# Strategic Decision Making under Uncertainty and Equivocality

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# Abstract

Firms frequently face unfavorable institutional environments that either exert institutional pressures limiting their decision making and behavior, or hold institutional voids that require them to compensate for immature or missing institutions. In both cases, the resulting question is how firms can respond to such environments by either mitigating institutional pressures or by working around and filling institutional voids. Based on a thorough review, structuration, and analysis of the academic literature in management and related fields, the thesis provides a overview on organizational responses to institutional pressures and institutional voids. Furthermore, enabling conditions as well as limitations to the application of these responses are discussed, and several research questions and areas offering promising avenues for future academic investigations are identified.

Challenges resulting from institutional voids are particularly frequent and severe in emerging markets settings. In such contexts, firms are particularly challenged by uncertainty and equivocality in their long-term oriented decision making. Based on organizational information processing theory (OIPT), the thesis analyzes how widely applied decision theories, organizational as well as procedural approaches contribute to coping with uncertainty and equivocality in emerging markets from a decision-making perspective. Subsequently, the potential of future-oriented Delphi studies to serve as an information processing and decision-making aid is discussed and demonstrated by reference to four case studies in different industries and emerging markets.

In a next step, an expert Delphi and scenario approach is applied to the Russian truck industry in order to support the information processing and decision-making processes of a Western European truck manufacturer considering a joint venture approach in this demanding emerging market environment.

Finally, in order to address frequent critique and doubts concerning the Delphi methodology's judgmental and forecasting accuracy, the thesis investigates how different cognitive biases affect panelists' initial estimates as well as subsequent Delphi iterations. Moreover, the thesis discusses how thoroughly adapting specific Delphi design features may mitigate the unfavorable impacts of these cognitive biases.

# Zusammenfassung

Unternehmen sind häufig mit ungünstigen institutionellen Gegebenheiten konfrontiert. Dabei handelt es sich entweder um institutionelle Zwänge, die unternehmerische Entscheidungen und Aktivitäten limitieren, oder um institutionelle „Lücken“, d.h. unterentwickelte oder gänzlich fehlende Institutionen, die seitens der Unternehmen ausgeglichen werden müssen. In beiden Fällen ergibt sich die Frage, inwiefern Unternehmen auf solche äußeren Gegebenheiten reagieren können, in dem sie institutionelle Zwänge abschwächen und institutionelle Lücken umgehen oder füllen. Auf Basis einer gründlichen Analyse und Strukturierung der akademischen Literatur im Bereich des Managements und angrenzenden Fachgebieten bietet die vorliegende Dissertation einen fokussierten Überblick zu unternehmensseitigen Reaktionen auf institutionelle Zwänge und institutionelle Lücken. Des Weiteren werden zu diesen Reaktionen Umstände und Anwendungsgrenzen diskutiert sowie verschiedene Forschungsfragen und -felder identifiziert, welche für weiterführende akademische Untersuchungen vielversprechend erscheinen.

Institutionelle Lücken sind in Schwellenländern eine besonders häufige und schwerwiegende Herausforderung. In diesen Ländern sind strategische Entscheidungen vor dem Hintergrund tiefgreifender Unsicherheit und Ambiguität zu treffen. Im Kontext der „organizational information processing theory” (OIPT) analysiert die Dissertation, inwieweit etablierte Entscheidungstheorien, organisatorische und prozedurale Ansätze einen Beitrag zum Umgang mit Unsicherheit und Ambiguität in Schwellenländern leisten können. Anschließend wird das Potential zukunftsorientierter Delphi-Studien als Informationsverarbeitungs- und Entscheidungsunterstützungs-Methodik diskutiert und anhand von Fallbeispielen aus verschiedenen Branchen und Schwellenländern demonstriert.

Im nächsten Schritt wird ein Experten-basierter Delphi-Szenario-Ansatz auf die russische Nutzfahrzeug-Branche angewendet, um die Informationsverarbeitungs- und Entscheidungs-Prozesse eines westeuropäischen Herstellers zu unterstützen, der in diesem herausfordernden Markt die Gründung eines Joint-Ventures in Erwägung zieht. Abschließend adressiert die Dissertation Zweifel und Kritik, die häufig in Zusammenhang mit der Evaluierungs- und Vorhersage-Genauigkeit von Delphi-Studien auftreten. Dazu wird untersucht, wie verschiedene kognitive Dissonanzen die Einschätzungen von Delphi-Teilnehmern beeinträchtigen können und wie diese unerwünschten Beeinträchtigungen durch spezifische Delphi-Designs abgeschwächt werden können.

# Paper overview

**Paper 1**

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|---|---|
| Title: | Organizational responses to institutional pressures and institutional voids |
| Authors: | Jens Winkler, Roger Moser |
| Status: | submitted to International Journal of Management Reviews |

**Paper 2**

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|---|---|
| Title: | Decision Making in Emerging Markets: The Delphi Approach's Contribution to Coping with Uncertainty and Equivocality |
| Authors: | Jens Winkler, Christian Paul Jian-Wei Kuklinski, Roger Moser |
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**Paper 3**

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|---|---|
| Title: | Coping with strategic uncertainty: Framework development for joint venture decisions abroad – The case of the truck industry in Russia |
| Authors: | Jens Winkler, Roger Moser |
| Status: | submitted to International Journal of Forecasting |

**Paper 4**

| | |
|---|---|
| Title: | Biases in future-oriented Delphi studies: A cognitive perspective |
| Author: | Jens Winkler |
| Status: | submitted to the 2015 Annual Meeting of the Decision Sciences Institute |

# 1 Introduction

Organizations and institutions coexist against the background of multifaceted interdependencies and interactions. Taking an organization's perspective, this becomes obvious as organizations of all kind, size and origin are substantially impacted by a broad set of institutions. On the one hand, firms rely on the presence and functioning of institutions for concerns as diverse and important as information gathering, market regulation, and contract enforcement (Khanna et al., 2010). On the other hand, social, economic, and political institutions exert substantial constraints on a firm's behavior (Peng et al., 2009).

In general, firms may face one out of three generic kinds of institutional environments: institutional pressures, institutional voids, or favorable institutional setups where firms neither suffer severe institutional pressures nor substantial voids. Institutional pressures are the most common environment in developed markets with established institutional structures. Institutional pressures are defined as unfavorable influences on organizations – either coercive, normative or cognitive (Heugens and Lander, 2009) – that are exerted by institutions and that limit the choice of organizations concerning their structure and conduct.

In the face of institutional pressures, the question resulting for practitioners and academics alike is which opportunities organizations have at hand to beneficially position themselves and efficiently respond to institutional pressures. The first part of this thesis addresses this question by systematically analyzing institutional theory and the development of major concepts in the recent literature. The analysis focuses on management literature but also accounts for relevant contributions from the fields of economics, entrepreneurship, sociology, and politics as scholars from these fields have made major contributions to the institutional literature that is relevant for the focus of this thesis.

In this research context, the first part of this thesis elaborates on distinct passive, reactive and proactive strategies which firms can apply in order to cope with institutional pressures. It further elaborates on recent developments regarding such strategies including enabling conditions, limitations to their application and critique offered by academics. By referring to concepts like organizational fields (DiMaggio and Powell, 1983), institutional multiplicity (Scott, 1987) and embedded agency (Holm 1995, Seo and Creed 2002), organizational responses such as passive

acquiescence or proactive strategies like institutional entrepreneurship, political strategies and discursive approaches are discussed.

Although the first significant contributions to institutional theory date back as far as to Selznick (1948), there is still massive interest and potential for further research in institutional theory in a variety of fields (e.g. Henisz and Swaminathan, 2008; Suddaby et al., 2010). Some recent contributions to institutional theory show an impressive 'degree of diversity, in levels of analyses, empirical contexts, and methodological approaches' (Suddaby et al., 2010: 1235). Since Oliver's (1991) seminal article on organizational responses to institutional pressures, literature has further developed several institutional constructs and organizational responses.

Institutions may of course not generally be regarded as something evil. Firms do not only suffer institutional pressures but also heavily rely on institutions, their proper functioning and the services they provide. Institutional theory underlines the fundamental importance of institutions and emphasizes that firms' strategic choices are not only a result of a firm's resources – as proposed by the resource-based view (Barney, 1991) – and competition-centered industry characteristics – as stipulated by the market-based view (Porter, 1980) – but as well impacted by the institutional framework governing the environment a firm is operating in (Peng, 2002; Gao et al., 2010; Peng et al., 2008, 2009).

By "defining the boundaries of what is legitimate" (Peng et al., 2009, p. 66) institutions – as "the rules of the game" in a society or economy (North, 1990) – provide information about the likely behavior of business partners and other relevant actors (Meyer et al., 2009). Consequently, information asymmetries as a major source of market failure are reduced (Arrow, 1971). Institutions also provide stability, which in turn reduces uncertainty, renders the long-term environment predictable (Fedderke and Luiz, 2008), and facilitates transactions as well as investments (Scheela and Jittrapanum, 2012; Meyer, 2001; Meyer et al., 2009). Accordingly, the reduction of uncertainty is uniformly seen as the key purpose of institutions (e.g. Beyer and Fening, 2012; Peng et al., 2009).

This institutional perspective largely contributes to explaining the special characteristics of emerging economies as their institutional frameworks substantially differ from that of developed countries (Peng and Heath, 1996). Emerging economies are usually characterized by severe institutional voids, i.e. immature or completely missing institutions (Khanna et al., 2010). When institutions are not completely developed, they are not able to deploy their full uncertainty-reducing potential as

stipulated by institutional theory. Again, the question arises how firms can respond to institutional voids, or even actively contribute to the development and long-term establishment of favorable institutions. The first part of the thesis also addresses this question by discussing strategies that firms can apply in order to work around or fill institutional voids.

The second part of the thesis takes up the focus on emerging markets introduced during the end of the first part and digs deeper into the specific challenges firms and decision makers face in these specials markets with their demanding institutional and informational characteristics. Emerging markets offer enormous business potential across industries but also very distinct institutional contexts. This unique institutional environment needs to be well understood when planning, evaluating, implementing and expanding business operations in these markets (Khanna and Palepu, 1997; Khanna et al., 2005). Organizational information processing theory stipulates that managers' information level influences decision making effectiveness and, as a result, firm performance (Galbraith, 1974; Tushman and Nadler, 1978). According to Daft and Lengel (1986), decision makers are challenged by two major information contingencies. First, uncertainty, defined as a lack of information, which may occur in different environmental domains and refer to various stakeholder activities (e.g. regulations of the government or competitors' strategic moves). Second, equivocality, or ambiguity, defined as the lack of clarity of available information. In equivocal situations, multiple potential interpretations of the information at hand conflict with each other. Hence, their implications (e.g. for the focal industry or firm) remain unclear (Daft and Macintosh, 1981). Institutional voids and frequent changes in the institutional environment of emerging markets such as political shifts and evolving market conditions challenge managers in their decision making through both uncertainty about which changes might occur and equivocality about how to interpret changes in order to anticipate relevant consequences and interrelations at an early stage (Kuklinski et al., 2012).

The more adequate the information needs of decision makers are met, the better the effectiveness of their decision outcomes (Galbraith, 1974; Tushman and Nadler, 1978). The information processing requirements of firms in emerging markets are mainly exogenously predetermined due to the dynamic institutional context. Hence, firms have little choice but to adapt their information processing capacities in order to manage the information contingencies.

Yet, predominant decision theories direct little attention towards the question of how to actively cope with such information contingencies. As of today, managers can draw on little guidance how to balance limited information processing capacities with high information processing requirements. Thus, the second part of the thesis focuses thus on the information acquisition during decision-making processes, i.e. the phase of information gathering. Based on organizational information processing theory, the second part of the thesis elaborates on the potential of Delphi studies as an information gathering aid in emerging markets. It is stipulated that in the particular context addressed in this thesis future-oriented Delphi studies offer valuable support for the information gathering efforts of managers (Hartman et al., 1995). Properly employed Delphi studies can serve as a promising information gathering aid and enhance the decision making effectiveness in emerging market settings.

After outlining key characteristics of emerging markets as well as the resulting decision-making challenges and theories, the second part of the thesis provides a three-fold contribution. First, it provides a comprehensive overview of potential approaches to cope with the decision making challenges in emerging markets; specifically, it evaluates each approach's potential contribution to reducing uncertainty and equivocality. Second, it elaborates on the applicability of the Delphi-based approach in the context of organizational information processing theory. Third, it demonstrates the flexibility and appropriateness of the Delphi-based approach in different country and industry contexts through four case examples.

Having demonstrated the appropriateness and flexibility of the Delphi approach as an information gathering and decision support approach for emerging market settings in the second part of the thesis the third part applies this approach to the truck industry in Russia. As shown by institutional theory, Western firms cannot easily transfer their business models, structures and processes to emerging markets such as Russia as these have their own specific characteristics and “rules of the game” (North, 1990; Khanna and Palepu, 1997; Williamson, 2010). Among the most prevalent characteristics are immature institutions, underdeveloped factor and product markets, and an extraordinarily rapid pace of social developments (Hoskisson et al., 2000; Khanna et al., 2005). Facing these special conditions, managers experience substantial uncertainty concerning the future development of an emerging market’s institutional context.

Following organizational information processing theory’s tenet that information collection and processing serve as an approach to cope with uncertainty, a decision

framework that focuses on and appropriately structures the most relevant information for a pending joint venture (JV) decision in the Russian truck industry is developed in the third part of the thesis. The decision framework comprises the impact of regulatory changes, the development of the industry value chain (e.g. the supplier landscape), the emergence of new market segments, and the development of strategic groups including potential JV partners.

The applicability of the dedicated decision framework is demonstrated by applying a comprehensive Delphi study that serves the information demand of decision makers in the context of their JV deliberations. This includes an online real-time Delphi study executed in 2013 with a heterogeneous panel of 33 experts evaluating the probability, impact, and desirability of 20 projections each of which depicts a specific uncertain and relevant aspect for joint venture decisions in the context of the Russian truck industry. The quantitative and qualitative results of the Delphi along with the subsequent scenario analysis allow for a profound understanding of the Russian truck industry's likely development until 2025 and its underlying drivers. Following organizational information processing theory, the decision framework as well as the Delphi study represent helpful means to cope with the prevalent uncertainty and equivocality as well as the consequential information requirements.

The basic research questions addressed in this part of the dissertation include the development of a decision making framework for a joint venture decision and how the decision-relevant information can be gathered and processed. The large number of academic papers addressing the relationship between successful strategies and future-oriented questions in emerging markets (e.g. Gnatzy and Moser, 2012; Elliott et al., 2010) indicates the high relevance of such research. Strategic foresight is particularly important for firms with long product life cycles like in the automobile industry (Rothenberg and Ettlie, 2011). The research within this thesis describes likely developments in the macro- and micro-environment that are relevant for JV considerations. The research process and results create a profound understanding of relevant industry dynamics and directly feed into strategic decision making, thereby paving the way for sustainable market success and superior firm performance.

Although it is an industry of global significance and a major economic contributor in many countries including BRIC as well as NAFTA, the EU, and Japan, the truck industry has been widely neglected by management research so far. Hence, concerning country/industry focus the thesis add to very scarce scientific research and follow Baur et al.'s (2012) recommendation to focus automotive research on certain markets as it is

difficult to derive global implications. Furthermore, there is so far no decision making framework supporting a JV decision in the truck industry.

