of the process of problematization. I attempt to capture these topics through binaries, which I label changed vs. unchanged, surprise vs. unmasking, and justification vs. resolution, respectively.

Because the extant literature conventionally divides disruptions into exogenous and endogenous shocks (Meyer and Rowan 2006; Greenwood et al. 2008), it is important for the

[4] I owe this insight to Henri Schildt, a pre-examiner for this dissertation.

present codification to illuminate whether this dimension is adequate within this setting. This is done even though, according to the discussion in Chapter 3, such a conventional dichotomy is not indispensable for understanding the fundamental processes through which institutionalized practices are disrupted. This is obviously not done to test theories, which is what is typically done in functional analysis (Gioia and Pitre 1990). Besides analyzing the disruptions, I also investigate the outcomes of the disruptions. This is not done primarily to make causal claims. Rather, the outcomes are indicators that allow me to consider whether or not the problematizations succeeded in questioning certain issues. Even though I explain the codification in more detail in Chapter 6, I clarify some of its features in the following paragraphs.

I ended up selecting four binary pairs, which yielded 16 possible combinations. This is not overly much, but it seems to be enough to avoid the risks of simplification and reduction in analysis. It is clear that the more codes there are, the more the codification can be molded to different situations and the more one can describe with it. However, the more codes that are employed, the less each of them tells about this process. For this, I attempted to only employ a few codes and organized them into binaries to force the contrasts to appear between cases. I see that binaries, by virtue of their relativity, are flexible in describing and characterizing quotes that address varying issues. I do not claim to have chosen theoretical oppositions with my binaries. They only help to form continuums, which are important for the theoretical viewpoints. Thus, rather than being universally accepted binary pairs, these binaries describe the differences between problematizations.

As discussed above, the first-order coding reveals the materiality of disruptions. Actually, I use the binary of changed versus unchanged to determine whether a disruption is cognitive or material. As I comprehensively explain in Chapter 3, this dichotomy can be seen as a continuum in which both ends are exclusively analytical. In other words, there are no pure cognitive or material disruptions in empirical realities. In this view, the codification forces the disruptions to be put into either of these two categories. The rest of the codes are then used to form categories that are employed to distinguish the similarities within and the dissimilarities between them (Guérard et al. 2012). What is more, in a rather broad sense, I attempt to surmise the outcomes of the disruptions. This is not an attempt to claim causal connections between the disruptions and future occurrences. Instead, I use these indications to extend the

discussion and comparison between the disruptions.

To anticipate the results, this development results in three coherent categories (or second-order codes). Since the cognitive type of disruptions form a rather coherent group, the material types of disruptions were divided into two distinct types: jolt and accumulative disruption. These categories are then compared using the empirical material, as a way to make generalizations about the findings. In conceptual terms, the reasoning used in this analysis belongs to inductive inference, since I attempt to generalize the empirical findings (Ketokivi and Mantere 2010). The reasoning used in the analysis, however, is abductive, because I seek to offer an explanation for an anomaly or a surprising issue (Paavola 2004), which in this case is the incoherency of material disruptions. It is a surprise in the sense that I did not become aware of such an issue during the process of conceptual development, although I had a hunch about it (Shepherd and Sutcliffe 2011). To put it differently, the existing literature or theories would not explicitly or readily implicitly suggest such an issue. In general terms, the empirical material can offer anomalies or surprises that the conceptual development has not identified and thus function as a source of novelty (Paavola 2004). This was indeed the case here, with the result being a new type of disruption, which will be discussed in Chapters 6 and 7.

Taken together, the first-order codes, that is, the four binaries, illustrate a conceptual entity, a problematization, which I employ in analyzing empirical disruptions. Binaries are not stable or absolute meaning systems; rather, they are fundamentally relative. What is more, disruptions are always a question of perspective, as discussed in Chapter 3. However, since disruptions always at least partly depend upon a person's point of view, the arguments evolving in a discourse can be, if not objectively, at least *positively* addressed. Analytically speaking, I refer to the general knowledge and problematizations that evolve in the discourse. The point of view is thus that which can best be described with the essence of the terms "common," "generic," "general," and "public." This is obviously not the case when I refer to the actors or a group of actors who are primarily involved in a particular problematization, such as "sugarcane farmers."

Although the actual discovery process in this study was rather fuzzy, it is possible to identify some salient stages of the analysis retrospectively. During the first phase, I sorted out the typical elements and themes that remained within the discourse by virtue of their relevance. Based on this thematic analysis (Vaara et al. 2006) of the newspaper material, I then selected

the significant events and disruptions to analyze. In part, this was done to construct tables with “proof quotes” (Pratt 2009) selected from the discourse. With these considerations in mind, the stage has been set for the next chapter, where I provide a maximal access to the empirical context (Ketokivi and Mantere 2010) through constructing a narrative for the pattern that the Brazilian alcohol configuration took from the launch of one of the most ambitious renewable energy programs in human history to the end of the previous century and—millennium

> The seven sins, which the alcohol program can commit are: alcohol can compete with food production, . . . increase the number of 'bóias-frias,' concentrate the land and income even more, accentuate the imbalances between regions, pollute, let foreign capital enter to the sector of sugar and alcohol, . . . permit the continuance of a model that prioritizes individual transport and the interests of the car industry—thus prejudice options which would be beneficial for the whole of Brazilian society. (Antônio Barros de Castro, Folha de São Paulo November 4th, 1980, my translation)

5. Reconstruction of Proálcool

In this chapter, I reconstruct the history of Proálcool as it appeared in one of the most important national Brazilian newspapers, Folha de São Paulo (Folha). I attempt to reconstruct the discourse in chronological order, but still keep close to the texts. The reconstruction does not use all of the approximately 4,000 articles that I collected and read, but nonetheless more than 900 of them were explicitly used in the narrative. Obviously, the resulting narrative is repetitive, but this was necessary when attempting to stay close to the details and to illustrate the non-aggregate nature of the evolution of the alcohol program. The detailed narrative is also intended to prepare the grounds for the "explanation" in the following chapter.

Even though I concentrate on issues and not persons, some central individuals could not remain anonymous. In this reconstruction, I attempt to keep my interpretational inclination at bay. I mark the publication date of the articles that I refer to in the text. I do not provide a list of the articles analyzed in this dissertation due to their large number. My reconstruction takes place totally within the discourse published in Folha. It does not depict reality outside the discourse, even if it refers to issues outside the newspaper. In order to narrate the events that took place, the traces of which can be found in the data collected, it is necessary to provide at least a brief introduction to the context, that is, Brazilian society at the start of the chosen period. I do not discuss everything going on during that period of time, only those issues and events necessary for gaining an understanding of the beginning of the period.

Context: Brazil in 1975

Brazil suffered from a rather harsh US-backed military regime from 1964 until 1985. It was a period of repression and violation of human rights (Fausto 1995; Skidmore 1988). The repression at the end of the 1960s was especially strong. This was when the country also launched its economic "miracle," which meant that it invested heavily in basic industries, infrastructure, and military hardware (Meade 2010). This "miracle" was, however, financed mainly by foreign capital and resulted in staggering debt and very high inflation, which has marked the development of Brazil ever since. Economic growth was particularly strong between 1967 and 1973, but slowed down in the later part of the 1970s (Bethell 2008).

Actually, the situation at the time became rather unbearable because the cost of imports, especially oil, skyrocketed in the aftermath of the first oil crisis in 1973 and exports could not compensate for these increases. The rapid economic growth also exacerbated income distribution in the country. While executives' salaries were the highest in the world, the conditions for the large majority of people continually worsened (Skidmore 1988; Meade 2010). It was like the richer parts of Western Europe and the poorer parts of sub-Saharan Africa in the same country. Although political repression was not always as sever during Ernesto Geisel's time as president (1974-1979), disappearances and even political murders, such as the famous murder of the Journalist Herzhog in 1975, still occurred at the beginning of his reign. The military hard-liners still had a strong hold on power and attempted to stop the political liberalization that Geisel was introducing (Skidmore 1988). During Geisel's presidency, the infamous intelligence law, AI-5, was suppressed and political parties obtained the right to exist (Fausto 1995).

Towards the end of Geisel's presidency, demonstrations and strikes were common and the military police did not put a stop to all of them, which they had regularly done in the early 1970s. In 1979, the last military president, João Figueiredo, assumed the presidency. He inherited a growing foreign debt and a rather difficult economic situation: the economy had been primed to grow via foreign money. Strikes and demonstrations coordinated by ever more powerful labor unions attempting to improve labor conditions characterized the early 1980s. While they succeeded in bringing some benefits to the labor movement, the protests died down during the deep recession when Brazil was adrift economically. The shrinking global economy and increasing interest rates were poisonous to the Brazilian economy. Between

1981 and 1994, the per capita GDP increased on average by less than 0.1 percent annually, and inflation was running at an annual rate of approximately 100 percent at the beginning of the 1980s; it peaked at more than 2000 percent in the 1990s (Paiva Abreu 2008).

The military regime, besides violating other human rights, censored the media, including newspapers. Public debates about controversial issues did not exist. Rather, debates and decisions were made in closed cabinets, the results of which were announced to the public (Skidmore 1988). Regardless, Folha emerged as a salient forum for debate after the most rigid censure. It reported on the government's decisions and the opinions and insights of government insiders and informed readers about conferences and other central events in terms of the alcohol program. It also organized written debates and gathered specialists together and facilitated spoken debates, including debates having to do with Proálcool. Indeed, Folha emerged during Geisel's government as "the most important forum for the national debate over the need for fundamental political, economic, and social changes" (Skidmore 1988, 174).

However, although Folha was one of the largest newspapers in Brazil, the major part of the population chose not read it, even if they would have been able to read it (see Chapter 4). On the contrary, even today, when it enjoys its highest recorded circulation, the newspaper sells approximately 300,000 copies in the country to approximately 200 million people. In other words, when speaking of Brazilians in this dissertation, I mostly refer to the richest five percent of the country, the small minority affected by the discourse and its topics. Alcohol, nevertheless, was a rather ubiquitous topic in Brazil because it became central to transportation. Public opinion became essential due to the alcohol car, which was central to the success of the program. The next section follows the history of Proálcool as it was discussed in Folha de São Paulo.

Proálcool in the pages of Folha

Setting the scene

The 1970s were marked by great global political turmoil; oil had achieved a dominant position in the global economy and now this dollar-based system was under threat; the oil-exporting countries had unified and started to use their power to control supply and prices. As a result of

the high oil prices and slowing world economy, Brazil fell into a problematic situation in which its trade balance degraded rapidly. It went from having a surplus of US$ 250 million in 1973 to having a deficit of US$ 4.5 billion in 1974, and the trade balance continued to deteriorate from there (14.9.75). In March 1975, the minister of finance announced that Brazil could not continue to have a deficit as large as it did (8.3.75). Besides the slow-down of the export sector, a high dependency on—no longer cheap—foreign oil was poisonous to the Brazilian economy.

Since the Brazilian economy had previously exhibited two-digit growth, it came with a rapid increase in energy consumption. In order to meet the growing energy demand, huge nuclear and hydroelectric power projects were launched (5.3.75, 9.7.75). Brazil constructed the largest hydroelectric dam in the world, Itaipú. Moreover, as a heavily land-based transportation system became increasingly important, the country needed more fuel: oil. Domestic oil production could not keep up with rapidly increasing consumption: approximately 80 percent of oil had to be imported in 1975. This was referred to as the oil impasse: "impasse petróleo." The main solution to the problem was to export more goods (5.1.75). In particular, the oil-supplying countries were seen as new markets to be conquered (9.11.75). Another solution was domestic oil (4.1.75). It was, however, very risky and costly to drill holes into the bottom of the ocean (28.9.75), the best place to search for oil.

It was in this situation that alcohol fuel emerged as a partial solution. Brazil had much experience with using alcohol for transportation. Since 1931, it had been obligatory to mix at least five percent of it with gasoline and the Institute of Sugar and Alcohol (Instituto do Açucar e do Álcool, 'IAA' from now on) was created in 1933 to assist in this process (18.1.78). At the beginning of 1975, Shigeaki Ueki, Minister of Energy and Minas (MME from now on), began to study the possibilities of expanding alcohol production (10.1.75). Besides sugarcane, manioc and sweet potato were seen as the main raw materials for alcohol (14.9.75). These could be cultivated in the poorer regions of the country, like the northeast (9.6.75) and the Amazon (25.9.75). The price of sugar on the international market was high; the share of total sugar exports in 1973 was approximately nine percent, and in 1974 it was almost 16 percent (11.3.75). This made sugarcane-based solutions look improbable.

Brazil produced approximately 659 million liters of alcohol in 1974, and the production for 1975 was estimated to be 765 million liters (26.1.75). There were two types of alcohol: hydrated alcohol (96% alcohol - 4% water), which was used in the chemical and

pharmaceutical industries, and anhydrous, pure alcohol, which was mainly used in transportation as an additive to gasoline. The two biggest consumers of alcohol and oil were the transportation sector and the chemical industry (23.10.75). Alcohol use as a fuel was studied in various laboratories, the most important of which was the Centro Tecnológico da Aeronáutica (CTA); CTA began to develop the idea of "carro a álcool," the alcohol car (14.9.75, 25.9.75). The first attempt to increase alcohol production was via a decree on the 11th of July 1975, signed by President Geisel. The decree was brief and included exclusively alcohol from sugarcane; it did not provide any financial incentives for increasing alcohol production, only tax exemptions for alcohol when used in fuel (12.7.75).

The car fleet was already sizable; in São Paulo there were almost one million cars (25.1.75), which was argued to be too many cars for its streets to handle. The growing number of cars also increased the amount of pollution. Pollution emerged as one of the primary problems in urban Brazil. The gasoline octane number was very low, and thus lead was added to it so that the fuel could burn better. Carburetor engines, however, emitted large amounts of carbon monoxide, which caused serious health problems (13.6.75). Brazilian law permitted manufacturers to use mixtures of up to 20 percent alcohol in gasoline, and studies showed that gasoline that contained as much as 25 percent alcohol would work without needing to modify the engines of cars (16.7.75, 18.7.75). In 1975, approximately four percent of alcohol was added to gasoline. In fact, as the price of sugar had gone up in the first part of the 1970s, the alcohol mixture in gasoline decreased from 500 million liters to 300 million in 1975 (13.6.75).

Sugarcane and geography

It needs to be noted that the agrarian structure in Brazil was—and still is—typically Latin American; large farms, "latifúndios," are typically extensive (see Oliveira 2001). This was especially true in sugar and alcohol production because sugar mills were the largest entities in rural Brazil. Since such entities also cultivated vast areas of sugarcane, by law they had to purchase about half of it from sugarcane farmers. Most of the sugarcane harvesting was done manually and it was, indeed, laborious. Temporary labor accounted for approximately 70 percent of all rural manpower. These "bóais-frias," an unqualified, low paid, and seasonal workforce, the bottom of the workforce in rural Brazil, were particularly prominent in sugarcane harvesting (23.8.75, 31.8.75).

As the land area of Brazil is extensive, regions in different parts of the country greatly vary in their characteristics. Whereas the state of São Paulo was the main producer of sugar and alcohol in 1975, two states, Alagoas and Pernambuco, had held that place for many centuries. Policies related to the sugarcane sector were typically divided in relation to these two main production areas, the rich and productive center-south and poor and inefficient north and northeast, respectively. São Paulo was not only the biggest producer of sugarcane, but also the biggest consumer of oil, accounting for approximately 42 percent of the oil consumption of Brazil in 1975 (8.10.75). After the federal government, the state government of São Paulo was the main actor steering the alcohol program. São Paulo was typically not only proactive, but also optimistic in terms of the sugarcane and alcohol production capacity and technological advances (7.10.75, 11.11.75).

Preparing to launch

The trade deficit officially became the principal problem in Brazil; this was stated by the minister of finance on the front page of Folha on the 10th of August, 1975. According to the newspaper, the deficit was as much as US$ 6 billion in the year 1975 (18.10.75). Accordingly, Brazil, a country where the "petróleo-é-nosso" ("oil that is ours") keeps coming from the Middle East, a tropical country that possesses vast arable areas, has an obligation to *plant* fuel (14.9.75, 28.9.75). On October 9th, President Geisel held a long talk on television where he proposed an alcohol program as one of the main solutions to the crisis (10.10.75). After the speech, the launch of the program was anxiously anticipated (23.10.75, 5.11.75).

Whereas the launch of the program was eagerly awaited, the substance of it was debated. The issues that people generally agreed upon were that the productivity of sugarcane was low and that sugarcane alcohol would be expensive (8.10.75). Some proposed using manioc and sweet potato; they would reduce the production costs. What was more, the price of sugar had been very high. Now, however, it was dropping fast and the sugar producers saw their opportunity in alcohol and lobbied that it should be used as the main raw material for producing alcohol (26.9.75, 23.10.75, 2.11.75). Manioc, however, continued to be discussed and was even produced for a certain number of years, but it never increased its share significantly. Manioc was cultivated in the poor regions, for example Bahia, which lacked modern equipment; thus, productivity remained quite low (26.10.75).

Sugarcane farmers were interested in forming cooperatives and in participating in alcohol production (18.10.75). They had already earlier insisted that the price of sugarcane should be increased, because they felt that it was too low (10.5.75, 21.6.75). The farmers argued that since it did not cover production costs (17.7.75, 17.9.75), sugarcane was even lacking in sugar production (6.9.75). They also noted that as long as the IAA kept the sugarcane prices low, productivity, which was argued to be at a very low level, would not increase. Part of the problem was the poor rural labor conditions; the number of temporary laborers, "bóias-frias,"[5] had increased from approximately 3.8 million in 1967 to approximately 6.8 million in 1972 (31.10.75). The unqualified and migrating laborers were a serious problem in rural Brazil, something which contradicted the aim to modernize the countryside.

It was argued that the root of the problem was rural politics, which were dominated by the Ministry of Finance; the ministry kept the agricultural prices low in its fight against inflation. Opposing this, the Ministry of Agriculture argued that adequate prices (and thus profits) would permit the typically poor and inefficient small farmers to improve productivity and labor conditions (4.11.75). One thing seemed for sure: if the price of sugarcane was kept low, there would not be enough sugarcane for the necessary growth. Nobody was obliged to plant sugarcane. There had to be incentives, that is, an adequate price for sugarcane (26.10.75). However, overall alcohol production had a sound base. The trade deficit was Brazil's primary problem and growth of alcohol production would reduce the oil imports and increase sugar exportation (26.10.75).

Draft decree and a soap opera

At the end of October 1975, the government published a draft of the alcohol decree (31.10.75). The draft, in the form of a decree, would institute a Programa Nacional do Álcool (National Alcohol Program), the main objective of which was to attain an annual rate production of 3 billion liters of alcohol for fuel for industrial and commercial uses by 1980. A permanent working group would be created and chaired by a representative from the Ministry of Industry and Commerce (MIC from now on); it would also include a representative from MME and the Ministry of Agriculture (31.10.75). Financial questions would be coordinated by the Bank of

[5] "Bóias-frias" refers to lowest social class in rural Brazil, the landless rural laborers so-called for the home made lunches that get cold long before eating them.

Brazil. Since the draft retained an absolute monopoly for IAA to purchase and sell alcohol and molasses of any type, it provoked a reaction from the sugar and alcohol producers (31.10.75).

The draft amplified the debate about alcohol. It was argued that the technical dimension of using alcohol in engines had not been discussed sufficiently, even though it was agreed that a 25 percent blend of alcohol in gasoline would be feasible for the existing fleet of cars (2.11.75). The draft was also debated in the Senate. Members of the Senate argued that Proálcool offer a good opportunity to incentivize development in the poor regions. However, the poor regions alone were not seen to be able to produce the needed amount of alcohol. Thus, the rich regions could not be left out of the program. Furthermore, they argued that the monopoly was natural since it was part of the energy program; it would be odd to have something private as a part of the energy sector. In any case, the IAA would continue as before: coordinating the alcohol sector. The surplus ethanol could be freely sold on the market (4.11.75).

There were urgent pressures to launch the program. If the sugarcane plantation was to be expanded the following year, decisions were needed without delay (5.11.75, 7.11.75). The Minister of MME, Shigeaki Ueki, proposed that Petrobras, the state-owned oil company, have a monopoly over alcohol (6.11.75). Besides insisting on the role of Petrobras in the scheme, he promised to increase significantly the purchasing price of alcohol: from Cr$ 0.93 (cruzeiros) to Cr$ 2 (8.11.75). Copersucar, the largest entity of alcohol producers in São Paulo, was against the monopoly (6.11.75). However, after Ueki's proposal for increasing prices, the alcohol producers began to support it (7.11.75) and even took on a patriotic tone (11.11.75) when considering the idea of Cr$ 2.80 (9.11.75). The chemical industry was worried that it would not be able to buy all the alcohol it needed if there was no monopoly (12.11.75).

Regardless, it was not the industrial phase, but the agricultural phase, which was seen as the main problem (26.10.75). Agricultural production was falling behind the established industrial capacity (for sugar and alcohol) and productivity was very low (7.11.75). Sugarcane farmers continued to argue that the price of sugarcane was too low, and that it had been so already since the beginning of the decade (8.11.75). They argued that production costs were between Cr$ 100 and 120 and that the price of sugarcane was Cr$ 80. Thus, there was no incentive to expand sugarcane plantations (7.11.75). The farmers calculated that an alcohol price of Cr$ 2.80 would correspond to a price of Cr$ 187 for sugarcane and not to the current price of Cr$ 80. They argued that it to be very difficult, if not impossible, to reach quotas if adequate prices

were not guaranteed (11.11.75).

Joelmir Beting, an economic columnist, central to the discussion about both alcohol and rural problems, noted that sugarcane alcohol was not like oil, which is pumped continuously. Harvesting would take place in 90 days and would thus require additional investments in storage space. Expanding the sugarcane plantations would require much larger investments than those targeted for the industrial sector. However, in only eight years the savings from the trade balance would be amortized and Brazil would have profit "ad infinitum" with the existing alcohol park. He reminded readers that it is not enough to set prices for sugar and alcohol; they must also be set for sugarcane. After all, nobody was obliged to plant it (8.11.75). The Amazonian region was to have a central role in ethanol production; some 23 billion liters of alcohol could be produced there, it was argued (11.11.75, 12.11.75). Joelmir Beting wrote that the discussion was like a soap opera: everybody wanted to solve all of their problems with alcohol (13.11.75).

The alcohol decree

Then, finally, in mid-November the long-awaited alcohol decree (decree no. 76.593) was launched without a monopoly or quotas (15.11.75). Financial and price incentives aimed at increasing production. The price of alcohol was set at Cr$ 2.21 in the center-south and at Cr$ 2.60 in the north and northeast. The price of sugarcane was increased only to Cr$ 92.18 and Cr$ 113.40, respectively. Financial incentives were introduced as well. Interest rates for loans to increase alcohol production capacity were set at 17 and 15 percent in the rich and poor regions, respectively. Interest rates for loans aiming to expand sugarcane plantations were set at seven percent at a time when inflation was running at approximately 35 percent annually (Folha almanac 2011). Four banks oversaw the financial aspects of the program: the Bank of Brazil, the Brazilian Development Bank (BNDES[6]), the Bank of the Amazon and the Bank of the North-East.

The central controlling organ, the National Commission for Alcohol (CNA), which was created as a result of the decree, decided upon the projects for the alcohol plants. Sugarcane, manioc, or any other raw material could be used as raw material (15.1.76). The program was under the coordination of five ministries: the Ministries of Finance, Agriculture, MIC and MME and the

[6] Then it was called BNDE

Domestic Ministry, as well as the State Planning Secretary (Secretária de Planejamento da Presidéncia da República). In a letter attached to the decree to be signed by the president, the five ministries explicitly wrote down the objectives of the program. The program was to 1) economize foreign currency, 2) reduce regional and 3) individual discrepancies by concentrating on agriculture, and thus increase the income of the poorest people, and 4) expand the production of durable goods in terms of the national industry producing distilleries (15.11.75).

The CNA was to approve the projects that were submitted to the alcohol program using the following criteria: 1) the reductions to regional disparities, 2) feasibility, 3) transport costs, and 4) the necessities that the nearby producers needed in order to expand, that is, the questions pertaining to competition for raw materials (15.11.75). The prices of alcohol and sugar were tied together. After the launch of the program, sugarcane farmers criticized the higher price of alcohol compared to sugarcane; the former was increased by 25 percent, while the price of the latter increased by only 15 percent. They argued that it should have been the other way around. Not only was the price unsatisfactory for existing plantations, it provided even less of an incentive for their expansion (18.11.75). Fertile land that was suitable for sugarcane would be destined for other, better remunerated, cultivation. If, according to the farmers, the price increase for sugarcane was not enough, in the case of manioc it was even worse, which made the manioc farmers disinterested in the program (21.11.75). Agriculture was seen to be the Achilles' heel of the alcohol program; still nobody was obliged to plant sugarcane (18.11.75).

Alcohol as an additive

The first meeting of the Alcohol Commission (CNA) was held on the 17th of December, 1975; even before that, it began to oversee projects for new alcohol plants (28.11.75, 1.4.76, 20.8.76). The program got its famous nickname, Proálcool, soon afterwards (16.7.76). Alcohol was put forth as the main solution to the problem of the trade deficit. Besides economizing foreign currency, it was argued that alcohol production would offer innumerable social benefits (24.7.76). However, in 1976, even as the CNA kept approving projects, it was argued that nothing "material" had yet taken place. Joelmir Beting wrote that the program had not yet fulfilled the stipulations of the decree: none of the 64 approved projects had received their

funding and the program had not resulted in any increase in sugarcane plantations. The price of sugarcane, as farmers had argued, was too low to incentivize production, much less to expand sugarcane cultivation (28.8.76).

Regardless, while the arguments for the program were sound, they were not without their critics. Most of the critics came from the oil sector. One study argued that Proálcool would not enhance energy security since it was based on agriculture; the weather could not be controlled. Also, critics argued that sugarcane production would compete with food crop cultivation and, due to the low quality of labor used in sugarcane harvesting, income inequality would not be reduced; in fact, quite the opposite would occur (12.11.76). It was also argued that vinasse, an abundant residual of the alcohol production process, threatened rivers close to the alcohol plants (14.11.76). These critiques were debated—with much emotion—as soon as they emerged (13.11.76, 17.11.76, 21.11.76).

Confidence in Proálcool increased rapidly with the accumulation of studies that showed the positive technical results for alcohol engines: they showed that an alcohol engine was feasible (21.8.76). The CTA started to test-drive alcohol engines that it had constructed. These engines used hydrated alcohol, which contained approximately four percent water. Long test drives, which ran the length of the country, were reported with pride and enthusiasm (27.10.76, 20.11.76). Besides research institutions studying the uses of alcohol, various individuals reported methods to economize fuel (24.8.75, 20.1.76, 18.2.76, 14.7.76, 3.10.76). The most curious of these was an engine using a mixture containing 50 percent alcohol and 50 percent water (6.7.76, 1.10.75). However, its French inventor never let the CTA test the method (26.11.76). Also, a mixture of 80 percent alcohol and 20 percent water was shown to be feasible by researchers at the University of São Paulo (USP). Pure alcohol trucks were tested in alcohol plants (22.7.76).

It was intended that alcohol would be used as a substitute for both gasoline and diesel fuel so that overall fuel consumption would not decrease (27.10.76, 20.11.76). Moreover, coal was to be used as a substitute for fuel oil so that the nation would no longer be dependent upon oil imports. Although coffee was Brazil's "star export" in 1976, the alcohol program was the MIC's main priority; it was seen as critical for the economy (30.12.76). Little was written about alcohol production methods, although some articles reported that farmers were creating alcohol cooperatives (21.11.76, 8.6.77). The agricultural phase, sugarcane production, was

again argued to be the bottleneck of the program (30.12.76). As it was not obligatory to plant sugarcane, there had to be an incentive: an adequate price (28.8.76). Farmers wanted an official guarantee that all their harvest would be purchased (25.11.76).

Introducing the mixture

Alcohol production, however, kept increasing. The alcohol mixture in gasoline was increased first to 12 percent (22.7.76), and then it was intended that a 15 percent mixture would be launched in 1977 (30.7.76). The state of São Paulo was central to Proálcool, not only in production, but also as the main market for the alcohol. High economic growth had rapidly increased the number of cars in São Paulo and pollution was acknowledged to be a severe problem, with carbon monoxide being the main polluter. Alcohol was supposed to solve this problem; when it was added to gasoline, the fuel burned cleaner and it was possible to eliminate lead from it (30.4.77). Alcohol was introduced in a mixture of 20 percent as an *antipollution* gasoline by the Minister of MME, Shigeaki Ueki, who intended that it be used in the metropolitan area of São Paulo. This "equalized gasoline" was supposed to be introduced in May 1977, but it was delayed until mid July (4.6.77). Critiques and concern about the new fuel were expressed mostly by those in charge of the gas stations and by car owners. The durability and performance of car engines using the new fuel worried people (21.5.77, 27.5.77), and so the fuel additive market peeked (5.6.77).

Next, Oziel Almeida, President of the National Oil Counsel (CNP), announced that an antipollution gasoline would be introduced in Rio de Janeiro and then in the rest of the country in 1981. While experts considered a 13 percent mixture to technically be best, politically the optimal mixture was a 20 percent alcohol mixture (11.6.77). According to Ueki, Proálcool was to be a permanent solution for Brazil. He clarified that Proálcool was only one of the elements of Geisel's energy policy; the others included accelerating oil research, developing hydroelectric dams, other renewable sources of energy, and methods for energy conservation, and preparing Brazil for a nuclear era (17.6.77). However, many argued that Ueki was the main propagandist for nuclear energy and that his support for Proálcool was limited (21.8.77).

The sugar and alcohol producers, on the contrary, seemed to unanimously support a massive mobilization of resources for the alcohol program. According to Folha, this was partly because the international sugar markets were down and partly because the harvest seemed to be good

(21.8.77). Despite the sound arguments for Proálcool, there seemed to be intentional delays; eventually, these delays were even officially investigated (7.7.77). The extensive bureaucracy of the Bank of Brazil was blamed for the delay (16.9.77). Despite the bureaucratic barriers, 31 projects had received their funding out of a total of 131 projects that had been approved by August, 1977 (18.8.77). Since the objective of these projects was to build alcohol plants, the agricultural phase was still seen as the main problem: nature would not leap forward, and neither would sugarcane or manioc production (18.8.77). It was argued that agriculture lacked funding (21.8.77). Some cooperatives started to run alcohol plants (5.9.77).

Alcohol production was, however, growing rapidly and some infrastructural problems surfaced. One of these had to do with the lack of capacity to blend and distribute alcohol. Another problem pertained to stocking. Since sugarcane production was seasonal and fuel consumption rather constant, alcohol had to be stocked between harvests (18.6.77, 28.9.77). Also, the question of the production method emerged. The traditional sugar plants, annex plants, were flexible in terms of their ability to produce either sugar or alcohol, but alcohol production was limited by the IAA in these plants (8.7.79). The other option was an autonomous plant that would produce alcohol exclusively. While, in principle, Proálcool favored autonomous plants, the producers most often opted for annex plants. If something went wrong with the alcohol program, the annex plants could always produce sugar. The more annex plants operated, however, the more the international sugar price would impact alcohol production (30.7.77) and the less alcohol would be produced in comparison to sugar. The government had to ensure that the sugar price would not jeopardize alcohol production (18.6.77). At the end of 1977, it was noted that alcohol production concentrated in São Paulo (19.11.77).

- CNA approved 148 projects, of which 55 received funds (19.11.77) -

Professor Rogério Cezar de Cerqueira Leite ("Cerqueira Leite" from now on) was perhaps the most important columnist at Folha on the topic of Proálcool. He was also a member of the editorial council of Folha. As a physicist who specialized in energy, he had facilities to clarify costs and comparisons involving alcohol, which helped producers in their struggle against Petrobras and others who attempted to harm Proálcool through misinformation. Already in 1978, he argued that the same development that had occurred in the US, where the oil companies attacked attempts to use alternative forms of energy, would occur in Brazil.

Irrespective of whether a company was state-owned or private, large corporations tended to create their own interests, he argued (19.4.78). Petrobras, indeed, turned out to be the main enemy of Proálcool.

In mid-1978, the criticism of Proálcool started to increase; empirical observations of the program began to emerge. Petrobras saw the program as a problem that had to be solved; it argued that alcohol was expensive and that it would be difficult to adapt the oil-based infrastructure to accommodate alcohol (11.6.78, 23.8.78). Also, Joelmir Beting calculated that alcohol would be expensive: even *six* times more expensive than gasoline (13.8.78). Pressures from large multinationals, oil companies in particular, was also slowing the program down because the program threatened their highly promising markets in Brazil (11.6.78). Elsewhere, foes criticized the necessity to transport alcohol across long distances and the high number of annex plants. However, these problems were rather technical and Proálcool enjoyed the explicit support of President Geisel (7.6.78).

- CNA approved 163 projects, of which 79 received funds (11.6.78) -

The main criticism seemed to be associated with the steering and growth of the program (23.8.78). It was argued that Proálcool was too decentralized and thus inefficient (28.6.78); the five ministries responsible for the program had divergent objectives and preferences (20.6.78). Also, it was argued that the IAA always thought of sugar first and alcohol second, which was problematic for the energy program (20.6.78). Storage was further seen to be a considerable problem; the producers and the coordinating organs of the program, the CNP and IAA, did not have a fuel infrastructure. Petrobras did, but it was reluctant to help the program. Its role was only to fulfill the part given to it: to purchase alcohol and resell it (23.8.78). However, in 1978, just like various times in the future, it ultimately seemed to be a mystery just who or what was obstructing the program: everybody claimed to agree with the viability of Proálcool in theory (28.8.78). In the opinion of Joelmir Beting, Proálcool had not yet been born, but instead had yet to be created (27.8.78).

This critique was angrily swept away by the government, which argued that no other program was going as well as Proálcool. The government claimed that soon alcohol and vegetable oils could be used as a substitute for all oil, diesel fuel, and other fuel oil (18.8.78). In the latter part of 1978, a long debate about alcohol production and demand emerged. Alcohol producers wanted to make sure that there was enough demand for their alcohol and car companies

wanted to make sure that there was enough fuel for their cars (30.8.78). The government had to make promises to both; it promised that there would be enough alcohol and enough alcohol cars. Production was growing so fast that without alcohol cars, there would be a surplus of alcohol by 1980. However, the car industry was also making advances; Fiat was the first to produce a "real" alcohol car (4.9.78), and not a converted one. It was to travel across Brazil (13.9.78). With the development of an alcohol car, the rehearsal had come to an end, and it was now time for the real show (5.9.78); the horizon for bioenergy was seen to be infinite (23.9.78).

Miniplants

At the end of 1978, another important dimension emerged in the discourse of Folha. This was the question of how to produce alcohol. While questions of raw materials (i.e. sugarcane vs. others) and production methods (i.e. annex or autonomous plants) had been discussed, the main framework had remained the same: big producers and big plants. Then in 1977, Romeu Corsini, a professor at the University of São Paulo (USP), introduced small-scale plants (1.10.78). These "miniplants," which his research group had studied for a long time, would be self-sustaining in terms of energy, fertilizers, fuels, and feedstock production (8.10.78). The miniplants would use sugarcane and sorghum as raw material. Since the cultivation and harvesting of these crops would take place sequentially, it would make it possible for miniplant farms to employ their laborers permanently, not seasonally, as was the case with the large-scale plants. Corsini calculated that there would even be 150,000 farms that could build their own small plant to produce alcohol for their own and local uses in an economically, ecologically, and socially feasible way (15.11.78).