The chosen methodology is deemed particularly appropriate for the research context as precise analytical data processing techniques are not applicable (Melnyk et al., 2009; Donohoe and Needham, 2009; Ziglio, 1996) and trend extrapolation would be inadequate (Linstone and Turoff, 1975). Qualitative, expert-based approaches are the preferred key to the relevant information needed for strategic decisions. In emerging markets information collection and knowledge must be built on informed opinion and subjective expert judgments as well as experience-based interpretations (Yang et al., 2012; Melnyk et al., 2009; Pill, 1971; Linstone and Turoff, 1975). Pill concludes that "under conditions of uncertainty with insufficient data, incomplete theory, and a high order of complexity" (p. 61) the only valid solution is to "obtain the relevant intuitive insights of experts and then use their judgments as systematically as possible" (p. 61). As this is exactly what Delphi does, it is highly valuable in these situations of uncertainty and equivocality, and has continuously been used for future research and long-range forecasting (Yang et al., 2012; Nielsen and Thangadurai, 2007; Amos and Pearse, 2008).

Moreover, Delphi avoids the disadvantageous social, psychological, and power effects of direct confrontation (Rowe et al., 1991; Graefe and Armstrong, 2011; Klenk and Hickey, 2011) encountered by alternative expert-based methodologies, e.g. biases induced by dominant personalities (Landeta and Barrutia, 2011), panelists from higher hierarchy level or social status ("halo effect") (Tersine and Riggs, 1976; Landeta and Barrutia, 2011), majority ("groupthink effect", "bandwagon effect") (Rowe and Wright, 1999; Linstone and Turoff, 1975; Tersine and Riggs, 1976; Geist, 2010), or oratorical ability (Landeta and Barrutia, 2011).

Although Delphi studies have been used for decades in a variety of fields and methodological variations, regularly deliver accurate and valuable results (e.g. Holmes et al., 2002; Parente and Anderson-Parente, 2011) and still enjoy unabated interest as indicated by recent applications (Wester and Borders, 2014; Álvarez et al., 2014) and design considerations (e.g. Förster and von der Gracht, 2014; Gallego and Bueno, 2014), they have also continuously been subject to critique and doubt.

The major concern of practitioners and academics is Delphi's judgmental and forecasting accuracy (Shanshan et al., 2014; Parente and Anderson-Parente, 2011; Fildes and Goodwin, 2007). Researchers investigating the impact of different design features, e.g. statistical vs. argumentative feedback, on Delphi results' accuracy found

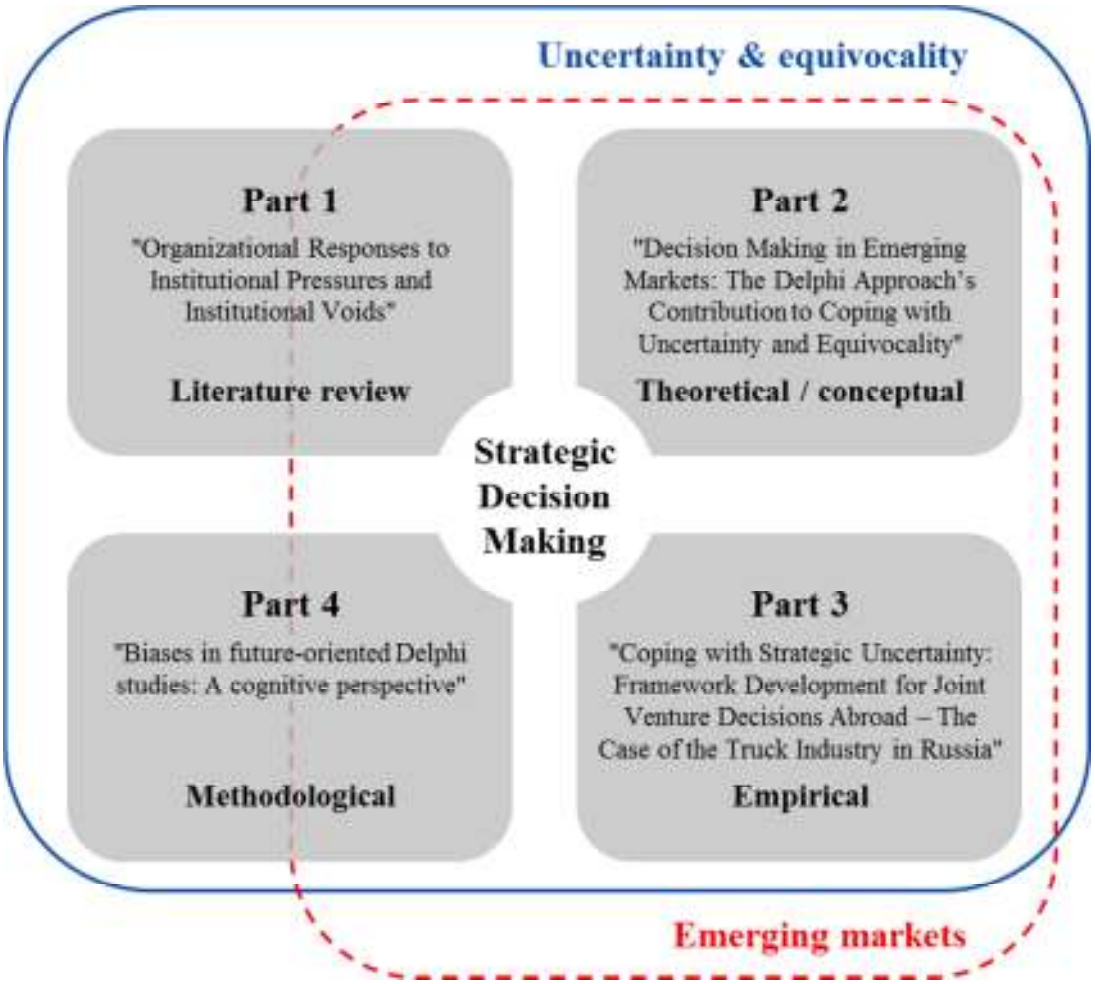
contradictory results (e.g. Rowe et al., 2005; Rowe and Wright, 1996). However, these studies frequently do not apply a strong cognitive perspective on Delphi processes, i.e. they do not link the design choices to cognitive processes and biases they may cause or mitigate. Delphi's accuracy depends on i) how researchers use (or abuse) their high degree of discretion in terms of study design and execution (Rowe and Wright, 1999; Story et al., 2001), and ii) to which extent several cognitive biases take effect at different stages of the process; the latter being to a large part dependent on the former. The fourth part of the thesis aims at a methodological contribution addressing these issues by applying a cognitive perspective on the Delphi methodology.

The fourth part of the thesis is therefore focused on four cognitive biases encountered by Delphi participants that seem to be the most frequent and most impactful in Delphi applications, namely framing and anchoring, the desirability bias, the bandwagon effect, and belief perseverance. The analysis – that is structured along the typical process steps of a Delphi study – focuses on participants' cognitive biases, i.e. it does not address other issues such as sampling biases that have been studied elsewhere (e.g. Okoli and Pawlowski, 2004; Rowe and Wright, 1999). Thus, the thesis focuses on Delphi's main application, i.e. expert-based judgment and/or forecasting tasks that incorporate a high degree of uncertainty. Researchers applying Delphi to other study contexts might encounter different cognitive biases.

By combining literature on Delphi research and the fields of cognition and psychology the fourth part of the thesis aims at making a methodological contribution that is of value for both academics and practitioners applying Delphi studies in a variety of contexts by a) discussing different cognitive biases and their modes of operation during Delphi applications, b) elaborating on the impact of certain design choices on the prevalence of cognitive biases in Delphi processes and c) developing design recommendations that aim to mitigate or avoid the negative effects of cognitive biases and work towards increasing Delphi accuracy.

Overall the thesis makes a substantial and multifaceted contribution as it organizes the literature on organizational responses to institutional pressures and voids, develops theory in the field of decision making under uncertainty further, empirically applies a Delphi approach to a relevant but under-researched industry in a demanding emerging markets setup and provides a methodological analysis referring to cognitive biases within Delphi-based decision making. Figure 1 illustrates the contributing parts which all deal with a distinct challenge for strategic decision making under uncertainty and equivocality.

**Figure 1:** The four parts of the thesis and their respective context.

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# 2 Organizational responses to institutional pressures and institutional voids

## Abstract

Organizations frequently face unfavorable institutional environments that either exert institutional pressures limiting their decision making and behavior, or hold institutional voids that require them to compensate for immature or missing institutions. In both cases, the resulting question is how organizations can respond to such environments by either mitigating institutional pressures or by working around and filling institutional voids. Based on a thorough review, structuration, and analysis of the literature in management and related fields, we try to provide a comprehensive overview on organizational responses to institutional pressures and institutional voids. We discuss enabling conditions as well as limitations to their application, and identify several research questions and areas offering promising avenues for future work as they are not yet fully captured in recent institutional research.

## Key words

institutions, institutional theory, institutional pressures, institutional voids, paradox of embedded agency

## 2.1 Introduction

Organizations of all kind, size and origin are substantially impacted by a broad set of institutions. On the one hand, firms rely on the presence and functioning of institutions for concerns as diverse and important as information gathering, market regulation, and contract enforcement (Khanna et al., 2010). On the other hand, social, economic, and political institutions exert substantial constraints on the behavior of organizations (Peng et al., 2009). The questions resulting for practitioners and academics alike are which opportunities organizations have at hand to beneficially position themselves in the face of institutional pressures, and how to cope with missing or immature institutions, i.e. institutional voids. We try to address these questions by systematically analyzing institutional theory and the development of its major concepts in the recent academic literature. We focus on management literature but account for relevant contributions from the fields of economics, entrepreneurship, sociology, and politics as scholars from these fields have made major contributions to the institutional literature relevant for our research focus.

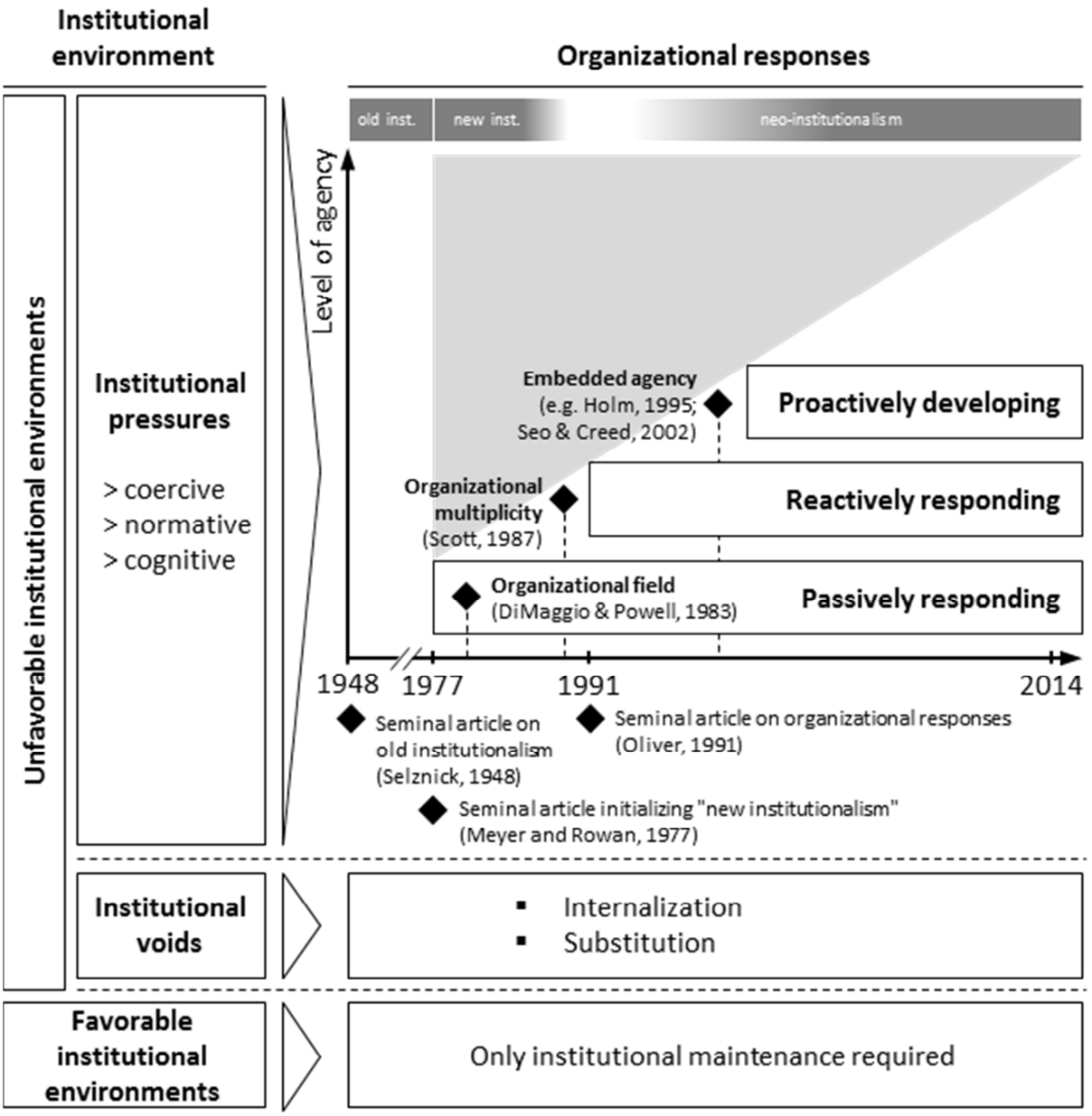
Although the first significant contributions to institutional theory date back as far as to Selznick (1948), there is still massive interest and potential for further research in institutional theory in a variety of fields (e.g. Henisz and Swaminathan, 2008; Suddaby et al., 2010).

To structure our analysis we distinguish three generic kinds of institutional environments that organizations can face: First, environments that exert institutional pressures on organizations. We define *institutional pressures* as unfavorable influences on organizations that are exerted by institutions and limit the choice of organizations concerning their structures and conduct. Second, institutional voids that are characterized by immature or completely missing institutions. Third, favorable institutional environments that match organizational demands. As the latter do not require any distinct organizational response, they are not in the focus of this paper.

Figure 2 represents the focus and key concepts of our paper. With regard to institutional pressures, we discuss organizational responses in order of increased level of agency. We thereby account for the time of introduction of these responses and their representation during the development of institutional theory from 1977 until today (2014). Following the introduction of key concepts like organizational multiplicity and embedded agency, researched organizational responses to institutional pressures increased in their level of agency over time. While passive responses may still be

appropriate today, proactive responses did not enjoy a considerable representation on new institutionalists' agenda in the 1970s and 1980s. Since Oliver's (1991) seminal article on organizational responses to institutional pressures, literature has further developed several institutional constructs and organizational responses, as our analysis will show.

**Figure 2:** Research focus and key concepts.




Our analysis is guided by the following two research questions: First, how can organizations deal with institutional pressures? In this research context, we elaborate

on distinct passive, reactive and proactive strategies which firms can apply in order to cope with institutional pressures. We elaborate on recent developments regarding such strategies including enabling conditions, limitations to their application and critique offered by academics. Second, how can organizations deal with institutional voids, i.e. immature or missing institutions? In the context of institutionally less developed markets, e.g. emerging and transition economies, firms cannot rely on institutional landscapes that are as mature as in Western economies. We discuss strategies that firms can apply order to work around or fill institutional voids. By addressing these two major questions, we hope to provide a valuable overview on recent developments in institutional theory, particularly on recent contributions to the 'nascent literature' (Doshi et al., 2013: 1211) that examines heterogeneous responses to institutional pressures and institutional voids and offer a structured analysis of promising future avenues to further progress with institutional theory. Our contribution is also expected to be of relevance to practitioners managing organizations in the face of unfavorable institutional setups, as well as to policy makers engaged in the development of institutions and interacting with affected organizations.

## 2.2 Study scope and process

In this paper we follow North's (1990) definition of institutions as 'the rules of the game' (p. 3) in a society or economy, i.e. prescriptions of appropriate conduct (Greenwood et al., 2013), that may be of cognitive, normative, or regulative nature (Scott, 1995). In order not to exclude any relevant contribution, we apply a rather broad definition of institutions that accounts for an organization's entire institutional environment, including political institutions such as regulations, economic institutions such as market structures, and socio-cultural institutions such as informal norms (Henisz and Delios, 2002), as well as their respective enforcement mechanisms (Ingram and Clay, 2000). In accordance to DiMaggio and Powell (1991), we distinguish between *old institutionalism* that focused on power and dates back as far as to Selznick (1948), the legitimacy-focused *new institutionalism* that was initialized by Meyer and Rowan (1977), and *neo-institutionalism* that tries to bridge the other two schools (e.g. Greenwood and Hinings, 1996). We follow Collins' (2013) definition of *organizations* as 'groups of all types, whether they are social groups, coalitions, or corporations, structured to pursue some collective purpose' (p. 527). Although this paper focuses on corporations, the broad definition eases integrating studies from other fields.

Our analysis of the institutional literature focusing on potential organizational responses to institutional pressures and voids started with recent articles from well-respected journals from the fields of general management, strategy, organizations, and international business. Specifically, we focused on articles published in AMJ, AMR, ASQ, JIBS, JoM, Org Sci, Org Stu, and SMJ. Articles were preselected by their title and abstract. As reviewing the long and rich history of institutional theory in its entirety is beyond the scope of a single paper, we focused our initial search on research published during the last 10 years, i.e. in 2005 and later.

In addition, we screened academic databases as well as the reference lists of the already identified papers to account for the most relevant studies from the pre-2005 years, and from other outlets, including those from related fields such as economics, entrepreneurship, sociology, and politics. Finally, more than 150 papers on the key concepts of institutional theory and the response opportunities of organizations were identified and analyzed. We supplemented these journal articles with several impactful books and book chapters that are widely cited within the institutional literature. Throughout the process, we reviewed the context of each piece of literature in detail in order to determine its contribution to the specific research questions addressed in this paper.

## 2.3 Institutional concepts and corresponding responses

### 2.3.1 Passively responding within one organizational field

DiMaggio and Powell (1983) introduced the notion of the 'organizational field,' which later constituted a central concept of institutional theory (Wooten and Hoffman, 2013) and the 'primary arena' (Heugens and Lander, 2009: 62) used to conceptually and empirically research organizational responses to institutional pressures (Oliver, 1991). Originally defined as 'sets of organizations that, in the aggregate, constitute an area of institutional life; key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services or products' (DiMaggio and Powell, 1983: 148f.), organizational fields are the major level at which institutional impacts shape organizational behavior (Pache and Santos, 2010). Scott (1995) further added that organizations within an organizational field interact more directly and repeatedly with each other than with actors outside the field and share collective beliefs and meaning systems. New institutionalists frequently conceptualized organizational fields as being single and unitary (Meyer and Rowan, 1977; DiMaggio

and Powell, 1983). Accordingly, each organization within an organizational field was influenced by the same institutional pressures.

### *Acquiescence*

Following Meyer and Rowan's (1977) seminal article, institutional theory basically promoted a single organizational response to institutional pressures within an organizational field: acquiescence (Oliver, 1991), i.e. non-reflective conformity (Lawrence, 1999). Driven by skepticism towards atomistic accounts of social processes as advocated by, for example, neoclassical economists, new institutionalists emphasized the strong and direct impact of institutional forces on the conduct of organizations (Heugens and Lander, 2009; Wooten and Hoffman, 2013). Rejecting rational choice as an 'undersocialized' (Granovetter, 1985: 481) conception that undermines environmental impacts, new institutionalists shared the conviction that the source driving organizational action originates from outside the focal actor (Wooten and Hoffman, 2013).

According to new institutional logics, firms react on institutional pressures with submissive alignment (Kostova et al., 2008), i.e. they adapt their structure and conduct to a given institutional pressure (Boxenbaum and Jonsson, 2013). This indiscriminative conformity results in organizational isomorphism (Battilana et al., 2009; Greenwood et al., 2013; Boxenbaum and Jonsson, 2013; Lawrence, 1999; Hoffman and Ventresca, 2002) as the behavior of organizations sharing an institutional field must reasonably be expected to be shaped by the same structural forces (Heugens and Lander, 2009). This uniformity–created over time as organizations collectively follow and incorporate institutionally prescribed templates (DiMaggio and Powell, 1983; Tolbert and Zucker, 1983)–refers to organizational structure (Tolbert and Zucker, 1983; Bansal and Penner, 2002), conduct (Bansal and Penner, 2002; Boxenbaum and Jonsson, 2013), and output (DiMaggio and Powell, 1983; Boxenbaum and Jonsson, 2013), and, less visibly, extends to culture, beliefs and values (Bansal and Penner, 2002; DiMaggio and Powell, 1983).

New institutionalism offers three distinct kinds of isomorphism: normative, coercive, and mimetic (DiMaggio and Powell, 1983; Boxenbaum and Jonsson, 2013). Normative isomorphism results from organizations applying structural and behavioral patterns that are widely considered as appropriate by relevant constituents in their environment (Kostova and Roth, 2002; Boxenbaum and Jonsson, 2013). Coercive

pressure is imposed on an organization by a more powerful actor (Kostova and Roth, 2002), mostly the state or a similar institution that has authority to demand something by fiat (Boxenbaum and Jonsson, 2013), monitor compliance, and sanction deviance (Heugens and Lander, 2009). Mimetic isomorphism finally occurs when organizations are encouraged to adopt structures or practices of peers and imitate what they have implemented (Haveman, 1993; Palmer et al., 1993; Kostova and Roth, 2002).

Institutional literature proposes three major justifications for acquiescing: First, following rationalized myths about what constitutes proper behavior (Boxenbaum and Jonsson, 2013) that are accepted as externally given social facts (Wooten and Hoffman, 2013). Second, gaining legitimacy in the eyes of relevant stakeholders (Meyer and Rowan, 1977; Lawrence, 1999; Battilana et al., 2009; Boxenbaum and Jonsson, 2013) to avoid social censure (Greenwood et al., 2013), secure access to necessary resources (Greenwood et al., 2013; Scott, 1987), improve performance (Meyer and Rowan, 1977; Kostova and Roth, 2002; DiMaggio and Powell, 1983), and ensure survival (Jackson and Deeg, 2008; Meyer and Rowan, 1977; Kostova and Roth, 2002; Scott, 1987; Wooten and Hoffman, 2013). Third, copying standard approaches in situations of high uncertainty and ambiguity (DiMaggio and Powell, 1983; Shipilov et al., 2010). As table 1 shows, the three reasons for conformity can be linked to the according types of institutions, types of isomorphism (Kostova and Roth, 2002) and acquiescence responses by Oliver (1991). She distinguishes ‘habit’ as unconscious adherence to taken-for-granted rules, ‘imitation’ which allows for either conscious or unconscious mimicry, and ‘compliance’ as rational obedience to institutional requirements for some self-interested reason.

**Table 1:** Linking types of institutions and types of passive organizational responses.

| **Type of institution** | **Type of isomorphism** | **Reason for conforming** | **Acquiescence response** |
|---|---|---|---|
| Normative | Normative | Follow rationalized myth | Habit |
| Regulatory | Coercive | Gain legitimacy | Compliance |
| Cognitive | Mimetic | Avoid uncertainty | Imitation |

Following rationalized myths led to frequent criticism claiming that acquiescence was the response of mindless actors (Schmidt, 2008; Wooten and Hoffman, 2013). On the other hand, gaining legitimacy and avoiding uncertainty are two undeniable benefits of conformity and isomorphism (DiMaggio and Powell, 1983). Hence, acquiescing organizations are not necessarily mindless but might decide consciously (Cantwell et al., 2010; Regnér and Edman, 2014; Luo et al., 2002) in order to be rewarded for conformity (Scott, 1987). Correspondingly, there is recent meta-analytical evidence contradicting the conformity-performance tradeoff and showing a positive relation between isomorphism and firm performance (Heugens and Lander, 2009).

Institutional theory has been substantially criticized for its contextual and argumentative orientation during the era of new institutionalism. Three main concerns were raised by critics. First, Meyer and Rowan (1977) and their early fellows had a strong bias towards explaining organizational homogeneity (isomorphism) rather than heterogeneity (DiMaggio and Powell, 1983). Organizational fields, institutional pressures and organizational responses were all conceived as static and unitary (Wooten and Hoffman, 2013). Second, new institutionalists have frequently deduced the operation of institutional processes from the mere presence of isomorphism (Adegbite and Nakajima, 2012; Heugens and Lander, 2009). Researchers note that isomorphism does not necessarily stem from institutional processes (Heugens and Lander, 2009; Boxenbaum and Jonsson, 2013; Shipilov et al., 2010) but may equally result from organizational learning (Boxenbaum and Jonsson, 2013) or competitive bandwagon processes (Abrahamson and Rosenkopf, 1993). Organizations may decide for identical patterns not because they are forced, uncertain, or morally obliged to do so (Boxenbaum and Jonsson, 2013), but because it is the best available solution that weeds out less efficient ones (Scott, 2008; Heugens and Lander, 2009). Third, the most fundamental criticism refers to new institutionalists' neglect of agency (Lawrence, 1999; Heugens and Lander, 2009). Schmidt (2008) notes that new institutionalism conceives of unthinking actors that are literally not agents at all. Responding to an overemphasis on agency without structure (e.g. by rational choice and behaviorism scholars), new institutionalists brought institutions ''back in' in an effort to right the balance, but they may have tipped it too far in the other direction' (Schmidt, 2008: 313). Later, institutional theory scholars remarked that organizations have some discretion in responding to institutional pressures (Heugens and Lander, 2009), and that these pressures may even be a source of deviance (Oliver, 1991) or institutional entrepreneurship, organizational responses that we elaborate next.

### 2.3.2 Reactively responding to institutional multiplicity

Institutional theory's early focus on explaining homogeneity started being severely challenged during the years following the new institutional era. Institutionalists increasingly questioned and re-examined their earlier assumptions (Scott, 1987), e.g. the concept of a single, unitary, and stable organizational field (Cantwell et al., 2010). Researchers developed a growing acceptance that organizations face not one but multiple institutional environments (Scott, 1987), and that both organizational fields and organizations are less homogeneous as initially envisaged (Greenwood et al., 2013). This work resulted in the establishment of the concept of institutional multiplicity as the existence of multiple institutions and institutional logics both within and across organizational fields.

Multiplicity exerts contradictory demands on organizations (Seo and Creed, 2002; Pache and Santos, 2010; Scott, 1987). Contradictions may arise between institutions of different types, levels, locations and temporal spheres. The challenge for organizations not only arises from institutions being numerous and conflicting. Institutional literature stresses the complexity (Alon, 2013; Greenwood et al., 2010; Batjargal et al., 2013) and interdependence (Ostrom, 2005; Ingram and Silverman, 2000) of institutions and their impacts on organizations.

The concept of institutional multiplicity is at odds with new institutionalism's standard response to institutional pressures. Unilateral conformity as introduced above is not possible as satisfying one institutional demand would mean to ignore or defy another (Pache and Santos, 2010; Oliver, 1991), thereby endangering the organization's overall legitimacy (Scott, 2008; Pache and Santos, 2010). Organizations' identity is pulled apart and cross-institutional consistency and integrity are hardly achievable (Kraatz and Block, 2013). On the contrary, being subject to multiple institutional pressures or logics may create opportunities (Regnér and Edman, 2014) as organizations use the existing contradictions as well as their exposure to other organizational fields and their experience with conflicting institutional setups (Garud et al., 2007). Inspired by multiplicity and driven by their interest to reduce uncertainty and resolve conflict (Oliver, 1991), organizations may engage in alternative practices and strategic responses (Regnér and Edman, 2014; Oliver, 1991; Hardy and Maguire, 2013). As firms are less homogeneous as assumed in new institutionalism, their responses to institutional pressures will also be less uniform (Doshi et al., 2013; Greenwood et al., 2013).

We may conclude that conventional new institutional assumptions and explanations are not sufficient (Kraatz and Block, 2013) as 'institutional environments are multiple, enormously diverse, and variable over time' (Scott, 1987: 508), and firms can respond to institutional multiplicity, both despite and because of it (Kraatz and Block, 2013). In the next sections, we elaborate on possible organizational responses to institutional pressures that are more active and creative than new institutional acquiescence.

**Reactive responses**

Starting in the 1990s, institutional theory experienced more and more criticism for portraying organizations too passively and environments as overly constraining (Greenwood et al., 2013). The focus on passivity rather than activeness, conformity rather than resistance, and unconscious habit rather than rational decision making became less accepted (Oliver, 1991; Greenwood et al., 2013), and researchers called for the restoration of agency to institutionalism (Leca and Naccache, 2006). Institutional literature thus shifted to a greater emphasis on organizational self-interest, agency, and strategic responses to institutional pressures (Oliver, 1991; Wooten and Hoffman, 2013; Cantwell et al., 2010). This emancipation from determinism (Leca and Naccache, 2006), along with the tensions stemming from institutional multiplicity (Pache and Santos, 2010), allow for considering diverging organizational responses (Ingram and Clay, 2000) that reach from conformity to outright defiance (Oliver, 1991).

Organizations applying the responses introduced in this chapter still conceive of institutions as externally given and constraining. The elaborated responses go beyond unconscious acquiescence and entail much more rationality and agency than merely passive behavior. Yet, they do not operate towards changing institutions' nature or influencing their development. The focus is rather on actively dodging or ignoring institutional pressures, and strategically alleviating the tensions stemming from institutional multiplicity (Pache and Santos, 2010). We focus on three reactive responses, namely ceremonial adoption, avoidance, compromise (Table 2).