Corsini criticized the large-scale plants; they presented higher production costs and more entrepreneurial risk. Moreover, large plants would employ their "bóias-frias" for a maximum of only 200 days per year, thus concentrating manpower during peak season. Furthermore, excessive dependence on one type of raw material, the impossibility of redistributing production units in the national land space, and pollution all combined to make the large-scale solution socially and ecologically harmful (18.10.78). Miniplants would solve all these problems and also increase national security and reduce the price of hydrated alcohol. Basic miniplants would produce approximately 20,000 liters of alcohol per day containing 20

percent water. Engines could be cheaply converted using technology that the same research group had developed (18.10.78).

The plan was to launch miniplants as a national campaign with standardized equipment. National ambition would be aroused (15.11.78). It was argued that this campaign would not hurt the existing sugar industry. First, approximately 3,000 miniplants would be constructed; these would substitute for all imported oil in Brazil (18.10.78, 15.11.78). These miniplants would initiate the second phase of the Proálcool (Pro-Álcool 2.0): putting an emphasis on small farming. Joelmir Beting embraced the plans of Corsini. However, he correctly saw that it would be politically difficult to opt for them. The large economic—and thus political—interests would not profit from the miniplants; *only* the masses, the environment, and the nation would profit from them. Beting saw this as a dream that would be thrown out the window as a result of "national stupidity" (8.10.78). It certainly was. Beting continued to legitimize miniplants and problematize the large-scale option (e.g. 20.2.79, 30.5.79, 8.6.79).

Various politicians, such as Paulo Egídio, the governor of São Paulo, welcomed the idea of miniplants. According to him, the large-scale plants could not solve Brazil's problem of energy dependence. The only solution would be miniplants (25.2.79). Also, the Ministry of Agriculture welcomed the miniplant solution. The plans of Corsini's team were elaborate; they included detailed reference cases for farms of different scales, including cost calculations, material flows, and financial considerations (1.10.78, 15.11.78). According to Corsini, miniplants would be more productive than large-scale plants. However, some official government studies argued that miniplants would not be as efficient as the large-scale plants in the most central rural areas (24.2.80).

The federal government reacted to Corsini's suggestions in a positive manner and said they already had plans for smaller plants. The government, however, emphasized that at the beginning of Proálcool, the existing infrastructure had to be used; without it, the present production capacity would not have been achieved. Incentives for miniplants were promised (9.11.78), but the funding for Proálcool never reached Corsini's miniplants. Then, more studies on the impacts of Proálcool began to emerge. There were observations that the alcohol program would not reduce but, in fact, increase regional discrepancies. Poor regions did not get anything from Proálcool. Most of the alcohol plants were built in São Paulo, the richest state in Brazil (7.11.78, 21.1.79). What was more, Proálcool efficiently led to a concentration of

land and rural income in the hands of a few (1.8.79, 28.10.79).

Carro a álcool - alcohol car

The heated political situation in the Middle East led to another oil crisis in 1979. This caused the Brazilian government to accelerate promotion of the alcohol program. The prices paid to producers were increased by 4.7 percent, and annex mills were to allocate 30 instead of 20 percent of the milled sugarcane for alcohol production. Alcohol was also to be introduced for cars using diesel fuel, first four percent and then seven percent, which was seen as the technical limit before engines would need to be modified (1.2.79). At the same time, however, the CNA itself argued that alcohol should not be seen as the savior of the nation. Oil would be the main source of income and alcohol would only serve as one alternative (14.2.79). This was debated: the slogan "álcool é nosso," ("alcohol is ours") echoed throughout the debates. Better to milk one's own goat than the neighbor's cow; better to use all raw material, including wood, to produce alcohol, than to import oil (5.3.79).

- Pumps of hydrated alcohol for all of Brazil (21.3.79) -

In March 1979 João Figueiredo assumed the presidency, which was marked by a further emphasis on alcohol cars; the president himself wanted to have a Volkswagen Beetle that ran on alcohol (1.6.79). The federal car fleet (10.5.79), and the public fleet of São Paulo (11.5.79), would run on alcohol. State-owned companies had already been testing alcohol engines in order to improve their technology (27.2.78, 10.5.79, 11.5.79). These conversions were done by the CTA. Alcohol was seen as cleaner than gasoline; it produced less carbon monoxide and no lead was needed. The alcohol car started to be ready for the masses as well; Volkswagen and Fiat were the first to develop them, followed by GM and Ford (18.10.78, 21.12.78). News published on the advances was frequent (13.4.79, 22.4.79, 2.5.79, 17.5.79). Volkswagen announced its intention to launch a mass-produced alcohol engine already in September 1979 (5.4.79, 4.8.79).

- 1500 authorized alcohol cars (15.4.79) -

Buses that would run on alcohol (13.5.79) were proposed, studied, and promised (20.7.79). There was even a Brazilian car company, Villares, which wanted to produce an alcohol car using the CTA's technology. This was a dream of founding a national car industry (25.7.79). Everything was seen to depend on the alcohol car; it would unblock Proálcool (8.7.79).

Newspapers throughout the world, including in the Financial Times and Wall Street Journal (12.8.79), ran stories about efforts to develop an alcohol car. Mercedes Benz was against pure alcohol cars and instead argued for truck engines that would use a mixture of diesel and alcohol, that is, flex fuel. Alcohol and diesel, it argued, were similar fuels. This would dramatically reduce the supply security, especially when travelling internationally (19.7.79). The days of the gasoline car were seen to be numbered and alcohol was expected to clean up the image of the car (12.8.79). Petrobras was attempting to slow down the program and it was criticized for doing this. A state-owned company should not function in the same way as a private one. It was argued that if the decision were left to Petrobras, alcohol would never arrive at fuel pumps (5.6.79).

The government promised that alcohol engine production would be permanent. Anfavea, the representative of the car industry, together with the government, established quotas for alcohol cars. Approximately 250,000 alcohol cars were to be produced by the end of 1980, and 300,000 and 350,000 in 1981 and 1982, respectively. Allowing for the possibility of markets and technological feasibility, priority was given to collective transport, cargo, and agricultural machines (20.9.79). Also, the alcohol price was guaranteed to be equal to that of gasoline in terms of energy content (9.10.79), that is, approximately 65 to 70 percent of the gasoline price. Alcohol was to be added to diesel fuel as well; the CTA had developed a feasible mixture (5.11.79). What is more, various studies had been conducted to analyze the technical feasibility of using vegetable oils in diesel engines (14.10.79, 20.12.79).

With the introduction of the alcohol car, the debate over market synchronization raised its head again: should there be enough alcohol cars to match the existing supply of alcohol or enough alcohol to match the existing number of alcohol cars? It was argued that there would either be a crisis of alcohol or a crisis of the alcohol engine (8.7.79, 11.6.79, 25.11.79). The system was rather inflexible; it required establishing a balance between alcohol production and alcohol car production. The only measure of flexibility for the alcohol fuel system had to do with the alcohol blend in gasoline, which could be adjusted (19.5.81). However, this flexibility was not unproblematic since the alcohol used in gasoline was anhydrous, whereas the alcohol used in alcohol engines was hydrated. It later became apparent that this flexibility was not only technically, but also politically, problematic. Nevertheless, the importance of the program made it a battlefield for powerful interests; some changes in the coordinating organs

of Proálcool were made, for example the responsibility for financing of the program was shifted from the Bank of Brazil to BNDE (25.10.79). The former, however, continued to manage the projects for a long time (20.7.80, 23.12.80, 10.10.81, 6.3.82).

Producers clarified some central issues pertaining to Proálcool. First, there was not going to be a lack of alcohol. Then, the most feasible plant would be one that produced 240,000 liters per day, that is, one that was twice as big as the "normal" large-sized plants. These autonomous plants would be the "Brazilian solution" according to producers: annex plants should no longer be enrolled in Proálcool (8.7.79). Small-scale production was to be done on small manioc farms; sugarcane miniplants were not mentioned. While some had argued that Proálcool led to a concentration of land and income in the hands of a few, producers felt that Proálcool was principally designed to produce alcohol, not to facilitate agrarian reform or solve social problems. However, the main reason for the concentration of land and income in the hands of the few was identified: the system of guarantees. Banks required heavy guarantees for loans. A loan of Cr$ 150 million required guarantees of Cr$ 200 million. As irrational as it was, "naked" land was accepted as a guarantee, which resulted in production being concentrated on the most expensive land, that is, in the heartland of São Paulo. It was thus possible that whereas the same project would be approved in the already cultivated areas around São Paulo , it would be rejected for the vast empty areas of the periphery due to the guarantees (8.7.79).

First wave of criticisms

Towards the end of the 1970s, Proálcool was increasingly criticized. Besides concentrating land and income in the hands of a few and increasing regional disparities, it was argued that the program harmed food production (21.1.79, 1.8.79). It was observed that nearly all of the Proálcool projects that had been approved went to already established producers, that is, to large alcohol and sugar companies with a single owner (9.11.79, 25.11.79). As these agribusinesses expanded in the regions in which they were already operating, they forced small farmers to work on less fertile lands or to move into the cities, or forced them to become "bóais-frias," thus amplifying the already grave social problems (1.8.79, 14.10.79). Simply put, it was argued that Proálcool went against its very objectives: to reduce regional discrepancies and discrepancies involving individual income (19.7.79). In addition, it was argued that Proálcool directly influenced the cost of living by increasing food prices (8.11.79). It was

argued that the alcohol program created feudalism, the type of agricultural structure that prevailed in the backward northeast. It was felt that Proálcool only served to maintain "an absurd orgy" of a few car owners (8.11.79). Many of these critiques were expressed at a symposium organized by those whose opinions had not been taken into account within the alcohol program.

In an editorial, Folha observed that whereas all governmental programs praised their favorable effects on redistributing incomes and reducing regional discrepancies, none of them actually resulted in favorable outcomes (18.10.79). Although Proálcool incorporated great possibilities for reducing various socio-economical distortions, these issues never went beyond rhetoric, according to Folha. It continued by saying that, whereas there would have been plausible explanations for opting for the large-scale plants at the beginning of the program as a means of achieving high production growth, nothing could justify why projects like that of promoting the miniplants continued to be ignored in the medium term. The newspaper concluded that the alcohol program was by no means exceptional as a governmental program with regard to its promises and actual impacts. Folha emphasized that, due to its magnitude, it was especially important to seize the opportunities inherent in the alcohol program to reduce poverty and inequality (9.11.79).

Again, it was argued that the low price of sugarcane was a problem: farmers argued that the price of sugarcane was not high enough to cover its production costs (30.8.78). Again, nobody was obliged to plant sugarcane or to continue planting it. While other agricultural products enjoyed 70 percent price increases, sugarcane only increased by 20 percent. Farmers argued that sugarcane needed to be planted before a crisis occurred. They continued to ask how bad it would be if alcohol would need to be rationed because of a shortage in raw materials (12.8.79). They argued that alcohol mills were running at a high idle capacity due to a lack of sugarcane. According to the farmers, all the parties were focusing either on the distilling phase or on alcohol cars and forgetting the agricultural phase. Alcohol plant suppliers agreed: the agricultural aspect should be emphasized (22.8.79). The alcohol producers, however, argued that the sugarcane producers would get adequate reimbursement, approximately 15 percent (8.7.79).

Zoning and divisions

In order to resolve the increasing amount of criticism, the minister of agriculture announced the start of a zoning process; alcohol plants would no longer be built anywhere. Zoning would solve the problems of regional discrepancies and food crop production; it would help put a stop to the competition between sugarcane and food crops and also enhance the use of other raw materials for alcohol production. Also, more miniplants would be built. Although it was argued that their productivity was less than that of large plants, they would end up being economically advantageous because of a reduced need to transport raw material and, above all, fuel to distant regions (14.11.79, 28.1.80).

The zoning legislation was to ban new plants from being built São Paulo, Alagoas, and Pernambuco (1.1.80); it was seen as indispensable to expand the Proálcool program to other states. Nobody would be interested in cultivating sugarcane in places where it would initially yield some 45 tons instead of 70 tons. If Proálcool would be left at the mercy of market forces, as the transportation sector had been, Brazil would be filled with sugarcane fields, just as it was already being filled with roads and not, for example, with railroads (18.11.79). There were already some worrying examples of this, such as Iracemápolis, where 82 percent of the land was being planted with sugarcane and no other food crops were being cultivated; as a result, some 3,000 “bóias-frias” were being used as sugarcane labor (24.2.80).

The initial quota for Proálcool, first 3 and then 4 billion liters of alcohol per year, was fulfilled; another quota for 10.7 billion liters was set for 1985. This quota was a source of continuous debate. Some argued that it was impossible to reach, whereas the producers and officials of São Paulo suggested producing 20 billion or even 30 billion liters of alcohol (21.3.80). This was to be done without prejudicing at all the food crop production. By improving the productivity of cow pastures, which covered most of the land and were extremely inefficient, vast areas could be liberated for other crops, including sugarcane (22.12.79). Anfavea (24.11.79, 2.7.80) and President Figueiredo argued that 14 billion liters of alcohol should be produced in 1985 (24.5.80). They viewed this increase to the original quota of 10.7 billion liters as social, that is, it would serve as a substitute for diesel fuel (13.6.80, 24.6.80).

- CENAL approved 271 projects (11.5.80) -

There seemed to be two incommensurate interests and corresponding social groups. The first

group wanted to keep Proálcool on the same path that it had already been advancing along, that is, large-scale plants, individual alcohol cars, and the controlled conversion of gasoline cars into alcohol cars. Only minor corrections were necessary, that is, sugarcane production needed to be expanded to other regions. Only gasoline would be substituted and no other types of oil products would be included. The other group wanted to break the pattern by introducing miniplants, rigid zoning and alcohol engines to the collective transport and cargo and free conversion of cars. The idea was to substitute all the imported oil. The conflict between these two camps manifested itself at the highest level as a conflict between the MIC and MME and their ministers: Camilo Pena and César Cals, respectively (6.1.80).

The latter group argued that the program was going in the wrong direction; it only involved large plants, only used sugarcane and only substituted gasoline. It argued that the whole issue of car transportation was off base; Proálcool was centered on the interests of producers and the car industry rather than on those of society at large. Each region should be autonomous in how it chose to produce and use energy; people would be happier (12.1.80). The camp of Camilo Pena argued that the large plants were more efficient and that there would be market distortions if the quality of the alcohol produced and the conversions made were not strictly controlled (12.1.80). The Pena camp evidently won. Whereas all plant types were welcomed, the official emphasis was on the "normal" plants that produced 120,000 liters of alcohol per day (16.3.80). Again, it was argued that sugarcane would create a production bottleneck. This time the high sugar prices also brought uncertainties; it would be more lucrative to produce sugar (15.2.80). Camilo Pena, however, argued that the quotas were "untouchable" (20.2.80).

Camilo Pena also brought foreign capital into the discussion, arguing that there was a lack of domestic interest in alcohol production (6.7.79). If Brazilian businessmen would not invest in alcohol, then multinational corporations could brought into the picture to help with the program, that is, the most important component of solving the oil crisis, announced Minister Pena (11.7.79, 13.10.79). These announcements were criticized; critics argued that that there were no general policies steering the program and no clear points of orientation for the program (6.1.80, 15.2.80). What was more, it was argued that approximately 140 projects still needed to be approved (24.5.80). Critics did not want foreign capital in general to become part of Proálcool: the slogan "álcool é nosso," ("the alcohol is ours") was launched (7.7.79, 12.8.79, 17.2.80) and even one military general patriotically intervened, arguing for purely Brazilian

alcohol (8.4.80). Besides foreign capital, Petrobras was also forbidden from entering into alcohol production (19.3.80).

No miniplants had as yet been financed, even though the government continued to argue that there were no barriers to financing them. This was because the Institute of Science and Technology (STI) argued that miniplants were economically unfeasible (3.7.80). CENAL,[7] the successor to the CNA, listened to STI and did not approve miniplants. However, it was argued that these criticisms originated principally in the car industry, which wanted to have large distilleries in order to maintain the quality of fuel (13.6.80). Miniplants never arrived in great numbers, even though the milling technology made great advances (17.8.80) and even though the STI defended the miniplants (30.7.81). Even though Folha reported that approximately 40 miniplants were reported under construction (27.12.80), these were hardly the types of miniplants that Corsini had envisioned and very little was heard from them afterwards.

- BB received 139 projects, 120 were financed (20.7.80) –

At the same time that the position of diesel fuel remained untouched, a program to incentivize the production of vegetable oils, Proóleo, was proposed (27.9.80). Another program, Procarvão, was designed to find substitutes for fuel oil, which was used in large quantities in heavy industries; the pulp and paper industry would use wood in the form of vegetable coal as a substitute for fuel oil (21.10.80). These programs were discussed, but they did not take off (22.10.80). Joelmir Beting observed that there were too many sources of raw material for vegetable oil (23.10.80, 24.10.80). It was felt that the program would require that vast areas be cultivated; much more than with Proálcool (25.10.80). It was also argued that the price of vegetable oil was too high (28.9.80, 27.10.80, 22.2.81). Vice President Aureliano Chaves reminded people that food would come before fuel (31.10.90). Folha, in an editorial, argued that before any large moves could be made with vegetable oil, alcohol needed to be harnessed and used for collective transport (5.1.81). The launch of Proóleo was delayed (4.7.81, 12.7.81) and it was referred to as the Tower of Babel (7.9.81) and forgotten until the present millennium.

Same direction, more speed

In the midst of this critique, car manufacturers were hesitating. They were not fulfilling the

[7] Figueiredo established this new institution as part of a political struggle.

quotas they had agreed upon with the government. While the quota for the first quarter of 1980 was set at 44,000 cars, manufacturers had only produced one thousand alcohol cars by mid-March. It was argued that car companies were trying to create a negative atmosphere for alcohol fuel (16.3.80). Still, as the 200 alcohol taxis in São Paulo had not always been able to find alcohol, it was legitimate to ask how alcohol fuel would work on a large scale. Also, buses and trucks that ran on alcohol were missing from the scene (26.3.80), although Ford was testing alcohol tractors (12.3.80), and it was reported that alcohol buses would soon be used in São Paulo (4.5.80). The price of the alcohol car was reduced to the same level as that of the gasoline car. Consumers were scared; alcohol was reported to be highly corrosive, and alcohol engines were reported to not last more than seven years (29.3.80). Nevertheless, the incentives—the low price of alcohol and a reduced price on alcohol cars—finally worked: people had to wait in line before being able to buy an alcohol car.

In 1980, approximately 265,000 alcohol cars were produced (19.11.80). The price of alcohol was fixed at 65 percent that of gasoline (24.6.80). The alcohol engine was more economical than the gasoline engine, which made the alcohol car very attractive (7.8.80). However, as the rapid growth in the number of alcohol cars appeared to exclusively involve individual cars, people began to strongly criticize Proálcool. The program was called perverse because, by fueling the cars of the rich, food would become more expensive for poor people, who were already spending half their income on food. While individual car transport had previously been discouraged, it was now indirectly subsidized. At the same time, collective transport was becoming more expensive. There was a debate about whether it was more important to fill car tanks or the plates of the people (13.7.80). Vice President Aureliano again claimed that the priority was food production: first energy for the people, and only then for machines (7.10.80).

It was argued that the absolute preference for individual cars over collective transport, cargo, and agricultural machines was one of the most controversial aspects of Proálcool. Besides other adverse effects, in the event of a crisis having to do with the supply of oil, only individual cars would remain supplied, not the economically indispensable trucks, buses, and agricultural machines (13.11.80). The president of the CNP, Oziel Almeida, argued that the alcohol car was a mistake and "prayed that the gods" would make those in charge aware of the need to design an adequate use for the expensive alcohol. However, the price of diesel fuel was kept at a very low level, making it economically unfeasible to substitute diesel with alcohol (12.3.81).

While these critiques emerged, the IAA exalted the use of the present infrastructure in the existing agricultural regions and claimed that without it the growth of the program could not have been achieved. The IAA argued that the expansion of sugarcane plantations was in no way prejudiced against other food crops; there was plenty of space in Brazil. Only about 0.3 percent of the national territory was used to plant sugarcane (9.7.80). Furthermore, aggregate numbers were presented to justify that sugarcane was not harming other crops (10.8.80). Folha argued in an editorial that Proálcool was moving at a sluggish pace. At its present speed, it would take half a century to substitute all oil (27.8.80). Minister Pena announced that once production increased, everything would be liberated. He asked for less euphoria in terms of alcohol cars; if there was a Carnival, there would also be a day after it: a deep hangover (6.9.80, 23.10.80).

Just when the debate over foreign capital seemed to be at an end, the topic was reintroduced into the discussion. This time it took on a new form: foreign capital would exclusively be directed at exports, so that Proálcool would remain "intact" (7.9.80, 10.9.80). A major French oil company announced that it would produce alcohol together with Petrobras in order to export the product. Folha strongly criticized this proposal (29.10.80, 6.2.81). In principle, Proálcool was not supposed to use foreign capital, but it could enter into the picture in the form of minority investments in Brazilian companies; the companies would then sell alcohol on the domestic market (3.2.81). At this point, however, foreign investors attempted to introduce capital in the form of a World Bank loan. The bank offered to finance Proálcool, but with some contingencies: the manufacturing of equipment would have to be opened to foreign competition. Folha wrote in an editorial that this would be undesirable in terms of Brazil's trade balance and its national industry (20.9.80).

The largest project financed partly by foreign money was that of an extensive alcohol plant to be built in Pantanal, an ecologically fragile swamp area. This project would produce approximately ten times more alcohol than "normal" plants, that is, 1.8 million liters of alcohol per day. It was revealed that an American, Rockefeller, had his hands in the project. He was the owner of a huge farm along the border between Paraguay and Bolivia, an important area in terms of national security (8.2.81). Environmentalists with the state government of Mato Grosso do Sul, however, succeeded in putting a stop to the project, even though CENAL had already approved it (27.11.81). The World Bank insisted upon giving a loan to Proálcool: US$ 1

billion over the course of 12 years (17.2.81). Cerqueira Leite argued that because government profits from the alcohol mixture in gasoline were about US$ 1 billion per year, that is, ten times more that the loan itself, the loan was not needed (9.10.80). It was later reported that the loan was used to make interest payments to the debtors (24.4.81).

- BB received 208 projects, 157 were financed (23.12.80) -

Proálcool was increasingly being debated. Folha organized a round-table discussion to debate the program. Professor Antonio Barros de Castro observed that Proálcool was capable of committing—and indeed *was* committing—seven sins. The sins were as follows: 1) competing with food production, 2) increasing the number of "bóais-frias," 3) concentrating land and income in the hands of a few, 4) accentuating regional inequalities, 5) causing environmental damage, 6) permitting foreign capital to enter into the sugarcane and alcohol sector, which had traditionally been owned by Brazilians, and 7) permitting the continuation of a model that privileged individual transportation and the interests of the car industry, thus restricting options that would otherwise be beneficial for the whole of Brazilian society. The participants in the debate agreed that, depending upon the control that society had over Proálcool, the program could either be malign or beneficial to Brazil as a whole (4.11.80).

Alcohol cars stalling, more speed in production

During the rapid increase in the number of alcohol cars, the flexibility of the system was put to test. The proportion of alcohol in gasoline was reduced first to 13.9 percent and then to 12 percent (8.4.81). The economized anhydrous alcohol was then transformed into hydrated alcohol to supply the alcohol car fleet (14.4.81). Despite this, Petrobras announced that there might not be enough hydrated alcohol on the market (19.5.81). The government, however, promised that customers would be able to find hydrated alcohol at every gas station (12.6.81). A reduction in alcohol car quotas was considered (25.4.81), a consideration that Petrobras backed (15.5.81). The price of alcohol increased from 45 to 62 percent of the price of gasoline, which did not help to reduce the quota: alcohol car sales plummeted. In April 1981, alcohol car sales had declined by 67 percent (20.5.81) from what they had been in January, and in July they had declined by 96 percent from the corresponding figure for January (7.5.81, 16.5.81). The fall worried the government (23.6.81); Minister Camilo Pena blamed consumers for ruining the image of the alcohol car (25.6.81).

The government admitted that Proálcool lacked credibility and that this was partly due to the fact that the government had not always provided correct information about the program (20.8.81). The government, however, also suspected there was a campaign to undermine the credibility of Proálcool (21.8.81, 4.9.81). Minister Delfim Neto announced that henceforth Proálcool to be inflationary, but he did not bother to tell how or to what extent this would occur (24.8.81). There were evidently too many official opinions about the alcohol program. Thus, an order was drafted that any official information about Proálcool had to be approved by Ministers Camilo Pena and Delfim Neto and that any reference to Proálcool had to be positive in order to maintain the credibility of the program (26.8.81). Brazil was still governed by a military regime.

- BB received 254 projects, 204 were financed (10.7.81) -

During the period when alcohol car sales were in severe decline, it became evident that the car fleet quotas would not be fulfilled (20.4.81, 2.6.81, 21.8.81). In the meantime, Proálcool offered exceptionally beneficial loans, which led to a large number of applications for new alcohol projects (20.6.81). Producers reaffirmed their confidence in Proálcool; it was the definite solution for substituting oil (11.7.81, 13.9.81). Thus, despite the criticism of the program and the sluggish alcohol car sales, alcohol production shifted into another gear. It was again argued that credit lines would be open to miniplants (3.9.81), although no longer at the highly beneficial rates (4.9.81). Many felt that the quotas for the year 1985 could be achieved (17.9.81). Even as alcohol car sales remained low, the stocks of hydrated alcohol accumulated (13.9.81) and experts studied how it could be blended with diesel fuel (22.9.81). There was a campaign to regain confidence in alcohol cars (13.9.81, 17.9.81). The campaign broadcasted the idea that people should count on alcohol and that it would not be lacking (30.9.81). Alcohol car sales, however, kept falling (8.10.81).

- BB received 267 projects, 214 were financed (10.10.81) -

The “exiled” status of food farming was again widely discussed and criticized (1.9.81). It was argued that alcohol plants would make the sugarcane farmer disappear; the plants bought up all the land around them, thus verticalizing the industry (6.10.81). The political opposition strongly criticized the program; it was unwanted, inconvenient, temporary, and unjust. The opposition saw the steering organ, CENAL, as the main culprit (19.9.81). Nevertheless, most experts still typically felt that the program’s problems could be corrected. Professor Cerqueira

Leite observed that innovation had been prohibited in Proálcool. The main reason for this was bureaucracy: projects that did not directly affect alcohol production capacity were ignored. Sugarcane, however, could yield various other products, such as electricity. If all the plants enrolled in Proálcool would be harnessed to generate electricity, they would yield one and a half times more electricity than the eight nuclear plants that Brazil was planning to build. The professor criticized Proálcool for having blinders on (11.10.81).

Still more speed, alcohol car rebounds

Proálcool was doing fine, but the alcohol car was not (7.2.82). Instead of 360,000 alcohol cars, only 150,000 were sold in 1981 (14.2.82). The size of the alcohol car fleet was approximately 400,000 cars, but it was decreasing as the sales remained sluggish and alcohol cars were being converted back to gasoline (24.2.82). The stocks of hydrated alcohol continued to increase. Already approximately 2.5 billion liters of alcohol was in storage, which was enough to last eight months: the required amount in storage only needed to be for two months (31.12.81). Most of the stocks were hydrated alcohol, which could not be easily converted into anhydrous alcohol (8.1.82). Demand for diesel fuel had been increasing rapidly; in now represented almost twice the demand as that of gasoline and alcohol combined. The introduction of cheap natural gas to cars was seen as a threat to Proálcool (21.1.82). The only solution was to increase the alcohol car fleet (24.2.82).

Whereas the Minister of MIC, Camilo Pena, kept insisting on expanding the alcohol fleet by building more passenger cars, various quarters wanted to have more "noble uses" of and better social returns from alcohol. Such critics wanted alcohol to be used in tractors, CHPs, buses, trucks, and even trains (30.12.81, 7.2.82, 14.2.82, 12.3.82). The Minister of MME, César Cals, proposed that diesel be prohibited in light trucks and buses (less than 6 tons), a category that was almost totally dominated by vehicles that ran on diesel fuel (12.3.82). Incentives for alcohol trucks were requested in the form of tax exemptions, like what had been done for the taxi fleet (20.6.82). Diesel fuel was so highly subsidized that it was economically unfeasible to entirely substitute it with some other form of fuel. Also, diesel engines were more efficient in terms of energy consumption than alcohol; thus, alcohol did not have the same advantage that it had when used as a substitute for inefficient gasoline engines.

- BB received 288 projects, 227 were financed (6.3.82) -

Nevertheless, alcohol engines were reported to be highly feasible in an agricultural setting. Volkswagen had been testing alcohol trucks in alcohol plants, with excellent results; diesel could and should be substituted (10.3.82). Surely knowing this, GM and Ford launched sugarcane trucks that ran on diesel, sparking bitter criticism from alcohol producers: there was absolutely no sense in not using alcohol in sugarcane transportation (10.6.82, 20.6.82). Soon after having rejected the idea of conceding anything more to alcohol cars (5.2.82), the government announced a plan to stimulate their use (6.3.82). It gave tax exemptions to alcohol cars in order to lower the purchasing prices: they would be 6.7 percent cheaper than gasoline cars (21.3.82). Also, the price of hydrated alcohol was set at 59 percent that of gasoline; this was a drop from the earlier 65 percent (25.3.82). Taxis were obligated to use alcohol, a decision that taxi drivers strongly criticized (14.2.82).

- CENAL approved 383 projects (16.11.82) -

The stimulus measures for the alcohol car worked. Soon, approximately 80 percent of the cars that were sold were alcohol cars (13.8.82, 14.8.82, 4.9.82). This made the government worried about the supply of alcohol (20.3.83). Alcohol producers, however, guaranteed that there would be enough alcohol; the harvest would be large (21.3.82, 31.3.82). Producers were soon even claiming once again that sugarcane would be left "on foot," that is, that it would not be harvested, if the production quotas were not increased (29.4.83). The president of the CNP, Oziel Almeida, wanted to restrict the production of individual alcohol cars. Instead of 500,000, he proposed a limit of 200,000, which would make space for other types of alcohol vehicles: tractors, trucks, and buses. Oziel was worried about the extent to which the alcohol car would distort the oil market; that is, he was worried about a lack of diesel fuel and a surplus of gasoline (7.4.83). The MIC, however, approved the 500,000 alcohol cars (4.6.83). It had again been demonstrated that a mixture of alcohol and diesel fuel was feasible in an agricultural setting (8.10.83). Although the price of the alcohol car increased (2.11.83, 9.11.83), their share remained dominant.

- CENAL approved 418 projects, 280 were financed (9.3.83) -

Conta álcool - alcohol account

Miniplants once again became part of the discussion. Folha published a large story discussing the prospects of using miniplants. The story was very positive; miniplants would resolve all

the problems caused by the current patterns. Professor Corsini pondered the inexplicable silence of the government. A plane full of North American farmers had arrived in Brazil so that they could view the plants; Paraguay had ordered miniplants and representatives of the World Bank had visited some of Corsini's plants, but no Brazilians had done so (18.7.82). Elsewhere, it was argued that Proálcool would represent a direct loss for the government; Petrobras had to pay more for the hydrated alcohol than it made by selling it to distributors. It was argued that this "conta álcool" would accumulate and result in an alcohol impasse (1.8.82). In fact, Petrobas subsequently employed the "conta álcool" as part of the most devastating delegitimation campaign that Brazil had seen thus far, as Professor Cerqueira Leite later observed. It was also discussed by the CNP (2.3.83), academics (15.5.83), and others (3.6.83).

- The millionth alcohol car was produced in August (18.9.83). -

During the time when the alcohol car fleet was growing rapidly and the production capacity increasing, the question of finance reemerged. Brazil was in the middle of a deep recession, and the country was short on finances and had to turn to foreign sources: once again, the World Bank loaned Brazil money. It at first decided to loan US$ 2.5 billion (6.8.83), but this figure later shrank to US$ 200 million (7.10.83); however, after negotiations, the World Bank again raised the figure to US$ 500 million (8.10.83). Private capital was already important for expansion; it was argued that more than 60 percent of finances in 1983 were from private sources. It was argued that this proved that the sector was now mature (22.9.83). Later on, the World Bank attempted to enter into the agricultural phase of the program as well, but was denied (2.2.84). The financial support, however, did not reach the small farmers. For more remote farms, the closest gas station could be as much as 180 kilometers away. Even more absurd was that these farms would have been perfectly capable of producing the fuel needed for the farm, only there was no financing available for this. Brazil had chosen to support the large-scale plants, thus making it difficult to balance supply and demand and making it necessary to transport alcohol long distances (10.3.84).

Rural chasms

It began to be clear that not all was right in rural Brazil. While some crops, like sugarcane and soybeans, had enhanced productivity as a result of expansion, the results had not been good for most of the food crops. The productivity of rice, beans, and manioc had decreased

substantially from levels in the 1960s (21.4.84). These opposite numbers were clearly related. Hence, the government of São Paulo attempted to steer Proálcool in more of an ecologically and socially sustainable direction: new guidelines were written. The expansion of new plants was limited to the western parts of the state and 60 percent of the sugarcane had to be bought from sugarcane farmers. São Paulo wanted, on the one hand, to have an entity that would approve projects in order to avoid an excessive concentration of sugarcane, and, on the other hand, that would favor the transfer of benefits from the program to the wider social sphere. This was a direct challenge to CENAL, the federal-level organ (16.5.84).

These new guidelines seemed both to unmask and amplify the disparities between the alcohol producers and other parts of society. Producers attacked the new guidelines claiming they were draconian and absurd (10.5.84). Producers used emotional and ideological arguments by arguing, in turn, that the authorities were ideological and emotional. They praised the gods that they lived in a capitalist country where private initiative would find its own way, unlike in Russia or Cuba. The discourse resembled that of a neoliberalist manual; the new guidelines were not consistent with the origins and ideas of democracy and liberty, producers argued (21.5.84). Academics intervened in the debate, remarking that the alcohol sector was anything but free. The government not only set prices, but also guaranteed to purchase everything that was produced, not to mention the subsidies granted to producers (1.6.84). São Paulo got its state organ to approve the projects, but the projects had to go through CENAL as well (6.7.84).

The strikes initiated by the "bóias-frias," rural laborers, increased (17.5.84, 27.9.84). In 1985, an investigative journalist from Folha claimed to have found out that there was an underground market through which alcohol was being commercialized. The journalist speculated that the actual alcohol production would be approximately 15.5 billion liters instead of 9.1 billion liters, which was the official quota (18.11.84). In other words, almost half of the alcohol was being produced and sold clandestinely, the journalist argued (18.11.84). These accusations were answered by one of the alcohol producers, who threatened to kill the journalist (28.11.84). Other alcohol abuses emerged and were discussed (2.12.84), as was the concentration of land (4.4.85), which the producers attempted to hide. What is more, the low interest rate loans offered by Proálcool were seen as government donations to alcohol producers. It was argued that "Brazilian capitalism" gave very much to a very few. Reform was seen as inevitable; there should be some benefit for rural laborers, who had not benefited from

the program so far (2.2.85). The chasm between the rich and the poor was, however, only widening.

It was argued that Proálcool had only served to worsen the conditions of rural labor. The earlier, more stable demand for labor was now concentrated within a three-month period, during which time laborers had to earn their living for a whole year. It was reported that the median purchasing power of the rural laborer had decreased by approximately 50 percent between 1978 and 1984. The number of "bóais-frias" was about 40 percent of the agricultural manpower in São Paulo (24.2.85). While large producers expanded, small farmers had to sell their land and typically ended up unemployed and living in the municipality or migrating to a large city. Within this context, the "bóias-frias" began to organize strikes and demonstrations (27.1.85, 18.5.85, 20.5.85, 25.5.85). The alcohol producers argued that the concentration of production in the countryside was, in fact, "positive" because it increased productivity due to the modernization of the plantations. The large producers were not to blame because the small farmers, who were not able to manage their property, sold their lands. It was argued that every producer had the right to expand and that alcohol production would radically increase employment. The producers, however, admitted that something had to be done to increase labor rights and that the counties should get more benefits from alcohol production (4.4.85).