**Table 2:** Reactive responses to institutional pressure.

| Reactive response | Other terms | Activities | Reasoning / benefit | Examples from literature |
|---|---|---|---|---|
| **Ceremonial adoption** | ▪ symbolic adoption (Kostova and Roth, 2002: 216)<br>▪ decoupling (e.g. Okhmatovskiy and David, 2012: 156)<br>▪ surface isomorphism (Greenwood et al., 2013: 4) | ▪ meet some demands by action, and others 'by talk' (Boxenbaum and Jonsson, 2013: 86)<br>▪ claim to comply with a practice while in reality not implementing it (Boxenbaum and Jonsson, 2013: 86)<br>▪ decoupling appearance from the technical core (Thornton and Ocasio, 2013; Greenwood et al., 2013) | ▪ simultaneously achieve legitimacy and secure efficiency and profitability (Deephouse and Suchman, 2013; Boxenbaum and Jonsson, 2013).<br>▪ solve identity conflicts by presenting themselves differently to different stakeholders (Kraatz and Block, 2013; Zajac and Westphal, 2004) | ▪ decoupling in the adoption of stock repurchase programs (Westphal and Zajac, 2004),<br>▪ ceremonial adoption of a shareholder value orientation (Fiss and Zajac, 2004) |
| **Avoidance** | ▪ circumvention (Regnér and Edman, 2014: 282),<br>▪ jurisdiction shopping / jurisdictional arbitrage (Ahuja and Yayavaram, 2011: 1641) | ▪ exiting the affected geographical location (Ahuja and Yayavatam, 2011; Child and Tsai, 2005)<br>▪ exiting the affected industry (Oliver, 1991) | ▪ exit the domain in which the institutional pressure is exerted (Pache and Santos, 2010; Oliver, 1991; Kraatz and Block, 2013),<br>▪ escaping the conditions that necessitate conformity (Oliver, 1991). | ▪ firms positioning themselves in the assurance industry in order to avoid institutional pressures specifically designed for banks (Ahuja and Yayavaram, 2011) |
| **Compromise** | | ▪ initiate negotiations with multiple institutional entities (Pache and Santos, 2010; Oliver, 1991)<br>▪ balance all competing expectations ( Pache and Santos, 2010)<br>▪ devote energies to appeasing resisted institutional source (Oliver, 1991). | ▪ achieve parity between all relevant stakeholders as well as internal interests (Oliver, 1991)<br>▪ solve institutional tensions by cooperative approach (Kraatz and Block, 2013) | ▪ organizing a consulting firm into two distinct business units to reach compromise between different institutional pressures (Pache and Santos, 2013). |

Another potential reactive response to institutional pressures is ignorance. However, this response is only applicable when one out of two rather specific enabling conditions are given. First, an organization might be faced with extraordinarily beneficial role expectations that make it less susceptible to usually applied institutional pressures (Regnér and Edman 2014). Second, organizations might actively decide to ignore institutional pressures within a 'weak institutional environment, characterized by a lack of accountability and political instability, poor regulation and deficient enforcement of the rules of law' (Cantwell et al., 2010: 575; Oliver, 1991), particularly when the organization disagrees with the objectives of the institution that exerts pressure on it (Boxenbaum and Jonsson, 2013), and when the dependence on that institution's approval and support is low (Oliver, 1991).

### 2.3.3 Proactive development of institutional environments by embedded agents

During the end of the 1990s, scholars increasingly lamented that organizations were still portrayed as being largely caught within institutional constraints and that institutional theory lacked the power to explain institutional change. Consequently, they called for bringing back the concept of change into the institutional literature and for paying more attention to organizations' active influence on institutional development (Hirsch and Lounsbury, 1997; Greenwood and Hinings, 1996).

In the following years, research has been shedding much more light on how institutions originate and evolve under the purposive influence of organizational actors (e.g. Hoffman and Ventresca, 2002; Seo and Creed, 2002; Kogut et al., 2002). Within this stream of literature organizational agency does not merely refer to a degree of adaptation (Saka-Helmhout and Geppert, 2011) but organizational actors try to affect, change and shape the formation and transformation of institutions and their impacts on organizations (Lawrence, 1999; Dorado, 2005). This new level of agency that is intended to improve the rules has been termed institutional strategy–as opposed to competitive strategy that is limited to improve within the rules (Lawrence, 1999; Martin, 2014).

The central role assigned to organizational agency in the (trans)formation of institutions engendered a major debate in institutional literature at the center of which is the paradox of embedded agency–'one of the most important challenges facing contemporary institutional theory' (Battilana et al., 2009: 96). The core question of the debate is how an organization (or individual) whose identity, cognition and conduct

are conditioned by the prevalent institutions is able to break with and change these very same institutions (Holm, 1995; Battilana et al., 2009; Thornton and Ocasio, 2013). Being subject to regulative, normative and cognitive institutions, how can actors disembed from these influences (Leca and Naccache, 2006) and envision and champion new structures and practices (Hardy and Maguire, 2013)?

The debate is enriched by structural determinism on the one side and rational choice on the other (Battilana et al., 2009). The former conceives of institutions as hegemonic (Greenwood et al., 2013) and organizations as unable to escape institutional embeddedness (Leca and Naccache, 2006), the latter understands organizations as free to decide and act. This long-standing tension between structure and agency is a central theme in recent institutional thinking (Greenwood et al., 2013).

'How the social system influences organizational behavior and how individual and organizational actions can affect the social system, are precisely what we need to understand at this juncture. A better understanding of embedded agency might enable actors to influence more effectively the direction of change and thereby favor more desirable institutional change.' (Battilana et al., 2009: 96).

In order to come to a solution to the paradox of embedded agency recent literature on institutional entrepreneurship and co-evolution proposes to account for institutions as enabling and constraining but not determining the choices of actors (Battilana et al., 2009). Structure and agency should not be put in a subordinate relation to each other as this would either neglect the freedom of actors or the constraining power of institutions (Leca and Naccache, 2006). The co-evolutionary perspective, based on the notion of institutions being enacted instead of divined (Berger and Luckmann, 1967; Lawrence, 1999), explicitly considers multi-directional interaction patterns (Dieleman and Sachs, 2008; Lewin and Volberda, 1999); i.e. it 'accounts for the influence of context on the entrepreneur and for the freedom of the latter to modify it' (Dieleman and Sachs, 2008: 1274). Organizations and institutions are conceived as parts of a larger system where they interdependently influence each other's evolution (Dieleman and Sachs, 2008) in a dynamic and complex manner (Carney and Gedajlovic, 2002). This perspective of mutual interaction allows for institutions being products of and constraints to action alike (Holm, 1995; Beckert, 1999; Carney and Gedajlovic, 2002; Rodrigues and Child, 2003). This actually corroborates North's (1990) early definition of institutions as '*humanly devised* constraints that structure human interaction' (p. 3, emphasis added).

### *Institutional entrepreneurship*

Institutional entrepreneurship, originally introduced into literature by DiMaggio (1988), has attracted a lot of attention in management research during the last years (e.g. Garud et al., 2007; Battilana et al., 2009; Pacheco et al., 2010; Tolbert et al., 2011). It represents an intriguing field as institutionalism traditionally tends to focus on continuity while entrepreneurship has always been closely related to change (Garud et al., 2007). Compared to the other organizational approaches introduced above institutional entrepreneurship is something inherently imaginative and proactive. It can be called the innovation response to institutional pressures.

An institutional entrepreneur is defined as a 'self-interested agent that sponsors institutional change to capture economic benefits' (Pacheco et al., 2010: 975). The quest for institutional change distinguishes an institutional entrepreneur from the actors that merely react on given institutional pressures. Institutional literature in the field of sociology applies a broader definition of the institutional entrepreneur–compared to management and economics–as it does not necessarily require self-interest (Pacheco et al., 2010), and might therefore include social entrepreneurs (Mair and Martí, 2006). The change that institutional entrepreneurs aim at (Hardy and Maguire, 2013) may be in the form of deinstitutionalization, i.e. the dissolution of an existent institution, creating an entirely new institution or the combination of both (Rao, Monin, and Durand, 2003). Innovations as the result of institutional entrepreneurship may comprise new formal institutions (e.g. Demil and Bensédrine, 2005), new organizational forms (e.g. Greenwood and Suddaby, 2006), new role identities (e.g. Rao et al., 2003), or new practices (e.g. Boxenbaum and Battilana, 2005).

The key challenge inherent to institutional entrepreneurship lies in its far-reaching impact that, by definition, needs to cross firm boundaries, and take effect in an organization's environment. This raises the question how institutional entrepreneurs actually achieve their intended objectives. Which specific activities do they engage in to pursue change? Literature offers four main approaches: spotting opportunities, mobilizing resources, collaborating, and discoursing (Table 3).

**Table 3:** Key activities of institutional entrepreneurs.

| **Entrepreneurial approach** | **Key activities** |
|---|---|
| Spotting opportunities | ▪ disembed from the existing institutional framework (Beckert, 1999)<br>▪ actively reflect on and challenge existing rules and practices (Pacheco et al., 2010)<br>▪ envisioning alternative institutional arrangements (Emirbayer and Mische, 1998) |
| Mobilizing resources | ▪ mobilize material / financial resources (Lawrence and Suddaby, 2006; Battilana et al., 2009)<br>▪ acquire intangible resources like information and know-how (Dorado, 2005; Hardy and Maguire, 2013)<br>▪ built on social resources like positional, political, or reputational assets (Battilana et al., 2009; Mair and Martí, 2009).<br>▪ use networks to enhance access to diverse tangible and intangible resources (Mair and Martí, 2009; Stam and Elfring, 2008) |
| Collaborating | ▪ offer incentives to potential allies (Pacheco et al., 2010)<br>▪ apply sanctions to silence potential opponents (Hardy and Maguire, 2013)<br>▪ initiate partnerships to enhance the available resource base (Stam and Elfring, 2008)<br>▪ built trust to lessen the risk of being considered illegitimate or being opposed (Greenwood et al., 2002). |
| Discoursing | ▪ use of symbolic language, storytelling, analogies, and framing (Zilber, 2007; Lounsbury et al., 2003; Benford and Snow, 2000)<br>▪ explain causes, assign blame, and provide solutions (Garud et al., 2007)<br>▪ depict preferred institutional change as appealing to others<br>▪ discredit existing institutional arrangements (Henisz and Zelner, 2005). |

Institutional entrepreneurship is often induced or facilitated by enabling conditions. These fall into two categories: field-level conditions (Table 4) and the entrepreneur's personal or organizational characteristics (Table 5) (Battilana et al., 2009; Battilana, 2006). While literature largely agrees on the former, the latter are more discussed. Particularly the role of institutional entrepreneurs' position in the organizational field is controversial. Recent empirical research has shown that institutional change may either be initiated by central actors (e.g. Greenwood and Suddaby, 2006; Rao et al., 2003; Boxenbaum and Battilana, 2005) or by peripheral peers (Lounsbury et al., 2003; Hensmans, 2003).

**Table 4:** Field-level conditions enabling institutional entrepreneurship.

| **Field-level condition** | **Explanation** |
|---|---|
| High degree of institutional heterogeneity | The more contradictions institutional entrepreneurs encounter, the more change they envision (Seo and Creed, 2002; Greenwood and Suddaby, 2006) |
| Low degree of institutionalization | Established norms and practices are either absent (Maguire et al., 2004) or have not yet gained deep-rooted and stable legitimacy (Henisz and Zelner, 2005). |
| Disruptions | Social upheaval, new technologies, economic crisis, or regulatory changes (Battilana et al., 2009; Hardy and Maguire, 2013) end 'what has become locked in by institutional inertia' (Hoffman, 1999: 353). |

**Table 5:** Personal/organizational characteristics enabling institutional entrepreneurship.

| Characteristic | Explanation |
|---|---|
| **Peripheral position in the organizational field** | ▪ less awareness of and less embeddedness in institutional norms and practices (Battilana, 2006; Hardy and Maguire, 2013),<br>▪ higher likelihood of being exposed to alternative institutional arrangements (Hardy and Maguire, 2013),<br>▪ less privileges given by prevailing institutions (Battilana, 2006),<br>▪ higher encouragement regarding institutional modifications (Lawrence, 1999),<br>▪ lack of power and resources to implement institutional change (Garud et al., 2007). |
| **Central position in the organizational field** | ▪ sufficient resources and power to innovate (Garud et al., 2007; Battilana, 2006),<br>▪ missing incentives to engage in change (Garud et al., 2007; Battilana, 2006),<br>▪ tendency to benefit from the current institutional setup (Hardy and Maguire, 2013). |
| **Others** | ▪ **Reflexivity** (Beckert, 1999; Seo and Creed, 2002)<br>▪ **Superior political and social skills** (Hardy and Maguire, 2013),<br>▪ **Immigrant background** (Kraatz and Moore, 2002),<br>▪ **Reputation, social status and legitimacy** (Battilana, 2006)<br>▪ **Experience with previous institutional entrepreneurship initiatives** (Regnér amd Edman, 2014) |

There are some critical voices referring to shortcomings in the institutional entrepreneurship literature. The most frequently expressed critique addresses the tendency of literature on institutional entrepreneurship to depict institutional entrepreneurs as single, heroic actors and neglecting the wider array of actors needed to successfully implement and diffuse institutional innovations (Lounsbury and Crumley, 2007). Similarly, some institutionalists (e.g. Delmestri, 2006) criticize institutional entrepreneurship 'for promoting an instrumental and disembedded view of agency that is, arguably, incompatible with institutional theory' (Battilana et al., 2009: 73).

Another point of criticism is the neglect of institutional entrepreneurship's dark side (Khan, Munir, and Willmott, 2007). Institutional literature provides numerous positive examples of institutional entrepreneurship and co-evolution in various fields

(Battilana et al., 2009; Rodrigues and Child, 2003; Child and Tsai, 2005; Dieleman and Sachs, 2008; Carney and Gedajlovic, 2002) but has largely neglected opposition and failure. As any organizational field has some players who are invested in, committed to, and advantaged by the existing institutional environment (Garud et al., 2007), institutional entrepreneurship is unlikely to be uncontested (Puffer et al., 2010; Garud et al., 2007). Few papers mention the possibility of institutional entrepreneurship being unsuccessful (Garud et al., 2002) or pointing to the persistence of inefficient institutions (Ingram and Clay, 2000). Carney and Gedajlovic (2002) and Battilana (2006) are rare examples of papers mentioning unintended or even unaware processes of institutional renewal. Although several researchers acknowledge the possibility of attacking or even eliminating institutions (e.g. Oliver, 1991; Kraatz and Block, 2013) it is always in the positive light of opposing inefficient or even evil institutional arrangements. Rare examples mention non-recoverable costs and disadvantageous lock-in effects (Cantwell et al., 2010) as well as piratical entrepreneurship (Puffer et al., 2010). Khan et al. (2007) offers the most extensive account of institutional entrepreneurship's negative effects by elaborating on increased unemployment and poverty as a result of an institutional entrepreneurship initiative aimed at abolishing child labor in the Pakistani soccer ball stitching industry. Following Khan et al.'s (2007) assessment that 'Institutional entrepreneurship is typically portrayed in a positive light in the institutional theory literature, frequently symbolizing ideals of progress and innovation' (p. 1055), we call for more critical perspectives on institutional entrepreneurship, both for the sake of scientific neutrality and the very promising insights covered behind the unsuccessful, unintended, and destructive instances of institutional entrepreneurship.

**Political strategies**

Organizational attempts to affect the policies and regulations that impact their conduct and performance potentials have long been and still are intensively researched, as exemplified by the literature on corporate political activities and nonmarket strategies (e.g. Holburn and Vanden Bergh, 2002). Institutional literature also suggests that firms cannot only combat competitors in different market arenas but also in the nonmarket political realm (Oliver and Holzinger, 2008; Peng et al., 2009). Attention is drawn to ways of proactively responding to and influencing political processes and institutional pressures (Child and Tsai, 2005). For defining political or nonmarket strategies we follow Holburn and Vanden Bergh (2002) who note that:

> *'While market strategies consist of actions aimed at shaping interactions with competitors, customers and suppliers in the market place (e.g. pricing and investment decisions), non-market strategies consist of actions specifically designed to influence the institutional players who determine public policy–state and federal legislatures, executives, regulatory agencies and courts' (p. 34).*

The definition underlines political strategies' limitation to regulative–as opposed to normative and cognitive–institutions (Keefer and Knack, 2005). Hillman and Hitt (1999) distinguish organizations' political approaches into informational strategies, financial incentive strategies and constituency building strategies which correspond to the three goods in political markets–information, money, and votes, respectively (Hillman and Hitt, 1999; Hillman et al., 2004).

As political entities assume substantial influence on the institutional arrangements governing organizations (Holburn and Vanden Bergh, 2002), political strategies have the potential to considerably enhance organizational performance (Shaffer, 1995). While political strategies often lead to one-time transactional advantages (Hillman et al., 2004) like preferential access to licenses or government contracts (Dieleman and Sachs, 2008; Puffer et al., 2010), institutional theory predominantly emphasizes the value of organizations' long-term relational advantages (Hillman et al., 2004) allowing them to shape regulatory boundaries (Rodrigues and Child, 2003) and the institutional environment at large (Dieleman and Sachs, 2008; Holburn and Vanden Bergh, 2002).

Political strategies may promise more benefits when applied in deficient resource environments as political advantage through nonmarket strategies might be easier obtainable and more performance-relevant than market strategies (Wan, 2005). However, organizations should be aware that political strategies have some substantial limitations. First, they might backfire in case political power switches, e.g. through elections (Feinberg and Gupta, 2009; Dieleman and Sachs, 2008); second, political engagement may be perceived as illegitimate, particularly when it includes corruption (Dieleman and Sachs, 2008); third, non-market strategies and capabilities are extraordinarily local in nature and can hardly be transferred to other realms (Wan, 2005).

### Cognitive and discursive strategies

Cognition and discourse refer to actors' 'background ideational abilities' and 'foreground discursive abilities' (Schmidt, 2008: 315). Of particular interest for proactive organizational responses to institutional pressures is actors' ability to think and speak beyond prevailing institutional frames. While cognition comprises mental processes like perceiving, interpreting, and sensemaking, discourse refers to practices of talking and writing (e.g. Phillips et al., 2004). Accordingly, the discursive perspective conceptualizes institutions as a 'textual affair' (Munir and Phillips, 2005: 1669). From a cognitive point of view which builds on social constructivism (Berger and Luckmann, 1967), institutions are mental entities that exist only in the minds of the people (Holm, 1995). Institutions are constituted as meanings that are increasingly shared and accepted as reality (Hardy and Maguire, 2013; Phillips et al., 2004), a process that can be proactively supported and shaped by linguistic agents.

Integrating institutional theory and cognition is a fascinating endeavor as 'institutional theory emphasizes similarities, but issue interpretations recognize differences' (Bansal and Penner, 2002: 322). While institutionalism's traditional focus on isomorphism seems to clash with the nature of cognitive processes that are first and foremost individual, they may also complement each other if we understand institutions as shared and taken-for-granted cognitive frames.

Although prevailing institutions have considerable power in structuring cognitions, individual-level attributes must not be neglected (Bansal and Penner, 2002). Institutional influences and pressures are not free from filtering and interpretation processes (Wooten and Hoffman, 2013; Lawrence, 1999). Individual actors have their personal selective attention and perception, cognitive frames and sensemaking (Hoffman and Ocasio, 2001; Pache and Santos, 2010; Dorado, 2005). As cognition renders objective conditions differently (Dorado, 2005) the cognitive lens provides an explanation for heterogeneity in organizational responses to institutional pressures (Bansal and Penner, 2002; Wooten and Hoffman, 2013).

Moreover, the insight that individuals' understandings, organizations' actions and actors' acceptance of institutions depends on cognitive processes encourages some players to take proactive influence on institutional evolution by influencing others cognitions (Zilber, 2007). Proactive agents may channel the sense-making activities of others (Garud et al., 2007) in directions of the institutional setups they favor. Shaping others' understanding of institutional arrangements will mostly be realized via discursive activities (Phillips et al., 2004).

In this respect, discursive activities can take different forms and may be used for different developmental objectives. Concerning the latter, Mair, Martí, and Ventresca, (2012) point to the importance of 'conscientization,' (p. 827) i.e. provoking others to self-reflect and question their institutional conditions so that they start de-naturalizing it, and become aware of 'possibilities for expanding the boundaries of permissible behavior' (p. 840). Another frequent objective is the active delegitimatization of unfavorable institutions, e.g. by describing existing structures or practices as unjust, ineffective or inefficient (Hardy and Maguire, 2013). In parallel, discourse is applied to promote alternative institutions (Phillips et al., 2004; Hardy and Maguire, 2013) and create legitimacy for institutional change and new practices (Seo and Creed, 2002; Hardy and Maguire, 2013). The most important objective attributed to discourse is the conviction and mobilization of potential followers (Battilana et al., 2009). As successful institutionalization requires a broad collective of supporters, discourse is the primary means for sharing ideas and understandings (Abdi and Aulakh, 2012), engaging in sensegiving (Gioia and Chittipeddi, 1991), making change meaningful to others (Hardy and Maguire, 2013), building consensus (Hardy and Maguire, 2013), persuading potential collaborators (Garud et al., 2002), and generating collective action (Benford and Snow, 2000).

In order to achieve those objectives, actors may turn to different discursive tools and techniques. Among those, framing is frequently used to present the favored institutional change in a compelling way and in the interest of potential allies (Leca and Naccache, 2006; Benford and Snow, 2000). One way to frame and legitimate change initiatives is through telling stories (Zilber, 2007; Lounsbury and Glynn, 2001). Stories connect past events via causal links, attribute responsibility, cast actors in distinct roles, and provide prospects into future trajectories of the organizational field, serving the narrator's interests (Zilber, 2007). Enriched by metaphors, myths, and images, narration is a potent tool for sensemaking (Schmidt, 2008; Zilber, 2007; Phillips et al., 2004).

Literature on sensemaking and institutions assesses cognitive and discursive strategies to be of particular interest in novel, counterintuitive and uncertain situations as they both require and enable sensemaking processes (Gioia and Chittipeddi, 1991; Weick, 1995; Dorado, 2005; Phillips et al., 2004). Accordingly, several recent examples of cognitive and discursive strategies are positioned within novel and uncertain environments (Zilber, 2007; Maguire and Hardy, 2006; Munir and Phillips, 2005; Suddaby and Greenwood, 2005).

Mair and Martí (2009) note that institutional and sensemaking perspectives are rarely applied simultaneously. Although, our assessment is somewhat different concerning the general integrative application of those two streams, we identified multiple interesting avenues for further research. First, although the important role of cognitive and discursive activities in institutional change is widely acknowledged and there are several recent studies addressing the phenomenon at large, there are not many studies specifically exploring how meanings are constructed or influenced (Suddaby and Greenwood, 2005; Zilber, 2007). As Phillips et al. (2004) rightly notice, 'institutional research has tended to focus on the effects rather than the process of institutionalization' (p. 635). The discursive perspective offers great opportunities for future research to perform more process-focused analyses of institution building. Further empirical research, e.g. ethnographic studies, deep-diving into the use of sensemaking and discourse in the context of organizational attempts to shape institutional arrangements would certainly be able to make substantial contributions to academic knowledge and theory development, as exemplified by Zilber (2007) and Phillips et al. (2004).

Second, while researchers in the discursive literature stream account for the relevance of collectives (Zilber, 2007)–as the dissemination and consumption of texts (Phillips et al., 2004) are naturally collective processes–their colleagues in the field of cognitive research tend to have a focus on individual perception and sensemaking. Bringing cognitive research to the collective / organizational level is still rarely done but highly promising, particularly as many actors are embedded in organizations, and organizational conduct and performance should be investigated under the light of organizational cognition. Third, we point again to the promise of researching the dark side. Studies focusing on deinstitutionalization via discourse are rare (Hardy and Maguire, 2013), as well as studies addressing unintended, unsuccessful, or destructive ways of discursive institutionalism. Finally, we see much potential in studies bridging different research streams dealing with discursive institutionalism. For instance, discursive institutionalism has been a topic in political institutionalism (e.g. Campbell, 1998; Schmidt, 2008) but the link to organizations and management is hardly established, a gap that may be fruitfully targeted by integrative future research.

**Self-regulation**

In case of institutional pressures being too intrusive (King and Lenox, 2000), too difficult (Okhmatovskiy and David, 2012) or overly costly (Lenox, 2006) to comply

with, firms may decide to proactively install an alternative institutional arrangement for the same fundamental issue which is (planned to be) addressed by an undesirable government regulation (Ahuja and Yayavaram, 2011).

Instead of complying at high costs or not complying at all (Okhmatovskiy and David, 2012) organizations may allay the concerns of stakeholders (Lenox, 2006) by introducing alternative private institutions such as codes of business conduct, corporate governance codes, corporate social responsibility guidelines, or other prescriptions (Sethi, 2003; Bondy et al., 2004). By sticking to these self-imposed standards that are less costly to comply and more amenable to organizational influence (Ahuja and Yayavaram, 2011), organizations signal that they do not ignore important issues that are subject to regulation and avoid the negative consequences of noncompliance with the original institutional requirement (Okhmatovskiy and David, 2012). Proactively forestalling or replacing government regulation (Lenox, 2006) allows firms to justify their noncompliance with the original requirements (Okhmatovskiy and David, 2012) or to argue that those public institutions are not required anymore (Ahuja and Yayavaram, 2011).

Recently, Okhmatovskiy and David (2012) described the introduction of individual internal corporate governance codes (ICGC) by Russian firms that want to avoid the very specific and demanding requirements of the official Russian corporate governance code (FCSM). Other examples deal with the voluntary adoption of environmental standards by the US chemical (King and Lenox, 2000; Lenox, 2006) and tourism (Rivera and de Leon, 2004) industries as well as the non-obligatory adherence to IFRS standards (Alon, 2013).

Okhmatovskiy and David (2012) argue that the introduction of and compliance with self-induced regulations is more likely for organizations that are closely watched by constituents that value the regulated aspect. They found empirical evidence that internal corporate governance codes are more likely to be introduced by firms that are publicly traded and have access to foreign capital markets (Okhmatovskiy and David, 2012). Critics of self-regulation point to the inherent danger of opportunism and free-riding as the exerted institutional pressure is normative instead of coercive, and private standard-setters do not have the same power to monitor and sanction deviators as state authorities would have (King and Lenox, 2000).

In some environments–those where the institutional landscape is weakly developed–the primary institutional challenge for firms is not responding to pressures but filling or dodging institutional voids. They do so by applying the organizational

strategies that we address in the next chapter. While some of the strategies presented above, e.g. institutional entrepreneurship, may be equally applicable to institutionally deficient environments, the strategies presented next are specifically tailored to institutional voids.

### 2.3.4 Strategies in the face of institutional voids

Institutional voids are understood as situations where institutions that enable and support the proper functioning of societies, economies, and markets are absent, immature, or fail to accomplish their role, e.g. due to weak enforcement (Mair and Martí, 2009; Khanna and Palepu, 2005). Those situations that are frequently encountered in emerging and transition economies (Meyer, 2001; Khanna et al., 2010) hold some severe challenges. Market functioning, development and participation are hampered (Mair and Martí, 2009), market transparency and efficiency are hardly realized (Mair et al., 2012), and environmental as well as transactional uncertainty is prevailing (Batjargal et al., 2013). Institutional voids in the area of contract enforcement and (intellectual) property rights protection are particularly detrimental as these institutions solve the problem of credible commitment given in any exchange relationship (Greif, 2005; Hillmann, 2013; Ingram and Silverman, 2000). A failure in these areas increases transaction costs (Hillmann, 2013) and probably prevents a lot of otherwise beneficial transactions altogether (Greif, 2005).

#### Substitution

Substitution as a strategy to counter institutional voids rests on the assumption of different institutions being substitutable by one another. When one institution is weak or missing altogether, but another, more properly working institution is available, actors will turn to the alternative institution in order to mitigate the disadvantages of the deficient one (Herrmann, 2008). Transaction costs are frequently used as a selection criterion; if transaction costs under the alternative institutional arrangement are lower than under the weak or missing one, than exchange partners will resort to the alternative arrangement (Meyer, 2001).

A considerable body of studies (e.g. Poppo and Zenger, 2002; Abdi and Aulakh, 2012) has addressed the relationship between different governance arrangements. The ‘fundamental question of whether (and to what extent) efforts at the

relationship level can offset the underlying governance gap at the institutional level' (Abdi and Aulakh, 2012: 478) has been answered divergently, depending on whether the replacing transaction-level (private) arrangement is informal or formal.

The constellation most frequently researched is the replacement of weak public formal institutions (e.g. contract enforcement and property rights protection) by private informal arrangements (e.g. networks) (Jackson and Deeg, 2008; Batjargal et al., 2013). Formal institutions that are weak, or weakly enforced, create uncertainty (Puffer et al., 2010; Peng, Lee, and Wang, 2005) as they invite exchange partners to engage in opportunistic behavior. Instead of relying on deficient public institutions like laws, regulations and courts (Ingram and Clay, 2000), private relational institutions resolve commitment problems (Hillmann, 2013) based on trust (Dyer and Chu, 2003), communal norms and intra-network sanctioning mechanisms (Greif, 2006; Hillmann and Aven, 2011). Transaction partners within the network that violate the community's norms run the risk of being collectively boycotted by their peers (Hillmann, 2013). Consequently the long-term payoff of adhering to the norms is larger than the one-time benefit of being opportunistic (Ullmann-Margalit, 1977). This informal system based on mutual support, effective monitoring, and fast transfer of reliable information allows for trustworthy partnerships (Hillmann, 2013) at rational transaction costs as uncertainty is reduced (Peng et al., 2009) by checking for partners' social and reputational capital (Peng et al., 2005).

Hence, there is an overall substitutive relationship between public formal institutions and private informal arrangements (Batjargal et al., 2013). Recent institutional literature provides numerous examples for such replacements in various contexts (Scheela and Jittrapanun, 2012; Carney and Gedajlovic, 2002; Spicer and Pyle, 2002; Puffer et al., 2010; Greif, 2006; Hillmann and Aven, 2011).

A major limitation of private networks used as informal institutions to replace deficient formal ones is that their effectiveness depends on density and closure (Abdi and Aulakh, 2012; Hillmann and Aven, 2011). As enforcement can only be ensured within the confines of close-knit communities they are primarily a local phenomenon that turns ineffective and inefficient when transactions cross spacial and social borders (Ingram and Silverman, 2000; Hillmann, 2013; Abdi and Aulakh, 2012). Accordingly, Hillmann (2013) notes that there is 'little empirical support for the effectiveness of reputation and private-order arrangements beyond the boundaries of local marketplaces' (p. 264) and Peng (2003) characterizes relationship-based institutions as temporal solutions that are sooner or later replaced by formalized ones. Another major

limitation to reputation-based institutional arrangements is their dependence on recurring transactions. One-time transactions do not provide the 'shadow of the future' (Zenger et al., 2002: 289) that is substantial to the effective functioning of reputation-based enforcement (Lazzarini et al., 2004).

In addition, it can be noted that deficient formal institutions are not always replaced by informal ones in a socially favorable way; formal institutional voids may also lead to the proliferation of corruption and outright bribery (Tonoyan et al., 2010). Similarly, the prevalence of informal institutional setups does not necessarily indicate the weakness of formal institutions as the informal arrangement might just be culturally favored (Meyer and Peng, 2005).

Substituting formal institutional voids by formal arrangements at the transaction-level is commonly assessed to be of limited applicability. While Luo (2005) found that 'firms use contractual systems to remedy weaknesses in the host country's legal system' (p. 221), Abdi and Aulakh (2012) show that the effectiveness of transaction-level formal arrangements, i.e. contracts, is dependent on formal institutions such as a properly working judicial system. They also found empirical evidence for this complementary relationship. Although, single private formal constructs such as termination rights and contractual hostages are able to reduce opportunistic threats in some cases (Abdi and Aulakh, 2012), Batjargal et al. (2013) conclude that weak formal institutions 'often make informal channels of protection the primary and perhaps the only alternative' (p. 1028).