Diesel fuel was still being sold in pure form. Once again, a mixture was created and alcohol could technically be used as a substitute for diesel fuel (8.6.65). The international sugar price was, again, at a very low level: approximately US$ 80 per ton. In contrast, it was argued that production costs were approximately US$ 220 per ton. Producers wanted to increase the proportion of anhydrous alcohol in gasoline from 22 to 25 percent and to introduce a five percent alcohol mixture to diesel fuel. Without these measures, the producers argued, the only solution was to leave approximately 14 million tons of sugarcane "on feet," which would be "stupid" since Brazil still imported approximately 500,000 barrels of oil per day (26.5.85). Microplants that could produce 5,000 liters alcohol per day were being built in the rural parts of the states. CENAL reported that more than 100 microplants had been built (13.4.85).

Proálcool stalling

Whether it was a result of the increasing criticism or the new president, José Sarney, the government decided not to finance any more new alcohol plants; the alcohol industry was in a

position to advance without special protective mechanisms. The new philosophy of the government was not to provide funding or subsidies of any kind. The government was, however, going to stimulate the creation of cooperatives of small farmers for the production of alcohol (16.5.85). Nevertheless, it was not Sarney, but Tancredo Neves who was elected president, the first civilian president after the military coup in 1964. He, however, died under rather suspicious circumstances before assuming the presidency[8]. The Vice President, Sarney, began, among other things, to oversee the agrarian reform, which the popular president-elect had promised. Folha published a list of "latifúndios" that were to be expropriated; nearly four million hectares of land would be distributed to approximately 70,000 landless families (29.5.86). Agrarian reform was, by law, independent of the national congress; the government alone could implement it (29.5.85). The government promised to conduct the reform, but emphasized that property rights were not be violated (1.6.85).

Along with the growing momentum of the reforms, an anti-reformist camp emerged. It argued that it was not the "latifúndios" but the demagogic politicians that were to be blamed for the low efficiency of the agricultural sector. They further argued that production had increased and been modernized during the military regime (8.6.85). Academics argued that growth had been achieved by increasing land and income concentration. It had devastated forests and destroyed fauna, in addition to violating the rights of the indigenous people. Authorities only chose to modernize some sectors, largely via government subsidies, while hindering the productivity of all the others, typically that of small farmers. The conditions of the poor were not alleviated, and food production was unsatisfactory; it was argued that approximately 3.3 million families lived below the level of absolute poverty. The annual inflation rate was running at 200 to 300 percent, which made price policies difficult to enforce and hurt the poor the most. The chasm between those who owned land and those who did not had been degenerating (8.5.85).

The promised reform agitated rural Brazil. The main argument in the reformist camp was that the "latifúndios" were keeping the rural population poor and economic growth low. Proálcool was central in the debate over land ownership; sugar and alcohol producers were typically the largest entities in rural Brazil, and during the program land had been heavily concentrated in their hands (12.1.86). Officials again argued that new guidelines for restricting alcohol

[8] Mr. Neves was already 75 years old, but I am always suspicious about deaths of political leaders. He died because of a disease that was typically rather easy to operate on and cure.

production were absolutely necessary. Alcohol plants would be limited to 270,000 liters per day and the plants were required to purchase 60 percent of their raw material from small sugarcane farmers; the law stated that plants could only use 40 percent of their own sugarcane (1.6.85). Again producers argued that the new guidelines were demagogic; food production was not threatened and large plants were the most efficient (1.6.85). Proálcool had arrived at a moment of contemplation, where its impacts could be scrutinized (2.11.85). This took place when the alcohol car fully dominated the scene; by the mid 1980s, alcohol cars accounted for approximately 97 percent of all car sales (26.5.85).

- 2 million alcohol cars produced (11.6.85) -

At this point, producers created a fable to laud the program. Proálcool shot an "urubu" (the phantom of the oil crisis), killed a "gavião" (the phantom of the sugar and sugarcane surpluses), reached—without wanting to—a "codorna" (increasing employment in the rural areas), and a "pardal" (abolishing lead in gasoline and reducing pollution and health problems)[9] (28.6.85). Employment was one salient argument that producers used. However, the numbers greatly varied from approximately 300,000 (of which 270,000 worked in sugarcane production and 30,000 in alcohol production) to 800,000 and even more, depending upon who was asked (2.11.85, 6.11.85). Opponents, mostly Petrobras, argued that alcohol was expensive and leaned towards "conta álcool" (19.10.85); they argued that there would be better places to invest (2.11.85). Petrobras also argued that it had to export gasoline because of Proálcool (12.1.86). Actually, Petrobras had increased its production to 600,000 barrels per day from only 150,000 in 1975 (2.11.85). Brazil was now also exporting alcohol, mainly to the US, which was a big, though uncertain, market.

In addition to alcohol producers uncritically lauding the benefits of Proálcool, there were also some more analytically serious adherents of the program, with Cerqueira Leite being the foremost among them. Besides continuously remarking that alcohol should be compared with gasoline, not oil, he demonstrated how the costs of alcohol and gasoline should be calculated. This was not straightforward, since Petrobras did not share its production costs. Alcohol, indeed, *was* competitive with gasoline, the professor argued (2.11.85). Also, the "conta álcool" was a question of fuel prices and, in any case, it represented only approximately two percent of

[9] The urubu is a common carrion bird in Brazil, the gavião is a sparrowhawk, the codorna is a quail and the pardal is a sparrow.

Petrobras' overall turnover (19.10.85). Proálcool should be maintained. Whereas a small pause in the expansion of the program would give critics an opportunity to better see its effects, the growth in the number of miniplants in distant regions was certainly positive, he argued (20.10.85). Also, the socially questionable aspects of the program should be corrected (2.11.85). The system, even if the government had already been attempting to fine-tune it for a decade, remained dissonant. There was a great hangover, as Joelmir Beting observed (18.10.85).

Oil strikes again

In 1986, the price of oil plummeted from almost US$ 30 to below US$ 10 by March (1.4.86). This had a direct impact on the economic viability of Proálcool; its relative cost increased and critics heatedly debated its viability. Proálcool, however, enjoyed government support; it was strategic and should not be steered from outside Brazil. The effectiveness of the program could not be determined by "simple arithmetic;" it existed on a strategic level (28.1.86, 18.2.86, 28.2.86, 5.3.86). The camp against Proálcool wanted to revise the production quotas (15.2.86) of the program and change the price ratio between alcohol and gasoline from 65 to 70 percent (23.2.86, 18.5.86, 12.6.87). The new Minister of MME, Aureliano Chaves, however, argued that the price ratio should remain at 65 percent because of the different energy content of the two fuels (18.2.86).

Petrobras continued to argue for its "conta álcool" and continued to aggravate alcohol producers by chronically delaying its payments; it argued that it was short of money because of the "conta álcool" (2.1.86, 16.1.86, 19.2.86). Producers argued that Petrobras did not buy all the production; the law explicitly promised that it would (20.2.86). Finally, the new Minister of MIC, Castelo Branco, announced that he would create a new interministerial council for alcohol (19.2.86) and study the existence of "conta álcool." He reminded people of the profits that the anhydrous alcohol yielded to Petrobras (21.3.87). Subsequently, Minister Castelo Branco announced that Proálcool was not subsidized; it was generating an annual profit of approximately US$ 80 million (22.2.86, 30.3.86, 21.5.86); the program should not be made to suffer because of the temporarily low oil prices. Other criticized the study that Castelo Branco based his arguments on; its conclusions were not seen as watertight (24.5.86).

Alcohol producers invited the president and four central ministries to Ribeirão Preto, the

largest alcohol producing region (5.3.86). Regardless of the magical promises that Sarney made to everyone, there were no stimulating policies. A study done in São Paulo showed that the existing production capacity was able to fulfill demand already for 1990 (19.3.86, 20.3.86). Producers argued the study was erroneous and flawed (21.3.86). Folha wrote that when the whole nation is making an effort to combat inflation, Proálcool should do so as well. Whereas revision was needed, Folha wrote that the ones who claimed that the program was mistaken and inconsiderate would be mistaken and inconsiderate themselves for such claims (21.3.86). Nevertheless, Proálcool was not to expand; no new production capacity would be built until 1990, announced the minister of finance in the Financial Times (29.3.86).

In fact, the fight against inflation had halved fuel prices from the levels they had been at in 1980; the frozen public tariffs, which included those of energy, were the main tool for doing this (18.10.85). The price of electricity was the lowest in the world, it was argued (12.1.86). Sarney, whose main enemy seemed to be inflation, intensified these policies; he changed the currency twice and froze prices and salaries several times, with the aim of stopping the inflation. He lost every time and soon the inflation was peaking at an annual rate of approximately 2000 percent. The freezes, producers argued, had rendered prices too low; the sector was being de-capitalized (21.1.86, 13.3.86, 25.7.86). They argued that the disparity between production costs and prices was 35 percent for sugarcane and 25 percent for alcohol (20.10.86), or even more (8.10.86). Not only the sugarcane producers, but even Petrobras, were in trouble because of the low fuel prices; some argued that it was the largest single crisis in Petrobras's history (11.6.87).

Brazil had been exporting surplus alcohol to the US since 1984. However, the US government was protecting its own alcohol production and increased the trade barriers beyond those recommended by the international trade organs (24.1.86, 16.2.86). Thus protectionism dried up the huge potential of the US market. A former Minister of MIC, Roberto Gusmão, argued that Petrobras had been dumping alcohol onto the US market, thus triggering protectionism. According to him, Petrobras was trying to destroy Proálcool (2.4.86). The alcohol sector took another hit when the Federal Police charged 15 companies in the alcohol sector with having used the subsidized finances for other purposes than investing in their production capacity (1.4.86). This scandal was investigated (10.4.86, 12.4.86, 15.4.86); those involved argued that it all hinged on data from the Central Bank (23.5.86). The bank, however, announced that no

fraud had taken place (6.6.86). It was inferred that this investigation had been triggered by Petrobras.

Agrarian reform

During the year 1986, the ones wanting the agrarian reform had lost their patience; demonstrations and strikes by the "bóias-frias" were frequent and "latifúndios" were invaded (3.7.86, 5.7.86, 14.7.86, 21.7.86, 29.7.86). It was argued that as long as misery, inefficiency, and backwardness characterized the Brazilian rural scene, tumults and convulsions would continue. Folha, in an editorial, saw the reforms as indispensable (9.7.86). Even the pope argued for agrarian reform and, thus, social justice (11.7.86). Finally, conflicts with the "bóais-frias," mainly sugarcane labors, turned bloody; two young "bóias-frias" were killed by the military police (12.7.86). A new agrarian program, Proagro, was launched, which attempted to improve the productivity and conditions of the rural laborers (13.7.86). The "bóais-frias" kept striking; they demanded labor rights, increases in salaries, and permanent employment (14.7.86, 15.7.86, 29.7.86). Also, they demanded that sugarcane laborers be able to eat every month. The Movimento Sem Terra (Landless Rural Worker's Movement) had been created earlier and was now getting stronger. While the "bóias-frias" had represented approximately 15 percent of rural labor in 1970, this figure in 1987 was 30 percent (12.6.87). Rural development was seen as degenerate; from 1981 to 1986 the income of rural laborers had decreased by approximately 60 percent (21.7.87).

Cerqueira Leite observed that the feasibility of Proálcool depended upon ideological, political, and regional views (9.4.87). He demonstrated that alcohol would be the best option for answering the growing energy demand. It would be better than the options of hydroelectric power, foreign oil, and even domestic oil. It would be cheap and the least risky option (20.5.87). He showed that by increasing prices, the "conta álcool" would disappear; in fact, if only the taxes on different oil products would be redistributed, the "conta álcool" would disappear. There was a holy war against Proálcool, as Cerqueira Leite claimed (11.11.87). It was argued that diesel fuel was extremely cheap and highly subsidized. All of the light trucks and buses were running on diesel fuel, and thus gasoline had to be exported (29.11.87). It was, however, possible to produce any mixture of oil products (e.g. diesel, gasoline); it was just a question of investing in refineries claimed Cerqueira Leite (11.11.87).

- Some 4 million alcohol cars in circulation (21.1.88) -

Alcohol producers argued against the claims of those who wanted the agrarian reforms. Proálcool was not only meeting the economic aims, but also the social aims established at the beginning of the program. They argued that Proálcool had reduced income disparities and increased GDP. Furthermore, they argued that the program had created approximately three million new jobs during its existence (21.1.88). Also, technology was advancing; Copersucar had invested approximately US$ 16 million in research and development and new varieties of sugarcane had been developed (1.12.87). However, the sugarcane farmers were in an unsustainable situation; price of sugarcane had been frozen since February of 1986 at approximately 30 percent below production costs (24.5.88). Farmers pleaded for price increases, arguing that the prices were 85 percent below the production costs; they protested and made blocked off the streets in order to disrupt harvests (5.5.88). According to Folha, between 1983 and 1987 the price of sugarcane was at its lowest level in 26 years (7.10.88).

Struggle over meaning

Professor Cerqueira Leite demonstrated that the energy balance of alcohol production was strongly positive; put one unit of energy in, receive 6.4 in return (24.12.87, 13.1.88, 17.2.88). He also calculated that a straw of sugarcane would contain enough energy to double the electricity generation of the country (17.2.88). Sugarcane, he remarked, was an infinite source of energy (25.7.88). It was just that Proálcool was not compatible with neoliberal ideology, according to which anything subsidized was bad. Proálcool was subsidized, thus Proálcool must be destroyed. It was enough to insist upon this point; a million repetitions can make for a single truth. Ironically, at the same time Brazil was subsidizing oil. Cerqueira Leite argued that Petrobras was against Proálcool since Proálcool offered a substitute for its only profitable product: gasoline (31.5.88). He argued that Petrobras was conducting a campaign to calumniate alcohol; it insisted “ad nauseam” that alcohol was much more expensive than gasoline and, indeed, highly subsidized (27.6.88, 7.10.88). Producers argued that the production cost of sugarcane was as low as the equivalent of US$ 12.6 per barrel of oil. They also argued that for one job created in the oil sector, approximately 30 would be created by producing alcohol (5.11.88).

It was argued that the production of alcohol cars had generated the largest conflict in history

between Petrobras and alcohol producers (2.11.88). Petrobras argued that alcohol was being transformed into extremely expensive fuel and that, by all forecasts, oil would not get more expensive until the mid-1990s (2.11.88). In addition, Petrobras had to export approximately 100,000 barrels of gasoline per day and was afraid that international markets would not be able absorb this amount. Petrobras suggested limiting the share of alcohol cars to approximately 30 percent of the total; at the time, the figure was close to 90 percent (11.11.88). Others argued that the "conta álcool," which Petrobras insisted that it would have to pay for, was in fact not at all relevant (27.6.88). It was calculated to be approximately US$ 150 million between 1980 and 1987; in the same period, Proálcool generated approximately US$ 1.7 billion in tax revenues (17.11.88). Cerqueira Leite argued that it was ill will, great stupidity, or both to condemn Proálcool for receiving subsidies (17.11.88).

Chronicle of a shortage foretold

At the end of 1988, the IAA observed that the year's harvest would be approximately 500 million liters less than the demand. It ordered alcohol producers to produce more alcohol and less sugar (2.11.88, 18.11.88). It turned out that producers in the northeast did not follow the orders of the IAA; alcohol production was reduced by approximately 400 million liters (11.3.89), a reduction that was later corrected to 700 million liters. According to the investigations of Folha, producers in the northeast had been prioritizing sugar and molasses (16.5.89). This event was a prelude to a chain of events that led to a severe alcohol shortage. Immediately after noticing the shortage, the alcohol mixture was reduced from 22 percent to 18 percent (18.3.89). Then, alcohol was reported to be lacking in the capital, Brasília, and it was argued that the supply was "very irregular" (9.5.89).

Then Petrobras, which bought all the alcohol and commercialized some 50 percent of it, surprisingly informed the public that it did not have much alcohol in its security stocks (14.5.89). It explained that producers had not sold it enough alcohol (14.5.89). Nonetheless, it did not reveal how much alcohol it had in its security stocks (16.5.89). After the unexpected reduction in alcohol production, producers in the center-south part of the country had to send alcohol to the northeast and other regions to prevent the shortages from expanding (16.5.89). Alcohol producers blamed Petrobras for the problems, but they agreed that a shortage in the following year could only be avoided if there was a balance between alcohol and gasoline

consumption. They emphasized that if something was missing, that something would be sugar; maintaining an adequate supply for the alcohol fleet was most important (16.5.89).

Immediately after the event, corrective measures were taken. Besides limiting alcohol car sales to between 30 and 50 percent of total car sales, sugar and molasses exportation was limited; anhydrous alcohol was to be reduced to 12 percent, or even eliminated from gasoline, and five percent of gasoline was to be mixed with alcohol (17.5.89). Producers in the center-south of the country were to anticipate how large their harvest would be in order to avoid shortages. However, others argued that this would only postpone problems; experts argued that green cane yielded approximately 37 percent less alcohol than mature sugarcane (30.5.89). The minister of energy planned to finance approximately 100,000 more hectares for sugarcane plantations and security stocks for alcohol (5.9.89).

These measures gave rise to criticism. The car industry protested against limiting the production of alcohol cars. After all, they were not like bakeries; they could not change their production rates at an instant's notice. The event itself, however, immediately reduced demand for alcohol cars (21.5.89, 6.6.89). "Now everybody wants to get back to gasoline," a car salesman commented (18.5.89). Petrobras got rid of its alcohol fleet (20.7.89). The share of alcohol cars declined from 69 percent in January to 45 percent in August (13.9.89). It was argued that pollution would increase if the alcohol mixture in gasoline was reduced and the sugar export limits would harm the trade balance (19.5.89). Environmental organizations insisted that at least in the biggest cities, the mixture should be 22 percent due to environmental concerns (22.6.89, 4.7.89, 19.7.89). It was decided that, apart from in São Paulo and Rio de Janeiro, gasoline would be added to alcohol from September onwards and also that the alcohol in gasoline would be reduced to even 12 percent (19.8.89, 28.7.89).

According to investigations by Folha, the local alcohol shortages had been due to changes in the purchasing procedure and not because of a lack of alcohol. Producers no longer received the price on the delivery day, but the price on the day when the alcohol was purchased. This made a difference in light of the super-inflation gripping the country. Only if there was a delay of longer than ten days between the purchase date and the delivery date could the producers re-price the order (16.9.89). In September, Petrobras warned that the harvest would be much smaller than previously thought: not 13.1 billion liters, but only 9.1 billion (16.9.89, 30.5.89). The prices of sugarcane, sugar, and alcohol were also increased in order to provide at least a

minimum profit (10.10.89). Still, nobody was obliged to plant sugarcane, Joelmir Beting remarked, like he had been doing since 1975 (1.11.89). Beting made an observation about the bizarre end of the decade of alcohol: less alcohol in gasoline, the introduction of gasoline into alcohol and - the importation of alcohol (1.11.89)!

Methanol and its ban

In this situation, methanol (methyl alcohol) emerged as a lifeline for Proálcool. It was similar to alcohol as well as abundant and cheap on the international markets. It was argued that mixtures of methanol and alcohol of up to 30 percent would be feasible without needing to modify the engines and without increasing pollution at all (26.8.89, 3.11.89). CNP, however, argued that there would be no need to import methanol; it was enough to shift sugar production to alcohol (3.11.89). The alcohol producers argued that this was not true. It was decided that 1 billion tons of methanol would be imported. The use of methanol was approved by the Ministry of Health (14.11.89), and the MME and MIC supported it.

Nevertheless, according to Petrobras, methanol was very expensive and highly polluting. It wanted to use the gasoline it exported so that the anhydrous alcohol could be totally eliminated (28.11.89). It also suggested that MTBE be used instead of anhydrous alcohol (29.11.89). These propositions were knocked down by the official environmental organization of the state of São Paulo, CETESB. However, the CNP and Petrobras promoted a campaign in which they alerted consumers and especially fuel station laborers about the toxicity of methanol (1.12.89, 2.12.89). According to the studies by Petrobras, methanol was more dangerous than other fuels used in Brazil. It was agreed that, if ingested, methanol would cause blindness or even death (3.12.89).

When the first shipment of methanol arrived, some environmental activists staged a protest around the ship (4.12.89). A fuel blend containing 66 percent alcohol, 33 percent methanol, and 7 percent gasoline was chosen. Petrobras argued that the government had to subsidize the purchases of methanol and mark methanol pumps in red to alert people about the presence of the product and make consumers aware of the risks of methanol (5.12.89). Gas station attendants protested against the use of methanol (3.12.89). Just when it seemed as if methanol would be used regardless of the apparently popular protests, a judge in Rio de Janeiro prohibited the importation and use of methanol throughout the entire country because of the

irreversible damage that it could inflict on the environment and to public health (6.12.89). This was followed by an attorney in Brasília banning the sales of methanol throughout the entire country until there was proof of the safety of the product (7.12.89). Methanol was later banned by various state mayors, including the Mayor of São Paulo (23.12.89).

Immediately after the injunction, the government announced its intention to file a lawsuit in order to overturn the bans (8.12.89). According to investigations by Folha, specialists argued that the campaign to raise awareness about the harmful effects of methanol was the main reason for the population panicking. The minister of industry and commerce argued that the ban was politically motivated (7.12.89). Various specialists felt that the injunction was based on emotions, not scientific knowledge (9.12.89). The bans evoked opinions from various scientists and state organs (e.g. CETESB and USP) and car producers arguing for the virtues of methanol as a fuel (7.12.89, 8.12.89, 9.12.89). Typically, it was argued that methanol was a better fuel than gasoline; it was less toxic and caused less pollution (8.12.89). Petrobras seemed to have done its work. It commented that it was not its business to be involved in politics; it was only the executor of the nation's will (7.12.89).

Alcohol was seen to be seriously lacking (7.12.89). The shortage was already felt in Rio de Janeiro at the end of the year, although not because of a lack of alcohol, but because of low prices (9.12.89). The CNP argued that alcohol would be lacking from February until as late as May (12.12.89, 14.12.89). According to the CNP, alcohol would not be rationed in the classic sense (19.12.89). However, it was argued that the CNP was downplaying the severity of the shortage. It forecasted a 20 percent lack, whereas 40 percent would have been more realistic, some argued (20.12.89). As the injunction remained in place and the situation in terms of alcohol degenerated, the alcohol producers announced that they were going to do the only thing that was under their control: they would suspend the delivery of anhydrous alcohol to Petrobras and instead produce hydrated alcohol for the alcohol fleet (20.12.89, 21.12.89, 29.12.89). It was argued that the anticipated shortage would mark the death of Proálcool (24.12.89).

Cerqueira Leite clarified the origins of the crisis. Since the beginning of Sarney's government, there had been attempts to ruin Proálcool. Petrobras had been able to establish many rules that caused difficulties for producers; for example, one rule prolonged the purchase of alcohol from 6 months to 12 months and another transferred the onus of financing and storing the

alcohol from Petrobas to the producers. According to Cerqueira Leite, at this point the average Brazilian associated alcohol with rationing, the black market, chaos, and corruption and was almost always misinformed about the real situation. This shortage would be the final defeat, the death blow, for the only successful and environmentally satisfactory renewable energy program in the world that provided a substitute for oil (31.12.89). The alcohol producers (1.1.90) and rural business unions (2.1.90) fully agreed with Cerqueira Leite. At the same time, Folha reported that scientists in the US want to use methanol as a substitute for gasoline (31.12.89).

Liberation of methanol

The government of Rio de Janeiro wanted to liberate methanol. It was argued to be incredible that a clean fuel such as methanol could not be used in Brazil in an emergency situation (3.1.90). In addition to reporting on the alcohol shortages (30.12.89, 4.1.90, 5.1.90), methanol was discussed daily in Folha (6.1.90, 7.1.90, 8.1.90, 9.1.90, 10.1.90, etc.). The official environmental organization of the state of São Paulo, CETESB, argued that the ban would increase pollution in São Paulo (10.1.90), and the Mayer of São Paulo considered repealing her prohibition (11.1.90). The minister of finance pointed out who was guilty: the ministry itself, by keeping sugarcane prices too low between 1985 and 1988, Petrobras for continually attacking Proálcool, and the environmentalists who had invoked the ban (11.1.90, 16.1.90). Folha gathered together specialists to discuss methanol; they strongly supported its use (13.1.90).

Folha, in an editorial, argued that, regardless of the reasons for the crisis, two issues had to be addressed: the short-term emergency supply, where it saw methanol as the only solution, and longer term planning, in order to start a useful debate about the future of Proálcool. What could not be tolerated was a situation in which the neglect and lack of planning by the federal government would result, without any rational decision and without any consultation of society, in the destruction of a program that society had been allocating resources to, put much effort into and invested in for many years (14.1.90).

The federal court finally lifted the ban on the use of methanol; it would only be prohibited in Rio de Janeiro and São Paulo. According to the minister of MME, these states should also recall their prohibitions against it (16.1.90). There was a campaign to inform people about the use of

methanol, conducted by the Ministry of Health (17.1.90), which addressed not only the new mixture, but fuels in general (26.1.90). Finally, the Mayor of São Paulo repealed the prohibition she had put on methanol (19.1.90). Also, the national environmental organization, IBAMA, approved the use of methanol throughout the entire country (20.1.90). It then became apparent that the use of methanol *had* already been tested before, especially between 1979 and 1983, with good results (21.1.90). Of course, methanol had already been used for over 50 years in model air planes, without any health problems whatsoever, Folha reported (26.1.90).

Just at the point when it looked as if methanol would become widely used as a source of fuel, an attorney contested the decision of the federal justice: the ban put in place by the justice of Rio de Janeiro was still legal (18.1.90, 23.1.90), at least it could not be removed from Rio de Janeiro (26.1.90). Then, suspiciously, the first methanol truck suffered an accident in Espirito Santo (a state); the driver had lost control of the truck (30.1.90). It was insinuated that the toxicity of methanol had been the reason for this crash, which increased public fears about methanol and the use of methanol was postponed (30.1.90). The Mayor of São Paulo was adamant: there had to be *absolute* security at the fuel stations. If there was not, she would re-ban methanol (30.1.90, 31.1.90). The Ministry of Labor did a study showing that when methanol was used as fuel, it posed "critical," if not "catastrophic," risks to laborers, and thus demanded that workers be provided with full security equipment (31.1.90). All this took place in a country where security measures for workers had typically been nonexistent (1.2.90).

In addition to the government and Petrobras in general being blamed for the crisis, the producers saw themselves as being blamed as well: after all, they were the ones who produced approximately 30 percent of the fuel used in Brazil and they should have had some notion of the political problems involved (28.1.90). Nevertheless, reports on the real shortage of alcohol started to increase (3.2.90, 4.2.90, 5.2.90, 8.2.90, 9.2.90, 10.2.90 etc.). It was closely followed by Folha. During the daily reports on the shortage, Petrobras offered an insightful explanation: alcohol consumption had been growing at the same time that its production had remained stable. What was more, many producers had switched to sugar as a result of the low prices of alcohol (4.2.90). According to Petrobras, alcohol should return to its former role as an additive to gasoline (8.2.90).

The minister of MME foresaw a grave alcohol crisis; according to him, the only way to avoid it was to immediately begin using methanol (5.2.90). The juridical block was, however, still in

effect. The CNP argued that even with methanol, there would be a crisis (7.2.90). The use of methanol was finally allowed by the federal justice, but the ban in Rio de Janeiro remained in force (9.2.90). The final decision was then to be made by the Supreme Court (13.2.90); it decided to approve the use of methanol (14.2.90). It only remained banned in Rio de Janeiro. The distribution of methanol was to start in São Paulo at the end of March (15.2.90). Brazil was already importing grape alcohol from Europe (20.2.90). Petrobras expected chaos for April (2.3.90).

Sealing the destiny of Proálcool

When Fernando Collor became president on the 15th of March 1990, if nothing else, the relative importance of the alcohol crisis was reduced: Collor changed the entire economic and political system of Brazil (16.3.90, 17.3.90, 18.3.90, 19.3.90, etc.). Among other things, three ministries, MME, Transportation and Communication, were merged into a Ministry of Infrastructure. Collor chose as the first head for this super ministry the ex-president of Petrobras, Ozires Silva (26.2.90), a man who had responded to professor Corsini's miniplant plans with the words, "the best solution to alcohol is oil" when still presiding over Petrobras (2.9.90). Whereas it was argued that he had changed his negative opinions of Proálcool, he continued to insist that alcohol was very—very—expensive, a synonym for subsidy (26.2.90, 28.2.90, 4.3.90).

Even if the supply for April 1990 was supposed to be 25 percent below demand, the Minister of Infrastructure, Ozires, was against any rationing of alcohol, saying that it represented violence against the consumer. Instead, he defended voluntary economizing. Producers argued that rationing was inevitable, and that in practice it was already taking place (16.3.90). When a new president took power, fuel prices were increased by 57.8 percent, sugarcane by 32.1 percent, and all the subsidized prices and tariffs for alcohol production were abolished (14.4.90). Nevertheless, several weeks after the historically shocking start to Collor's chaotic, and hence short, presidency, the main news in Folha was that the government was maintaining the alcohol subsidies in the northeastern part of the country and in Rio de Janeiro; the subsidy was disguised in language as "due to the equalization of costs" (14.4.90).

Even though the crisis had been widely reported in newspapers since the beginning of the year, the core of the material crisis was still to come. It was argued that the continuous

reporting was impacting public opinion; the shortage interfered with the day-to-day life of citizens, who were facing growing difficulties in finding alcohol (13.3.90). When the worst part of the crisis arrived, it was broadly reported in Folha. The newspaper, for example, published a special section dealing with the crisis, saying "if you have already found yourself waiting in a long line to fill the tank of your alcohol car, now prepare for even worse lines" (16.3.90). The problems of alcohol supply continued until late into July and became bound up with a truck tankers strike, the abolition of governmental institutions (IAA and CNP), which had administrated the fuel distribution, and delays in methanol importations (19.4.90, 22.5.90). Nonetheless, as of May there would have been enough alcohol available.

Even though the crisis had been foreseen - and foretold - various years beforehand, and even though the government and Petrobras were to blame for the crisis (12.4.90), the long lines at the gas stations reported in the daily news effectively destroyed the image of the alcohol car. Even the new president now talked about driving a gasoline car instead of an alcohol car. The slogan "alcohol car, are you going to have one more?" became "alcohol car, do you still have to get rid of one?" (16.3.90). The words "alcohol car, never again" were also heard (26.3.90), which had a deep resonance with the events of recent history of the country.

It was in this situation that the minister of infrastructure announced that the future of Proálcool would be decided by market forces, that is, alcohol car sales would be decided by the market (4.4.90). The Ministry of Infrastructure now repeated, almost exactly, the earlier comments by Petrobras: the shortage was because of insufficient alcohol production and that alcohol, which was much more expensive than oil, should never again be used as a pure fuel (26.3.90). Cerqueira Leite once again clarified that alcohol should not be compared with oil, but rather with gasoline. And indeed, when alcohol was compared with gasoline, the former was quite competitive (25.3.90).

After the shortage

Facing the demise of Proálcool, it was now argued that there were risks of job loss and risks of a loss of technology, independence, and investments in alcohol plants and cars, in addition to a loss in the belief that Brazilians could do something well (12.4.90). The crisis was analyzed and talked about throughout the year (16.3.90, 27.5.90, 17.6.90, 31.8.90), until an event brought some light to Proálcool: war broke out between Iraq and Kuwait. At the time, Iraq was

the main supplier of oil to Brazil: it supplied approximately 160,000 barrels per day of the total 650,000 barrels that Brazil imported (3.8.90). The Minister of Infrastructure, Ozires, said that if the oil price were to become sufficiently high to render Proálcool viable, then Brazil would be in trouble, since the oil price would then have to be excessively high (4.8.90).

Facing the dark prospects for oil, the president decided to re-launch Proálcool, emphasizing the potential using sugarcane straw to generate electricity (30.8.90). As Cerqueira Leite had argued nearly a decade earlier (11.10.81), sugarcane straw had a great deal of potential in terms of generating electricity. The president might have had other reasons for re-launching the program, as he came from Alagoas, the main sugarcane state in the northeast. According to Collor, alcohol had a strategic role in the Brazilian energy matrix. The resurrection of Proálcool caused friction between Ozires and Collor, which the former admitted in an article in Folha (3.9.90).

- Alcohol car share 15 percent of total car sales (18.1.91) -

Although Collor had rhetorically re-launched Proálcool, little was done after that. Only one of the promised two price increases was put into place (7.10.90). It was argued that the cost-price disparity in sugarcane was still approximately 40 percent (7.10.90), which had forced many farmers to switch to other crops. Alcohol producers said that rhetoric was not enough, concrete measures were required: credit lines should be reopened and hydrated alcohol should be inserted into the national energy matrix (2.9.90). The energy sector totally lacked a coherent strategy, it was argued. As the capacity of the existing alcohol plants had been approximately 16 billion liters per year since 1985 (27.7.91), producers argued that production could be increased to 18 billion liters with minimal investments (10.3.91). However, the problem was that, as a result of the low price of sugarcane, farmers had not increase production on their plantations and had been unable to renovate their equipment since 1986; it was argued that the sector was de-capitalizing (13.5.91).

Since Collor had extinguished the IAA and CNP, the sector lacked coordination. Folha argued that the total lack of planning in the sector would lead to violent cycles of surpluses and shortages (10.8.91). It was apparently deregulated, but still differentiated prices were introduced: more to the northeast and less to the center-south of the country (16.9.91). Producers in the center-south part of the country were strongly opposed to these price differences. They argued that instead of enhancing productivity, the price differences would

reward inefficiency (19.6.91). Producers also criticized the grand solution, that is, subsidized loans; their problems would not be solved by accumulating debt (26.7.91). Also, producers argued that the fact that agricultural credit lines were not open to approximately 60,000 sugarcane farmers was an injustice since sugarcane was, after all, a food crop. In addition, Petrobras did not purchase all the alcohol that, by law, it should have purchased. Although the harvest seemed good, 800,000 liters of methanol still needed to be imported (16.9.91).

Image of the alcohol producers

The crisis had not only afflicted the image of the alcohol car, but also that of the producers. The producers in the center-south of the country blamed the media for smearing them and distorting public opinion; alcohol production was associated with negative issues such as huge debts (of which 50 percent were in Rio de Janeiro, 25 percent in the northeast and 25 percent in the center-south of the country), and Collor's questionable interferences (by providing subsidies to alcohol producers) caused much disaffection among people (26.7.91). The producers argued that most of them were serious about their business, but the media still depicted them as backward, inefficient, and bad employers. Even in the face of the "price-siege," the sector had transformed vinasse into a fertilizer and created other uses for raw materials like sugarcane straw in the form of electricity, bio-coal, and even bio-plastics (9.1.92). Even still, Proálcool and the alcohol producers were still depicted as a prime example of backwardness (11.10.92).

Environmental issues, especially sugarcane burning, created heated debates. Producers and local government argued that it was necessary for employment. Opposing them, environmentalists and public prosecutors argued that sugarcane burning had adverse effects on public health and local fauna. One agronomist argued that the burning did not exist before 1970; it was introduced in order to increase productivity; at the same time, however, it was wasting the straw, which contained much energy (7.7.91). Another, this time positive, environmental issue was the highly positive energy balance of alcohol production and the fact that carbon dioxide was being completely recycled (10.3.91). While Proálcool was born as a strategic issue, it was now also an environmental issue, producers advertised. The practice of generating electricity from sugarcane straw was discussed in particular (10.3.91). Producers demonstrated to the new minister of infrastructure how electricity could be generated using

sugarcane straw at half of the price of hydroelectric power (23.11.91).