**Internalization**

Organizations that are either not able or not willing to rely on uncertain contractual arrangements (i.e. formal institutions) and do not have any faith in substitutes like relational norms or trust, may still decide for ownership control and internalize important operations (Feinberg and Gupta, 2009). By giving preference to make instead of buy firms may increase the extent of intra-firm trade and revenue streams (Feinberg and Gupta, 2009). Being a response to institutional voids that works for buying markets, selling markets and capital markets alike (Wan, 2005), internalization may help to mitigate several institutional voids affecting external market transactions or cooperations. As the dependence on local market participants, partners and institutions is greatly reduced (Feinberg and Gupta, 2009), organizations experience much less exposure to institutional voids (Chang and Hong, 2000; Guillén, 2000) and

such negative consequences like information asymmetries between buyers and sellers (Meyer et al., 2009) or the risk of expropriation by cooperation partners (Feinberg and Gupta, 2009).

Internalization theory (e.g. Buckley and Casson, 1976) suggests that internalizing is superior to market transactions as long as the transaction costs of trading internally are lower than those of using the market. Internal modes of organization are subject to high costs, particularly when many relevant transactions are internalized leading to a diversified conglomerate (Meyer, 2001; Wan, 2005). However, in the face of severe institutional voids internalization may still cause less transaction costs than establishing risky market transactions amid deficient formal and informal institutional arrangements (Wan, 2005).

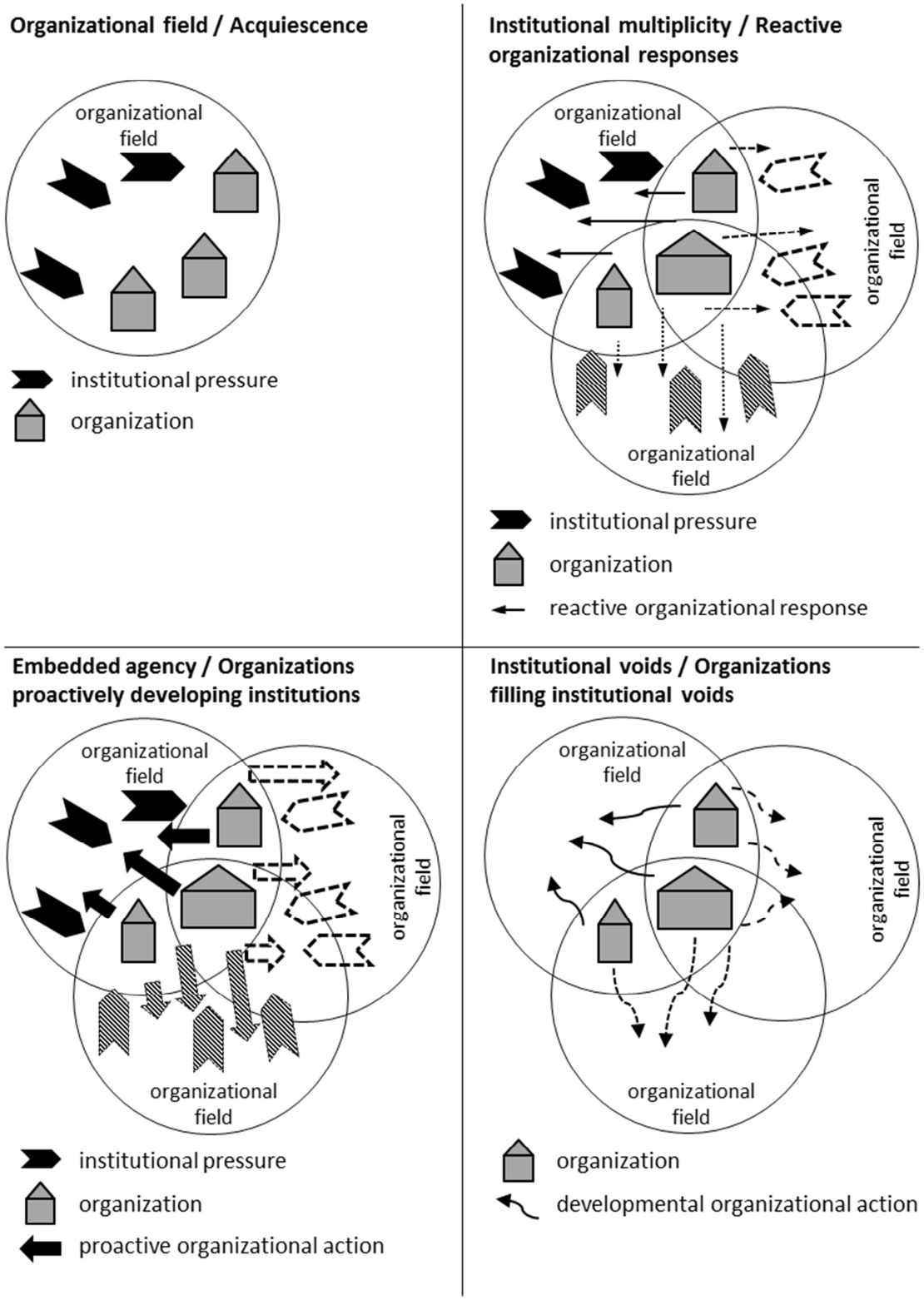
Accordingly, Peng et al. (2005) propose 'The better developed the formal market-supporting institutions, the narrower the scope of the firm' (p. 630). Recent empirical evidence by Feinberg and Gupta (2009) provides further transaction cost arguments for internalization and confirms that higher levels of country risk lead to a greater extent of operational integration of a subsidiary within an MNC's global trading network. Additional support comes from numerous studies indicating that large diversified conglomerates situated in institutionally deficient emerging economies frequently enjoy higher profitability than independent firms (Chang and Hong, 2000; Guillén, 2000; Khanna and Rivkin, 2001). 'The competitive advantages of diversified firms in these economies are essentially institutionally based' (Wan, 2005: 170).

## 2.4 Conclusion and implications

During the era of new institutionalism the institutional environment has been largely conceptualized as a unitary and stable organizational field and focused on organizational acquiescence leading to structural and behavioral isomorphism. Later, this core view of new institutionalism is complemented by the recognition of conflicting institutional demands and the concept of institutional multiplicity that allows organizations to exercise some level of strategic choice. We discussed organizational responses that conceive of the institutional environment as largely externally given and aim at circumventing institutional pressures. Triggered by the structure-versus-agency debate institutional literature has further developed, addressing the paradox of embedded agency and creating more and more contributions that assigned organizations an even more active role in responding to and developing

institutional arrangements. Accordingly, this paper elaborates on proactive organizational approaches that span from institutional entrepreneurship, over political strategies, to cognitive and discursive approaches influencing institutional setups. These responses account for institutionalists' recent interest in explaining structural and behavioral heterogeneity instead of isomorphism, self-interested agency instead of obedience, and change rather than stability (Boxenbaum and Jonsson, 2013; Wooten and Hoffman, 2013). Simultaneously, the institutional literature has emancipated from its initial US ethno-centrism (Greenwood et al., 2013) and meanwhile incorporates numerous accounts addressing fairly different institutional environments including emerging and transition markets where the key institutional challenge for organizations is not dodging institutional pressures but filling institutional voids. Figure 3 illustrates the different concepts and types of organizational responses in a simplified manner.

**Figure 3:** Simplified illustration of institutional concepts and organizational responses.




After years of intensive development, today's institutional literature offers a rich portfolio of organizational responses to institutional pressures as well as institutional voids. The variety of approaches supports managers in both developed

and emerging markets in reacting appropriately to the different institutional environments–either passively, actively, or proactively. Although introduced separately for structural and educational reasons, response strategies are not mutually exclusive (Cantwell et al., 2010; Khanna et al., 2010) and need not be applied on a stand-alone basis. On the contrary, as institutional environments and their impact on organizations vary widely across–and even within–organizational fields (Henisz and Delios, 2002; Khanna et al., 2005) the potential responses may be fruitfully combined (Okhmatovskiy and David, 2012; Cantwell et al., 2010; Oliver, 1991). A single organization's responses may vary across different host countries and industrial sectors (Cantwell et al., 2010). Moreover, as institutional arrangements develop over time, organizational responses need to change as well (Khanna et al., 2010; Cantwell et al., 2010). Instead of a one-size-fits-all strategy (Wan, 2005) managers should carefully analyze the institutional environment (Khanna et al., 2005), and customize their organization's array of responses, always taking firm-specific resources and capabilities into account (Henisz and Delios, 2002).

Whenever possible, we outlined the enabling conditions or limitations to the applicability of the discussed approaches. These are of particular relevance for institutional actors that want to engage in institutional change but also for policy makers that want to support or hinder specific institutional developments. Institutional reforms and conditions may have substantial impact on the economic development of countries or industries (Dikova and van Witteloosstujin, 2007). Whether introduced coercively by the state or co-evolutionarily developed by private stakeholders, institutional developments like the enhanced provision of public goods, the containment of corruption, or the improvement of market intermediation have significant impact on whether a country attracts firms and prospers (Chan et al., 2008).

## 2.5 Future research

Though being well established, institutional theory still enjoys numerous developments and massive interest among scholars from different fields, including management, economics, sociology, politics and entrepreneurship. Decades of research by scholars from all these fields have answered many questions and critiques, but also triggered new ones that have not yet been sufficiently answered by the academic community. In the context of our analysis, we want to highlight some of these issues and simultaneously point to promising directions for future research.

Although we outlined how the concept of embedded agency contributes to solving the structure-versus-agency debate, this long-standing struggle is not yet resolved. Very recently, international business research was criticized (e.g. Saka-Helmhout and Geppert, 2011; Regnér and Edman, 2014) for its narrow view of institutions which largely accounts for their deterministic character as 'rules of the game' (North, 1990: 3). Several scholars have lamented the strong underrepresentation of agency in institutional analyses of the multinational enterprise (MNE) (e.g. Kostova et al., 2008; Phillips et al., 2009).

On the contrary, studies that privilege agency are frequently criticized for promoting heroic models of actors (e.g. Garud et al., 2007). Particularly, 'the notion of 'institutional entrepreneur' too often invokes 'hero' imagery and deflects attention away from the wider array of actors and activities' (Lounsbury and Crumley, 2007: 993). Future institutional research should investigate in how far a broader collective of actors contributes to institutional change (Hardy and Maguire, 2013; Lounsbury and Crumley, 2007). For instance, both the application of the discursive lens (Zilber, 2007) and the integration of institutional theory and social movement theory (e.g. Lounsbury et al., 2003) hold great promise in this regard.

Three more points of criticism that the present institutional literature has been subject to represent promising potential for future research. First, institutional scholars have been criticized for quickly accepting isomorphism as a sufficient indicator of institutionalization (Heugens and Lander, 2009). Mizruchi and Fein (1999) complain that researchers are 'positing a particular process that results in a behavioral outcome, but they are measuring only the outcome while assuming the process' (p. 664). Others added that practices are not necessarily adopted for legitimacy reasons (Boxenbaum and Jonsson, 2013) or as a response to institutional pressures (Greenwood et al., 2013). There are multiple alternative explanations for isomorphism, including social-level learning (Levitt and March, 1988), other 'bandwagon' processes (e.g. Abrahamson and Rosenkopf, 1993), or competitive superiority of the favored practice (Scott, 2008). Future empirical research is recommended to separate different kinds of isomorphism (Heugens and Lander, 2009) similarly to Lee and Pennings (2002) and provide more compelling indicators of institutionalization than merely an increasing number of adopters (Boxenbaum and Jonsson, 2013).

Second, institutional studies tend to focus on one single institution and neglect its mutual interdependencies with other institutions on the same or superordinate levels, a shortcoming that may be particularly inaccurate and misleading in studies of

institutional entrepreneurship and change. While inter-institutional connectedness may increase the constancy of an institution (Zucker, 1988) in times of stability, it may produce different patterns of dynamism in times of change (Holm, 1995). Notwithstanding rare exceptions (e.g. Crossland and Hambrick, 2011; Holm, 1995), institutional research has largely ignored such interdependencies. Scholars should take constellations of institutions into consideration instead of solely focusing on distinct ones.

Third, the majority of institutional studies decide for the environment, mostly the organizational field, as the level of analysis (Greenwood et al., 2013). While doing so organizations are treated as unitary actors and intra-organizational processes are ignored (Pache and Santos, 2010; Greenwood et al., 2013). Institutional theory may be further developed by acknowledging that each organization consists of multiple pluralistic entities with individual perceptions, interests and power bases. As exemplified in recent studies (e.g. Kim et al., 2007), investigating the interplay of institutional and intra-organizational dynamics seems promising. In particular, we agree with Pache and Santos (2010) who note that 'intra-organizational processes are an important factor explaining differences in organizational responses to institutional pressures' (p. 459).

Further insights might arise from institutional theories' neglect of two relevant perspectives which we term institutional maintenance and the dark side of institutional agency. Concerning the former, Hardy and Maguire (2013) raise the question whether organizational action ends once practices are initially institutionalized or it comprises subsequent 'institutional work' (Lawrence and Suddaby, 2006) aiming at their continuous preservation (Hardy and Maguire, 2013). We conceive of institutional maintenance as being clearly distinct from mere stability or an absence of change, and involving directed activities by stakeholders interested in retaining a favorable institutional status quo (Adegbite and Nakajima, 2012). While some researchers point to the fact that institutions, even inefficient ones, may enjoy long-term persistence due to their long-established legitimacy and self-reinforcing character (Roberts and Greenwood, 1997), literature hardly provides any accounts of active institutional maintenance (Lawrence and Suddaby, 2006; Lockett et al., 2009). Research tends to depict organizational responses to institutional pressures as a one-time act. Future research may widen our horizon by conceptualizing organizational agency affecting institutions as an ongoing effort.

Pointing to what we call institutional literature's missing attention to the dark side, Mair and Martí (2009) note that 'an intriguing feature of the existing literature on institutional entrepreneurship is the almost complete lack of attention to its unintended and even negative effects' (p. 433). While we do not limit this critique to institutional entrepreneurship but to institutional literature on organizational agency in general, we agree that there are way too few studies addressing destructive, unintended, or unsuccessful endeavors. Khan et al. (2007) is a rare example of such a contribution. Garud et al. (2007) and Hardy and Maguire (2013) argue that the limited attendance to the dark side stems from institutionalists' tendency to depict organizational actors, particularly institutional entrepreneurs, as heroic leaders, as it runs the risk of emphasizing intentionality and success. Another underrepresented perspective that links the dark side of institutional change and the aforementioned institutional maintenance is opposition or resistance to institutional change (Adegbite and Nakajima, 2012; Hardy and Maguire, 2013).

Although institutional theory has been applied to many management phenomena like mergers (Joshi et al., 2010), diversification (Peng et al., 2005), or strategic alliances (Dacin et al., 2007), it has only limitedly been integrated with other theories from management and related fields. For instance, we share Greenwood et al.'s (2013) assessment that the juxtaposition of institutional theory and the dynamic capabilities view would be an innovative and promising lens, particularly in emerging markets' fast-paced institutional environments. Integrative studies may produce great impetus for academic research as it lies not in the tradition of institutionalism to explain phenomena like change and dynamism (Child and Tsai, 2005). Dialogue with more activity-centered perspectives like dynamic capabilities, agency theory, or micro politics is assumed to produce fruitful contradictions and novel academic insights. In this regard Child and Tsai (2005) particularly promote further integration of institutional and political perspectives for developing knowledge concerning embedded agency and co-evolutionary approaches like institutional entrepreneurship. Agreement comes from Holburn and Vanden Bergh (2002) who state that–compared to the massive literature on competitive strategies–non-market strategies have received little academic attention.