Articles summing up the impact of Proálcool were published with increasing frequency. Producers and other adherents calculated that Proálcool had saved much more than they had originally invested in it. One of these adherents argued that with an investment of approximately US$ 10.5 billion in the alcohol program, most of which had been the producers' own capital, approximately US$ 18 billion had been saved (10.3.91). Ribeirão Preto, a region in São Paulo, had emerged as the main alcohol producer; it represented approximately 44 percent of the state and almost 30 percent of national alcohol production in 1992 (15.10.92, 21.11.92). Ribeirão Preto was, however, not only the largest alcohol producer, but also the largest producer of soybeans and other beans, and one of the largest producers of various other agricultural products (20.9.92). This fact was used to argue that sugarcane did not harm food crop production.

- Approximately 4.5 million alcohol cars in circulation (22.9.92) -

Once the alcohol supply had been normalized and the lower price of alcohol vehicles put in place, consumers began to return to the alcohol car. For the first eight months of 1992, the share of alcohol car sales was approximately 26.5 percent the total of all car sales. Petrobras, however, kept insisting on the existence of "conta álcool," which it argued was insupportable. It calculated that it had accounted for approximately US$ 840 million over the previous four years and approximately US$ 35 million per month. To solve this, the government wanted to transfer the purchase of alcohol from Petrobras directly to distributors (20.6.92, 3.11.92). This was, however, a solution that Petrobras would not approve (24.6.92). Petrobras also proposed using another gasoline blend containing alcohol and MTBE as additives (30.1.92, 2.5.92). This, however, was opposed by the environmental organizations.

The chaotic era of Collor was about to come to an end; a large and complex case was brought against Collor. This was referred to as Collorgate (a reference to the Watergate trial in the early 1970s in the United States), and just like Watergate it ended in the impeachment of the president. As a part of the trial, a web of deceit and corruption, particularly in his home state Alagoas, was investigated. Folha played an important role in this process, because it reported and investigated the backgrounds of the cases. Sugar and alcohol producers in the northeast had been the main active partners in this corruption (2.3.93). The sugar and alcohol producers, representing approximately 65 percent of the GDP of the states of Alagoas and

Pernambuco, were argued to have used subsidized loans in other sectors to expand their empires (11.4.93). Part of Collorgate also focused on the shortages of 1990, since on the eve of the shortage eight sugar and alcohol producers had exported sugar, exacerbating the lack of alcohol (27.9.92).

Brief reinvigoration

Gradually, the Vice President, Itamar Franco, began to govern the country (21.9.92). Itamar's new government liberated approximately US$ 1.2 billion in the form of subsidized loans, in particular loans to the sugarcane plantations and for alcohol storage (10.2.93). Although it was argued to be problematic in terms of inflation, the new president wanted to stimulate Proálcool since it was strategic for generating energy and offering employment (6.2.93). The government also wanted to stimulate alcohol vehicles; 40 percent of all vehicles should be alcohol vehicles. Although the government increased alcohol and gasoline prices by 48 percent at the start of the year (4.2.93), producers argued that the prices were still 40 percent too low in the center-south of the country and 58 percent too low in the north/northeast of the country. Approximately 36 mills had stopped operating (14.2.93). Sugarcane, for its part, it was argued, was still priced at approximately 40 percent below production costs (16.2.93). Folha, in an editorial, argued that the government, the main agent of the program, was attempting to free itself of all responsibility and leave Proálcool suspended in an indefinite status (6.4.93).

The announced reinvigoration prompted new critiques; it was argued that the increasing number of loans to alcohol producers amounted to approximately US$ 2.5 billion. Most of the 485 existing alcohol plants were reported to be highly indebted (11.2.93). While differences between the alcohol plants in the center-south and northeast parts of the country were acknowledged, the critics argued that the producers—the sugar mafia—would never repay their debts (11.2.93). For this, the Bank of Brazil demanded economically feasible projects (12.2.93). Other critics argued that, besides bringing harm to Petrobras in the form of the "conta álcool" (15.2.93), and creating prejudices in terms of food production (19.2.93), alcohol was still much more expensive than oil. Producers argued that the image of the sector was inhibiting its development. In fact, they argued that the image was incorrect with regard to São Paulo, but that the industry in the northeastern part of the country was an embarrassment

(5.4.93). The differences between the ever more productive center-south and ever more backward northeastern parts of the country—and Rio de Janeiro—became clearer during the decade.

Cerqueira Leite again demonstrated that alcohol production was economically feasible when compared to the cost of gasoline. The professor argued that it would not be necessary to subsidize alcohol production, but simply to stop subsidizing oil importation and remove taxes from alcohol (14.2.93). Producers continued in their pro-Proálcool arguments, claiming that alcohol production made use of idle land, created jobs for unskilled laborers, and prevented an exodus from rural Brazil. Compared to the US$ 11 billion that had been invested in Proálcool, US$ 22 billion had been saved, the producers argued (15.2.93). Cerqueira Leite inspected the energy price policies; when compared to other public tariffs, fuel prices had been reduced to approximately 45 percent their level in the 1980s as a result of the fight against inflation. This, he argued, only resulted in reducing energy prices and, thus, increased consumption and increased the losses of those companies already operating at a loss. Cerqueira Leite argued that Petrobras had lost approximately US$ 25 billion between 1980 and 1993 (2.8.93).

Regardless, the incentives effectively incentivized sugarcane plantations (16.2.93). The alcohol producers argued that the credit should be opened in particular to sugarcane farmers who had not had access to credit during the Collor era. Many had sold their land to large landowners as the only solution and thus land had been even more concentrated in the hands of a few (9.2.93, 10.2.93). In addition to spurring Proálcool, Itamar also attempted to steer alcohol production in a new direction. The government announced plans to create a substitute for Proálcool, Pronal, which would incentivize alcohol production in small plants that were already integrated with milk production; the idea was to use straw as animal feed. Approximately US$ 60 million was going to be liberated (19.3.93); the government still had plans to create Pronal as late as August of 1993 (7.8.93). It also targeted cogeneration. Already since 1987, seven plants had been generating electricity and selling it to the national grid in Ribeirão Preto; the pilot phase was now over and a new phase was started (7.5.93, 26.6.93, 26.7.93). The surplus electricity could even be as much as nine GW (26.7.93, 13.8.93).

According to the World Bank, Brazil had a huge potential to reduce greenhouse gas emissions by substituting gasoline with alcohol, a potential which the Brazilians apparently had not fully captured. There were no apparent barriers, definite policies were awaited (17.12.93).

Cerqueira Leite argued that obtuse government policies, besides compromising the entire electricity system and Petrobras itself, had driven Proálcool to the edge of collapse. Approximately 50 alcohol plants had stopped functioning (2.8.93). When the highly polluting fuel oil was exempted from taxes, the clean and renewable fuel, alcohol, would pay approximately 36 percent in taxes (2.8.93).

Finally, energy prices were taken more seriously: the prices of alcohol and gasoline were adjusted by approximately 35 percent in September 1993 (22.9.93), again in March 1994 and still one more time in May 1994 (13.5.94). These were done in an attempt to freeze prices at their real value level: URV (Unidade Real de Valor), which was subsequently transformed into the Real, was the new currency (15.5.94). Even if the sugarcane harvest was argued to be good, approximately 500 million liters of alcohol was still lacking (12.11.94). The price increases had incentivized sugarcane plantations and made it possible for the sugarcane farmers to renew their tractors, trucks, and other machines for the first time since 1986 (12.11.94).

Definite indefiniteness

The—not always agreed with—father of the Plano Real, Fernando Henrique Cardoso (FHC from now on), began his presidency at the beginning of 1995. The Plano Real had been launched already during Itamar's government, freezing almost all prices. This time the plan seemed to work, but soon, already at the beginning of 1995, alcohol producers pleaded for price increases (3.2.95). According to Cerqueira Leite, Proálcool was left to starve, without prospects, without guidelines (26.3.95). Alcohol car sales were declining; only 4.4 percent of the cars sold during the first three months of 1995 were alcohol cars. There were no popular alcohol cars, that is, cars with a 1.0 liter engine, and even among larger cars alcohol models were few. Also, whereas electronic injection was introduced to gasoline models, alcohol models still used carburetors (30.4.95, 2.10.95). The demise of the alcohol car was typically explained as a supply crisis at the beginning of the 1990s; it destroyed the image of the alcohol car (30.4.95; 4.10.95). It was even argued that the car industry was conspiring against the alcohol car (20.5.95). The price of alcohol was increased to 80 percent and then to 88 percent that of gasoline; arguing—perversely—that it would incentivize the development of the alcohol engines to be more efficient (16.7.95).

Problems in the northeast surfaced again and again; reports of chronic financial problems,

frauds, low productivity, and subsidies accompanied the sector (9.4.93, 28.9.94). Also, repeatedly producers in the northeast followed the prices rather than the sectoral agreements. They sold sugar when the price was high, irrespective of the situation or what was ordered. What is more, child labor abuses and human right violations were frequently reported (31.1.94, 28.9.94). One notable case was that the sugar and alcohol producers in Alagoas and Pernambuco, when attempting to avoid labor right payments, destroyed approximately 90,000 houses that their laborers lived in (28.5.95). They then had the gall to demand more subsidies in order to stop the destruction of the houses and blamed the federal government and labor laws; it was very risky to have labor living inside the "latifúndio."

Indeed, sugar and alcohol producers in the northeast were seen to be the most backward within the overall backwardness of Brazilian capitalism (29.5.95). The mass destruction of the houses that the workers lived in was condemned as shocking and criminal and even President FHC threatened that he would not hesitate to expropriate the producers who had done such a thing (2.6.95). The producers, however, argued that this was legally impossible due to the modifications to the constitution that Sarney had made: only unproductive farms could be expropriated (7.6.95). However, many alcohol plants had been shut down in the northeast because of the low prices (9.6.95). Overall, the labor conditions and the administration of plants remained highly questionable in the north and northeastern parts of the country (10.7.95, 16.7.95).

At the same time in São Paulo, the labor conditions were improving (31.7.95). Besides the differences between the regions, it was acknowledged that not all producers were the same. Indeed, there were both: serious producers and "real deadbeats" (22.7.95), including in São Paulo (5.6.95). The debts of the alcohol producers had been accumulating; they increased from approximately US$ 2.5 billion to US$ 5 billion (22.7.95). Producers argued that the disparity between the production cost and prices, which had started already during the time of Sarney's government, persisted. Although promised, prices had not followed the inflation indices (29.6.95, 2.7.96, 25.10.95). The government answered with its most typical and established solution; it offered more subsidized finance (7.7.95, 21.7.95). However, sugarcane received a price increase of 12.6 percent in July (16.7.95).

- Alcohol car sales make up 3.6 percent of total car sales (19.10.95) -

Cerqueira Leite assessed the situation in a column entitled "Proálcool, the death foretold"

(9.10.95). According to him, money was always at the heart of the debate over Proálcool. Traditionally and persistently, the price of alcohol was compared with the price of crude oil and the taxes collected from alcohol production were ignored in the calculations. Also, when calculating an aggregate value for oil, it is important to calculate the values of all oil products; similarly, one should calculate the prices of the sub-products of sugarcane—alcohol, sugar, straw, vinasse, electricity, and so forth—in order to attain the value of sugarcane (9.10.95). He argued that Petrobras had orchestrated the most devastating campaign of demoralization that the country had ever witnessed to destroy Proálcool. As a result of the campaign, the grave alcohol shortage did not put an end to the Proálcool program. The ones who most punished Proálcool were the governments of Collor, Itamar, and FHC because they starved the program with low prices and indefinite demands. He argued that globalization and neoliberalism seemed not to be compatible with an eminently national program; there was an ideological conflict between them (16.10.95).

Finally, FCH made political promises to the alcohol sector (10.11.95). Producers pleaded for a government decision regarding alcohol. As a salient point, producers demanded that the role of Petrobras should be clarified; either it should act like a state-owned company, mutually responsible for the national energy matrix, or it should act like a private company in competition with alcohol producers, but not as both (15.11.95). The government again decided to maintain Proálcool and started to study incentives, in particular for alcohol cars. Regardless of the promises, the government failed to clarify the matter (27.2.96). Critics argued that it was inexplicable and unsupportable that a program as important as Proálcool would not receive any adequate or definitive evaluation by the government, not to speak of the policies for the sector. It was left to die slowly along with alcohol car sales, which hit record lows (20.1.96).

Resistance, Proálcool front

Facing the absolute indefiniteness of the president, a group of parliamentarians created a "Proálcool Front" whose objective was to press the government to provide incentives for the objective of using alcohol as a source of fuel (25.1.96). The Front had 70 congressmen and 8 senators at the beginning (25.1.96), and it increased in numbers quite rapidly, counting some 200 congressmen and 31 senators in less than a month (23.2.96). It argued that one cannot allow irresolution to continue while a salient national industry is at the brink of collapse

(31.1.96). Producers kept arguing for price increases, reminding the government of the accord made between them and the Sarney government; prices were to follow inflation. They argued that the disparity caused the sector an annual loss of US$ 1.4 billion (5.2.96). Even if Brazil produced approximately 60 percent of the world's alcohol, it still was chronically short of alcohol (22.2.96). Besides saving the producers and farmers from the crash, the reinvigoration of the program would create approximately 200,000 jobs, argued the alcohol front.

FHC promised that Proálcool would not be extinguished during his era. Indeed, during his first term it was not. He wanted to get rid of the "conta álcool," but there were no measures for how to do this. The environmental tax and green fleet emerged as a solution and persisted in the discourse and were the main policy tools discussed to solve the problem of Proálcool (11.2.96, 6.4.96, 6.3.97, 7.3.97). The government argued that alcohol was important because it was renewable, it was a useful national technology, it generated jobs, and it improved the energy security; thus, it was strategic. What was more, the government saw that it could make use of the program's ecological appeal in international relations (22.2.96). In the same breath, however, the government emphasized that the cost of alcohol should be lower (25.2.96). A package was then proposed; Proálcool would be re-launched via incentives for alcohol cars and the building of new sugarcane plantations (23.2.96).

The announced re-launch of the program sparked criticism; critics blamed Proálcool for child labor abuses and bad labor conditions; even a demonstration was organized against Proálcool (20.3.96). Petrobras reminded the public of "conta álcool" (27.2.96). Thus, instead of re-launching Proálcool, the government began to study how to liberate alcohol prices and sought to reduce the number of plants from 346 to 200 (25.2.96, 26.3.96). The proposed package for reinvigorating Proálcool was continually delayed (13.3.96) and finally it was argued that it had been transformed into merely a package of intentions (30.3.96). It was again argued that the government, the principal actor in the Proálcool program, was trying to free itself of any responsibility and leave the program in an indefinite status. The rebirth was promised various times, but promises remained promises (12.7.96): no policies were defined (10.9.96, 22.11.96).

A fuel price adjustment was announced in February (7.2.96), but the government was still preparing for the adjustment in March (7.3.96). Since the Plano Real would not permit price increases more than once a year, it had to be approved by the government (12.3.96). Then, a

price adjustment of ten percent was to take place at the same time as the prices would be liberated (26.3.96). When this parallel price adjustment and liberation finally came into effect, it resulted in increasing prices by approximately 14 to 30 percent, instead of by ten percent, which made the president angry (3.4.96). Petrobras announced that the price adjustment did not resolve its problem of "conta álcool" (4.4.96). A letter from a reader argued that the fact that the president was angry about the price increase was an insult to the intelligence of the people: How could the increase have been limited to ten percent if 90 percent of the fuel stations belonged to only two owners (5.4.96)?

Oblique journalism and MTBE

A salient detail pertaining to the discourse has to be noted. Márcio de Morais, a journalist for Folha who wrote about the energy sector, kept reporting dubiously on alcohol. Whether consciously or unconsciously, the journalist subtly but systematically reported negatively on alcohol and positively on Petrobras and made adverse numerical mistakes with regard to alcohol production. In a word, he seemed partial. In one article, the journalist calculated (incorrectly) that the coming increases for sugarcane (17 percent) and alcohol (11.95 percent) would result in a 28.95 percent increase for the sector (27.3.96). One reader corrected this; there was no need to summarize the increases (5.4.96). The same journalist had written a story in which he argued that alcohol polluted the environment to the same degree as gasoline, referring to the studies of CETESB and Petrobras (12.3.96). The president of CETESB wrote a letter to Folha correcting the article; CETESB had never published results arguing that alcohol was more polluting than gasoline, only a single study by Petrobras had argued that (15.3.96). Later, CETESB published an article in Folha to confirm that alcohol causes less pollution than gasoline (30.3.96). For his part, an engineer for Petrobras argued that CETESB was lying (1.4.96), which again was debated and refuted by the CETESB (12.4.96).

An article by the same journalist reported a lack of approximately 100 million liters of alcohol. This lack could be solved by reducing the anhydrous alcohol mixture from 22 percent to 12 percent, he wrote (4.4.96). Alcohol producers, however, argued that approximately 100 million liters of alcohol was available in their plants, but that Petrobras had not bought it (13.4.96). Folha called Petrobras various times about the issue, but found no one who could comment on the issue (13.4.96). According to the producers, Petrobras wanted to de-structure

the sector. The government acted indefinitely again, contemplating whether or not to reduce the mixture to 12 percent. The DNC[10] argued that the mixture should be reduced (16.4.96). The CETESB argued that it would be ecologically harmful to reduce the mixture from 22 percent. What was more, it argued that MTBE would be ecologically harmful; even the North Americans were banning it (16.4.96). Petrobras, however, denied that MTBE was at all environmentally harmful and announced that it would build four new plants to produce it (17.4.96). For their part, alcohol producers offered assurances that no alcohol would be lacking (18.4.96).

The popular reaction to MTBE was strongly negative (5.5.96); Paraná (one state) prohibited MTBE, arguing that it did so for environmental reasons (24.4.96). Finally, the president of Petrobras commented that alcohol seemed to be reappearing on the market and that if he would have known that there was so much alcohol, he would have demanded that Petrobras buy it in the first place (25.4.96). Although the use of MTBE in Brazil was phased out in June, Rio Grande do Sul (one state) kept—illegally—using it (4.5.96, 10.10.96). The MTBE case aroused discussion about environmental concerns; they should be taken into account in the energy matrix (30.4.96, 3.5.96, 5.5.96). Even if it had obviously lost, Petrobras insisted on the use of MTBE, and the president of the company announced that he would put MTBE on the Brazilian market if the government allowed it. Again, the same oblique journalist reported that the adoption of MTBE would reduce the price of gasoline because it was much cheaper than alcohol (10.10.96); this opinion was the total opposite of what Cerqueira Leite had previously calculated (5.5.96).

Sub-products and the alcohol car

Sugarcane's sub-products were discussed increasingly; already approximately 15 sub-products were being explored (6.4.96, 23.8.96, 20.11.96, 28.10.97). It was argued, however, that Cuba was producing approximately 700 products based on sugarcane (4.11.97). Again, it was remarked that the sugarcane sector had the potential to co-generate much electricity while producing sugar and alcohol. It was argued that this potential was approximately 10 percent of Brazil's current electricity generation capacity and would be available during the dry season when hydroelectric dams have the lowest reserves of water (24.11.96). Also, the

[10] National Department of Fuels (Departamento Nacional de Combustíveis), the successor to the CNP.

production cost would be lower than that of hydroelectric power. Instead of incentivizing the use of sugarcane straw or any other sub-product, the government liberated alcohol prices. The liberation, which was to take place in May 1997, was seen as both a threat and an opportunity. What was agreed on was that it was a central moment in the history of the sector; the future of Proálcool would soon be decided (22.11.96, 26.11.96, 8.12.96).

- Alcohol car sales at zero in January (7.2.97). -

Before the price liberation in 1997, the unfulfilled promises and indefiniteness continued. There seemed not to be enemies for Proálcool, but alcohol car sales remained nearly nonexistent and nothing more than promises was offered (22.2.97, 2.6.97). It was reported that the sector in the northeast was in deep crisis; plants were being shut down, taking the state of Alagoas down with them (8.6.97). The producers there were highly in debt. It was typically argued that the ex-president, Collor, had initiated the crisis when giving subsidized loans to producers (5.6.97). During the crisis, the situation in Alagoas was analyzed in more depth. Despite having much higher economic growth than average, Alagoas had the highest illiteracy rates and child death rates in the country; economic growth had not brought about good for the state (21.10.96, 8.6.97). It was reported that the sugar and alcohol producers had not even paid taxes since the new constitution had been written in 1988 (18.7.97).

Recuperation as a rhetoric

Then, the promises announced by President FHC prompted new growth in the sector. He made the promises at a special session on the environment at the UN in New York, where approximately 70 heads of important economies gathered. FHC had opened the session by criticizing developed countries for not fulfilling their promises to allocate part of their GDP for sustainable development (23.6.97). The next day, the secretary for the Ministry of the Environment announced plans for a new Proálcool program. The president and the minister of the environment hastened to deny them; there would not be any subsidies, none at all (24.6.97). These promises were said to be only a marketing move by the government and should not be taken seriously (25.6.97). The President himself had spread the studies about a new Proálcool program. Despite denouncing the plans, they were argued to be the main incentive for the large increase in the number of sugarcane plantations. After this rhetorical move, Petrobras once again brought up the issue of “conta álcool” (25.6.97).

Sugarcane plantations had been increasing in São Paulo by 30 percent in the 1990s at the same time that the alcohol fleet had been decreasing (25.6.97), thus the 1997 harvest would be enough to supply all of the alcohol demand (1.7.97). The reasons to incentivize the alcohol fleet were increasing. One of them was the possibility to sell emission rights to rich countries in the future, which could amount to up to US$ 1.2 billion in revenues annually (25.6.97). It was argued that alcohol cars were the only purely clean cars. It was argued that the green tax was, for its part, necessary because the existing subsidies were to be cancelled at the end of the year (7.3.97, 26.6.97). The finance minister resisted: no stimulus for alcohol. The decision about the green tax could not be made by a group of half a dozen people, he argued, referring to the interministerial group that decided on alcohol matters (26.6.97).

The green fleet was finally approved, meaning that the government fleet would consist of alcohol cars (6.12.97). It was seen as the first step in the effort to resurrect Proálcool. The next step was to add approximately 15 percent alcohol to diesel fuel, a step that was never taken because the president of Petrobras vetoed against it; more studies were needed (6.12.97). However, it was felt that the green fleet would not to be able to save Proálcool, to rip off the "death foretold" image that had been applied to Proálcool (29.12.97). Also, critics claimed that the law mandating a green fleet was ridiculous; in fact, it was not followed, even in Ribeirão Preto (12.8.98). The 1997 harvest was the largest in history (26.8.97. 23.9.97, 21.10.97); as the crops had benefitted from the effects of "El Niño" (20.1.98). Since alcohol was plentiful, the alcohol mixture was increased from 22 percent to 24 percent and the government acquired rights to purchase alcohol for storage (19.1.98, 26.3.98). For the first time since the crisis in 1990, there was no need to import alcohol or methanol.

The deficit was in the headlines again; it had increased by approximately 114 percent between January 1996 and May 1997 (17.6.97). As part of the Plano Real, the currency was devalued, which increased the deficit. At the beginning of 1998, the deficit was already US$ 8 billion annually (2.2.98, 11.2.98, 5.4.98). One of the founding fathers of Proálcool, Shikeagi Ueki, returned to defend Proálcool; he argued that it was still the undeniable solution for Brazil in order to reduce the trade deficit (29.12.97). Alcohol producers argued that a fleet of cars consisting of 50 percent alcohol cars would save approximately US$ 117 billion by 2010. Also, the mixture should be increased to 26 percent and alcohol should be used as a substitute for the MTBE that was still being used in Rio Grande do Sul (2.2.98). Producers argued that the

government was addressing only minor problems without giving attention to the larger contributions that the expansion of alcohol production could bring to the country (11.2.98).

Agrocrisis and chaos

The harvest of 1998 was big in São Paulo (8.9.98). Thus, since the price that the producers sold anhydrous alcohol at had been liberated since May 1997, prices dropped from R$ 0.41 to R$ 0.29 (11.10.98) and then to R$ 0.18 (8.12.98). Unica, the representative of the alcohol producers in São Paulo, threatened to leave ten percent of the sugarcane standing in order to increase the alcohol and sugar prices. It argued that this would mean a loss of R$ 1 billion for the region and that the government would collect R$ 250 million less in taxes; it would be inconsiderate to leave sugarcane standing since each hectare of sugarcane would yield taxes of some US$ 1500 while, for example, the soy bean would yield only US$ 74 in taxes per hectare (11.10.98). In Ribeirão Preto, 36 plants and 9 distilleries announced that they were going to leave approximately 4 million tons of sugarcane unharvested (27.10.98). Also, the price of sugarcane had fallen by approximately 30 percent (8.9.98, 17.11.98). Protests by farmers had already erupted previously because of the low prices (16.6.98). It was argued that sugarcane farmers were in the edge of chaos (17.10.98).

During the crisis, various attempts to solve the problems were introduced. Major producers argued that there was a lack of self-awareness; alcohol producers had continued to think of themselves as agricultural producers when they were also energy companies. The stocks of alcohol continued to grow as a result of the crisis and the only solution seemed to be to reduce production. Indeed, alcohol producers and sugarcane farmers in São Paulo *did reduce* sugarcane cultivation by approximately 50 percent for the following year (17.10.98). Since the electricity sector happened to be in need of more capacity, another obvious solution would have been to use sugar and alcohol plants to co-generate electricity. This would have solved the two large problems effectively: the country had experience in cogeneration, sugarcane was plentiful, and the prices were low (9.9.98). The government, however, did nothing to proceed with this solution.

A not so obvious solution to relieving the crisis was to distribute alcohol for free. This solution, however, was in fact chosen. While these “handouts” were mainly to protest against the policies, they were also to incentivize alcohol car sales. Alcohol producers also offered first 200

(22.9.98), and then 1,000, liters of alcohol for each new alcohol car (12.2.99). Because there were approximately 300 sellers and only seven buyers in the alcohol market, one solution was to unify the lines of the sellers; producers proposed to create a commercialization pool (24.11.98). Soon Brasil Álcool was created to control alcohol stocks and to increase the price of alcohol (29.1.99). Another entity, Bolsa Brasileira de Álcool, was created in May 1999 as a cooperative to organize alcohol sales (2.10.99). Also, alcohol exportation and Clean Development Mechanism (CDM) projects attached to the Kyoto protocol were suggested as solutions (2.2.99).

The farmers did what they could; they switched to other crops, mostly to fruit crops (4.9.99). Besides this, they protested to show their indignation with the policies targeted at the sector by organizing long streets blockades (11.5.99, 2.6.99, 29.7.99) and giving away tens of thousands of liters of alcohol (2.6.99). The largest giveaway was 250,000 liters (30.4.99). Approximately 35 busloads of protesters, consisting of 1,500 farmers, arrived to Brasília to demonstrate (1.6.99). The protesters also pleaded with the car industry for more alcohol cars (8.6.99). Protests were also organized in the northeast, where the producers demanded that their subsidies be returned and threatened not to harvest the crops at all; an act that would cause a 12 percent reduction in national sugar and alcohol production and leave approximately 350,000 laborers without seasonal work (1.9.99).

Quenching the fires

As the attempts to solve the problems of surplus and low prices had been mainly private initiatives, the government woke up as well to quench the fires that its own actions had ignited. Before this, however, it reduced 65 percent of alcohol distribution subsidies (2.2.98). Besides opening credit lines in order to create private stocks of alcohol (2.2.99), the government organized auctions to purchase alcohol so as to increase prices (11.5.99), and announced plans to increase the alcohol mixture in gasoline from 24 to 26 percent and to use alcohol instead of MTBE, which was still being used Rio Grande do Sul (21.5.99). Although the 26 percent mixture was approved by the car industry (7.7.99), it was only implemented in Curitiba (the state capital of Paraná) (13.8.99). Tax exemptions were created to incentivize alcohol car sales in São Paulo (14.1.99, 16.4.99) and a program to renovate old cars favored alcohol cars (19.11.99).

- 0.5 percent alcohol cars (23.8.99). -

Overall, the sugar-alcohol sector had been severely and unjustly punished, producers argued (4.7.99), and the whole sugarcane sector lost approximately R$ 1 billion during the harvest of 1998/99, which represented a decrease of approximately 25 percent compared to the previous year. The price of sugarcane declined by approximately 29 percent (23.3.99, 1.6.99). Whereas the production cost per ton of sugarcane was R$ 21, some plants even offered to purchase a ton at R$ 7 - 8. Also, the international sugar prices were at their lowest levels in 15 years (17.7.99). For the first time in 20 years, experts forecast a reduction in the sugarcane harvest in São Paulo. The crisis was considered to be the worst in Brazil's history. One farmer commented: "I've never seen such a grave situation in my 70 years of life, nor heard of one this bad from my father, who was a producer himself" (11.5.99). Approximately 130 alcohol mills were shut down during the crisis, of which 18 were in São Paulo (4.9.99). It was even argued that approximately 1 million hectares of sugarcane would be turned into other crops in São Paulo. This would spell the end for small farmers; the sector was on the brink of collapse (23.8.99).

No more fire

Between October 1998 and September 1999, the price of alcohol had been approximately 40 percent that of gasoline; before the liberation it had been fixed at 85 percent (20.8.99). This time there were no doubts: alcohol had become *competitive* (2.10.99). Apart from being an unjust price level for the producers, the low price provided incentives to buy alcohol cars and to convert gasoline cars into alcohol cars (4.7.99). What was more, the price of gasoline had been increasing rapidly; it had increased by 48 percent since the start of the year (22.8.99, 28.9.99). Car companies woke up as well; GM began to produce alcohol cars again (17.8.99), and Volkswagen doubled its alcohol car production (19.8.99). Also, the prices of alcohol cars would be reduced by six percent, and 1,000 liters of alcohol and tax exemptions were offered with each new car (20.8.99).

Alcohol producers announced a price target: an increase from R$ 0.49 per liter to R$ 0.79 per liter (20.8.99). The oil price helped producers: it increased to US$ 20 in August (10.8.99) and then to US$ 24 in October (30.10.99). Then, the alcohol price started to climb (26.8.99, 5.10.99). Folha reported an unbelievable increase of 183 percent during the previous six

months (19.10.99), which it later corrected to stand at 83 percent (21.10.99). This was, however, too much for the government, which was afraid of inflation and decided to end the subsidies for distribution: the prices were now competitive (5.10.99, 22.10.99). It also announced that gasoline prices were now in line with the international price of oil; there had been an adjustment of 62 percent since the beginning of the year. The government also announced that it was starting an account for Petrobras; the savings from the alcohol subsidies would go to this account (23.10.99). Even though the government stopped subsidizing distribution, it increased subsidies for alcohol production in states other than in São Paulo (22.10.99).

Culprit: alcohol - sin: inflation

During the price hikes for oil and meat, the painfully familiar ghost, inflation, raised its head once again (14.10.99, 23.10.99). Brazil was still importing approximately 600,000 barrels of oil per day, whereas domestic oil production was approximately 1.1 million barrels per day and alcohol production approximately 300,000 barrels per day. The dollar was expensive; in addition to oil, the prices of imported raw materials had increased by as much as three-digit figures since the beginning of the year. Whereas the price of alcohol had been very low and price increases were seen as a natural return to the baseline of 75 percent with regard to gasoline (19.10.99), alcohol emerged as the main culprit for the inflation (6.11.99, 12.11.99). Producers showed that there was nothing wrong with the price increases; they argued that the prices were still very low in terms of the production costs and that, as the subsidies were removed, the price for consumers would naturally increase (6.11.99).

Nevertheless, the government rapidly reversed its earlier position; it started to undo all the measures that it had put in place only months before. It first announced plans to auction its alcohol stocks of 2 billion liters to reduce prices (5.11.99, 9.11.99). It then suspended finances for private stocks (10.11.99). The urgency in the government's actions was argued to be due to the rapid price increases in alcohol that had taken place after the subsidies had been suspended. The Minister of MME, Rodolfo Tourinho, who was the main character in this fight against price increases; he argued and kept repeating that instead of the determined six percent, the prices went up 50 percent (11.11.99, 24.11.99, 25.11.99). The government was preoccupied with consumers, he argued. It was fundamental to stabilize the equilibrium

between supply and demand to secure market supply (11.11.99). Tourinho said that the subsidy for anhydrous alcohol had to be suspended as well, something that would not influence prices by more than one percent, he argued.

It was pointed out that it would be important to offer sugarcane farmers and *not* alcohol producers a subsidy (12.11.99). Another option was to import alcohol and methanol and make a mixture that had been used in São Paulo before. Tourinho suspected speculation and the existence of a cartel by the gas stations. When the government started a cartel investigation in Ribeirão Preto, the prices edged slightly lower; the price of alcohol declined from R$ 0.77 to R$ 0.71 and gasoline from R$ 1.26 to R$ 1.20 (17.11.99). However, the prices returned to their previous levels soon afterwards (26.11.99). The business sector was not worried about the price increases. It saw them as extraordinary events. The price of fuel oil had increased by 124 percent and taxes had increased much more than alcohol. Alcohol was not to be blamed (21.11.99); it could *not* possibly be responsible for the inflation pressures (22.11.99). In fact, official numbers showed that alcohol affected inflation by approximately 0.06 percentage points out of the total 0.92 percent in October 1999 (24.11.99).

Regardless, the government kept, as Folha labeled it, *counter-attacking* against alcohol producers and cartels. It condemned the entities Brasil Álcool and Bolsa Brasileira de Álcool, which it had helped create earlier in the year to import alcohol in order to lower prices (23.11.99). In the meantime, Petrobras was reported to be dumping alcohol in order to reduce the effects of alcohol on inflation. Petrobras sold alcohol at R$ 0.38 per liter in São Paulo when the cost of alcohol for the other distributors was some R$ 0.68 per liter (24.11.99). Again, Minister Tourinho argued that a cartel existed and repeated that instead of six percent, there should be an increase of 50 percent and that the price of alcohol should be about 75 percent that of gasoline (25.11.99, 26.11.99). Of course, the price of alcohol price was not even 70 percent that of gasoline at the time. The price of alcohol had jumped from R$ 0.16 to R$ 0.41, which was reported in Folha to be a 216 percent increase (which it obviously was not). Critics still argued that alcohol was the main factor causing inflation (26.11.99). They argued that, as with other issues, the government was merely extinguishing fires without making any plans or showing a capacity to coordinate matters in the short term (27.11.99).

Even as Minister Tourinho wanted to import alcohol to reduce prices, other ministers were against it, arguing that it would be bad for the deficit, which already was running at

approximately US$ 1 billion per month. Tourinho, however, made his priorities clear (26.11.99) and gave the ultimate blow: "Don't buy an alcohol car, says minister" (26.11.99). This was the title of a piece of news whereby Tourinho wanted to cut the wings of speculation by reducing the sales of alcohol cars. Alcohol car sales had a market share of approximately 0.9 percent in 1999 (26.11.99). Tourinho argued that the country had lost its credibility because of price speculation; the government had always promised to keep alcohol prices substantially lower than gasoline prices (28.11.99). Tax exemptions for the alcohol car were suspended in Rio de Janeiro (28.11.99).

Furthermore, the government had established a tool which would allow Petrobras to be repaid the money that it had used to subsidize fuels—alcohol—throughout its history. In 1999, this measure amounted to approximately R$ 1.4 billion for Petrobras (1.12.99); the suspension of the alcohol subsidy added approximately R$ 348 million to this amount (23.10.99). Delfim Neto argued that the natural price of alcohol should be set at approximately 65 to 70 percent the price of gasoline for the sake of the energy content; under such conditions, the recuperation of the alcohol price would be natural (15.12.99). At the very end of the year, a quarterly inflation index showed that the main culprit for inflation was the transportation sector and that, within the sector, gasoline and not alcohol was the main culprit. Gasoline had increased in price by 57 percent and alcohol by only 33 percent in the final quarter of 1999 (24.12.99). Of course, gasoline was still much more important than alcohol in terms of volume. Whether because of this or because of the other virtues of gasoline, Tourinho ceded more power to Petrobras and other large oil companies at the very end of the year (31.12.99). It seemed that oil had won again and now definitely against the world's most successful renewable energy program.

Concluding remarks

The reconstruction of the history of Proálcool offered here shows some rather fascinating vicissitudes. The evolution of the program cannot be thought of in the context of "before and after" (cf. Barley and Tolbert 1997), since the situation varied based on who was president at the time, the changing oil prices, and other issues. It seems clear that the patterns of alcohol production and consumption could have taken on a very different character depending on some salient decisions or occurrences that were made or not made during the course of the

program. The alcohol program might have died at the beginning of its evolution or it might have transformed rural Brazil into a green power center in the world. However, what seems obvious is that alcohol was transformed from a national salvation into a problematic relic, one which required government steering. This was something repulsive in the era of neoliberalist ideology.

In the following chapter, I will analyze the most evident and not so evident issues that I see as having determined the direction of the program. In particular, I focus on the disruptions, which either arguably changed or arguably had the potential to change the direction of the patterns of alcohol production and consumption. Ultimately, this is to *explain* why this and no other history was written about the program.

> All problems arise on the background of what had been given as unquestionable (it is the latter which in the proper sense of the word becomes questionable) and all solutions of problems consist in transforming, by the very process of questioning, that which has become questionable into something new which now in turn appears as unquestionable. (Schütz 1966: 119)

6. Analysis: disruptions and problematizations

Based on what I have previously argued and shown, in this chapter I move on to a salient part of the argument: empirical analysis and the theorization that is based on it. The implications of my argument as a whole on theory and practice are discussed in the following chapter, which concludes the dissertation. In order to remain on track, I will briefly summarize what I have hitherto done in this dissertation. In the previous chapter, I reconstructed the evolution of the Brazilian alcohol program as a narrative. This narrative was based on empirical data; I provided information about the narrative in Chapter 4 and clarified other epistemological issues as well. In particular, I discussed how discourse analysis can be used to the study processes of change that were conceptually developed in Chapter 3, where I also explained the institutional micro-processes and integrated materiality into institutionalization in my aim to contribute to the existing literature on institutional processes that I reviewed in Chapter 2.

While the narrative of the alcohol program represented an attempt to reconstruct the most central events in the evolution of the program, in this chapter I analyze these events. Each of these events is comprised of cases in which I perceive disruptions. I categorize the nine cases using four-item binary pair codification, and I theorize about the roles of the disruptions through the continuance of practices. I chose to analyze four empirically central events, which seem to offer insights into different types of disruptions. The first of these, the problematization of the low *sugarcane price,* was already initiated before the alcohol program was even launched. The second event has to do with the problematization of the *large scale production patterns* at the end of the 1970s. The third event took place in the *mid-1980s* when some expected and some unexpected changes occurred. The final chain of events was

triggered at the end of the 1980s due to the *alcohol shortage*.

Extracting information from the empirical material is never unproblematic, as discussed in Chapter 4; induction is never foolproof (Ketokivi and Mantere 2010). Although informed by the narrative, the present empirical analysis builds on "proof quotes" (Pratt 2009) from select newspaper articles. I translated some typical quotes from Portuguese into English that address the cases falling within the four events and organized these cases into tables. While I used native speakers to verify the quality of my translations, the selection of articles and their phrases was a subjective choice. Strictly speaking, the analysis is my interpretation of the issue and entirely relies upon the world that was constructed in the pages of Folha. However, as it is certainly not "objective," the analysis attempts to be as plausible and logical as possible and to provide insights by explaining different disruptions.

To anticipate the result of this analysis: whereas the ideal types of disruptions discussed in Chapter 3 seem to form adequate empirical categories, an anomaly remains. The present empirical material strongly suggests a hybrid form of disruption: an *accumulative disruption*. This third elementary type of disruption presupposes a particular social reality and theory; it assumes an institutional theory and that practices produce material forms, as will be discussed below. I have structured this chapter as follows. I begin by elaborating upon the codification with which I conduct the analysis. After this, I attribute codes to the cases separately and divide them into cognitive and material types. Then, I characterize the three types of disruptions at a more abstract level, attempting to derive some typical characteristics for them and to theorize about how their roles evolve through the institutionalization of practices. Finally, I recapitulate the main findings and discuss their plausibility based on the empirical material.

Codification

The rationale for using events in this chapter is that I perceived these events to be decisive in terms of the evolution of the alcohol program. It was subsequently evident that these events consisted of smaller cases, and that the cases cannot be detached from the events because they form the context for the disruptions. The four events also structure this chapter and make understandable the actual objects of analysis, that is, the cases presented in Tables 2-5.

Obviously there would have been other disruptions, for example the problematization of individual alcohol cars, foreign capital in Proálcool, the formation of the Proálcool-front, and skewed fuel fluxes. I thought, however, that it would be more insightful to address a small number of the most relevant empirical disruptions because this would make a more detailed investigation possible. In this analysis, the idea is to scrutinize the *problematizations* attached to each case and to categorize the disruptions according to their characteristics.

This scrutiny is done through codification, which I subsequently employ when comparing the types of disruptions. As discussed in Chapter 4, I employ binary codification to compare the cases. I selected "proof quotes" (Pratt 2009) to illustrate these cases. As discussed previously, this particular codification, albeit conceived as part of the conceptual development, is motivated by the current empirical analysis and has been tailored to fit this particular analysis. It is important to note that the aim here is not to code every part of the empirical material, but only the elements that help illuminate the topic being studied.[11] It should be clear that the "proof quotes" inform, illustrate, and exemplify the problematizations, but they do not comprise them and are not the ultimate objects of analysis. Instead, disruptions, that is, the cases that the "proof quotes" illuminate, are the objects of the analysis. The narrative was part of a process of reconstructing these disruptions and making their context understandable.

The four binaries that I employ are the following: changed vs. unchanged, surprise vs. unmasking, resolution vs. justification, and external vs. internal. The principal aim here is to analyze whether the dichotomy between material and cognitive disruptions makes sense with respect to the empirical material. By making sense, I mean that I want to analyze whether these categories exhibit high similarity within a category and high dissimilarity between categories (see Guérard et al. 2012). The binaries will illuminate the materiality, expectedness, effectuality, and externality of the disruptions, respectively. The materiality of the disruptions, which is explained in Chapter 3, refers to changes in the "material situation" with respect to practices. This binary is relevant in the analysis because I use it to determine whether the disruption can be categorized as cognitive or material.

Expectedness is assessed using the surprise vs. unmasking binary. What is important here is whether the changed situation is a surprise or whether it was somehow expected or even

[11] I owe this insight to Henri Schildt.

expected. Even though this binary pair does not necessarily constitute a theoretical opposition, it nevertheless forms a continuum. One end of the continuum captures an event that is not expected or that is not simply a result of reproducing a practice. The other end of the continuum captures events that have been expected or that are at least anticipated. I label this end of the continuum unmasking since I also used it to capture whether the quote is revealing rather than an example of news-like reporting of "normal" issues.

Effectuality of disruption is captured through the opposition between resolution and justification. With resolution, the emphasis is on solving a problem as opposed to justifying that a problem exists. Justification, for its part, implicates problems that are not yet legitimate problems. The binary "external versus internal" refers to whether the quote problematizes something due to its external or internal occurrences. In essence, this means that I scrutinize whether the problematization was "triggered" by external or internal events. The relevance of this oppositional pair is primarily motivated by the extant literature and it is important for linking the empirical analysis with the established perceptions. In addition to these codes, I employ another type of tool to analyze and illustrate the effects of the disruptions. I look at the subsequent patterns, that is, the outcomes, and attempt to distinguish the extent to which the problematizations analyzed here succeeded in their task.

Although I do not attempt to establish any causal connections between problematizations and the subsequent activity, I consider what happened to be an outcome of the disruption. Whereas outcomes are always questionable, they might reveal whether the meanings that were problematized continued to be unquestioned or not. In some cases, the outcomes are evidently rather clear and easily justifiable. Nevertheless, binary or oppositional pairs are always relative. They also form a continuum along which I categorize the disruptions. There cannot be disruptions that would be located at the very extremes of such a continuum. The differences revealed by the oppositional pairs are important for the analysis. The binaries are not unambiguous and ascribing codes to cases cannot be objective. Thus, when ascribing codes to disruptions, I explicitly explain and justify my choices.

Sugarcane price

Problematizations offered by the sugarcane farmers

Proálcool was not launched based on nothing. Instead, the sugarcane sector, which was almost entirely responsible for producing alcohol, was one of the most traditional industrial sectors in Brazil, and thus the practices involved in producing it were deeply established. Basically, three distinct groups took part in the sugar and alcohol supply chain. The lowest group, the sugarcane laborers, the "bóias-frias," played a major role in the mid-1980s when they attempted to change the status quo through revolts and strikes. The highest group, the sugar and alcohol producers, were engaged in an ongoing struggle against the national oil company. The middle group, the sugarcane farmers, already began criticizing the program before it was even launched (see Table 2a).

Table 2a Sugarcane farmers' problematizations of the low price of sugarcane

[item], title (date), quotes	1st level coding
[2a-1] Faesp claims Cr$ 101/tons for sugarcane (10.5.75).	a. justification – (price of sugarcane is too low) b. unchanged – (price structure) c. unmasking – (providing an alternative explanation for the established situation) d. internal – (farmers problematizing the situation)
The Faesp [The Federation of Agriculture of the State of São Paulo] points out that prices are unsatisfactory and that profits are not being distributed justly or adequately throughout the sector.	
Faesp analyzed the discrimination of IAA: in 1974, approximately Cr$ 4.5 billion in profit from sugar exportation went to sugar producers and only Cr$ 640 million to the sugarcane farmers.	
[2a-2] FGV calculates the production costs for sugarcane (21.6.75).	
The commission [consisting of researchers from FGV, an esteemed private university, and Faesp] intends to show the calculated costs without any political, regional, or sectoral skew.	
[2a-3] Sugarcane farmers want distilleries (18.10.1975)	
Sugarcane farmers tend to collaborate with the government in the alcohol program, including alcohol distilling.	
"We swear that there is something wrong with the sugar policies."	
[2a-4] Sugarcane farmers accept the idea of a monopoly (7.11.1975).	
Without a price stimulus, it is possible that the government plan for using alcohol as fuel might not succeed.	
From the point of view of sugarcane farmers, without a government monopoly, there are no advantages to expanding production.	

The basis for the farmer's problematizing the situation mainly had to do with the inadequate price level for sugarcane [2a-1], which was a result of the structural inequalities established

within the sector. Farmers attempted to justify their claims by recruiting one of Brazil's most esteemed business schools to calculate the production costs [2a-2]. When the sugarcane-based alcohol program was first becoming a reality, the farmers argued that price increases were needed. They also wanted to take part in the alcohol production process [2a-3]. Due to the launch of the massive alcohol program, the problems that the farmers had already called attention to gained immediate importance. The farmers argued that if the prices were not sufficiently increased, the whole program might be jeopardized [2a-4]. Nevertheless, according to the farmers, the sugarcane prices remained too low (see Table 2b).

Table 2b Continuation of the farmers' problematizations of the situation

[item], title (date), quotes	1st level coding
[2b-1] Farmers want to find out how much they would earn (11.11.1975).	a. justification – (success of alcohol program requires higher sugarcane prices) b. unchanged – (price remains at a problematic level) c. unmasking – (meaning of chosen price policies) d. internal – (to the production practices)
The alcohol industry is solely responsible for the price stimulus measures for alcohol and does not include the raw material producers, the sugarcane farmers, at all in this process.	
[2b-2] Sugarcane producers protest against a major increase in sugar (18.11.1975).	
This price discrimination is not in line with egalitarian agrarian politics.	
The percentages (of price increases) should have been inverted: 15 percent for sugar and 25 for sugarcane.	
[2b-3] Agriculture seems to be frustrating the alcohol program (21.11.1975).	
The newly fixed price for sugarcane per ton, according to the sugarcane producers, and the non-fixed minimum price for manioc, could jeopardize the National Alcohol Program.	
The sugarcane producers are not satisfied with the prices and say that the price increase is not enough to stimulate increases in production.	
[2b-4] The price of sugarcane is not attractive (21.11.1975).	
The National Alcohol Program will not reach its targets because it does not stimulate increases in sugarcane production at the current price levels.	

The farmers clearly saw that the incentives for alcohol and sugar would not automatically be passed on to them [2b-1]: a higher alcohol price would not result in a higher sugarcane price. When the price of sugar increased more quickly than the price of sugarcane [2b-2], the farmers continued their criticisms, repeating their threats [2b-3, 4]; the alcohol program would need them to become mobilized. Indeed, the only lawful way of increasing sugarcane production would be to incentivize sugarcane farmers, and this required higher prices. Yet, the prices were not sufficiently raised and it was difficult for the cooperatives of small farmers to enter

into the program. One salient Folha columnist, an economist and an eager spokesman for alcohol, Joelmir Beting, continued to problematize the inadequate price level of sugarcane. He saw that the price of sugarcane was the main barrier to the success of the alcohol program (see Table 2c).

Ascribing first-order codes

I read the problematizations offered by sugarcane farmers as an example of an essentially "unchanged" situation; in such a situation, farmers attempted to "justify" a problem having to do with the sector's price structure. They "unmasked" why the price was set at too low a level. It was clearly an "internal" disruption inside the sugarcane sector. Within this setting, the alcohol program was first seen as a solution. The farmers' situation would have been enhanced radically had they been able to participate directly in alcohol production. The alcohol program as a solution did not come to fruition (see Table 2b) because small farmers were prevented from producing alcohol, because of unequal price increases, and because the price of sugarcane remained at a problematic level for farmers. Thus, the overall situation with regard to the sector and its unequal price structure remained the same. The farmers argued, however, that sugarcane was important in terms of the growth of the alcohol program, and thus the problem of the sugarcane farmers threatened the success of the entire alcohol program; in other words, the fact that the price sugarcane was too low was not only their problem.

Problematizations offered by Joelmir Beting

In this situation, Joelmir Beting repeatedly argued that the key to the growth of Proálcool was raw material and that sugarcane farmers would not expand their production since the price was lower than production costs [2c-1, 2, 6]. The situation was obvious: nobody was obliged to plant sugarcane and nobody would plant it at a loss [2c-4]. These problematizations continued until the end of 1978, when the evident outcome had become evident: sugarcane was planted, though not by sugarcane farmers. The sugar and alcohol producers, for whom the low sugarcane price was not an issue, were expanding their sugarcane production [2c-7] because they had the credit to do so and because alcohol was remunerative. According to Beting, this meant that sugarcane farmers were a race on the verge of extinction.

Table 2c Joelmir Beting's problematizations of the low price of sugarcane

[item], title (date), quotes	1st level coding
[2c-1] Beting: Rediscovery (5.5.76).	a. justification - (alcohol program cannot succeed with a low sugarcane price) b. unchanged – (price policies remain essentially the same) c. unmasking – (the price is not high enough; thus the alcohol program cannot grow) d. external – (the columnist is an outsider and not part of the sector)
Will there be enough raw material for the existing and new alcohol plants? I doubt it.	
[2c-2] Beting: Bottomless bag (11.6.76).	
The fixed price of sugarcane is not enough to even cover the production costs.	
[2c-3] Beting: Alcohol without cane? (13.10.76).	
The only issue yet to be defined—one which could jeopardize the whole program—has to do with the lack of an adequate price for raw materials.	
[2c-4] Beting: Without cane (4.5.77).	
Cane plantations are shrinking instead of expanding. Nobody is obliged to plant sugarcane, much less at a loss.	
[2c-5] Beting: Bottom of the well (5.1.78).	
By the way, the alcohol program will suffer because of a lack of raw materials.	
[2c-6] Beting: Waste (7.6.78).	
Poor cane, says the document. It was increased by 11 percent, meaning that one ton costs 201 cruzeiros at the door of the plant. It just so happens that the same ton costs the sugarcane farmers 260 cruzeiros.	
[2c-7] Beting: Race in extinction (30.8.78).	outcome
The number of sugarcane farmers is shrinking, but the alcohol producers are not complaining. The race of sugarcane farmers is becoming extinct.	

The tone of Beting's critique changed after this observation. The logic of his economic arguments, the basis for the problematizations, was dissolved. The alcohol program could and would grow without increasing the sugarcane prices (as long as the alcohol price was high enough). Any critique against the inadequate prices should now be based on ethical questions (inequality in the supply chain, obedience to the law), which entirely changed the situation. The obvious fact that alcohol producers were breaking the law when expanding (by law they could not produce more than half of their raw material), seemed hardly to matter. Proálcool's quotas were more important than rural equality. It seemed that sugarcane farmers formed a social class together with all the other small agricultural producers in Brazil. They were prevented from accumulating capital because the prices were not remunerative. Instead, production was incentivized via subsidized credit, which Joelmir Beting, among others, criticized (see Table 2d).

Table 2d Joelmir Beting's problematizations of the credit-based policies

[item], title (date), quotes	1st level coding
[2d-1] Beting: Price is better than credit (30.1.77).	a. justification – (price is better than credit) b. unchanged – (price structure) c. unmasking – (the workings of price and credit in agriculture) d. external – (journalist)
Price is the best fertilizer for the land. A producer does not want credit without price. He prefers price without credit.	
[2d-2] Beting: The right hook (20.1.78).	
Inflation lives on worn-out credit and not just on price.	
[2d-3] Beting: Waste (7.6.78).	
In times when current rural policies include lots of credit and little price, to stop producing signifies loosing less.	
[2d-4] Beting: The countryside without guilt (15.12.78).	
Agriculture has had abundant credit. The longstanding and favored practice of offering credit, which one-fifth of rural producers currently receive, does not increase production or make products any cheaper.	
What makes for abundance is a just price and not easy credit for the producer.	
[2d-5] Faesp proposes to increase minimum prices by an average of 355% (16.7.85).	outcome
Faesp's methodology was based on direct and indirect costs, remuneration, and	

Reaching agreement on agricultural price policies seemed to involve a struggle between the Ministries of Agriculture and Finance. The former wanted to offer adequate prices so that small farmers could also accumulate capital and thus be able to invest in machines and other technology to enhance productivity, which was improving at a very low level, and to incentivize food production in general [2d-3]. Brazil was still importing much of its wheat. The latter, much stronger ministry, argued against any price increases because of *inflation*. In this situation, Joelmir Beting repeatedly insisted that profit is the best fertilizer [2d-1]. He continued by saying that as rural credit would not reach the majority of farmers [2d-4], it would only feed inflation [2d-2]. Since the official argument for the low prices of agricultural goods was inflation, it seemed that the real reason was *control*. Indeed, the lack of capital efficiently reduced the number of options that the masses had. Their activity could then be efficiently directed by giving subsidies and credit to particular areas of activity.

As long as these agricultural practices remained in place, the gap between the modernized exporting agribusiness, which did not face low domestic prices, and small farming widened. Since the prices paid to small farmers were used to fight inflation, they ended up being

massively damped down: in 1985 a state organization in São Paulo argued for an average increase of 355% for basic food crops, which were mainly cultivated by small farmers [2d-5]. These agricultural politics, although seemingly distant from the alcohol case, are not peripheral in the present analysis. The price issue is central since, without the large sugar and alcohol producers, the government would have needed to increase the price of sugarcane in order for Proálcool to succeed. This might have transformed the higher level political processes, in addition to disrupting the large-scale alcohol production practices.

Ascribing first-order codes

Joelmir Beting's problematizations were conducted in an "unchanged" situation in terms of agricultural policies. Not only was the price of sugarcane kept low, but all the other prices of small agriculture were kept low as well. He kept "justifying" that the price of sugarcane price was too low and "unmasking" why the alcohol program would never succeed without increasing this price. The journalist was obviously "external" to the sector, although he obviously had informants within the sector. These problematizations did not yield changes in price policies, but instead, the basis for them changed because the large alcohol producers increased their sugarcane production. This was an accumulative outcome due to a continuation in the growth of the alcohol program and low sugarcane prices. After this fact about sugarcane production was revealed, Joelmir Beting could not keep problematizing the price in the same manner. The underlying problem, he observed, was indeed the credit-based system throughout rural Brazil.

Materiality of disruptions

Based on the conceptual development presented in Chapter 3, these two problematizations are clearly *cognitive disruptions* (see Table 2e). It was essentially an established situation in terms of sugarcane and other agricultural pricing practices. However, although there were no essential changes in the materiality of the situation, they were not absent from the problematization of pricing practices. Farmers' attempts to unmask their problems due to the low price of sugarcane were levered due to the alcohol program; the low sugarcane price would not only be their problem. Instead, it was thought that the success of Proálcool would depend on the actions of sugarcane farmers. It was not only an ethical question of rural inequality, but also an economic question whether the grand solution, Proálcool, would

succeed in saving Brazil or not. A central argument was that sugarcane, a raw material, would be lacking. Materiality, however, only played a secondary role in this problematization of pricing practices in my view.

Table 2e Summarizing coding for cases pertaining to the price of sugarcane

event	cases	1st codes – (referent)	materiality
sugarcane	farmers	justification (price too low) unchanged (price structure) unmasking/expected (price structure) internal (within the sector)	cognitive
	Joelmir Beting	justification (price too low) unchanged (price structure) unmasking/expected (price structure/policies) external (journalist observer)	cognitive

The threat of a future material disruption subsequently went away because the sugar and alcohol producers, in violation of the law, expanded their own sugarcane plantations. This radically changed the problematization of pricing practices. Arguments retreated once again to ethical issues. Since these issues were not very relevant in terms of solving the problem of oil dependency and reaching the quotas set by Proálcool, the rationales for changing the situation practically evaporated. The fundamental problem, oil dependency, could be solved without it being necessary to increase the price of sugarcane and thus without needing to disturb the higher level practices of rural pricing policies. Joelmir Beting attempted to justify that the credit-based system was problematic by referring to another issue: inflation. He argued that inflation would remain as long as the credit-based system was opted for. The credit approach, however, remained in place and kept feeding inflation and inequalities, which over time became exacerbated and manifested themselves in relation to other problematizations regarding pricing practices.

Large-scale production patterns

Miniplants

At the end of 1978, a new topic emerged in the discourse of Folha. Professor Corsini introduced a small-scale method of alcohol production. Corsini's research group had been

researching alcohol production and use for many decades, and now it seemed feasible that the concept and the situation could be put into practice. Miniplants were to resolve the problem of oil imports in a faster and cheaper way [3a-1]. In addition, alcohol production in miniplants would remove *all* the complications inherent in large-scale production patterns [3a-2]. To be more exact, the established solution was problematized on ethical (an increase in the number of "bóias-frias," regional concentration), economic (high investment risk, a sophisticated, that is, more expensive, product) and environmental (pollution, single material) grounds [3a-3].

Table 3a Legitimation of the miniplants

[item], title (date), quotes	1st level coding
[3a-1] Alcohol miniplants allow for decentralization (1.10.78).	a. resolution – (producing alcohol in better way) b. unchanged – (established production method) c. unmasking – (pros and cons) d. external – (university research)
A parallel program to that of Proálcool, this program, by establishing miniplants using sugarcane and manioc at the level of individual farms, would make it possible to produce 10 to 12 billion liters of alcohol in the same amount of time that it would take Proálcool to reach 4 billion liters.	
[3a-2] Beting: Alcohol without complications (8.10.78).	
Every farm, every site, every grange, every backyard of São Pedro de Morrinhos [distant village] would make "gasoline" for its own vehicles.	
And Petrobras? Would it stay out of the picture? And the anhydrous Proálcool? Idem. And the national and foreign distributors of oil? Idem. And the retailer branches? Idem. And the Receita Federal [federal taxation organ]? Idem.	
[3a-3] Beting: The miniplants (18.10.78).	
[miniplant] . . . questions some unconventional issues regarding large-scale production: 1) high initial investment and risk, 2) high concentration of manpower during peaks, producing "bóais-frias," 3) excessive use of a single raw material, 4) impossibility of allocating production in other regions, 5) problems with pollution, 6) sophisticated product instead of more basic ethanol.	
[3a-4] The plan for miniplants goes to Brasilia (15.11.78).	
Alcohol production, at the desired level, would be based on projects with different characteristics depending on socioeconomic, geographical, and topographical conditions as well as the raw material used in corresponding locations of the country.	
[3a-5] Beting: Without gasoline (13.2.79).	
The "clandestine" market of hydrated alcohol, a non-disposable solution, would correspond in Brazil to an invention of a car fueled by nothing. Invention of the century.	

Alcohol production in miniplants would be adapted to existing conditions in different localities [3a-4], and it would be used in conversed engines, which Corsini's group had also developed. It was obvious from the start that the powerful big players would not gain anything from this solution [3a-2]. Petrobras was still benefiting from the alcohol program and the car manufacturers had a promising new market in alcohol cars. Moreover, the sugar and alcohol

producers, the lords of rural Brazil, would immediately lose much of their power since their access to "bóais-frias" would be reduced due to the smaller alcohol farms that would employ their labor all year round. What is more, those sugarcane farmers who would start producing alcohol would no longer supply sugarcane to large alcohol producers. Regardless, it seemed that few others than Joelmir Beting discussed in Folha the miniplant option; this incredible solution was efficiently silenced and it did not disrupt the large-scale production practices.

Ascribing first-order codes

I see the case of the miniplant as an "unchanged" situation where experts attempted to "resolve" the obvious problems with the established practices. It was an attempt in which Professor Corsini kept "unmasking" problematic issues with the established practices. The emphasis was, however, on the new solution itself, on the miniplant. Corsini clarified how and why small-scale alcohol production would be better than large-scale production. Similar to the sugarcane price case, Joelmir Beting continued to argue for miniplants in his columns in Folha. Obviously, the miniplant solution came from outside the sector; it was an "external" disruption.

Large-scale production

Had Professor Corsini introduced the solution one or two years later, the solution might have been received differently and it might have ended up being discussed more and disrupting established practices more. Large-scale production practices began to be increasingly problematized in 1979 in the public discourse (see Table 3b). The first official heavy critique against the patterns of Proálcool published in Folha reported the results of an extensive study by an esteemed research institution, CNPq (The National Council for Scientific and Technological Development). This study explicitly stated that Proálcool was going against some of its own purposes [3b-1]. Subsequently, for some reason, the results of this document were ignored, at least in Folha. The criticisms, however, occurred on a broader front at the end of the year. Empirically based problematizations of the situation claimed that Proálcool efficiently concentrated both land and income in rural Brazil and also increased the already large regional discrepancies [3b-2, 3, 4, 5].

Table 3b Problematizing large-scale production

[item], title (date), quotes	1st level coding
[3b-1] Proálcool rejects small producers (21.1.79).	a. justification – (alcohol program has changed rural Brazil for the worse) b. changed – (income/land distribution) c. unmasking – (how the alcohol program changes rural Brazil) d. external – (both outside the sector as well as inside)
Implementation of Proálcool based on large alcohol plants is accentuating the problems of both land and income concentration through the expansion of the land used by alcohol plants, the extinction of a large number of small farmers, and the subsequent expulsion of the population of those areas.	
The document suggests considering concrete possibilities for land reform.	
[3b-2] Concentration of land is an obstacle to the alcohol plan (1.8.79).	
The quotas for Proálcool . . . can only be reached via a complete transformation of agricultural policies. Sugarcane cultivation has to be done by small rural farmers.	
The first thing to do is to change the "fundiário" system, which cannot continue based on "plantejo" in which the alcohol producer is the master of the distillery, the land, the sugarcane, and often even the will of the laborers.	
[3b-3] Proálcool creates income concentration (16.9.79).	
Entrepreneur Luis Lacerda Biagi admitted recently . . . that "Proálcool has led to high concentrations of income, because the program requires guarantees that only those who already have large properties can offer."	
Currently, approximately 70% of land belongs to the alcohol producers and only 30% to sugarcane farmers, although there is a law that obligates alcohol producers to buy 50% of their sugarcane from farmers.	
[3b-4] Lots of conflicts over land (25.11.79).	
Today, the most ambitious program in agriculture is exacerbating the difficulties concerning alimentation of the most poor, due to the exigencies of the sugarcane plantations managed by large explorative companies.	
[3b-5] The church condemns the current regime (15.2.80).	
The substantial official program, Proálcool, based on government subsidies, is already concentrating land and expelling farmers when it could have been an opportunity to redistribute land.	

The fundamental problem was alleged to be the structure of land ownership, which had to be changed in order to adequately produce alcohol [3b-2]. Even the alcohol producers themselves admitted that the sugar and alcohol producers were buying lands from the small farmers, whether the latter were willing to sell them land or not. Alcohol producers claimed that the main problem was the credit system [3b-3]. The credit offered by Proálcool was exceedingly attractive and it was easiest to use the land close by. The central argument made by those attempting to problematize the situation was that Proálcool exacerbated poverty. It created more "bóias-frias" [3b-2] and expelled small-food farmers, thus contributing to an increase in food prices [3b-4, 5].

No matter how the problematizations changed public opinion (as they certainly did), they

could not change the opinions of those who decided upon the practices at the governmental level. Since the new government of President Figueiredo took power just when economic growth seemed to slow down, everything seemed to be done in order to keep the economy running faster. Camilo Pena in particular, the growth, security and control-oriented minister of industry and commerce, attempted to hold the reigns tight over the growth of the program. It would be best to grow through a mutually reinforcing increase of individual alcohol cars and large-scale alcohol plants. Other official opinions about alcohol were prohibited in order to keep the program's image polished and thus keep people buying alcohol cars.

Ascribing first-order codes

Criticism of large-scale alcohol production practices is an evident case where the problematizations of the situation were based on observations of a "changed" situation in rural Brazil. The problematizations of the situation aimed to "justify" that the alcohol program had exacerbated land and income distribution as well as regional discrepancies, and that this had to be changed. The observed changes were "unmasked" as outcomes of large-scale alcohol production practices that Proálcool had incentivized. This situation was widely debated at the societal level and included a number of different actors from outside the sector. As a result of this, the debate is coded as "external." The problematization of the situation, however, occurred closer to the production practices and the regions where the practices were located. Participants in the seminars where Proálcool was now debated consisted of those whose opinions had not been asked before.

Materiality in disruptions

The miniplant case is exemplary of a problematization based on a new solution that was introduced to substitute for an established one: a solution that claimed to solve problems associated with the established practices. Although the miniplants were introduced in an established and unchanged situation, Corsini's problematizations of the situation referred to unwanted material impacts inherent to the established situation. Materiality was thus not entirely absent from the picture. However, the miniplant is more of cognitive than a material disruption in my view because it problematized problems within the established pattern of activity. Corsini's problematizations gave a new interpretation to the practices, an interpretation that was based on rather distinct knowledge with regard to public or general

knowledge by virtue of his research.

Table 3c Summarizing coding for large-scale production practices

event	cases	1st coding – (referent)	materiality
large-scale production patterns	miniplant	resolution (large-scale production) unchanged (large-scale production) unmasking/expected (large-scale production) external (university invention)	cognitive
	large-scale production	justification (land/income distribution) changed (land/income distribution) unmasking/expected (land/income distribution) internal (within countryside)	material

Subsequent problematizations of large-scale production practices were more clearly directed at observed material changes that the established patterns of activity had produced. In contrast to the miniplant case, where the emphasis was on resolving the situation, this critique was aimed at changes that the diffusion of alcohol production practices had produced. This problematization is thus categorized as a material disruption. The reason for those material changes, that is, the concentration of land and income in the hands of a few and the reduced food production, were not the alcohol production patterns per se, but their diffusion and expansion. Thus, the impacts of Proálcool's practices, which granted attractive loans exclusively to the large producers, and of those political practices coordinating it were the reason for these material changes. Subsequently, the continuance of large-scale alcohol production practices, together with the exclusivity of individual alcohol car sales, resulted in skewed fuel fluxes in the Brazilian transportation fuel configuration and contributed to leading rural Brazil to the edge of revolution.

Mid-1980s

Domestic oil production

By the end of 1985, Brazil's internal energy situation had changed dramatically from the time when Proálcool was started: Petrobras had succeeded in increasing its domestic oil production almost fourfold from what it was in 1979. An evident question was that, if Brazil were self-sufficient in oil, what would the role of the alcohol program be [4a-1, 2, 3, 4]? The typical train of thought was that the reasons for the alcohol program and oil imports were the previous

insufficiency of domestic oil production. Thus, when the problem of oil dependency no longer existed, the solution would become obsolete. Besides, if alcohol continued to be produced, there would be the problem that surplus gasoline would have to be exported because alcohol had managed to replace gasoline, but not diesel fuel.

Table 4a An increase in domestic oil production

[item], title (date), quotes	1st level coding
[4a-1] The future of Proálcool (20.10.85).	a. resolution – (what to do in a new situation) b. changed – (more oil is produced) c. surprise – (it was not forecasted) d. internal – (Petrobras is part of the alcohol chain)
Petrobras just announced passing the benchmark of 600,000 daily liters of oil.	
[4a-2] A pause for reflection (2.11.85).	
Brazil shifted from domestic oil production of 160,000 barrels per day in 1979 to today's 600,000 barrels per day.	
[4a-3] Proálcool and the self-sufficiency of oil (7.1.86).	
If the [critiques] used to be directed with the most intensity at the multiplicity of the perverse effects associated with the voluntary implementation of the plan (notably those concentrated in the social sphere), today they refer to the inability to achieve self-sufficiency in terms of oil production.	
[4a-4] Feasibility of Proálcool (12.1.86).	
In the meantime, both national and international scenarios changed. The price of oil drifts to 20 dollars and the domestic production of Petrobras to 650,000 barrels per day.	

Ascribing first-order codes

Increased domestic oil production in Brazil was treated as news, or even as a "surprise;" it seemed that people did not expect that it would happen, at least not on this scale. Domestic oil had been the primary solution to the expensive oil imports, but at that time it had not succeeded in responding to the rapid increase in oil demand. The increase in oil production essentially "changed" the situation with regard to alcohol production practices. This increase opened a discussion about what to do with the alcohol program; Was it still needed or not? There were few justifications needed to legitimize the importance of the change in terms of alcohol practices. The emphasis was on "resolving" this new situation mainly by downsizing the alcohol program. Since it was an issue very close to the alcohol production practices themselves, precisely because Petrobras was tightly holding onto the reigns of alcohol distribution, I coded it as "internal."

Counter-shock of oil

In early 1986, the price of oil rapidly plunged to one-third its previous level. The price of oil seemed to be tightly linked to the feasibility of alcohol production and to the whole alcohol program because the price of alcohol was regularly compared with the price of oil. Indeed, the plunge triggered new interpretations of the matter; it opened up discussion about alcohol (see Table 4a). The interpretations clearly showed the causality: the plunge in the price of oil reopened old questions, especially with regard to Proálcool [4a-1, 2]. Typically, people readily agreed that the tumbling price of oil would take away from the feasibility of Proálcool and make it necessary to grant more subsidies to it. For this, the program had to be rethought, or better, downsized [4b-3].

Table 4b Material disruption due to falling international oil prices

[item], title (date), quotes	1st level coding
[4b-1] Editorial: Rethinking Proálcool (19.10.85).	a. resolution – (rethinking Proálcool) b. changed – (oil price) c. surprise – (not forecasted) d. external – (international oil price)
Facing stabilization and prospects of an imminent fall in international oil prices, the moment to rethink national alcohol policies has arrived.	
[4b-2] The severe decline in the price of oil makes the government rethink Proálcool (9.2.86).	
Sarney's government faces its first challenge: a decision about what to do with Proálcool when it is facing continuing decreases in the price of oil.	
[4b-3] The quotas for Proálcool have to be changed, says Funaro (15.2.86).	
Recently, the chief of commercialization for Petrobras . . . already mentioned the necessity to review the alcohol program, due to falling oil prices.	
[4b-4] The question of alcohol (16.2.86).	
In the first place, the vertical drop in oil prices brought up the question of the feasibility of the alcohol program.	
[4b-5] Perspectives of the National Program of Alcohol (6.4.86).	
The free fall of oil prices on the international market reopened questions about national energy policies, especially with regard to Proálcool.	