We see most promise for future institutional research in the expansion of cognitive and discursive studies and the execution of process-focused empirical research. Cognitive and discursive strategies, both as part of an institutional entrepreneur's repertoire and as a separate proactive approach, are powerful tools for

modifying institutional arrangements. The discipline is still rather nascent and offers numerous white spots researchers could make the subject of their efforts. Weber and Glynn (2006) call for more exploration of sensemaking in the context of institutionalization. Zilber (2007) also notes that 'there are not many studies that explore how meanings are constructed and manipulated' (p. 1050), Suddaby and Greenwood (2005) being a rare exception. Concerning discourse, Zilber (2007) contends that we do not know how exactly discursive mechanism are used by actors in the field. Future research may benefit from a detailed investigation of the content of texts, their effects, and different discursive mediums. Empirical progress in the cognitive and the discursive realm can be generated by collecting data 'in situ and in vivo' (Zilber, 2007: 1051), e.g. by ethnographic studies deep-diving into the use of sensemaking and discourse in the context of organizational attempts to shape institutional arrangements, similar to Zilber (2007) and Phillips et al. (2004). With regard to other future research potentials mentioned above, cognitive and discursive studies are of particular interest. As the dissemination of both texts and meanings is a clearly collective process, cognitive and discursive studies may lead research on institutional entrepreneurship away from its hero imagery and enhance the emphasis on broader collectives' impact on institutionalization (Zilber (2007). Furthermore, discourse and sensemaking, seen as ongoing processes, may grow our knowledge on institutional maintenance, but also on intra-organizational dynamics and the dark side.

Concerning process studies, we join other scholars' (e.g. Phillips et al., 2004) call for more such research in the field of organizational institutionalism. Dorado (2005) points to the need to understand how (as opposed to why) institutional change is created. Hardy and Maguire (2013) draw a dividing line between actor-centric perspectives and process-centric perspectives. The latter, that have been applied all too rarely, hold great promise for understanding how exactly organizations can impact institutional change, and, additionally, allow for zooming into unintended and negative results of such processes (Hardy and Maguire, 2013). Concerning institutional entrepreneurship Phillips et al. (2004) lament that 'existing views of institutional entrepreneurship leave its exact nature–and the mechanisms through which institutional entrepreneurs work–undefined' (p. 648). Hardy and Maguire (2013) agree by stating that it is 'unclear how institutional entrepreneurs get other embedded field members to take up and institutionalize new practices' (p. 199). These kinds of questions, that are left unanswered by institutional literature so far, are exactly where process-focused studies can create considerable academic impact. A more process-

focused view on how organizations respond to or impact institutional contexts incorporates the potential to simultaneously address some of the above-mentioned shortcomings within institutional literature. By investigating processes of institutional change, scholars cannot merely measure the outcome while assuming the process, would probably not treat organizations as unitary actors, and may shed light on under-researched phenomena like institutional maintenance. Moreover, it seems that 'disadvantages and possible negative outcomes of institutional entrepreneurship are more likely to be recognized in process-centric narratives' (Hardy and Maguire, 2013: 212).

In sum we may conclude that–despite its age and maturity–institutional theory still enjoys massive interest in the academic world–as also exemplified by very recent debates (e.g. Greenwood et al., 2014; Meyer and Höllerer, 2014)–and continues to hold promising roads for future research to enrich our understanding of how organizations respond to and interact with institutions.

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# 3 Decision Making in Emerging Markets: The Delphi Approach's Contribution to Coping with Uncertainty and Equivocality

## Abstract

Firms in emerging markets are particularly challenged by uncertainty and equivocality in their long-term oriented decision making. These markets are characterized by dynamic institutional contexts especially affecting the predictability of future developments in the business environment. Based on the organizational information processing theory (OIPT), we first analyze how widely applied decision theories, organizational as well as procedural approaches contribute to coping with uncertainty and equivocality in emerging markets from a decision-making perspective. Accounting for inherent information asymmetries, we then elaborate the potential of future-oriented Delphi studies to serve as an information processing aid. To demonstrate the applicability of Delphi-based studies in the context of emerging markets we draw on case examples centered on China's and India's automotive industry, India's aerospace and defense industry as well as the health insurance industry in rural India in 2020.

## Keywords

Emerging Markets, Uncertainty, Equivocality, Delphi, Organizational Information Processing, Decision Theories

## 3.1 Introduction

Emerging markets offer both enormous business potential across industries but also very distinct institutional contexts. This unique institutional environment needs to be well understood when planning, evaluating, implementing and expanding business operations in these markets (Khanna and Palepu, 1997; Khanna et al., 2005). Organizational information processing theory (OIPT) stipulates that managers' information level influences decision making effectiveness and, as a result, firm performance (Galbraith, 1974; Tushman and Nadler, 1978). According to Daft and Lengel (1986), decision makers are challenged by two major information contingencies. First, uncertainty, defined as a lack of information. In our context, uncertainty may occur in different environmental domains and refer to various stakeholder activities (e.g. regulations of the government or competitors' strategic moves). Second, equivocality, or ambiguity, defined as the lack of clarity of available information. In equivocal situations, multiple potential interpretations of the information at hand conflict with each other. Hence, their implications (e.g. for the focal industry or firm) remain unclear (Daft and Macintosh, 1981). Changes in the institutional environment of emerging markets such as political shifts and evolving market conditions challenge managers in their decision making through both uncertainty about which changes might occur and equivocality about how to interpret changes in order to anticipate relevant consequences and interrelations at an early stage (Kuklinski et al., 2012). In addition to a significant lack of information that firms naturally face in foreign markets, emerging markets are more dynamic and '*surprise-intensive*' (Root, 1984, p. 22) than most firms are accustomed to from their home markets.

The more adequate the information needs of decision makers are met, the better the effectiveness of their decision outcomes (Galbraith, 1974; Tushman and Nadler, 1978). The information processing requirements of firms in emerging markets are mainly exogenously pre-determined due to the dynamic institutional context. Hence, they have little choice but to adapt their information processing capacities in order to manage the information contingencies. Yet, predominant strategic management as well as decision theories direct little attention towards the question of how to actively cope with information contingencies. Managers draw on little guidance how to balance limited information processing capacities with high information processing requirements. In this paper, we focus on the information acquisition of decision-making processes, i.e., the phase of information gathering rather than phases

associated with evaluating alternatives and choosing courses of action (Simon, 1960). Although the sequential character of conceptualized decision phases has been subject to critique, the differentiation allows for a further clarification of the paper's locus from an OIPT perspective. We stipulate that in our particular context future-oriented Delphi studies offer valuable support for the information gathering efforts of managers (Hartman et al., 1995). We assert that properly employed Delphi studies can serve as a promising information gathering aid and enhance the decision making effectiveness in emerging market settings.

Based on organizational information processing theory, the paper focuses on the information gathering phase of decision making processes, and elaborates the potential of future-oriented Delphi studies as an information gathering aid in emerging markets. More precisely, the contribution of the paper is threefold. First, we provide a comprehensive overview of potential approaches to cope with the decision making challenges in emerging markets; specifically, we evaluate each approach's potential contribution to reducing uncertainty and equivocality. Second, we elaborate on the applicability of the Delphi-based approach in the context of the organizational information processing theory. Third, we demonstrate the flexibility and appropriateness of the Delphi-based approach in different country and industry contexts through four case examples.

The remainder of this paper is structured as follows. The next chapter outlines key characteristics of emerging markets as well as the resulting decision-making challenges, and introduces the central tenets of organizational information processing theory. Subsequently, we discuss the applicability and effectiveness of procedural approaches, analogical reasoning and extrapolation techniques as well as dominant decision theories with respect to coping with information contingencies in emerging markets. We then introduce the Delphi method and elaborate on the effectiveness of future-oriented Delphi-based information gathering efforts in order to cope with uncertainty and equivocality. We draw on four emerging market case examples: The health insurance, the aerospace and defense as well as the automotive industry in India and the automotive industry in China in 2020 (in total 183 expert panel participants). Finally, we proceed with conclusions, followed by limitations and implications for research and practice.

## 3.2 Decision making in emerging markets: An organizational information processing perspective

As opposed to the relatively stable political, social and economic environments in developed countries, emerging markets are portrayed by a dynamic institutional context characterized by opaque regulations and little transparency in decision-making processes of governmental institutions such as courts and other relevant entities (Hoskisson et al., 2000). In many instances, emerging markets have arisen from centrally planned economies and undergo an institutional transition towards free(r) market principles and safeguarding mechanisms (Hoskisson et al., 2000; Wright et al., 2005). Hence, the institutional framework enabling and regulating economic transactions is rapidly evolving (Hoskisson et al., 2000; Wright et al., 2005).

The considerable dynamics in the business environments of emerging markets can be structured along political, economic, social and technological aspects (PEST). The political environment in emerging markets is characterized by government policies that favor economic growth or liberalization. Still, emerging markets remain comparably regulated and considerable governmental involvement occurs more frequently than in most industrialized countries (Hoskisson et al., 2000; Khanna and Palepu, 1997; Wright et al., 2005). The economic environment is mostly characterized by less developed product and financial markets (Khanna and Palepu, 1997; Khanna et al., 2005). In the social domain, major differences between industrialized and emerging markets concern not only the educational system (e.g. higher illiteracy rates) but also regional and country-specific cultural aspects determining key factors such as customer requirements or the code of conduct during economic transactions (Khanna and Palepu, 1997). From a technological perspective, many emerging markets lag behind in relevant business infrastructure conditions such as communication and transportation systems, energy and water supply or automation of production processes (e.g. Khanna and Palepu, 1997). As a result, we assert two main aspects to be particularly challenging in emerging markets: institutional voids referring to a less-established institutional framework (Khanna and Palepu, 1997; Khanna et al., 2005) as well as difficult-to-predict, often non-linear changes of the institutional context. These challenges along with companies' constrained information processing capacities confront managers with incomplete and ambiguous information.

According to OIPT, organizations are open social systems which process information to complete or coordinate tasks (Daft and Lengel, 1986; Tushman and Nadler, 1978). Following the understanding that uncertainty constitutes some kind of

information deficit, Galbraith (1974) suggests information processing as an uncertainty-reduction strategy. If firms acquire sufficient and adequate information, they can reduce and eventually eliminate information contingencies (Sharfman and Shaft, 2011). Thus, larger information requirements demand increased information gathering and processing. The better the 'fit' between the information processing requirements and capacities, the higher is the effectiveness of the decision outcomes and subsequently corporate performance (Keller, 1994).

Firms can align their information processing requirements and capacities by either reducing their information requirements, or taking measures to increase their information processing capacities; both can prove equally effective (Bensaou and Venkatraman, 1995). However, information processing requirements in emerging markets are predominantly influenced by exogenously determined conditions, i.e. the institutional context (Egelhoff, 1991). Firms can only limitedly reduce such information processing requirements (e.g. by lobbying). Accordingly, firms normally have to adapt their limited information processing capacities to the pre-determined level of information processing requirements (e.g. Bensaou and Venkatraman, 1995; Georgantzas and Acar, 1995). In this respect, research suggests a change of organizational structures and designs including process coordination and control mechanisms as well as analogical reasoning and extrapolation techniques (Bensaou and Venkatraman, 1995; Lipshitz and Strauss, 1997).

## 3.3 Decision making approaches in emerging markets

### 3.3.1 Organizational approaches

In line with both organizational information processing as well as structural contingency theory, researchers stipulate that adapting an organization's structure to the specific environmental conditions forms a prerequisite for organizational effectiveness (e.g. Bensaou and Venkatraman, 1995; Leifer and Huber, 1977). An appropriately adapted "organizational design can provide information of suitable richness to reduce equivocality as well as provide sufficient data to reduce uncertainty" (Daft and Lengel, 1986, p. 559). In this context, organismic and mechanistic structures are two commonly distinguished generic options (Burns and Stalker, 1966; Tushman and Nadler, 1978). According to OIPT, organismic structures have greater information processing capacities than mechanistic structures and can cope with higher levels of uncertainty and equivocality; organismic structures can thus

be considered better suited for dynamic business environments such as emerging markets.

### 3.3.2 Procedural approaches

In order to improve their decision making effectiveness firms need to consider an adaptation of implemented routines and processes (Miller and Friesen, 1983). For example, Milliken (1987) suggests that firms should adapt their strategic planning processes in light of 'state', 'effect' and 'response uncertainty'. In situations characterized by state uncertainty, Milliken (1987) recommends allocating more resources to environmental scanning and forecasting in order to achieve a better understanding of upcoming events or changes. With respect to effect uncertainty, Milliken (1987) recommends adapting the strategic planning process towards analyzing more environmental threats and opportunities as well as formulating related contingency plans. When encountering response uncertainty, he proposes postponing strategy implementation in order to gain time for deriving and evaluating alternative solutions, developing multiple forecasts to model various responses and associated outcomes, or imitating strategic responses (e.g. from competitors) which have already proven effective in similar situations (Milliken, 1987).

Moreover, research suggests that decision makers can draw on procedural approaches such as incrementalism (Bourgeois and Eisenhardt, 1988; Bruton et al., 2005). Following the trial-and-error principle, appropriateness and effectiveness of decisions are evaluated *ex post* and induce more frequent learning effects. This approach allows decision makers to reduce resource requirements for searching and evaluating alternative solutions (Neumer, 2009). Bruton et al. (2005) show that the application of pragmatic "learn as you go" (p. 228) approaches can prove successful. Yet, the applicability of such procedural approaches for strategic decisions in emerging markets is questionable: Potential learning effects are rather tacit due to the time span between strategy implementation and feedback, the complexity of cause-effect relationships as well as non-linear, hard to predict developments (e.g. Comes et al., 2011).

### 3.3.3 Extrapolation and analogical reasoning

A pragmatic way for coping with information contingencies is to search for existent data and to draw on past experiences for guidance. Quantitative references from the

past can be used to derive helpful insights (e.g. sales forecasts) based on statistical analyses such as extrapolation techniques (Lipshitz and Strauss, 1997). However, in emerging markets extrapolations of the past hardly offer a reliable guidance for medium- or long-term plans. These markets often develop in a non-linear way and do not follow statistical reflections of the past (Davidson, 1991). As many obstacles in emerging markets cannot be captured through standalone figures, we argue for qualitative references, i.e. representations from the past that go beyond statistical estimates. Similarly, Lipshitz and Strauss (1997) suggest decision makers to enrich explicit knowledge with assumption-based reasoning to cope with information contingencies. Firms need to critically reflect on their experiences, consider imitating approaches (e.g. from competitors, other industries) or consulting external experts to draw on well-informed opinions (Milliken, 1987; Tihanyi and Thomas, 2005). Moreover, we will further emphasize the value of scenario-driven approaches allowing decision makers to account for a variety of possible future states.

### 3.3.4 Decision theories

According to *classical decision theory* (CDT), also labeled (expected) utility theory (EUT), decision makers draw on complete information (Savage, 1954; von Neumann and Morgenstern, 1947) and are fully rational; i.e. decisions are made in favor of the alternative that offers the highest (expected) utility according to an individual preference scaling function (Hey et al., 2010). Over time, researchers have challenged most assumptions central to CDT (e.g. Neumer, 2009; Simon, 1982) as decision makers usually face at least one of four challenges not accounted for by CDT. First, not all alternatives are known; i.e. the available set of alternatives is mostly incomplete. Second, neither all possible future states of nature nor all their probabilities are known. Third, the outcomes of some state-alternative combinations remain unclear and not all (expected) utilities can be calculated reliably. Fourth, preferences are neither clear nor consistent, especially when decisions concern multiple stakeholders with diverging objectives.