Ascribing first-order codes

The rapid fall in the international price of oil was a "surprise;" it was hardly expected, nor was it forecasted. It radically "changed" the situation with regard to the alcohol program. If imported oil was cheap, there were no longer problems with expensive imports and alcohol was thus no longer needed. Few justifications were needed for legitimizing the change, but instead the emphasis was on its implications. Among other "resolutions," the alcohol program

was to be abolished. This event was clearly “external” to alcohol production practices.

The superficial interpretations that the fall in the price of oil and increase in domestic oil production rendered the alcohol program obsolete were, however, contested. These interpretations were countered by arguing for the temporality of the nose dive in the price of oil [4c-4]; Proálcool was a strategic issue and should not be affected by temporary fluctuations. Proálcool was not just an economic issue, but rather a strategic program concerned with national security and energy independence [4c-1, 2]. Besides the question of autonomy, alcohol production was important for the industrial sector, even central to the Brazilian economy [4c-2]. Also, the nearly taken-for-granted view that alcohol production was subsidized was questioned [4c-4]. Overall, the alcohol program was not seen as a problem due to the fall in international oil prices, even if the fall in prices should become permanent. The rapid material changes were, however, not the only occurrences in the mid-1980s.

Table 4c Alternative interpretations of the changed material situation

[item], title (date), quotes
[4c-1] Aureliano reactivates the CNE and revises Proálcool (18.1.86).
[According to Aureliano Chaves, the Minister of Mines and Energy] "Energy is not only economic. It is a strategic matter involving national security."
The strategic aspects are superimposed atop the simple arithmetic about the state of the economy.
[4c-2] To Gusmão, Proálcool will not change (24.1.86).
We have to preserve the dynamics of the sector because the price of oil might again increase and thus we should continue to have an alternative: alcohol.
[4c-3] PMDB wants self-sufficiency in energy, Simon says (10.2.86).
It is fundamental to have a program that decreases the vulnerability of the country in terms of external energy sources.
[4c-4] The truth about Proálcool (21.2.86).
The fall in the price of oil is conjectural and temporary.
The top economic advisors in the government and the leaders of Petrobras use an argument about subsidies as a reason to propose reducing Proálcool’s quotas. There are no subsidies in the National Program of Alcohol.

Land reform

The Brazilian military regime ended in 1985 when Tancredo Neves was democratically elected as the new president. One of his main promises was land (or agrarian) reform. The political practice of “conservationist modernization” had exacerbated the gap in rural Brazil between

the rich who owned nearly everything, and the poor who owned practically nothing [4d-1]. The large producers pushed small farming to less fertile lands, thus harming food production [4d-1]. Since Proálcool was not the focal point of the problematizations, this development was largely mediated through it [4d-2, 3, 4]. Thus, the question of land reform is not peripheral to the present analysis, but quite central to it.

Table 4d Problematizing the status quo in rural Brazil

[item], title (date), quotes	1st level code
[4d-1] Food production and land reform (12.2.85).	a. justification – (land reform needs to take place) b. changed – (rural conditions) c. unmasking – (how the rural conditions have changed due to the alcohol program), d. internal – (also external to the production practices because of societal issue)
The increase in the amount of food production is directly bound up with the system of land property favoring large land owners over small land owners; large land owners are responsible for approximately 70% of basic food production, feeding the majority of all Brazilians.	
[4d-2] Economic panel: pacific reform (12.4.85).	
In terms of Proálcool, the new chief of Incra (the National Institute for Land Reform) proposes a pacific reform, which would reapply the law requiring that a minimum of 60% of sugarcane must be purchased from farmers not financially connected to the alcohol plants.	
[4d-3] Secretary proposes changes in Proálcool (1.6.85).	
The secretary of agriculture and supply for the State of São Paulo . . . affirms that "it is absolutely necessary to revise the criteria directing Proálcool at the state level."	
[4d-4] We have to change the “fundiário” system (8.6.85).	
The expansion of agricultural production succeeded, but the costs included exasperation of land concentration, devastation of the forests and fauna, disrespect towards the rights of indigenous people, and an increase in the number of violent conflicts between "posseiros" and "grileiros."[12]	
The "conservationist modernization" approach was systematically and persistently applied by the technocrats who steered the agricultural sector during the entire period of the military regime.	
There are two fundamental aspects missing: this policy was incapable of solving the problem of rural poverty; also, the problem of alimentation for the lower level income populations remained unsolved.	

The problematizations of rural conditions were based on ethical (labor rights, poverty, the rights of the indigenous people) and environmental questions (inequality, forest devastation), but also on economic questions (food and agricultural production in general) [4d-4]. There

[12] ”posseiros” were peasant farmers who had gained the legal right to a plot of land and ”grileiros” those who had falsified documents in order to rob land (Adriance 1995)

was a strong momentum for change, which culminated around the President-elect Tancredo Neves. The New Republic would distribute its wealth more equally. Proálcool was to be reformed so that the alcohol producers could first own only part (40%) of the sugarcane they processed (as the law then stated), and then later on, none of it [4d-2]. For the first time, rural laborers demonstrated and rioted, which were the only ways that the poorest people could problematize their conditions, and be sure that their grievances would be heard at the government level.

The degenerate rural conditions were seen as the roots to the problems in Brazilian society in general. The poor rural conditions were the principal reason that so many people were migrating from the countryside to cities, resulting in growing *favelas* (slums), violence, and other social problems that would remain until the problems in the countryside would be resolved (see Table 4e). The question of land ownership and its concentration was the most topical, urgent, and salient issue that needed to be treated and resolved. The only solution seemed to be to dismantle the colonial "fundiário" system, where extensive land properties were owned by a very few, leaving most of the land without unused and thus inhibiting both economic and human development in rural Brazil.

Land reform, never

The political will to conduct a land reform had gained momentum on the eve of the elections. The sudden and suspicious death of the person who personified this momentum, Tancredo Neves, was a heavy blow to it. As José Sarney took the reins, he assured people that land reform would be conducted; according to him, "land reform is irreversible. It is not just a personal decision, but a problem of personal conscience" (3.7.85). With the fight against inflation, land reform was emphasized as the main concern of the government (26.6.85). It seemed that the problematizations of the situation had worked and that rural Brazil would finally find alleviation in its fight against poverty and inequality: the sub-development.

Nonetheless, in contrast to what Sarney claimed, due to his personal conscience, the reform was *never* conducted. Sarney's family was one of the biggest land owners in Maranhão, a state in northern Brazil. The reform, or *conversion,* of the status quo was turned into the *conservation* of the status quo [4e-1, 2]. After the hopes for land reform had been gradually suppressed, an interesting event took place. The pope emphasized the necessity to conduct the

land reform when speaking with Sarney, whom he referred to as "the representative of the nation." According to the pope, land reform was indispensable for social justice and democracy [4e-3]. Sarney interpreted the words of the pope in a rather biased manner; the reform should remain a reform and be conducted by laws, peacefully. He played down the revolutionary nature of the reform.

Table 4e Problematizing the failure of land reform

[item], title (date), quotes	1st level code
[4e-1] False reform (19.10.85).	a. justification – (reform still needs to take place) b. changed – (rural situation) c. unmasking – (what the government really does), d. external – (societal debate)
When examining the project of land reform elaborated by the government, whichever way one sees it, the point is always the same: the government intends more to preserve the current property relations rather than change them.	
The National Plan of Land Reform should be called the National Plan of Land Conservation, only the methods that continue to be used instead for conserving land keep generating protests and result in the deaths of people, fish, birds, and plants.	
[4e-2] Impasse on the agrarian question (9.7.86).	
Indisputably, given its faults and inconsistencies, the land reform proposed by the government does not answer the needs of rural labor—it only increases the number of conflicts—nor does it contribute to progress in agricultural production.	
As long as misery, poverty, and backwardness persist in rural Brazil, convulsions and riots will always be a latent threat—not only in the countryside, but also in the cities.	
[4e-3] Agrarian reform cannot fail in Brazil, the pope said (11.7.86).	
Agrarian reform cannot fail in Brazil, it is a problem of social injustice, the pope said.	
Sarney seemed not to have doubts as to the interpretation of the pope's words: "He wanted to say that agrarian reform should be done within the standards of democracy and non-violence. Reform is, after all, a reform and not a revolution."	
[4e-4] Pope discourages forces resisting reform (12.7.86).	
[For the cardinal-archbishop of São Paulo], "it is time for us to initiate an agrarian reform, with dynamism and vigor, but also with much order and without violence."	

The Catholic Church vigorously backed the reform, but wanted it to be conducted without violence [4e-4]. As it became evident that the government's plan for land reform was far from that which had originally been promised and that, even as such, it was continually being postponed, revolts became more frequent and violent. As the cognitive tools had not been working, it was time to use material power to force the reform: take the initiative into your own hands, as some labor unions threatened. Some "latifúndios" that were no longer being actively use were expropriated, primarily by the then recently founded social movement,

'Movimento Sem Terra' (MST), which continues its fight even today.[13]

Ascribing first-order codes

The problematizations of the "bóias-frias" during the 1985 (Table 4d), which were conducted in the form of riots, demonstrations, and strikes attempted to "justify" the need for land reform. The need for reform was evidently due to "changed" material conditions in rural Brazil, where the ambitious alcohol program played a salient role. Even as the poorest workers problematized the conditions materially, academics and other members of society "unmasked" the way how the conditions had changed with respect to land and income distribution due to governmental policies and related production practices. The uprisings in the countryside were carried out in particular by the "bóias-frias" that mostly worked on the sugarcane plantations. This problematization is thus categorized as "internal."

Similar to the cases of sugarcane price and the miniplant, external actors, such as academics, journalists, and the Catholic Church, continued what had been started internally with regard to alcohol production practices. They continued to "justify" the need for a land reform and "unmasked" what the government attempted to sell as land reform by clarifying the real intent of the reforms. The rationale for the problematizations remained the same: to draw attention to those material conditions that had been established but that had gradually "changed" over time. Although this societal debate was mainly "external" to the production practices, it still focuses primarily on rural conditions via reports and examples. I categorize the overall disruption of land reform as internal because it was triggered from inside.

Materiality of disruptions

The two previous disruptions, domestic oil production and counter-shock triggered by the declining price of oil, were clearly marked by changed material conditions. The rapid increase in domestic oil production capacity as well as the rapid drop in the price of oil are prime examples of *material disruptions* (see Table 4f), which directly evoked questions regarding practices within the alcohol sector: "something had happened" that was relevant to the alcohol program. Although these unexpected material changes were rather positive for society as a

[13] MST in English is Landless Workers Movement. The main problem today in rural Brazil in terms of land seems to be the extensive eucalyptus plantations of the international pulp and paper industry, including Stora Enso (see Kröger 2010; 2012; Kröger and Nylund 2012).

whole, they were used to problematize the rationale and the feasibility of the alcohol program, respectively.

Table 4f Summarizing coding for the mid-1980s

event	cases	1st coding – (referent)	materiality
mid-1980s	increase in oil production	resolution (downgrading alcohol program) changed (oil production capacity) surprise (oil production capacity) internal (within sector)	material
	counter-shock of oil	resolution (downgrading alcohol program) changed (international oil price) surprise (drop in the price of oil) external (international)	material
	land reform	justification (inequality as problem) changed (land/income distribution) unmasking/expected (land/income distribution) internal (triggered from within)	material

I categorized the third disruption, land reform, also as a material disruption. As discussed above, the underlying reasons for it were the changed material conditions in rural Brazil. These material changes were a result of the continuing political practices and the attached production practices that had given rise to controversial material conditions. Since Proálcool was tightly linked with these policies, although they were not their ultimate focus, Proálcool was inherently linked with these problematizations. Nonetheless, as the political democratization of the country permitted alternative interpretations of the rather established inequality to gain space in the discourse, this disruption had cognitive features in it as well.

Alcohol shortage

Triggering the shortage

The chain of events that arguably most disrupted the Brazilian alcohol program was initiated at the very end of the 1980s. In early 1989 it became evident that alcohol would be lacking. This was affirmed by a minor local alcohol shortage in the capital city, Brasília [5a-1]. Although the roots of the shortage obviously lay in the inadequate governmental policies (the lack of a remunerative price for sugarcane and alcohol), it was alleged that the actual chain of events was triggered by the self-interest of the alcohol producers in the northeast [5a-3]. The

producers, however, argued that they had produced only about five percent less than the previous year and that their sugar production had fallen by much more.

The alcohol reserve held by Petrobras was the main issue that made the long foreseen lack of sugarcane and the alcohol shortage a surprise, and thus disruptive. Petrobras should have had enough alcohol in reserve to last for one month, but it only had enough for nine days [5a-3]. Petrobras alleged that alcohol producers did not have alcohol to sell. Alcohol producers objected to this; there had been alcohol in their stocks, but Petrobras had not bought it. The alcohol producers argued that the new alcohol-purchasing scheme was the reason for this mix-up [5a-9]. Whatever the case, solutions to the alcohol problem were immediately offered.

One solution to this imminent crisis was to harvest the sugarcane for alcohol production earlier than normal. The harvest in the center-south of the country typically began in June and a harvest of premature cane would reduce significantly productivity [5a-2]. However, incentives were needed because premature harvesting was less productive. The incentives, for their part, went against the price policies that attempted to control inflation [5a-3]. Other solutions included reducing sugar production and exportation as well as alcohol consumption. The most obvious solution was to employ the flexibility of the alcohol mixture in gasoline. Indeed, the mixture was immediately lowered, except in large cities where the mixture was maintained due to environmental concerns. Petrobras also insisted on reducing and limiting alcohol car sales [5a-4].

The limits for alcohol cars became obsolete when alcohol car sales crashed soon after the initial event [5a-7, 8]. Consumers not only stopped buying alcohol cars, they also began to convert their current cars to gasoline. This was helped by Petrobras, which had studied conversion techniques and was now advertising them to alcohol car owners. It was clear that Petrobras was guilty, but this would not change the situation. Then, another forecast was made according to which alcohol would be lacking much more than was previously thought [5a-9]. This was an obvious outcome of the premature harvest. The sugarcane harvest would be so small that neither reducing alcohol car sales nor shifting production from sugar to alcohol would be sufficient or economically sane to compensate for it. The local shortage had been transformed into a crisis for the entire sector.

Table 5a Triggering the alcohol shortage in 1989

[item], title (date), quotes	1st level code
[5a-1] Stations without alcohol in Brasília: CNP forecasts an "irregular" supply of alcohol (9.5.89).	a. resolution – (how to solve the alcohol shortage) b. changed – (alcohol lacking) c. surprise – (although expectable, it was not forecasted as such) d. internal – (shortage internal to alcohol supply chain)
The director of supply for CNP (National Oil Counsel) . . . asserted that the [alcohol] supply in the whole country will continue to be "very irregular" for the next ten days.	
[5a-2] Petrobras forecasts major difficulties in 1990 (9.5.89).	
Petrobras would like alcohol producers to accelerate the harvest in the next weeks, even if it means productivity losses and thus have negative consequences for the next harvest.	
[5a-3] Petrobras does not have alcohol in its strategic stocks (14.5.89).	
The supply crisis of alcohol . . . has two main reasons: low prices, which does not stimulate producers to prematurely harvest sugarcane (to compensate for the loss of productivity resulting from the premature harvest), and a drop in alcohol production in the northeast.	
Increase would be highly inflationary, said a director of CNP.	
[5a-4] Northeast provokes a plunge in production (16.5.89).	
To alleviate the shortage, the producers in the center-south of the country decided to harvest from June to May. But this will only push the problem into the future.	
The solution employed by the government is to decrease the production and exportation levels for sugar and reduce the production of alcohol cars in favor of gasoline cars.	
[5a-5] The problem might occur again in 1990 (16.5.89).	
The problem of an alcohol shortage will repeat itself in the next year unless the consumption of gasoline and alcohol is balanced.	
We are in favor of Proálcool, but the country cannot be dependent upon alcohol, since it will generate serious unbalances, stated a director of Petrobras. The representative of Petrobras did not want to reveal how much alcohol the company has in its tanks.	
[5a-6] Petrobras guarantees that the supply crisis is over (19.5.89).	
The alcohol supply will only be really secured if the alcohol producers fulfill a quota of 500 million of liters within the 15 first days of the harvest.	
[5a-7] Alcohol car production will be limited to 50% of total car production (17.5.89).	outcomes
[5a-8] Consumers continue to search for more gasoline cars (19.5.89).	
[5a-9] A plunge in harvest levels is forecast (16.9.89).	
Alcohol fuel harvest for this year is going to suffer a plunge of 1.5 billion liters.	
According to the investigations by Folha, the current shortage of alcohol is provoked by changes in the purchasing scheme for alcohol, which was decided by CNP last month.	

This whole event had been very brief. It took only ten days from the news of the initial local shortage [5a-1], when officials began discussing and making decisions about whether or not to harvest the sugarcane prematurely, reduce the alcohol mixture, and set limits for alcohol car sales, to the point at which Petrobras announced that the crisis was over [5a-6]. This had the

effect of crashing alcohol car sales and forced alcohol producers to advance the start of their harvest, thus reducing its total yield. Since Petrobras was the unique social actor that had information about alcohol reserves, its interpretations seemed to be the most legitimate. Moreover, as it had control over the reserves and all alcohol purchasing, other actors did not have grounds to resist its resolutions. Petrobras not only had the power over material fluxes, but also power over interpretations, that is, meaning.

Ascribing first-order codes

The chain of events that ultimately resulted in the grave alcohol shortage was a "surprise," even though it had repeatedly been foretold, for example by Professor Cerqueira Leite. The situation was obviously "changed" in material terms; Petrobras had less alcohol than it should have had in its security reserves. The rapidity with which authorities tried to "resolve" the seemingly immediately legitimate problem was truly remarkable. The changed situation was clearly "internal" to the alcohol production practices.

Problematizing methanol

Just when the situation seemed desperate, two options emerged for resolving it: foreign alcohol and foreign methanol. Since the former was very expensive and not available on a sufficient scale, the latter seemed perfectly suited to solving the problem of a lack of alcohol: it was abundant and cheap on the international market. Methanol was strongly supported by the ministers of mines and energy and of industry and commerce. Methanol would pollute less than gasoline and would be well-suited to work as a substitute for alcohol. Indeed, a mixture of 60% alcohol, 33% methanol and 7% gasoline was determined and importation permitted. This solution was disrupted by the problematization offered by Petrobras, which argued that the people had to be educated in terms of methanol.

The National Oil Counsel (CNP), arguably closely linked with Petrobras, was from the beginning against methanol, claiming it to be toxic [5b-1] and arguing for another solution [5b-2] (claimed unfeasible by the alcohol producers). Since the toxicity was first related to ingesting methanol, it was then argued that inhaling the gases that methanol emits is also harmful. It was argued that methanol increases pollution in the big cities. Folha seemed to be partial in this matter. The title and text of the article listed in row [5b-3] of Table 5b were

clearly against methanol; however, the professor being interviewed argued that methanol would pollute *more than alcohol*, but *much less than gasoline* (and was less toxic than gasoline) and that it would be better to import methanol than face the alcohol shortage. Various other titles in Folha were clearly biased against methanol. This, however, is peripheral to the present analysis.

Table 5b Problematizing methanol

[item], title (date), quotes	1st level code
[5b-1] Methanol (26.8.89).	a. justification – (attempting to illegitimate methanol) b. changed – (fuel distribution in the future) c. unmasking - (how methanol will change fuel distribution) d. internal – (Petrobras)
The CNP is against the idea because of the high toxicity of the product.	
[5b-2] CNP disagrees with the measures taken in terms of alcohol (3.11.89).	
Directors of CNP argue that only the suspension of exports of sugar, and diverting more sugarcane to alcohol fuel, will solve the problem.	
[5b-3] USP says that the use of methanol as a fuel will increase pollution (16.11.89).	
Use of methanol as a fuel mixed with alcohol and gasoline . . . will increase pollution in big cities.	
A specialist from USP affirms that the solution to import methanol is better than the option of having a lack of alcohol.	
[5b-4] Petrobras wants to return to blue gasoline (28.11.89).	
During the last months, the state company [Petrobras] has accelerated research to combat the decision to import methanol – considered expensive and highly polluting – which it did not want to see become a reality.	
[5b-5] Workers in the gas stations want to prevent putting methanol into alcohol (3.12.89).	
The president of the labor union affirms that the use of methanol increases health risks for attendants by 200%.	
The president of the labor union affirms that the studies by Petrobras prove that methanol is more risky than other fuels in Brazil.	
[5b-6] Ecologists protest the disembarkation of the fuel (3.12.89).	
Militant ecologists of São Paulo prepared two boats yesterday to protest against the disembarkation of 50 million liters of methanol.	
[5b-7] The importation of methanol will be counted as a subsidy (5.12.89).	
The consumers should be made aware of the risks related to methanol through an ample campaign to alter public opinion, said a director of Petrobras.	
[5b-8] A judge prohibits the use of methanol throughout the whole country (6.12.89).	outcome
A judge complied with a request by an environmental group and issued an injunction [prohibiting importation and use of methanol in Brazil] . . . he said that methanol can "irreversibly harm the environment and collective health."	

Petrobras was explicitly against methanol. It argued that methanol was highly toxic and polluting and also expensive [5b-5]. It offered its solution, "blue gasoline," which would not contain any alcohol but whose octane number would be the same. None of the official

environmental organizations would, however, accept this gasoline. The leaflets produced of Petrobras, which it distributed, among other places, to gas stations, claimed that it threatened laborers' health and was highly polluting. The tactic seemed to work. Indeed, the strongest opposition against methanol seemed to be by the workers at the gas stations, which Petrobras had explicitly "educated" [5b-5]. The environmentalists joined the chorus and organized an impressive protest against the first methanol delivery [5b-6]. Corresponding problematizations were based on ethical (health, security), environmental (pollution), and economic (cost) issues.

Petrobras was not only the one that spread information (of the threats) about methanol, it was also the source of this information [5b-4]. Methanol as a transportation fuel was successfully transformed from being the salvation for alcohol into being an imminent threat to national health and the environment. Its importation and use in the whole country were then banned by a judge in Rio de Janeiro [5b-7], and the next day by a judge in Brasília [5b-8]. Of course, the chemical industry, which had been using methanol all along without any health problems, would not stop using it.

Ascribing first-order codes

Methanol, the primary means of solving the problem of the alcohol shortage, was problematized in an "unchanged" (although crisis) situation in terms of the alcohol-producing practices and also with respect to using methanol as a fuel. Although the problematization referred to changes in the future fuel supply system, before the problematization offered by Petrobras, these changes were conceived of as unproblematic. Methanol was perceived as being similar alcohol in various forms, so that the fuel distribution and end use would remain essentially untouched. Petrobras problematized this by "unmasking" (or masking) the fact that methanol would be harmful to laborers. It "justified" this by arguing that it was toxic and a pollutant. Petrobras was obviously a rather central actor in the alcohol supply chain, which is the reason why I categorize this disruption as "internal." Of course, an important issue has to be noted: methanol had not yet established any type of position in any practice and thus it is questionable whether this disruption can be linked to any type of *institutional* change.

Contesting the ban of methanol

Right after the declaration of the injunction by the judge in Rio de Janeiro, the government

started a judicial process to attempt to remove this ban [5c-1]. A discursive struggle, or a framing contest (Benford and Snow 2000), *par excellence* took place. The camp opposed to methanol had the state governments on their side; various mayors banned the use of methanol in their cities, including in São Paulo. Interestingly, Petrobras retreated in this situation; it stated that it was a neutral "executor of the nation's will" and did not comment on methanol. Its work seemed to have already been done. Although various specialists attempted to convince officials and the public that methanol could be used as a fuel because it was much less toxic than gasoline and polluted the environment much less, profound doubts about methanol remained. Very strict rules were imposed to work out where methanol would be handled. Never before had the health of poor laborers played such a big and visible role in Brazil.

Table 5c Contesting the ban on methanol and acting upon it

[item], title (date), quotes
[5c-1] The government goes to court to guarantee the use of methanol (7.12.89).
[5c-2] Specialists think methanol is better than gasoline (8.12.89).
Methanol is a good fuel option to combat the supply problems of alcohol. This was the opinion of the majority of the environmental, energy, and public health specialists consulted by Folha yesterday.
[5c-3] Specialist disagrees with the injunction (9.12.89).
The injunction decision is more based on emotions than on scientific knowledge.
Methanol is toxic, but less so than gasoline and much less toxic than carbon monoxide.
[5c-4] Alcohol producers threaten to boycott alcohol deliveries to Petrobras (20.12.89).
Informally, the producers already alerted Petrobras that, if there will not be rationing of gasoline [and alcohol], they won't supply more anhydrous alcohol to it.
The intention of the producers is to transform all of the anhydrous alcohol in their stocks into hydrated alcohol.
[5c-5] Alcohol producers fear the end of the program (25.12.89).
The main fear of the alcohol producers is that the supply crisis will definitely hinder the National Program of Alcohol, making the 400 active alcohol plants obsolete.
A price shock, defended by the producers in the medium term so as to reduce alcohol consumption, does not yet have CNP's approval.
[5c-6] Producers suspend alcohol delivery to Petrobras (29.12.89).
We won't deliver anhydrous alcohol to the torturer of Proálcool, affirmed an entrepreneur, who continued: "Petrobras has to find another additive for its rotten gasoline."
We are not withholding our product. We are going to hydrate the anhydrous alcohol and deliver it to consumers.

Problematizations of the ban attempted to downplay the decision to ban methanol by changing the meaning of methanol. It was alleged that there were political interests behind the ban and that the decision was based on emotions, not on scientific knowledge [5c-3]. It was argued that methanol was less toxic and polluted the environment much less than gasoline and it was much cheaper than the domestic alcohol it would substitute. These problematizations had a concrete topic and aim: to remove the ban that was put on methanol. When the delay over liberating methanol became evident, the alcohol producers began to worry (Table 5c).

Alcohol producers did not have many options when facing the imminent threat of an alcohol shortage that methanol seemed unable to save. They had harvested premature sugarcane and even imported alcohol (only to have it put into quarantine by Petrobras), but the problem that threatened the whole alcohol program remained [5c-5]. They arrived at an obvious, but controversial decision: to stop delivering anhydrous alcohol to Petrobras [5c-4]. They did this was to maximize the amount of hydrated alcohol used in alcohol cars. It was difficult not only because it meant an explicit war against Petrobras, the torturer of Proálcool, as they claimed [5c-6], but also because it was argued that in big cities the alcohol mixture in gasoline was indispensable in terms of combating pollution.

The alcohol producers awakened to the situation very late. They apparently had not understood the game being played in which their destiny was decided. It made no difference who was blamed for the shortage if the shortage would destroy the image of the alcohol car and thus abolish the only indisputable reason for them to maintain their production. When they became conscious of the matter, it was already too late: it was not in their power to save the alcohol car from the severe shortages. The rest was history: methanol did not arrive in time to save alcohol. The lines of alcohol cars were frequent and long, and well reported in the media. Sales of alcohol cars sharply dropped: the image of the alcohol car was ruined for good. The slogan for alcohol cars was turned upside down: “Alcohol car. Do you still have to get rid of one?”

Materiality of disruptions from the alcohol shortage

The triggering of an alcohol shortage in the end of 1989 was an evident material disruption (see Table 5d). The lack of alcohol gained immediate legitimacy as a problem that needed to be solved. Plans were made to limit the sales of alcohol cars; this, however, was not necessary

since the demand for them slowed soon after the initial shortage. Another immediate solution was a decision to engage in premature harvesting. The disruption had similar characteristics as the two previous material disruptions: the increase in the domestic oil production and the counter-shock resulting from the drop in the price of oil; *something had happened* that was relevant to the alcohol practices.

Table 5d Summarizing coding for the alcohol shortage

event	cases	1st coding – (referent)	materiality
alcohol shortage	triggering the shortage	resolution (downgrading alcohol program) changed (alcohol supply) surprise (shortage) internal (inside alcohol supply chain)	material
	problematizing methanol	justification (ban of methanol) unchanged (future fuel distribution) unmasking (how methanol is dangerous) internal (within alcohol supply chain)	cognitive

Another issue was the problematization that disrupted the distribution of methanol. Although various material changes occurred when the problematization first began, the problematization addressed them only implicitly or secondarily. The main issue had to do with changing ideas about the use of methanol as a substitute for alcohol from unproblematic to problematic. Thus, similar to the case of the miniplant, when Professor Corsini introduced new knowledge, Petrobras objectivated its knowledge, that is, its interpretation of methanol. This interpretation then contested the previously accepted, unproblematic view of methanol and succeeded in replacing it in the societal discourse. At least, some of the federal judges and environmental activists took the bait and the threat was amplified.

Categorizing empirical disruptions

In this section, I discuss the empirical findings at a more abstract level. This is first done to analyze whether the conceptually derived cognitive and material types of disruptions form adequate categories, that is, whether the empirical cases present similarities within their categories and dissimilarities between them. Since the binary pair "changed versus unchanged" determines whether a disruption belongs to the cognitive or to the material category, the rest of the codes are employed in these comparisons. In the following two tables,

I organize first the cognitive and then the material disruptions and remove the "changed versus unchanged" coding for the sake of simplicity. What is more, I add plain "outcomes" for the disruptions in order to better ascertain whether the disruptions succeeded in disrupting the established practices that they aimed to disrupt.

The second-order codes are based on the first-order codes and are ascribed to disruptions at the end of each of the four problematizations. Similar to the first-order coding, the second-order coding, or categorization, cannot be strictly objective. We cannot argue for entirely objective disruptions; instead, they partly depend upon our point of view. However, the statements and arguments evolving in a discourse can be addressed rather objectively, which is what I attempt to do in this empirical analysis. Analytically speaking, I refer to general knowledge and the problematizations that evolve within that analytical entity. The point of view is thus that which can be best described with the essence of the terms "common," "generic," "general," and "public." This is obviously only when I do not refer to the actors or group of actors primarily involved in a problematization, such as "sugarcane farmers."

Cognitive disruptions

In Table 6, cognitive disruptions are compared with each other. The problematizations in these cases were coded as "justifications," apart from the miniplant case. As was discussed in Chapter 4 and at the beginning of this chapter, "justification" indicates the *effectuality* of disruptions. If the emphasis is on justifications rather than on resolutions, it indicates that the problem has not gained sufficient legitimacy so that it can be solved. This seems to be the case in all of the three cases that were coded as "justifications." However, although the case of the miniplant is coded as a "resolution," the solution that Professor Corsini offered via his miniplants was not accepted by those organs of the government that decided upon the alcohol program. It seems that, although Corsini attempted to resolve problems inherent in the large-scale production methods, these problems were not generally legitimate. Had they been, the miniplants would most probably have been received differently.

Table 6 Comparison of cognitive disruptions

cases	1st code – (referent)	outcome
farmers' problematization	justification (price too low) unmasking (price structure) internal (within the sector)	"nothing"
Joelmir Beting's problematization	justification (price too low) unmasking (price structure/policies) external (journalist observer)	"nothing"
miniplant	resolution (large-scale production) surprise (large-scale production) external (university invention)	"nothing"
problematizing methanol	justification (ban of methanol) surprise (methanol is toxic, a pollutant and expensive) internal (within alcohol supply chain)	ban of methanol

With regard to the second oppositional pair, the first two were coded as "unmasking" and the latter two as "surprise." This oppositional pair indicates the *expectedness* of a disruption. As discussed previously, unmasking as opposed to surprise refers to an attempt to see an established situation in a different light. Moreover, it refers to something that is not a surprise, something that is expected, even though it might not be consciously or explicitly thought of as such. In the miniplant case, the surprise refers to the invention that, by definition, is always some sort of a surprise. In the case of methanol, the toxicity and polluting nature of methanol was made into a surprise by Petrobras, especially with respect to the implications of its use as a transportation fuel.

The last binary pair, internal versus external, is equally spread across the table. However, depending on the boundaries, that is, whether practices, geographical region, or supply chain delineate the system, externality could be almost anything. Here, the code refers to production practices or to the supply chain of alcohol production. Thus, if Petrobras is not seen as shaping part of the alcohol practices, the methanol case should be coded as external. It seems that two disruptions, the problematizations offered by the sugarcane farmers and by Joelmir Beting, are very similar in other dimensions, but vary in this particular dimension. It is very difficult to provide an intelligible explanation for the role of externality with regard to these cognitive disruptions.

Besides comparing the features of the disruptions, I investigate the outcomes with respect to

the disruptions. Outcomes here indicate whether the problematizations succeeded in disrupting interpretations or even resulted in some changes in the future occurrences. It seems to be very clear that the cases related to the price of sugarcane did not result in any change in the agrarian policies. The prices remained chronically low, a fact that the quotes provided in the table [2c-7 and 2d-5] indicate. Since the problematizations did not disrupt the reproduction of practices, the discrepancies with regard to material fluxes, however, continued to grow. Also, the miniplant case presented similar outcomes: the miniplants were almost forgotten. Although there were some reports that even 100 miniplants were under construction at any one time, they never played a significant role in Brazilian alcohol production. In contrast to these cases, the problematization conducted by Petrobras succeeded in its efforts to ban methanol. It is obviously not clear whether it was the public discourse that gave rise to the ban or whether it was maneuvered through another type of "jeitinho" (Amado and Brasil 1991; Duarte 2006), for example through direct lobbying or some other influence.

Overall, although the coding for cognitive disruptions does not present a perfect coherence, the basic line of problematizations related to the price of sugarcane seems to form a category. This category is characterized by ineffectual unmasking, an attempt to justify a problem in an unchanged situation. The miniplant case, due to the solution-approach, looks different in the light of the codes, but its similarity with the two earlier cases is striking. The only case that falls outside this category is the case of methanol. There are some explanations for this. First, methanol was not institutionalized through its use in practice; it was not generally accepted as a transportation fuel when Petrobras began to problematize the issue. Second, Petrobras was an enormously influential player that had access to many cabinets and government ministers, especially in Rio de Janeiro where its headquarters was located. On the opposite, the ones who problematized in the other cases did not have such strong subject positions and in particular were not that close to the government decision-making.

Material disruptions

Table 7 compares disruptions that were coded as "changed." The first code divides the cases promptly into two categories. The cases of large-scale production and land reform are coded as "justifications" and the rest as "resolutions." It was especially clear in the latter cases that

the emphasis was on resolving the new situation that was caused by the material change. The second code presents the same division between the cases. Again, the three "surprises" were clearly changes that took place rapidly and without adequate predictions. In terms of externality, only the case involving counter-shock due to the increase in the price of oil was coded as external. However, had Petrobras been considered external to the alcohol practices, would the cases of an "increase in domestic oil production" and "triggering the shortage" have been coded as "external"? Also, the cases of large-scale production and land reform could be external with a slightly stricter delineation. Overall, externality does not seem to explain much in these cases.

Table 7 Comparison of material disruptions

case	1st coding – (referent)	outcome
large-scale production	justification (land/income distribution) unmasking (land/income distribution) internal (within countryside)	"nothing"
increase in oil production	resolution (downgrading the alcohol program) surprise (oil production capacity) internal (within the sector)	the program was frozen
counter-shock of oil	resolution (downgrading the alcohol program) surprise (fall in the price of oil) external (international)	the program was frozen
land reform	justification (inequality as a problem) unmasking (land/income distribution) internal (triggered from within)	the program was frozen
triggering the shortage	resolution (downgrading the alcohol program) surprise (shortage) internal (inside the alcohol supply chain)	alcohol cars sales tumbled

Nonetheless, with regard to outcomes, it is evident that in the case of large-scale production practices, little was achieved as a result of the problematizations. Large-scale production practices continued to spread rapidly, regardless of the strong criticisms. As a result of the events in mid-1980s, the alcohol program was frozen. Whether the reason for this was the problematization of rural inequality or the two material surprises is not without dispute. In contrast to the dispute about the real reason the alcohol program was frozen, the case of the alcohol shortage is crystal clear. The initial surprise of a lack of alcohol, even if it did not

directly cause a sharp drop in the sales of alcohol cars, certainly induced a drop in sales. This also led to the severe shortage of 1990, when the overall harvest was strongly reduced because the crops were harvested prematurely.

Three types of disruptions

Overall, the empirical cases strongly suggest that the category of material disruptions is not coherent. Instead, there seems to be two distinct categories within it. The first category consists of those unexpected disruptions where emphasis was on resolving the changed material conditions. The second category consists of the justifications that were triggered by gradually changed material conditions and that kept unmasking the awkward situation that had resulted. It seems that the two latter cases have something in common outside these codes. The material changes unmasked by the problematizations seemed to be products of established practices, those of alcohol production and the existing agricultural policies. I label this disruption an "*accumulative disruption*" (see Table 8). The other type of material disruption is better suited to the characteristics of exogenous jolts conceived of in the existing literature (see Meyer 1982; Hoffman 1999). I label these simply as "*jolts.*"

Table 8 Summarizing the effectiveness of the 1st and 2nd level coding

events	cases	1st level coding	2nd level code
sugarcane price	farmers' problematization	justification - unchanged - unmasking	cognitive
	Beting's problematization	justification - unchanged - unmasking	cognitive
large-scale production	miniplant	resolution - unchanged - unmasking	cognitive
	large-scale production meth	justification - changed - unmasking	accumulative
mid-1980s	counter-shock of oil	resolution - changed - surprise	jolt
	domestic oil	resolution - changed - surprise	jolt
	land reform	justification - changed - unmasking	accumulative
alcohol shortage	triggering a shortage	resolution - changed - surprise	jolt
	problematizing methanol	justification - unchanged - surprise	cognitive

Types of disruptions

According to my empirical analysis, it is not enough to divide disruptions into cognitive and material types, but another type, accumulative disruption, is needed to better explain and understand the origins of institutional change. This suggests that we have to take into account the distinct processes through which material change is produced. In this section, I discuss the characteristics of these fundamental types of disruptions. I interpret the categories by returning to the empirical material and use conceptual development to propose a theory to explain the nature of these categories. The results of this analysis are linked to the existing literature mainly in the following chapter. I attempt to illuminate what kinds of issues affect the success of a disruption and how different origins of change, that is, disruptions, appear in a more general account.

To theorize about different types of disruptions, I address how the type of disruption determines subsequent changes in practices, with the help of materiality, expectedness, and the effectuality of the disruptions. Subsequently, I discuss how their relative importance changes along with the reproduction of practices. In doing this, I am theorizing about whether the role of disruptions becomes more salient or whether they become increasingly obsolete through the institutionalization of practices. According to the empirical analysis, cognitive disruptions seemed to form one coherent type of disruption, which I label "cognitive disruption." Another group was material disruptions, which can be divided into two types: "jolt" and "accumulative disruption." Schematically, if a "jolt" comes as "something that happened" and a cognitive disruption as "something that was claimed" (see Hannigan 1995), then accumulative disruption could come as "something that changed." Since these types of disruptions are *ideal* types, typically the disruptions take the form of "something claimed to have happened/changed."

Problematizations that argue against established practices based on alternative interpretations of them are *cognitive disruptions* and those based on material changes are *material disruptions*. It is important to distinguish between "problematization" and "disruption" because it is easy to confuse the *conduct* of problematization (i.e. problematization as an activity) with the *reasons* for it (i.e. a disruption). Here, the main

interest is in the latter. As discussed in Chapter 3, a disruption always entails problematization (a process), no matter how brief the latter might be. Nevertheless, it might not be obvious to categorize problematizations based on the *reasons* for them; instead, they can be categorized based on how they are conducted, as is done in the existing literature (see Morrill et al. 2003; Hond and Bakker 2007).

To make this salient point more understandable and justified, I provide some examples. The case of large-scale production patterns that occurred in 1979 was categorized as a material disruption in the present analysis. If we would follow the alternative form of categorization, it would have been a cognitive disruption, because the problematization of the issue was mainly conducted via symbolic means. In another example, the case of land reform, which was problematized through revolts and riots by the sugarcane workers in the mid-1980s, would be categorized as material disruptions because they involved material activity and damage (see Hond and Bakker 2007). Here, it is categorized as a material disruption for another reason; that is, the *reasons* for the problematizations had to do with the changed material situation due to the alcohol program. In the following section, I analyze the three types of disruptions and theorize about their characteristics.

Cognitive disruptions

By cognitive disruption, I refer to such a phenomenon in which one or more social actors problematize the status quo based on arguments that typically refer to injustice, oppression, or inequality, as discussed in Chapter 3. In the empirical material, the problematizations offered by both the farmers and Joelmir Beting highlighted sectoral injustice and economic problems. In the case of the miniplant, various issues such as ecological impacts, social inequalities, inefficiency, and the cost of production were problematized. In the case of methanol, Petrobras chiefly based its arguments on health and environmental issues. Typically, cognitive disruption is an attempt to change the meaning of the status quo and the corresponding activity in an "unchanged" material situation. Problematization in this case is provoked by a changed perception by *somebody* regarding the nature of these practices, or it might be a question of legitimating another, already existing interpretation in place of the generally accepted interpretation.

Since it is clear that various interpretations of particular practices can coexist, typically one is determined to be dominant interpretation, and through the continuance of practices, it becomes taken for granted. However, knowledge can be and often is insulated between different social groups (Reay 2010), so that contradictory typifications between different groups are likely to coexist. In the empirical material, we can think of various issues indicating insulation. It seemed, however, that insulation takes place much more in terms of ideology, even consciously. When the sugar and alcohol producers bought lands from the small farmers, they did not want to share their knowledge that what they were doing was against the law. They even went so far as to threaten to kill journalists if they continued with their investigation, that is, with sharing knowledge with the public.

When these differing, and possibly contradictory, typifications are exposed to one another, subsequent activity and changes in meanings are determined by how well these groups fare compared to one another in terms of, for example, physical power, interest, and argumentation. Of course, the characteristics of the established stocks of knowledge play a fundamental role in this process. The consequences of these kinds of *exposures* have to be empirically investigated in each case. Overall, we can think of various types of cognitive disruptions that range from everyday eureka moments to theoretical-level insights into broader societal issues. Some of these insights, those that are typically based on abstract knowledge, come to be objectivated in the social stock of knowledge through questioning, unmasking, and problematizing the typifications associated with the established activities. According to the present empirical case, the cognitive disruptions seem to have some typical characteristics.

Characteristics of cognitive disruptions

According to the empirical material, cognitive disruptions are ineffective. The introduction of miniplants and the problematization of the price of sugarcane did not result in practically any subsequent changes in the corresponding practices. Miniplants were forgotten and the price of sugarcane remained low. The reason that the disruptions were so ineffective was that, through the reproduction and diffusion of practices, not only did the activities gain approval and become taken for granted, but those social actors who benefitted from them gained even more power. Since the sugar and alcohol producers were the largest entities in rural Brazil, they

gained even more power due to abundant credit and government promises to buy all the alcohol they produced. Obviously, these large producers would not seek to problematize their source of benefits, but instead defend them.

Aggregate social-level issues, such all alcohol production practices, do not resonate with most individuals, who are far removed from such broad-based issues. The higher a practice is situated in the nested system, the more it seems to be based on abstract knowledge. For example, the increases in the price of sugarcane seemed to be blocked by higher level political practices, the ideologies of control and "conservationist modernization," that is, the same practices that played a role in the miniplant case. These types of policies are typically based on some complex and abstract economic models; knowledge of these models and the ideological issues that support it cannot be questioned on a purely empirical basis, but only by conceptual arguments. In addition, when problematizing something without referring to concrete material changes, the arguments are, of necessity, to some extent abstract: the reasons lack *concreteness*.

Farmers attempted to enhance the concreteness of their reasoning by calculating the share that distinct groups in the sector had in terms of income. What was more, they asked a renowned university to participate in the calculations, so that the calculations would be more plausible at the government level and thus be more concrete. When Joelmir Beting problematized the credit system and legitimized the miniplant solution, he gave concrete examples of what these issues really meant in rural Brazil. The credit system gave money to one-fifth of the producers, who then bought land from their neighbors because the system was not incentivized to encourage them to invest in production. The miniplants could be built in "every backyard of São Pedro de Morrinhos and would make 'gasoline' for their own vehicles". Even though attempting to make the issue more concrete, the problems still remained somebody else's problems for all those not directly involved.

Relevance and consequences for cognitive disruption

Consequently, cognitive disruptions typically remain at the level of problematization and only arduously manage to legitimize a problem with established practices and disrupt it. According to the empirical material, there are two issues that might help to legitimize a problem in an "unchanged situation" and subsequently disrupt established practices. First, the present

empirical data demonstrated that insofar as their acceptance is of interest, the reasons to change have to be brought close to those whose opinions are relevant. The reasons to change have to be made concrete and relevant for the "target audience." Somebody else's problem is not a problem that needs to be solved.

Petrobras seemed to have learned this lesson. It had failed to change the sale of alcohol cars through its problematizations of the issue in the 1980s, in which it argued for "conta álcool," alcohol, an argument that demonstrated the losses Petrobras had experienced as a result of alcohol sales. In the case of methanol, Petrobras transmitted the problematizations of the situation more closely to the masses, those relevant in terms of alcohol car sales. The leaflets that Petrobras made and distributed, especially to those who worked in gas stations, argued that methanol would harm *your* health, not health in general. For the laborers, methanol would not be somebody else's problem, but indeed, their own problem. Guérard et al. (2012) referred to this issue as "negative individualized evidence-based consequences" (see Guérard et al. 2012). This seemed to be an efficient way to make the problem relevant. Of course, methanol was not an established solution, and thus it was easier to disrupt its meaning. Obviously, the problematizations of the methanol case were partly based on changed future material conditions, and thus it is far from an ideal cognitive disruption.

Including consequences or *threats* in the problematizations of a particular issue also contributes to their relevance. The problematizations offered by sugarcane farmers contained an inherent threat: the alcohol program would not succeed without changes in prices. Without the sugar producers, who were able–in violation of the law—to verticalize their activities, the situation would have been very different: the lack of sugarcane would have forced increases in prices to solve the now relevant problem. If problematizations do not entail concrete and adverse consequences, their reasons for change tend to remain irrelevant. The miniplant solution clearly lacked a threat. All that was threatened was that if the miniplants were not chosen as a solution, the current problems would remain the same. Evidently, threats typically concern future material changes and thus evoke questions about the present categorization.

Material disruptions

At the operational level, material disruption is a type of problematization whose arguments

refer to a changed material situation. The empirical material strongly suggests that only one class of material disruption is not sufficient. The cases of counter-shock due to a drop in the price of oil and alcohol shortage are the clearest cases in which material disruptions were immediately legitimized as a problem for alcohol practices and provoked rather immediate solutions. However, other material disruptions, for example the cases of large-scale production patterns and land reform, do not fit this type of disruption. These problems did not gain immediate legitimacy.

I treat these emerging two categories of material disruption separately. In the first of these disruptions, a material disruption can refer to classic—exogenous or endogenous—"jolts" where the availability of a material flow (typically manifested as price variation) that is important for the existing practices for some reason unexpectedly changes. This is labeled a "jolt" following conventions in the existing literature (Meyer 1982; Greenwood et al. 2002). The other type of material disruption is one in which the changes that are the basis of the problematizations are produced by the practices themselves. This latter type, accumulative disruption, is a hybrid form of the cognitive and material disruptions since it involves characteristics of both of them.

"Jolts"

As a "jolt," I refer to problematizations in which the arguments against established practices are based on a changed material situation that is not produced by the practices themselves. These "classic" disruptions can manifest themselves in various ways ranging from earthquakes to bombs, from changes in the price of oil to various types of accidents and changes in policies. Within the given empirical reality, these material changes must typically be interpreted before they disrupt practices. The counter-shock due to a drop in the price of oil did not immediately affect the alcohol-producing practices, but the meaning of the shock had to be interpreted. The same thing occurred during the alcohol shortage, although it was mostly the interpretations of Petrobras that counted in terms of limiting alcohol car sales and harvesting the crops earlier than normal.

In the clearest cases of material disruption, problem legitimation might be a rather brief process, which is shown in the empirical material. Because of its quasi-nonexistence, it can

erroneously seem that there is no such process. For example, the alcohol shortage seemed to be a very concrete problem and not an interpretation. What is more, no matter how evident the causal reasons for the material disruption seem to be, they are not "objective," but always interpretative. The reason for the shortage in 1989, which triggered the major shortage in 1990, was explained by the decline in the amount of alcohol produced in the northeast and by the fact that the alcohol producers did not sell alcohol to Petrobras. Alternative explanations, for example that a change in the alcohol-purchasing procedure was the reason for local shortages, remained forgotten.

In the existing literature, this type of disruption is most typically seen as an exogenous shock; "a surprising break with routine practice" (Sewell 1996, 843). It is a surprise relevant to the practices at hand and comes from outside the system. Here, it is evident that this type of change can also take place *inside* the system, which was most obviously seen in the case of the alcohol shortage. Material disruptions cannot be or are not forecasted; they are surprises (Meyer 1982). Moreover, "jolts" can take place "neutrally," that is, without any social actor consciously using his or her powers to actively cause it, for example a natural catastrophe. Or then, it is very possible for social actors to act consciously, based on "political" or "strategic" motivations, to disrupt the material fluxes of the system. Think of the oil crises in the 1970s.

It is important to also note that gradual and accumulative changes due to established practices could be artificially made into surprises. The actions of Petrobras are examples of such consciously made artificial surprises. The increase in oil production capacity in 1985 was reported as a surprise, similar to the subsequent oil discoveries. As Professor Cerqueira Leite unmasked in 1990s, Petrobras had reported its discoveries within one year in a single news-like revelation. Petrobras also made a surprise out of the lack of alcohol in its reserves in 1989. Had it reported the lack when its alcohol tanks passed the security level, major events such as the grave alcohol shortage in 1990 would hardly have occurred.

It is important to note that material changes, or shocks, besides being able to disrupt practices, might equally solidify them. It might be that a material shock enhances a certain practice and manages to solve the problem that was the reason for the practice emerging in the first place. In the empirical material, the second oil shock in 1979 exemplifies this type of change. The alcohol program was solidified due to increased oil prices: its status as the savior of the nation

was enhanced, and thus its expansion was accelerated regardless of the mounting criticisms. Since positive shocks do not typically require changes in established practices, they are rarely given as much attention as the negative shocks that disrupt practices.

Characteristics of "jolts"

The emphasis of a problematization based on a "jolt" is typically not on the process of problem legitimation, but on the subsequent processes of solving the legitimate problem, as was the case with the alcohol shortage. This is evident if we think of the courses of action: a material change that is detrimental to some established practices is easily seen as a problem for those who benefit from the practices. For example, the alcohol shortage was a problem for the alcohol producers because it threatened alcohol production practices, their source of benefits. Even if the problematizations triggered by material disruption typically efficiently legitimize the need to change, this is not always the case. It strongly depends on the characteristics of the disruption and its relevance in terms of practices, something that is always a question of interpretation, as shown in the case of the counter-shock due to a drop in the price of oil. The material change in this case was contested.

Relevance with regard to the practice at hand seems to be central to the disruptiveness of a particular disruption. No matter how large the material disruption that takes place, if it is not linked to the practice at hand, it might be absolutely irrelevant to it. The drop in the price of oil was an imminent issue in terms of alcohol production, and the lack of alcohol was even more central. Another salient issue seems to be the *urgency* whereby the change takes place, and moreover, how quickly the adjustment practices have to be put into place. The increase in domestic oil production was a material change that improved Brazil's economic situation and thus did not require immediate action, even against the national alcohol program. Similarly, the counter-shock of oil had mostly positive effects on the economic situation of the country, although it rendered the alcohol program less feasible. The alcohol shock, in contrast, was something that required rather immediate actions to change ongoing practices.

Another important issue seems to be whether a material shock is sporadic or permanent. This *temporal character* of material disruptions was not agreed upon in the case of the counter-shock due to the drop in the price of oil. In other words, although something had clearly happened, the nature of the disruption was contested. Just as those who wanted to downplay

the alcohol program by referring to the drop in the price of oil argued for a more enduring price decrease, the adherents of Proálcool argued for the temporary nature of the shock: it was not permanent and thus it should not disrupt alcohol production practices. In contrast, in the case of the alcohol shortage it was explicitly argued that if nothing were done, the alcohol shortage would be repeated in the following year. Even as Petrobras had announced that there was a lack of alcohol and that it was unable to renew its supplies, alcohol producers denied the ongoing lack of alcohol and reasons for it, but not the future lack of alcohol: it was not just "rhetoric." It was clear that something had to be done to solve the future disruption.

Overall, a material "jolt" seems to be effective because it can directly undermine the benefits that the status quo provides to the central social actors. Thus, it might be that the most powerful social actors interpret the "jolt" as a problem precisely so that they can go about trying to resolve it. Hence, a problematization (process) that a "jolt" evokes must be seen as a very different type of process than a cognitive disruption. The resolutions evoked due to problematizations entailing a "jolt" are typically adaptative in their nature; they are able to adapt the practices to the new situation. Although Sine and David argue that "jolts prompt search processes that erode the taken-for-granted nature of institutions" (Sine and David 2003, 186), I find that the meaning-structures attached to the activity and inherent issues of domination tend to remain unquestioned in this type of disruption.

Accumulative disruption

Accumulative disruption is defined here as a problematization (process) of established practices where the arguments are based on the material changes that these practices themselves produce. Typically, accumulative disruption takes place along with a continuance of practices due to the *accumulation* of material impacts that the same practices produce. It can manifest itself in various types of social-level issues, such as local and global pollution, capital, traffic jams, and the extinctions of species. In addition, we can also think of accumulation at the individual level, for example obesity and wealth. This type of disruption is, by nature, closer to cognitive disruptions than it is to a "jolt" since it is typically equally ineffectual.

In the present empirical material, cases of large-scale production patterns and land reform

were categorized as accumulative disruption: the corresponding problematizations were clearly triggered by a material disruption produced by the problematized practices. However, the material changes were not legitimized as relevant problems, so the solutions that were offered were seldom implemented. It seems that a common denominator for these two cases was that they were results of *gradual* material changes, which sprang from an accumulation of the outcomes stemming from large-scale production practices. Moreover, it seems clear that accumulative disruption is seldom a surprise, but an expected or expectable issue. In fact, the alcohol shortage had all the features of accumulative material changes. Alcohol production continued to be stable after 1985 and the alcohol car fleet kept growing. As a natural outcome of this, there would be a lack of alcohol sooner or later. Had Petrobras not succeeded in making it a surprise and in forcing a premature harvesting that amplified the distortions, the alcohol shortage would have presumably been much less disruptive.

Those types of material changes that the practices themselves produce do not automatically disrupt the corresponding practices themselves, but, nevertheless, introduce qualitative material changes into the system in which they are embedded. These changes can then be used in arguments against the practices (see Maguire and Hardy 2009). However, the accumulation that the practices produce might also be relevant to their very continuity, for example practices that extract finite raw material reserves. While the two types of material accumulation, one due to an accumulation (of the impacts that the practices produce) and one due to a reduction (of raw material due to its continuous extraction), are manifested distinctly, they are fundamentally similar types of phenomena. They have one difference, though. When a mine runs out of ore, it cannot continue for long without changes. A factory, on the other hand, can continue polluting the environment without such compelling disruptions. Obviously, it is possible that the material impacts that the practices produce will not accumulate; besides the features of the accumulation, it is a question of the absorption capacity of the environment.

Characteristics of accumulative disruption

Accumulative disruption is close to cognitive disruption in some features. This is foremost because material accumulates as a result of practices, thus changing material conditions, the practices themselves, the *course of action,* can remain fundamentally unchanged. The changed material "situation" thus convergences and creates a situation in which a cognitive disruption

takes place. For example, the material changes manifested in exacerbated inequality due to a diffusion of alcohol and other large-scale agro-industrial practices were products of rather stable government policies. Another example, Rachel Carson's *Silent Spring*, was an accumulative disruption and not a cognitive one because most of the problematizations in it were based on empirical observations of a changed situation where the course of action remained the same (see Maguire and Hardy 2009). It is this constancy of activity that makes it difficult to problematize practices due to their accumulative outcomes.

Accumulative disruption is also ineffectual because those social actors who benefit from the established practices are most often not the ones who problematize them. To be sure, for alcohol producers the abundant and cheap credit they were granted was not something to be problematized. What is more, it seems that a justification for material change is done rather automatically by arguing for the virtues of the practice that produces the change, in other words, that it solves the legitimate problem that it is perceived to be solving. For example, the justification of the expansion of large-scale production patterns was derived from the legitimacy of alcohol production precisely because it was solving the legitimate problem of a trade deficit. Simply put, the problems related to accumulative changes seem to be natural trade-offs for solving higher-level problems, which are the *raison d'être* of the respective practices. The problem of rural inequality was no match for the alcohol program, which was the grand solution to the problem of a trade deficit. The question of the nestedness of the institutionalized practices is of imminent importance (see Holm 1995).

Another major source of legitimacy for accumulative changes is that at the same time that the practices gain a taken for granted status, so does the matter that they produce. Material fluxes and their accumulation become inherent parts of the embedded material environment as the corresponding practices get established. It is typically not necessary to explain the material changes that the practices produce, although in some cases they have to be justified. The justification typically takes place by referring to the practices that are resolving a definite problem. Moreover, in the empirical case, accumulative disruptions were accompanied by more cognitive disruptions. In the case of land reform, the problematizations referred to the exacerbated land concentration that the alcohol practices partly contributed to. It could just as well have been argued that the problem was concentration *per se*. Inequality and poverty,

although they were getting worse at the time, were not new, but rather permanent, issues that had to be changed. It was a question of changing the status quo, not just returning to the levels of concentration prior to the Proálcool program.

Legitimacy of accumulative disruption and its similarity with cognitive disruption is manifested in much more sustained and visible processes through which issues related to accumulation are problematized. It is not a brief and quasi-nonexistent process when a change is observed and readily seen to have happened and justified as being adverse with regard to a practice. In the case of large-scale production patterns, it seemed evident that the rural conditions had been substantially transformed. However, it was not without difficulties that the mere existence of these changes was accepted, much less that the changes were assumed to constitute problems.

Mitigative solutions

Accumulative disruptions, according to the empirical material, typically problematize the types of changes that can be solved via mitigative measures. Since practices always produce something, it is possible to mitigate them so that they produce less of a particular type of product or by-product, for example pollution. Technological solutions are exemplary of these types of resolutions. In the empirical material, vinasse, the main residual of the alcohol distilling process, was converted into fertilizer, thus preventing the vinasse from accumulating in rivers. One solution for land concentration was zoning, which would reduce (i.e. mitigate) adverse effects related to the expansion of the program. It might be, however, that by mitigating one harmful type of accumulation, other problematic impacts remain. For example, due to mechanical harvesting, it was not necessary to burn sugarcane anymore before the harvest, which reduced local pollution. Land, however, remained concentrated in the hands of a few and local unemployment even worsened.

On the other hand, practices typically produce "positive" accumulation as well. For example, alcohol, when blended with gasoline, reduced pollution and was seen as indispensable for human health in large cities. This was clearly evident in the empirical material; not only was a new alcohol mixture introduced as antipollution gasoline, but the environmental organizations countered Petrobras' attempts to introduce gasoline with less or no alcohol by presenting an environmental argument in favor of alcohol. If the material accumulation produced by certain

practices is more positive than negative, it can contribute to the legitimacy of the practices. For instance, whereas the noxious and maleficent aspects of economic growth are acknowledged (although downplayed), the positive effects of economic growth are typically argued as being superior. The same could be observed in the large-scale production patterns in the present empirical material. It is, of course, not a question of objective assessment, but of those particular objectivations that gain the most strength in the discourse.

Conclusions and discussion

The empirical disruptions that were analyzed demonstrated different types of underlying *reasons to change*. As shown, empirical reality is not about the most rational arguments. Instead, established practices, in terms of the social stocks of knowledge and social stratification, determine the outcomes for any attempts at change. It would be naïve to assume that simple unmasking and problematization would be enough to change the status quo, whatever it is, even if the reasons to change are solid and there is a ready-made alternative. Indeed, even the superb solution, a miniplant, was played down because it ran directly against the established power structure and equally against the higher level practices of rural policies.

Change in societies come in various forms. As a result of the analysis in this chapter, I proposed three elementary types of disruptions. This is to argue that any disruption in the empirical reality can be conceived of as representing a combination of these three types. Material disruptions have two distinct categories depending on how the material changes are produced. Accumulation presupposes patterned human activity and thus is readily in line with institutional theory, although there can be patterned human activity without accumulation. Institutional theory should predict predictable material fluxes (and reductions) and also the accumulative aspects of these fluxes. The theoretical nature of these categories is internally coherent (see Table 9). Cognitive as well as accumulative disruptions were ineffectual, whereas material disruptions were effectual, exactly as discussed in Chapter 3.

A cognitive disruption is typically emancipatory, for example when it goes against an established status quo, such as the existence of slavery (see Ellingson 1995), poverty (Freire 1970), or the oppression of women. In these cases, objectivations (which can also be physical)

against the status quo refer to abstract concepts such as liberty, freedom, and equality. For its part, a "jolt" can take place via conscious (or not that conscious) human action as well as more natural shocks. If the disruption is adverse to the practices at hand, typically the resolution is to *adapt* to the changed material condition. An accumulative disruption encounters a similar adamant resistance as a cognitive disruption because the material change that takes place along with the reproduction of practices is a natural, or at least an understandable, part of the social reality. The social actors who are problematizing the situation are seldom those who benefit from the status quo.

Table 9 Comparing the three types of disruptions

Disruption type	Cognitive	"Jolt"	Accumulative
Codes used in this research	Justification, unchanged, unmasking	Resolution, changed, surprise	Justification, changed, unmasking
Characteristics	Ineffectual, emancipatory, marginalized voice	Effectual, adaptive, quasi-nonexistence of legitimation	Ineffectual, mitigative, naturalized
Importance along continuance	Reduces due to taken for grantedness	Increases due to diffusion and interconnectedness	Increases due to material accumulation
Typical manifestation	Manifestations, social movements, strikes	Drop/increase in the price of a commodity, accidents, bombs	Pollution, various types of concentration
Examples	Sugarcane price, miniplants, slavery, feminism	Alcohol shortage, oil crises, tsunamis, wars	Large-scale production patterns, climate change

The relative importance of these different types of disruptions varies along with the reproduction of practices (see Table 9). Before having gained a taken for granted status, practices might be disrupted more easily through a cognitive disruption, as in the case of methanol. When practices are reified as an indispensable part of the social reality and the corresponding meanings are taken for granted, it is challenging to disrupt them. However, although practices, along with their continuance, are naturalized, they inevitably change the material conditions in which they are embedded, opening up possible reasons to argue against them. What is more, the practices that extract raw material obviously cannot be reproduced indefinitely precisely because they reduce the always-limited raw material.

The productive practices of human societies have expanded immensely in the last centuries; indeed, they have reached a global scale. Since material fluxes get bigger within a limited system, it is evident that their interconnectedness increases, and thus, that various types of

"jolts" become more frequent. This expansion furthermore means that the material impacts of the practices are increasingly easy to observe because they accumulate in the environment. Pollution and various other types of concentration, for examples large cities and the amount of traffic within them, are examples of accumulative material changes. These issues are discussed in the following chapter. Moreover, in the next and final chapter of this dissertation the findings of the entire dissertation will be discussed in light of the existing literature.

> The subject of our discussion is first of all *material* production. Individuals producing in society, thus the socially determined production of individuals, naturally constitutes the starting point. (Marx 1971: 16)

7. Conclusions: the accumulative nature of institutions

In this dissertation, I have explained the micro-processes of institutional change by scrutinizing the earliest moments of change through the lenses of sociology of knowledge and proposed to include material fluxes as part of institutionalization. In the previous chapter, I analyzed the empirical case and theorized about elementary types of disruptions, that is, the origins of institutional change. In this final chapter, my aim is to integrate these conceptualizations with the contemporary literature and discuss their implications for theory. I also make the limitations explicit and discuss the nature of contemporary societies in terms of change.

According to conceptual development, practices beget both meanings and material fluxes. In a simplified situation, these meanings are reified and material fluxes are stabilized through reproduction. I suggested conceiving of the processes in which continuity is disrupted in these same terms, cognitive and material, and argued that this dichotomy is of a more general nature than the conventional approach to endogenous and exogenous disruptions. Taken together, institutionalization should be seen as a process that both reifies meanings and forms material fluxes. Crucially, since material fluxes are typically not fully absorbed by the environment in which the practice is reproduced, *accumulation* takes place and brings about material changes.

In the empirical part, I reconstructed the evolution of the Brazilian alcohol program as a narrative based on diachronical data from Folha de São Paulo. Then, I explained how the phenomenon, the origins of institutional change, was manifest in the empirical data in the form of disruptions. As a result of the analysis, I have proposed that disruptions in the empirical reality come in three basic types, each of which has its own particular characteristics. The two ideal types of disruptions, cognitive and material, were discussed in Chapter 3; the empirical material strongly suggested a third type of disruption, which I labeled an *accumulative*

disruption. It seems to explain a fundamental feature of our social realities: even broad material changes have legitimacy because they are results of accumulation produced by institutionalized practices.

In essence, I have argued that as material disruptions are typically effectual when compared with cognitive disruptions, in contrast those material disruptions that are an outcome of corresponding practices are ineffectual. This means that even broad material changes in our societies can be considered natural through the very legitimation of those practices that produce them. I have structured this final chapter of the dissertation in two main parts. First, I discuss the main arguments in this dissertation and link them to the existing literature. In the second part, I clarify the limitations of the dissertation and discuss what the main propositions imply in practice. To conclude, I ponder the possibility of change in contemporary societies.

Contributions and theoretical implications

According to the present view, practice, similar to knowledge, is seen to emerge as a solution to a definite problem. When a problem becomes legitimate, people attempt to resolve it through a series of activities; typically, over time one of these activities is selected within a particular system. During its reproduction, this selected activity is then institutionalized as a reified—natural—part of the social system and can entail problems of a "second order." Again, if these problems become legitimate, solutions emerge as attempts to resolve them. Chains of problems and solutions are thus formed and together they constitute a hierarchy, that is, a nested system, which structures activity in societies. This type of nestedness of institutions and practices is acknowledged in the neoinstitutional literature (e.g. Zucker 1977; Friedland and Alford 1991; Holm 1995; Farjoun 2002; Lawrence and Suddaby 2006), although not often remembered (Norbäck and Raviola 2012). Obviously, in time the initial reasons for engaging in particular practices become forgotten (Berger and Luckmann 1966).

Institutionalization and deinstitutionalization are the fundamental processes through which these nested systems are formed and modified. I disentangled subjective- and social-level dimensions from one another with respect to the process through which practices are disrupted, something that has not been adequately addressed in neoinstitutionalism. Whereas I have argued that individuals are always the source of change in simple system, the subsequent social-level process of change, labeled *problematization*, was conceived of as a

central process of change, adding to the model proposed by Maguire and Hardy (2009), who conceive of problematizations as single texts. Through problematization, established practices are explained and justified as problematic, and subsequently, this analytical problem is used to disrupt the established practices.

Based on the disentanglement of cognitive and material issues, I have suggested that the reasons for the problematization of a particular issue or situation should be perceived through cognitive and material dimensions. I have argued and shown that combined attention to material factors and cognitive issues enhances our understanding of institutional change and institutional processes in general, in contrast to focusing on the issues in separate research streams. Out of necessity, an exclusive scrutiny of just the material issues lacks an understanding of the *reasons* for these material fluxes. Even if we were to map all the material fluxes in the world, they would not tell us why the particular patterns of social interaction that produce and use these material fluxes, and no others, take place (Schiller 2009). If the meanings related to material fluxes are ignored, knowing how to influence the social interaction that begets these material fluxes can be problematic.

On the other hand, it is from the outset problematic to solely concentrate on cultural or cognitive issues when explaining social interaction; out of necessity, social interaction occurs within materiality (Orlikowski 2007; Schatzki 2010). Not only is social interaction mediated through materiality, it also requires and produces materiality, thus influencing its own environment. The way material changes are produced becomes bound up with other issues, such as subject positions and taken for grantedness, with respect to these changes. Just as social interaction affects materiality, materiality in turn affects social interaction. In this dissertation, I attempted to provide an account explaining how changes in materiality systematically influence ongoing patterned social interaction. I have argued and demonstrated that the way material change is produced influences the disruptiveness of the material change. Even though this account is certainly not complete, it provides insights into the nature of this reciprocal relationship with respect to a rather broad, institutional-level scrutiny.

I have attempted to merge a phenomenological account that distinguishes between material and cognitive disruptions with Marxist conception of material production in order to conceive practices as producing material fluxes that are stabilized through the process of institutionalization. The present view makes it possible to examine the types of accumulative

processes that are often naturalized and non-disruptive, yet have significant impacts on our societies and on their environment, especially in the longer run. Paying attention to accumulation helps us explain patterns of institutional change, which previously were not explained. Maguire and Hardy (2009) deal with disruptive institutional work; they wrote that practices of chemical pesticide were problematized due to their negative impacts. These impacts were clearly accumulative in nature and their denaturalization ended up mitigating the practices of using chemical pesticides, not abolishing them altogether. It is important to note that accumulation is not always relevant, such as in most of the organizational context. This is similar to physics: quantum phenomena are not relevant in all scales of scrutiny, and because of this, they can be abstracted in various cases. This does not mean that they could be *entirely* ignored, though.

Disruptions - cognitive and material

The reproduction of practices is seen to continue until a *problem* appears (Berger and Luckmann 1966), that is, when a problem disrupts the previously unproblematic reproduction of a practice (Maguire and Hardy 2009). The existing literature deals with various types of disruptions and "events," including milestones, natural catastrophes, judicial issues (Hannigan 1995), and field-configuring events (Hardy and Maguire 2010). Scholars have argued that these disruptions manifest themselves as oil spills, speeches, laws, books, ozone holes, and urban smog (Hoffman 1999, Chung 2012), and additionally, as legislative mandates, political ideology, and disputes over professional jurisdiction (Colyvas and Powell 2006). Also, man-made events such as bombs, wars, and immigration have been taken into account (Barley and Kunda 1992).

Most typically, change has been seen to arise from either external or internal disruptions. The way Haunschild and Chandler put this in the "green book" leaves little room for doubt: the "debate between exogenous and endogenous sources of institutional change is one that has featured strongly within the neoinstitutional literature since its origin" (Haunschild and Chandler 2008, 631). Most often, the external disruptions are perceived as shocks or "exogenous events such as wars, immigration, changing economic conditions, climatic shifts, and so on" (Barley and Kunda 1992, 392; see also, Seo and Creed 2002; Greenwood and Suddaby 2006; Colyvas and Powell 2006; Scott 2008). The internal disruptions come instead

as "internal contradictions" (Meyer and Rowan 2006, 9) or "tensions endogenous to the system of ideas itself" (Barley and Kunda 1992, 392).

Furthermore, disruptions seem to come in two different classes. Precipitating (Greenwood et al. 2002) or environmental jolts (Hoffman 1999; Sine and David 2003) have been conceived of as the main sources of disruption and change (Sewell 1992; Reay et al. 2006; Vogel 2009). This type of "sudden and unprecedented event" (Meyer 1982: 515) only disrupts practices through theorization (Munir 2005). Another class of disruption has more recently been conceived of as *work*, especially in the form of "disruptive institutional work" (Lawrence and Suddaby 2006). Also, work is conceived of as being either internally or externally driven (e.g. Maguire and Hardy 2009). Institutional work treats change in the same way as scholars focusing on institutional entrepreneurship, that is, that acts of individual agents, by virtue of their awareness, can change the institutional setting (Lawrence et al. 2009).

In organization research, the conventionally employed dichotomy, endogenous vs. exogenous, often makes sense since organizations typically delimit the system under analysis. However, when investigating larger level societal practices or institutional logics, which do not have clear organizational, geographical, or demographical limits, it is problematic to suggest any meaningful insights by distinguishing between internal or external issues. Thus, when perceiving practices or institutions as "supraorganizational patterns of human activity" (Friedland and Alford 1991, 243), the notions of internal and external become confused. What is external and what is internal to a system of capitalism, to democracy, or to sustainable development? Indeed, if we deal with very broad-level practices, everything is internal. The present empirical analysis presents an alternative to the exogenous and endogenous distinction at the institutional level of scrutiny.

In this study, I have argued and demonstrated that within the context of broadly dispersed practices, it is more adequate to perceive of disruptions through cognitive and material dimensions rather than through the conventionally employed distinction between exogenous and endogenous disruptions. This proposed dichotomy is, of course, not unknown in the existing literature. Lepoutre and Valence (2012) distinguish between symbolic and material carriers of institutional logics. When speaking of forms of conflict, Morril et al. (2003) employ symbolic and material distinctions, as do Hond and Bakker (2007) when distinguishing between the different forms of damage that social movements can inflict. These refer to the

conduct of disruptions and not to the *reasons* for it, as is done here. What is more, these conceptions are not theoretically derived; for example, Hond and Bakker (2007) borrowed the dichotomy from the anthropological investigations of Scott (1989). In addition, the dichotomy has not been discussed in more general terms in neoinstitutional literature.

In this dissertation, the proposed dichotomy was derived from the phenomenological accounts of the sociologists of knowledge (e.g. Schütz 1967). The notion of materiality was introduced during the conceptual development, when subjective-level conscious processes were addressed. Courses of action or the situations in which individuals find themselves at any given moment are determined by two factors: the subjective stock of knowledge and the material conditions (Schütz 1966). I argue that the distinction between cognitive and material disruptions is more general than the conventional view would have it because there is no need to delimit the system at hand. However, rather than unambiguous types, it is a question of a continuum where one extreme accommodates purely cognitive disruptions and the other extreme purely material disruptions, similar to Morril et al.'s (2003) discussion of forms of conflicts.

The nature of change depends on whether it was triggered by a change in the subjective stock of knowledge or whether the material condition changed. When studied from the point of view of a practice, whenever there is a change in the material context where the practice is embedded, the change is common or shared at the outset for those who participate in the practice. Thus, based on material disruptions, changes in the practice are readily understandable, although not necessarily agreed upon. The situation is of a different nature when a single individual has changed his or her perception of the practice at hand. An attempt to change the practices via this changed perception is not shared at the outset, but instead is somebody else's problem in the minds of everyone else. While these ideal types of disruptions cannot be found in their pure forms in the empirical realities, analytically they provide important insights into the dynamics of change. They explain the observation of systematic differences in disruptiveness between disruptions.

The distinction between the cognitive and material disruptions is always analytical and any basis used to categorize empirical disruptions are always grounded in abductive reasoning, which attempts to find out what it was that triggered the problematization at hand. In other words, from an empirical standpoint the source of the disruption can only be inferred, not

proven (see Ketokivi and Mantere 2010). In addition, the distinction between an "accumulative disruption" and a "jolt" obviously depends on the point of view taken. For this, this study suggests that the starting point of any investigation of institutional change should be an established practice, not a particular "jolt" or event (cf. Hoffman 1999). Indeed, in order to argue that an institutional change has occurred, there has to be something established. Here, the concept of *practice* was conceived as such.

Cognitive and material aspects of neoinstitutionalism

I have proposed to distinguish between the cognitive and material aspects of institutions not only in terms of disruptions, but also in terms of practices in general. This divide, of course, involves an age-old question in the social sciences. However, it is a divide only in the analytical sense, if we can agree that the "social and the material are constitutively entangled in everyday life" (Orlikowski 2007, 1437). Although the role of materiality should be pervasive in the social sciences, insofar as the social is embedded in it, the dominant social scientific practice has been to theorize about society as if materiality did not matter (Reckwitz 2002a; Barad 2003; Beunza et al. 2006; Schatzki 2010). I have provided a view that addresses material fluxes and their accumulation in social interaction.

Leaning towards a Marxist approach (Foster 2000), I have argued that all practices require and produce material. Since the divide between the material and cognitive point of view is typically and erroneously perceived as a choice between deterministic and voluntaristic accounts (Barley 1998; Leonardi and Barley 2008), I have returned to the Marxist notions in my theoretical approach not to argue for any material determinism. Quite the opposite; strictly speaking, I find that "everything external is refracted by the interpretation of the actor" (Meyer 2006, 726). Thus, institutions provide a set of meanings, interpretations, and symbols that make sense of material reality (Barley and Kunda 1992); individuals must interpret external stimuli before they can respond by taking action (Machado-da-Silva et al. 2005; Munir 2005). The automatic nature of this refraction makes it difficult to fully understanding that there is any refraction at all.

Institutional theory certainly does not ignore materiality; already Friedland and Alford insisted that institutions "must be reconceptualized as simultaneously material and ideal" (Friedland and Alford 1991, 243). Some scholars even argue that material issues have been

dominating the neoinstitutional literature (e.g. Zilber 2006, Green et al. 2009), because action and activity as well as various types of structures of them have been seen as 'material' (Green 2004, Zilber 2008). However, when conceiving materiality as the very physical matter, that is, in a form of atoms and molecules and the fluxes different types of aggregates of them form, one can surely assert that materiality has not been dominating neoinstitutionalism.

Nonetheless, materiality is conceived in neoinstitutionalism mostly through in institutional logics (Friedland and Alford 1991) or through the tripartite conception of institutions (Scott 1995). The former approach conceives of the dichotomy as "material practices" and "symbolic systems" (e.g. Thornton and Ocasio 1999, 2008; Seo and Creed 2002; Machado-da-Silva et al. 2006; Lounsbury 2008; Armstrong and Bernstein 2008; Lok 2010). Materiality is perceived of as substantively embodied actions, substantive practices, resources, or routines (Misangyi et al. 2008, Lepoutre and Valence 2012). In the tripartite conception (Scott 1995), the regulative pillar embodies materiality (Hinings and Tolbert 2008). In my view, this is not sufficient to account for the entire material dimension in which institutions are embedded.

Whereas these approaches acknowledge that individuals are always embedded in materiality, they do not conceive of practices as a patterned activity that requires and produces materiality. Simply put, neoinstitutionalism does not treat materiality as fluxes that are formed through institutionalization and the diffusion of practices. The reason for this neglect seems to be that materiality is not conceptually derived. Instead, Friedland and Alford (1991) refer to a materialist-idealist divide when conceiving of materiality and several others refer to Scott (1995), who himself briefly refers to Marxian materialism when arguing for the material dimension. Thus materiality is acknowledged, but it has not been an object of conceptual scrutiny. Possibly due to the lack of adequate theoretical derivation, past studies have not discerned themselves with a corollary to this dichotomy: *accumulation*.

Accumulation in the literature

Accumulation, an empirically obvious part of practices, has been nearly entirely ignored in institutional theory. Since neoinstitutionalism has prioritized cognitive issues, manifested as "taken for grantedness" and "legitimacy," any train of thought that would attempt to take a deeper look at the material and its accumulative processes seems to be suppressed. According to institutional theory, human activity is able to produce nearly *any* kind of meaning for the

environment wherein it is embedded, and through reproduction, these meanings become naturalized. Thus, insofar as materiality does not change, it could be "anything" and still naturalized. This, of course, does not mean that individuals are fully malleable. It is to say, however, that when studying a stable system, materiality is not conceptually as central as it is in a dynamic system.

Nonetheless, to be precise, material stability is empirically and analytically impossible within a system of living beings (see e.g. Gunderson 2011). Not only do human practices change their environment as a result of their—even stable—practices, but all other living beings require and produce materiality as well. Nature is in constant flux (Rescher 1996). These systems might seem stable within a short period of time, but over a longer period of time they are always dynamic (see Clark and York 2005). Even the "dead material" system of our planet is not entirely stable; entropy remains valid (Burkett and Foster 2006). Materially speaking, all living forms, via their distinct practices, do the same thing as humans at the most fundamental level. They extract and consume some material, transforming it into a different form. Some, due to their size or number, end up transforming the common environment more than others. Think of the impact, for example, of beavers, termites, birds, fish, or trees on their environment.

For Marx, as he states in *The Grundrisse* (1971), the very starting point was *material* production. If practices are perceived of as patterned activity and attached meanings, it is clear that any activity requires material inputs and that the same activity produces material outputs: "nothing comes from nothing" (Foster 2000). As Schatzki put it: "Organisms and matter-energy flow through practice-arrangement nexuses regardless of whether and how labor and technology channel, shape, or capture the flows involved" (Schatzki 2010, 138). Strictly speaking, no purely cognitive practices exist (Orlikowski 2007). Accordingly, the materiality produced by practices *accumulates* if the system in which the practice is embedded does not entirely absorb this production. Since practices always require material input, sometimes the continuance of a practice drains the always-limited material needed for its reproduction.

Accumulation does not seem to be a popular concept in organizational studies apart from its use as capital or knowledge accumulation. In the relevant literature on institutional change, accumulation, when mentioned, has most typically not been used in a conceptual role (e.g.

Meyer 1982; Burawoy 2000; Jarzabkowski 2004; Ewenstein and Whyte 2007; Briscoe and Safford 2008; Erkama and Vaara 2010; Hardy and Maguire 2010; Rerup and Feldman 2011; Fenton and Langley 2011). When mentioned and used, it has most often *not* referred to the material accumulation produced by practices, but instead to capital accumulation and the accumulation of knowledge (Dorado 2005; Reay et al. 2006; Shipilow and Li 2008; Maher 2010; Chen et al. 2010; Geletkanycz and Boyd 2011; Tilcsik 2010). Elsewhere, the term has been employed as primitive accumulation or accumulation by dispossession (e.g. Kröger 2012), and is popular especially in Marxist literature.

Nonetheless, Sewell connects the reproduction of practices and accumulation, saying "[i]f schemas are to be sustained or reproduced over time . . . they must be validated by the accumulation of resources that their enactment engenders" (Sewell 1992, 13). Howard (1994) and Davidson (2007) copy this phrase almost word for word, and they also agree with the subsequent notion of Sewell (1992), that of the *unpredictability* of resource accumulation. Indeed, the main message seems to be that "resource accumulation is always unpredictable, and the meaning of resources is always ambiguous" (Howard 1994, 217). Whereas the underlying reason for this emphasis seemed to be to analytically allow for change, the notion of the unpredictability of accumulation is not in line with some central arguments in institutional theory. Instead, it explicitly argues for the endurance and reproduction of practices and thus suggests the predictability, or at least the stability, of material fluxes.

In addition to Sewell (1992), it seems that the only notions in neoinstitutionalism linking change and accumulation are those presented by Seo and Creed (2002) and Zietsma and Lawrence (2010). According to Seo and Creed, institutional change is triggered when the "accumulation of institutionally rooted inefficiencies reaches the point where decoupling the technical core from institutional practices becomes an inadequate or infeasible response," or due to "accumulated incompatibilities with other powerful institutions" (Seo and Creed 2002, 235, 236). Zietsma and Lawrence argue that those effects of conflicting actions "which accumulate over time . . . create the conditions necessary for a shift to occur" (Zietsma and Lawrence 2010, 214). The latter is a peripheral comment where accumulation does not constitute a part of conceptual development. The former is debated in the following section.

Material accumulation

Seo and Creed's (2002) central argument is that when an accumulation of inconsistencies and contradictions in and between institutional logics occurs, the arrangements and prescriptions, through the process of being reproduced, trigger change at some moment in time. Although Seo and Creed's account seems readily plausible and has frequently been cited in subsequent literature, when taking another look at it, some parts of it go against the main arguments of institutional theory. Thus, if exclusively looking at from the symbolic dimension, institutional theory tells us that through reproduction, even the most controversial issues, that of oppression and domination, are in a process of becoming a natural part of the corresponding social system (Zucker 1977; Bourdieu 1990; Golsorkhi et al. 2009). Since this process can be disrupted in various ways, the basic *process* in the purely cognitive dimension is that of naturalization, in contrast to denaturalization. This conceptual paradox can be solved (see Poole and Van de Ven 1989) by introducing cognitive and material dimensions to the process of institutionalization.

Accumulation only makes sense when talking about material issues because, in the cognitive dimension, accumulation has a different nature. In contrast to the material produced, meanings do not accumulate, but are naturalized and taken for granted (Berger and Luckmann 1966; Bourdieu 2001). Thus, the salient piece missing from Seo and Creed's (2002) argument is that they do not to differentiate between the cognitive and material dimensions related to practices. On the other hand, if contradictions do gain force, there should be another process describing its dynamics, but not institutionalization or reproduction. Especially in terms of change, changes in a material "situation" due to accumulation gain immediate importance. When the material environment qualitatively changes, stable established meanings might end up becoming problematic. If a lake, for instance, is gradually polluted, it is problematic to keep thinking of it as a pleasant swimming place, something that it had previously been.

The material accumulation produced by various industries is governed by institutional logics (Friedland and Alford 1991). Currently, ideologies of capitalism and economic growth are the dominant logics, although they are continuously being questioned. Even when they are questioned, though, the material structures hold the system easily in place. The established nature of these practices implies that the accumulation is to a certain extent predictable. The existing literature has made use of material accumulation to denote, for example, individual-

level characteristics. For instance, O'Shaughnessy and O'Shaughnessy argue that, "the hedonistic experience of material accumulation" is the core object of existence on earth (O'Shaughnessy and O'Shaughnessy 2002, 524). Material accumulation in the broader field of academic literature seems to be entwined with the type of accumulation that Marx addressed, that is, capital and knowledge accumulation. Although accumulation is at times even given a salient role, it refers "to economic development and wealth creation (i.e., accumulation)" (Imbroscio 1998, 235; see also Cohen 1997), and it is thus narrowly conceived.

Accumulative disruption

I discussed the accumulative character of practices in Chapter 3. However, only in the previous chapter did I use inductive reasoning based on empirical material as a means of focusing on the different character of material change due to accumulation with respect to institutions. Thus, I claim that the empirical analysis brought the concept of *accumulative disruption* to life. According to the empirical findings of this study, the material changes resulting from accumulation are of a different nature when compared with unpredictable events as they are conventionally conceived of: that is, as material "jolts" (see Table 10). Through empirical analysis, it became clear that the continuum of disruptions, with its cognitive and material extremes, was sufficient only for purely theoretical speculation, in which no notions of patterned or institutionalized human activity were included.

If institutional theory were to conceive of the reproduction of practices as forming the basis for material fluxes, it would be able to account for predictable material fluxes in social systems. In this context, the concept of "accumulative disruption" is an analytical device used to capture the impacts of anthropogenic material accumulation and drain. The concept of accumulative disruption implies that material change can occur without disrupting the practices that produce them. As such, excessive accumulation seems to be an inherent part of human history. This does not mean that rifts would be indispensable for human societies. For Marx, establishing reciprocal material fluxes between the town and countryside was the solution for reducing the—already then—excessive material rifts. Among other things, Marx argued that this would be the main task of the associated producers (Foster 2000).

Overall, the disruptiveness of the material changes seems to depend on the source of the material change (see Table 10). Those material changes, which are produced by established

practices, tend to be expected and naturalized and only laboriously inflict change when compared with the material changes inflicted elsewhere or accidentally. The reason for this ineffectuality, as explained in Chapter 6, is due to different issues. Accumulative changes often take place gradually over time and they might even go unnoticed if the level of material accumulation is not visible in daily life or even in the media. For example, the global rift of electronic trash generated by the First World and transferred to the Third World is not overly visible in the media (Kuper and Hojsik 2008), not to mention in the everyday life of a layperson in the First World. Other examples, such as phosphorus (Cordell et al. 2009) and nitrogen (Mancus 2007) slip from consciousness much more easily due to their invisibility as such to human eye.

Table 10 Main differences between "jolt" and accumulative disruption

"Jolt"	Accumulative disruption
- changed "course of action" and material "situation" - not expected or naturalized - change due to adaptive actions taken by those in power - effectual and adaptative	- "course of action" same, "situation" has changed - expected and naturalized - change due to denaturalization by the powerless - ineffectual and mitigative

Another reason is that the social actors who benefit from the practices hardly problematize them. Thus, those who do not benefit from the practices, that is, the powerless, typically conduct problematizations in terms of accumulative disruption. Problematizations are needed to disrupt practices because the material accumulation, in my view, gains legitimacy from the practices that produce them. However, it seems that whenever a particular aspect of impacts gains sufficient legitimacy as a problem, those in power attempt to resolve it in order to maintain their legitimacy. Since pollution as a problem has gained much legitimacy recently, even those in power within practices that generate pollution as their side products have included emission reductions in their agenda. Whether this is to increase their legitimacy (Meyer and Rowan 1977), or to really attempt to reduce their emissions, is a question of empirical investigation.

Overall, the problematizations of material accumulation seem to yield mitigative changes, that is, changes that help reduce the adverse accumulation resulting from the corresponding practice. The importance of accumulation seems to be increasing in contemporary societies. I believe that the bulk of the material change is, by nature, accumulative because it is produced

by broad, established practices. Simply put, as a result of continuous exponential growth, various aspects of human activity now take place on a global scale. Material fluxes are proliferating in our societies due to, for example, industrialization, international trade, tourism, and traffic. Besides in the environment, material fluxes also accumulate in large cities (in the form of cars, houses, waste, etc.) and in human beings themselves (increasing rates of obesity). On the other hand, material drain is an equally evident phenomenon (Foster 2000; Gunderson 2011).

Recalling the dichotomy between cognitive and material disruptions, we can draw a rather curious conclusion. According to this study, in terms of change, material accumulation and the reification of typifications should be seen as opposite "forces" through the reproduction of practices over time. Through the process of institutionalization, meanings become taken for granted, and thus the contradictions inherent in established practices also tend to be naturalized. Material accumulative, for its part, changes qualitatively the material "situation" in which practice is embedded thus opening possibilities to disrupt meanings as well. However, while the qualitative material changes resulting from material accumulation could disrupt reproduction, their disruptiveness is often reduced due to the legitimacy they gain. Hence, it is not enough to observe accumulative material changes; they have to be denaturalized and problematized in order for them to be disruptive.

The accumulative nature of institutionalization brings in another implication for broader social theory, especially for the concepts of structure and agency (e.g. Archer 1995). Insofar as established practices, that is, institutions form the social "structure" into which individuals are socialized, even though this "structure" remains stable it does not mean that the system in which it is embedded should remain stable in material terms. This is obviously a corollary from the idea that if the material fluxes that established practices beget are not fully absorbed by the environment, accumulation that qualitatively changes this environment takes place. Another direct implication is that material change needs no agency in conceptual terms, insofar as "agency" is conceived as being able to consciously break up with the "more or less obligatory ways of doing things" (Luckmann 2008, 281) or as the capability to change one's relationship with the "structure" (see Emirbayer and Mische 1998).

Limitations, practical implications, and future orientations

This dissertation is obviously a limited enterprise facing the formidable challenge of elucidating the origins of institutional change. Throughout most of the conceptual development, I have addressed a simplified scenario in which institutionalization is seen as the rather smooth process of a single practice that goes mainly undisturbed. I have avoided dealing with the complexity of the empirical realm in order to highlight and understand the basic processes. Since it has been necessary to strip down the complexity of these processes, one can always question whether the basic processes identified in this dissertation help to explain our vast and complex societies or whether they even offer "correct" insights into the way events or situations are proceeding. Whereas it is not for me to judge this, had I not believed in it, I would not have written such.

In our empirical world, practices are most often being questioned through various lenses and purposes. The image of the institutionalization process as being harmonious and running smoothly is most often false. What is naturalized and to whom it seems natural depends, among other things, on the previous experiences of the corresponding individuals. It is a question of being socialized to a different material realm, often through a different process; socialization is not a constant (Archer 2010). Whereas several hundred years ago children learned to view horses as the most natural form of transportation, today they perceive horses in a very different way. The internet is not the same for those who were born long before it was created as it is for those whose reality has been shaped by the internet from the beginning of their lives.

Thus, while I have been employing terms such as broad dispersed established practices, one cannot forget that these are simplifications that aim to extract certain aspects from the complex and rich doings and sayings of the manifold of people. In addition, as individuals reproduce practices, there are always changes due to the mere flux of people whose doings and sayings constitute them. What is more, there are no practices outside the manifold of doings and sayings, which are ultimately expressions or articulations of ways of "how things stand and are going for people in their existence" (Schatzki 1996: 22). As necessary as it is to simplify, it is also important to be aware of the simplification. Besides its theoretical limitations, I am aware as well of the empirical limitations of this dissertation.

When starting the research process, I was not familiar with the empirical case or with the context in which the processes took place. I only gradually acquired familiarity with it during the dissertation project. Nonetheless, whereas being somewhat close to the context is typically emphasized in the existing literature, I claim that my distance from the context of the case was an asset. An outsider could more "objectively" construct a narrative of the discourse free from any previous, commonly shared typifications related to it. Another limitation is that I did not have access to other data sources than Folha de São Paulo. Other large national newspapers in particular, such as the Jornal do Brasil and Estado de São Paulo, could have yielded more detailed insights. What is more, I did not use any interviews in my research. This was, however, at the outset somewhat ruled out by the chosen method: current opinions or reminiscences could not be used, as argued in Chapter 4. Whatever the case, the more than 4000 articles used in the analysis should be enough to plausibly construct a coherent image of the discourse. I would be very surprised if I have missed something central in terms of the alcohol discourse during the period in question.

It would have been both interesting and important to extend the empirical study until the present day, in particular if desiring to offer topical implications for the sector. To be sure, some essential changes took place in the alcohol program in this millennium. In particular, it would have been fascinating to scrutinize the introduction of the flex fuel car. Since it was impossible, due to the abundance of material, to conduct a deep empirical analysis of the entire story of Proálcool with the chosen methodological approach, I preferred to concentrate on the beginning of the program rather than on the later development of it. The reason for this was obvious: if the history of the program was not understood, the subsequent developments could not be understood.

In conceptual terms, to a large extent I neglected the changes of government. Even though major changes seemed to take place in combination with presidential elections, this was hardly seen in the analysis and even less in the results. However, the presidents and their governments certainly mattered to the alcohol program; from an analytical standpoint, these changes did not seem to involve any systematic changes with regard to alcohol. To a certain extent, I also neglected the development of the Brazilian economy and most of the higher-level political events. In addition to these higher-level events, as unpleasant as it was, I had to ignore various issues that could have offered more insights into the patterns that the alcohol program

took. The aim, however, was to focus only on those issues that were discussed within the alcohol discourse and the most important disruptions that occurred within it.

Lessons of Proálcool

One of the most ambitious and indisputably successful renewable energy programs, Proálcool, is arguably relevant as an attempt to change the destructive patterns of human activity. Although the program had the potential to revolutionize all of rural Brazil, and subsequently also alleviate the degenerating problems in urban Brazil, it had rather adverse effects on the problems. Only two of the four objectives of the program were achieved. The foreign currency was economized and the production of durable goods in terms of alcohol plants expanded during the program. The other two objectives, to reduce regional and individual discrepancies by concentrating on agriculture, and thus, increase the income of the poorest people, seemed to be ignored most of the time. Actually, instead of alleviating the problems, the program exacerbated these problems.

Had the miniplant solution succeeded, the patterns would most probably have been very different. Brazil could be the green miracle of the world, a sustainable economy that generates its fuel and electricity on thousands of small energy farms, which use various types of crops as raw material. These small farms would be self-sufficient in food, energy, and water and would employ their workers all year round. A national miniplant campaign would most probably have disrupted the larger level political processes that were helping cause high inequality in rural Brazil. Also, had the land reform been conducted as it was originally conceived by Tancredo Neves, there would most probably have been much less for the Landless Workers Movement (MST) and other protest movements to do and rural Brazil as well as the large cities would probably be much more peaceful and prosperous today due to lower levels of migration from the countryside into the cities (see Oliveira 2001).

Had alcohol been used as a substitute for diesel fuel as well, the result could also have been very different. Petrobras would have had fewer arguments to make against alcohol; at least the gasoline exportation argument would not have been valid. Moreover, the same kind of alcohol shortage that took place would very probably not have occurred; resolutions would have been enforced if the salient parts of the economy had depended on the availability of alcohol. Thus, had alcohol fueled trucks, buses, and agricultural machines, the type of shortage that occurred

would not have been possible. Overall, present-day Brazil could easily be entirely free from gasoline and, indeed, independent of oil by virtue of its alcohol production. Evidently, Brazil has been oil independent already since 2006; this is not due to the production of alcohol, but due, instead, to the domestic production of oil.

The empirical case demonstrated that large players not only have access to public transmission channels, but they also have access to the cabinets where the decisions are made. This was most evident in the symbiotic relationship between the Ministry of Energy and Mines and Petrobras; ministers of energy and mines later became presidents at Petrobas, and vice versa. However, solutions that are not beneficial to the dominant actors can also be blocked by overt action. Solutions can be blocked by *rational* arguments because the very rationality of the argument is defined by societal discourse, which these powerful actors heavily influence. This was the case with the miniplants and diesel fuel. Other rationalities, frames of reference, or interpretations often do not even make their way to the arena in which they are debated. For example, it was not clearly evident in the societal discourse that the alcohol producers bought the lands of the small farmers—often in violation of the law.

It seems that, in particular, higher level political practices, which in the case of Brazil were called "conservationist modernization," are very difficult to disrupt. These policies, however, control, for example, the relative prices, which, along with the continuance of practices, determine where the material fluxes (richness) are directed and accumulate. For example, the depressed prices of the basic agricultural products impeded the majority of small agricultural producers from accumulating profit (i.e. capital) and thus entering into a virtuous cycle of investment and productivity. Instead, they continued fighting for their *subsistence* and had to focus on survival rather than development (see Furtado 1967). Had the former option become a reality, the large producers would have likely faced difficulties in buying the neighboring lands of the small farmers. Most probably, the large producers would have been forced to expand to more distant regions that were still intact, thus reducing regional inequalities.

The policies that blocked price increases leaned typically on arguments addressing inflation, which is an aggregate figure that can be measured in various ways. Moreover, there is no single explanation for why and how inflation takes place at the aggregate level of society, so causality can be explained in numerous ways—all of which might be coherent in logical terms (Bresser-Pereira 1990). The established explanation that was held by the Ministry of Finance

seemed to be based on beliefs such as "inflation follows increases in the prices of commodites, including basic agricultural products" and "the best way to enhance productivity is to offer subsidized credit." As long as these types of beliefs are valid and unquestioned, it is difficult to disrupt the corresponding policies.[14]

These beliefs contradict other beliefs, such as those held by Ignácio Rangel (1979) or Joelmir Beting, who argued that productivity or increases in absolute agricultural production would not be attained by subsidized credit. Accordingly, rural credit in Brazil reached at most one-fifth of the farmers, who then used the credit to buy up the lands in their neighborhoods rather than invest it in their own production processes because the prices were too low to incentivize the latter. Instead of being founded on empirical observations, these types of beliefs are based on theoretical models, which for their part are based on theorization that is grounded in empirical investigations done elsewhere and at different times (see Furtado 1967). Often these beliefs are based on untenable assumptions about social reality, that is, that there are absolute laws in the social world.

To change these beliefs, one cannot solely lean on empirical observations, since these beliefs and the outcomes of the actual practices do not have a one-to-one causal relation (Friedland and Alford 1991). In other words, the knowledge inherent in these beliefs is detached to a considerable degree from action. Thus, these models are based on a de-pragmatized knowledge, which is constructed over time in the provinces of special knowledge (Schütz and Luckmann 1973). In the following section, I elaborate upon these notions with respect to contemporary societies as a way of concluding the dissertation.

De-pragmatized societies

Accumulation seems to be very salient both in light of the present findings as well as contemporary social reality, where the ongoing destruction of our planet as a result of established practices seems to be very much naturalized, even while continuously being contested. Through "progress," societies have become increasingly specialized so that the share of specialized knowledge has increased to a point where everyone is dependent upon it; one can hardly survive with only a general knowledge without the help of the specialists. Individuals in the First World depend on special knowledge in even the most basic issues of

[14] Obviously, policies depend on manifold of issues, especially the land policies (see Oliveira 2001)

life, for example food and shelter. An increasing part of this ever-more-important specialized knowledge seems to be based on intellectual labor that is detached from "the necessities of its use in concrete situations" (Schütz and Luckmann 1973, 303). This is not to say that all special knowledge would be de-pragmatized, but that abstractions and "pure theory" are being constructed at an increasing speed, not least in terms of virtual worlds.

Yet, instead of fragmenting societies, this specialization seems to *homogenize* them because the "applications" of special knowledge are routinely transmitted to "everyone." According to Schütz and Luckmann (1973), these "applications" and the "consequences" of special knowledge are taking hold more and more deeply in people's daily lives—an observation that was made long before our "internet age." It seems clear that this type of knowledge has and is gaining more room due to the proliferation of mass information channels, including the internet. Consequently, as general knowledge increasingly entails "applications" of abstract special knowledge, general knowledge itself becomes de-pragmatized. Although "everyone" is some kind of specialist, there is all the time more special knowledge being produced in terms of which more and more individuals are laymen.

Put differently, through the proliferation of mass media, the share of knowledge that is "self-made" continuously decreases in our ever more virtual societies. The share of knowledge, which previously did not have any link with the practices of individuals' daily lives, is rapidly increasing and has become a part of their reality. This is easily seen in technology. We do not have the slightest idea what is inside most of the devices we use. This pattern applies also to the social sciences. For instance, we base our beliefs about the economy and its growth (which previously did not play much of a role in the daily life of an individual) on the results of typically complex economic models; most people are totally unaware of the dynamics, assumptions, and inputs of these models.

This has a fundamental corollary. As discussed in this dissertation, as long as their knowledge "works," individuals take its validity for granted (Schütz 1962). If a problem appears that cannot be solved in terms of the knowledge at hand, its validity can be questioned (Berger and Luckmann 1966). In the case of knowledge based on natural science, this is easy: if a technological device does not work, we might question the validity of the knowledge that was used to construct it. In the case of de-pragmatized knowledge, things become trickier. When knowledge is de-pragmatized, it is impossible to "judge" its validity based on practical

situations. There *cannot* be a problem in practical situations that would appear to disrupt the validity of this de-pragmatized knowledge. The only way to question the validity of the "applications" or "consequences" of abstract knowledge is to possess theoretical knowledge about the ways how this knowledge is derived.

This differs from general knowledge in the past, which was most often rooted in the practical questions of life. Thus, as long as the "applications" of specialized knowledge are presented to the average layperson without evident contradictions, they have to take them as given. As societies are ever more steered, for example, by economic issues, for which knowledge is de-pragmatized to a considerable degree, individuals become less aware of the circumstances and obligations that are not normally visible in their everyday understandings but within which their life is conducted. Although the task of changing our realities in a direction in which the majority of people would be less unaware of their knowledge is difficult, it is not impossible. Certainly, specialists and activists in different sectors do protest, problematize, question, and criticize that which has slipped out of the reach of general consciousness, such as has been taking place in parts of the global food system (see Wright and Middendorf 2008).

However, I believe that is it increasingly difficult to disrupt general knowledge for two main reasons. The first reason is the above-mentioned observation that general knowledge is de-pragmatized. The second reason is that those situations where individuals could confront and question the validity of the meaning-structures and relevancies that reside in general knowledge are close to becoming extinct in our mobile societies. Television and other information tubes are ever more ubiquitous, thus reducing the time and space of individuals to *reflect* for themselves. To put it differently, there are all the time more distractions that impede individuals from confronting the contents of their subjective stocks of knowledge. Confrontational perturbation does not take place. The only way to change this general knowledge thus seems to be to change the special knowledge, which this dissertation makes an attempt to do.

Change in de-pragmatized society

Let us consider the possibility of change in our contemporary context, where change is indispensable. At least it is indispensable if the ongoing destruction (of the diversity of both humans and other species) of our planet due to global human practices is seen as an

undesirable issue (Moghaddam 2006; Crist 2007; Hanski 2008). Indeed, the scale of human practices and population has expanded exponentially during the last few centuries. In particular, the use of energy has reached a scale where it endangers whole ecosystems and is changing the climate of the planet. Scholars typically argue that "this cycle of economic advancement and environmental degradation does not continue indefinitely," but that once the "material accumulation ceases to bring commensurate returns," the practices simply become obsolete and change (Cohen 1997, 111).

This research suggests the contrary. Whereas human practices qualitatively change the system in which they are embedded, that is, the climate, flora, and fauna of the planet, these changes come in the form of *accumulation*. This is to say that change is produced by established practices, such as industrialization, economic growth, and capitalism. Those who have benefited from these practices have gained dominant positions in our contemporary societies and their discourses. Although it should be clear that the relative benefits decrease when moving from "poverty" to "material wellbeing" and from "material wellbeing" to "material richness", everlasting growth still seems to be relevant to the majority of people who receive their general knowledge from various types of media. According to Schütz and Luckmann, "only if there appear explicit, socially relevant motives for the removal of this knowledge from the social stock of knowledge, and if they prevail vis-à-vis the 'Establishment', if a 'reform' or 'revolution' takes place, does not knowledge disappear from what is routinely passed on" (Schütz and Luckmann 1973, 297-298).

In light of past occurrences, these relevant motives hardly arise from material changes, no matter how large they are. Obviously, shocks or jolts of any type, whether human made or not, can disrupt our chosen path. But, insofar as the explanations offered by the "Establishment" for these jolts remain the most legitimate, only adaptative changes will be evoked. In other words, as long as the "Establishment" has the power to interpret jolts, disrupting and reversing the reproduction of practices through a jolt and shifting them to a genuinely sustainable direction does not seem probable from the current perspective. Similar conclusions have to be made with regard to those changes that are, by nature, accumulative. However, accumulative material changes, as discussed, seem to trigger mitigative changes in established practices, thus steering changes typically to a more sustainable direction. Yet, before attempting to problematize established practices based on these changes, they first

have to be denaturalized.

Social sciences that attempt to find laws based on the patterns of human activities seem to effectively legitimize these types of material changes. If it is argued that there are absolute laws governing human patterns, regardless of whether the patterns produce something adverse, for example in terms of the environment, then the laws *should* remain as they are precisely because they have been observed, analyzed, and theorized as laws based on empirical reality. This type of "socio-natural science," of course, is not the only option when conducting social scientific research. Another issue involves attempting to make visible and unmask naturalized human activities and the material changes they produce. From the institutional perspective, such unmasking can be seen as a struggle against the process of institutionalization.

This is a fight not only against the naturalized oppression and domination inherent in established practices, but also a fight against the naturalization of the material changes that these practices produce. As ever more de-pragmatized specialized knowledge is produced from which "consequences" and "applications" percolate and become general knowledge, it seems that change needs ever more effort to unmask the nature of this knowledge. With regard to changing our societies into a more sustainable direction, nothing is more important than to be able to pass knowledge of both of these to "everyone". In other words, the knowledge of the de-pragmatized knowledge inherent in activities within our societies and of the various material rifts that these activities produce should be routinely transmitted via general knowledge. Simply put, if we all come to know—become conscious of—*what* we are doing and *why*, we would stop doing it, or at least crucially change some of our habits.

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