Addressing some of CDT's shortcomings, researchers have developed fruitful amendments suggesting, for example, the use of stochastic estimates and subjectively perceived probabilities (Hey et al., 2010; Neumer, 2009), or the application of decision rules such as Maximin, Minimax Regret or the Hurwicz criterion to rank decision alternatives without probabilities (Aiginger, 1987; Hey et al., 2010). Yet, researchers

perceive information contingencies to be less relevant and rather easily manageable in such decision-making concepts (Aiginger, 1987).

As an alternative to CDT, Kahneman and Tversky (1979) proposed *prospect theory*. However, when comparing the central assumptions of both CDT and prospect theory with managerial practice, research found that in most cases rather simple (heuristic) approaches are applied to derive decisions (Bhaskaran et al., 2008). Loomes and Sugden (1982, p. 805) extend this notion by proposing *regret theory* which 'has greater appeal to intuition'. According to regret theory, decision makers experience regret upon realizing (in hindsight) that a better choice had existed, and experience no regret in case they believe they made the best choice (Aiginger, 1987; Loomes and Sugden, 1982). Driven by similar perceptions concerning the applicability of CDT, Simon's (1997) *bounded rationality* perspective accounts for informational limitations and incorporates the behavioral phenomenon of 'satisficing'. Bounded rationality asserts that decision makers are not perfectly informed – neither about individual preferences nor the surrounding environment. In addition, bounded rationality suggests that decision makers generate decision alternatives instead of exclusively relying on a pre-existent set of alternatives, and utilize estimation procedures instead of only fact-based probabilities (Simon, 1997).

### 3.3.5 An OIPT perspective on decision-making approaches in emerging markets

The introduced decision-making approaches offer some scattered support for decision makers, e.g. by suggesting organizational and procedural adaptations, stochastic and heuristic methods, or estimation procedures and satisficing. However, these approaches direct little attention towards the challenge of how to actively cope with information contingencies at the grass-roots level of information gathering and processing in order to reduce uncertainty and equivocality (cf. Table 6). More specifically, we highlight that although the depicted decision-making conceptualizations partially acknowledge information incompleteness, the suggested aids serve to optimize decision outcomes based on existing information levels (respectively unmet information processing requirements), rather than to match information processing capacities with information requirements (Neumer, 2009).

**Table 6:** Decision making approaches in light of uncertainty and equivocality.

| | **Information Contingencies** | |
|---|---|---|
| **Theoretical Perspective / Approach** | **Uncertainty** | **Equivocality** |
| **Structural Contingency Theory** (prescriptive) | ▪ each organizational structure can process a distinct amount of information<br>▪ organic structures recommended for high uncertainty | ▪ each organizational structure can process information of distinct richness<br>▪ organic structures recommended for high equivocality |
| **Procedural Approaches** (incrementalism) (prescriptive) | ▪ incrementalism is recommended when high information contingencies render detailed analyses difficult and experience is largely missing<br>▪ especially applicable in rapidly evolving environments such as emerging markets as decision speed can keep pace with changes<br>▪ difficult to apply for long-term oriented decisions in complex environments due to diluted connection between decision and feedback | |
| **Extrapolation and Analogical Reasoning** (descriptive/prescriptive) | ▪ fact-based reasoning drawing on historical quantitative information enriched by assumptions based on experience<br>▪ helpful for coping with uncertainty/equivocality if referenced approach and fit between referenced and required approach are of good quality | |
| **Classical Decision Theory (CDT)** or (Expected) Utility Theory (prescriptive) | ▪ decision makers draw on complete information<br>▪ focuses on situations of risk rather than uncertainty<br>▪ missing information can partially be compensated through subjectively perceived probabilities, expected utilities, and special decision rules | ▪ theory does not take equivocality into account<br>▪ basic assumption: available information is unambiguous |
| **Prospect and Regret Theory** (descriptive) | ▪ decision makers draw on complete information<br>▪ both conceptualization focus on situations of risk rather than uncertainty | ▪ theories do not take equivocality into account<br>▪ basic assumption: available information are unambiguous |
| **Bounded Rationality** (descriptive) | ▪ decision makers are never fully informed and have limited cognitive capacity<br>▪ uncertainty reduction through generation of decision alternatives<br>▪ uncertainty is intentionally not resolved entirely, instead: satisficing | ▪ does not specifically account for equivocality<br>▪ estimation procedures can also apply to reduce equivocality<br>▪ limited information processing capacity may hinder the dissolution of equivocality |

## 3.4 Delphi-based information gathering to reduce uncertainty and equivocality

### 3.4.1 Introduction to Delphi

The Delphi method has its origins in expert-based military research conducted in the 1950s (Donohoe and Needham, 2009; Linstone and Turoff, 1975). It is defined as a structured, interactive group communication and judgmental forecasting process with the purpose of facilitating a systematic exchange of informed opinions among a panel of experts and developing a consensual understanding on a topic (Donohoe and Needham, 2009; Linstone and Turoff, 1975). Especially in situations characterized by uncertainty, i.e., when objective, fact-based quantitative information is scarce, the Delphi method has proven effective (Donohoe and Needham, 2009; Gray and Hovav, 2008). Moreover, Delphi is particularly well suited for emerging market research as the method can be used for "1) expanding geographic boundaries of global business research; 2) engaging stakeholders with diverse and diverging perspectives; 3) exploring complex interrelationships and interdependencies within the global system" (Nielsen and Thangadurai, 2007, p. 151). While avoiding costs and time for bringing dispersed entities together (von der Gracht, 2008), Delphi "enables researchers to expand their field of view beyond the Triad to delve into emerging markets and developing countries" (Nielsen and Thangadurai, 2007, p. 151).

Decision makers are well advised to exchange existing views, to draw on informed opinions and subjective expert judgments as well as experience-based interpretations (Daft and Lengel, 1984; Linstone and Turoff, 1975). The underlying idea of the Delphi method is that structured, group-based approaches yield more accurate judgments than individual expert assessments (Donohoe and Needham, 2009; von der Gracht, 2008). Research stresses the assertion that groups of decision makers have higher information processing capacities and reduce information contingencies by exchanging various viewpoints especially about topics which are perceived to be difficult to assess (Daft and Lengel, 1984, 1986; Luo, 2005). We stipulate that, even in the dynamic institutional context of emerging markets, some features of the future can be considered foreseeable by at least some members of an expert panel (e.g. Georgantzas and Acar, 1995; Walsh, 2005).

### 3.4.2 Online real-time Delphi

Our approach is a modified version of the conventional, consensus-seeking Delphi technique (Linstone and Turoff, 1975) and can be described as an online real-time Delphi that is complemented by expert workshops, scenario analysis, correlation analysis, and road-mapping. By combining these methods with a PEST and adapted stakeholder perspective (Duncan, 1972), we propose to develop an in-depth understanding of the analyzed environment and its institutional developments (Walsh, 2005). Such information can substantially reduce uncertainty and equivocality, support strategic planning and decision making, and eventually lead to improved managerial decisions and firm performance.

In order to discover a focal industry's most relevant institutional developments and its most influential drivers as well as the relevant activities promoting or preventing the important developments, we propose both an outcome perspective and an industry-focused stakeholder perspective. Within the outcome perspective we aim to cope with uncertainty by investigating possible developments along the political, economic, socio-cultural, and technological (PEST) dimensions of the industry. Applying the PEST framework adds to methodological rigor (Durance and Godet, 2010) by ensuring a comprehensive and holistic environmental analysis (Meristö, 1989). Based on our industry-focused stakeholder perspective we investigate how different key stakeholder groups could influence the development of the focal industry, thereby accounting for equivocality.

The core of the Delphi research approach is built by projections, i.e., single statements about a specific future development in the focal industry. An important prerequisite for the construction of these projections is the identification of the most relevant and influential drivers of the development within each of the four PEST perspectives. The identification of these major drivers is based on intensive database and desktop research as well as interviews with selected industry experts. Using dedicated questions as a starting point, experts identify, discuss and prioritize developments and drivers. In order to keep the number of projections within reasonable limits, our proposed approach usually focuses on the two most influential factors of each of the four PEST perspectives. Taking the political perspective as an example, table 7 shows both the starting questions and the resulting projections for each of our four sample Delphi studies.

**Table 7:** Development of political outcome projections for the four case examples (based on Gnatzy and Moser, 2012).

| **Development Guideline for Political Outcome Projections for the year 2020** | |
|---|---|
| (1) | What is the most important governmental regulation restricting the development of this industry? |
| (2) | What is the most important business development incentive from the government for this industry? |
| ***India Health Insurance 2020*** | |
| (1) | A stringent regulatory environment for the Indian health insurance industry is strictly enforced. |
| (2) | Health insurance is mandatory for everyone in India. |
| ***China Auto 2020*** | |
| (1) | China has the most stringent vehicle emission requirements in the world. |
| (2) | Consumer incentives for New Energy Vehicles (NEVs) are such that the purchase price is competitive with gasoline vehicles. |
| ***India Aerospace 2020*** | |
| (1) | The offset requirements fulfilment rate of each program and its respective suppliers is automatically published on the MOD website. |
| (2) | There is no FDI limitation for foreign manufacturing companies in the Indian Defence sector. |
| ***India Auto 2020*** | |
| (1) | The emission regulations in all regions of India are the same as in Europe. |
| (2) | The Goods and Service Tax (GST) for small cars in India is a third of the tax rate for all other kinds of passenger cars. |

As the development of the projections directly influences the validity and reliability of the results, we follow the rigid research practices of leading Delphi method experts (Linstone and Turoff, 1975; Rowe and Wright, 1999; Nielsen and Thangadurai, 2007).

Literature on scenarios and environmental analysis stresses the relevance of both environmental forces, as covered by our outcome projections, and actions of stakeholders (Walsh, 2005) because they significantly influence these future developments (Schoemaker, 1995) and shape part of the industry environment (Smircich and Stubbart, 1985). Applying an industry-focused stakeholder approach and following a similar process as with outcome projections, we develop *enabler projections* in order to investigate how key stakeholder groups could enable or inhibit

specific developments within the PEST environment of the focal industry. Considering the activities of five key stakeholders groups on an industry level, i.e. customers, suppliers, competitors, governments, and society at large, we apply a multiple perspectives approach that enriches the strategic foresight and scenario development process (Coates, 2000).

Subsequently, we build an expert pool that comprises at least around 30 industry experts with heterogeneous backgrounds in order to ensure quality, reliability and validity of the research results (Tersine and Riggs, 1976). The experts are provided with an individual, web-based access to the Delphi platform and are asked to assess the probability (0-100%), impact (5-point Likert scale), and desirability (5-point Likert scale) of each projection. The assessment of impact aims at the relevance of the respective projection for the industry's development. Desirability is included to avoid a potential desirability bias with respect to the probability assessment (Windschitl et al., 2010). As recommended by Nielsen and Thangadurai (2007), we combine quantitative and qualitative methods to enhance the strengths of the conventional Delphi approach. Experts are encouraged to provide written qualitative arguments underlining their quantitative assessments for each projection. The qualitative arguments lead to a profound understanding of prospected developments as well as the underlying drivers and interdependencies (Graefe and Armstrong, 2011).

Having completed the assessment of a single projection, each participant immediately receives an automatically generated feedback concerning his estimates and arguments compared to the other panelists. Each expert can then see whether the own evaluations match the group opinion, and is encouraged to rethink his own contributions in light of the input of the other participants and to restate his initial estimates, if desired. This constitutes the real-time character of this Delphi approach (Linstone and Turoff, 1975). Compared to classical Delphi studies the process is simplified while efficiency increases; completion time, fatigue and drop-outs are reduced (Klenk and Hickey, 2011; von der Gracht, 2008).

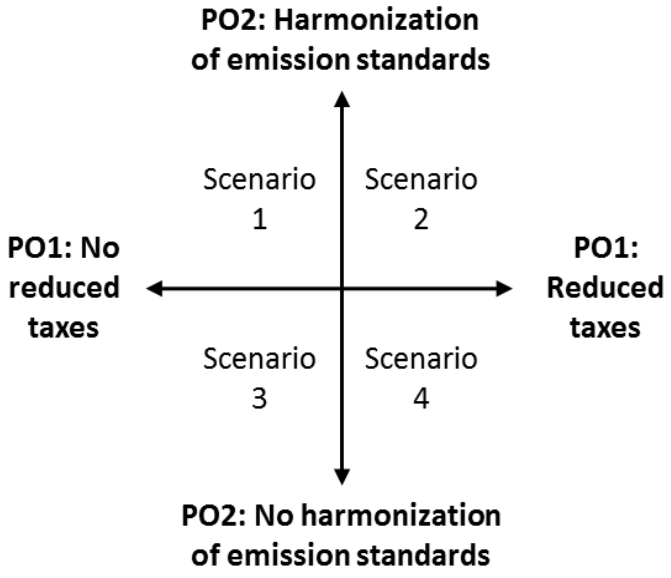
After two estimation rounds, the Delphi process normally ends as most improvements of estimates take place between the first and the second iteration (Woudenberg, 1991; Parente et al., 1984). Additionally, considering the heterogeneous expert panels and emerging market focus, a strong consensus, which is usually reached by multiple iterations, is neither likely nor the primary objective. Although many Delphi studies aim at consensus among participants, the purpose of our proposed study approach in the context of emerging markets has a different focus (Klenk and Hickey,

2011; Woudenberg, 1991). In fact, one needs to account for an inherently high degree of uncertainty and equivocality rendering a high level of dissent inevitable (Woudenberg, 1991). Under these circumstances, Delphi studies should rather be designed to make the plurality of opinions and their underlying arguments visible (Landeta and Barrutia, 2011; Story et al., 2001). Exploring the diversity of underlying arguments based on substantial disagreements among experts is far more insightful than evaluating projections where consensus is reachable (Story et al., 2001; Gordon and Pease, 2006). Accordingly, research suggests to strive for stability of group opinion for a single projection (e.g. in the form of multiple consensus clusters among the experts), rather than for an overall consensus among panel participants (Story et al., 2001). The final quantitative results comprise the ratings for probability of occurrence, impact on industry, desirability, consensus values expressed by interquartile ranges, and convergence rates of experts' estimates following the feedback and restatement over several rounds (Klenk and Hickey, 2011). The quantitative estimates are complemented by the experts' qualitative comments.

### 3.4.3 Scenario development and expert workshops

Based on the two outcome projections of each PEST perspective, four scenario fields can be built (van't Klooster and van Asselt, 2006). Figure 4 shows the political scenario matrix of the India Auto 2020 study as an illustrative example.

**Figure 4:** Political scenario matrix of the "India Auto 2020" study.



We follow the recommendations of the scenario literature to further integrate the experts' knowledge to build the scenario content (Gudonavicius et al., 2009), construct scenarios on combinations of projections (Gausemeier et al., 1998) instead of dealing with projections in isolation (Burt et al., 2006), and to keep the number of dimensions down to two in order not to complicate the development, presentation and application of the scenarios (Fahey and Randall, 1998).

As our Delphi approach requires participating experts to provide both quantitative and qualitative contributions, it provides a very valuable basis for scenario construction (von der Gracht and Darkow, 2010; Kosow and Gassner, 2008). At this stage, the proposed approach abandons the Delphi-specific anonymity and the study administrator invites local industry experts to scenario development workshops. After benefitting from the advantages of anonymity, e.g. avoidance of bandwagon effects (Rowe and Wright, 1999; Linstone and Turoff, 1975; Tersine and Riggs, 1976) or halo effects (Tersine and Riggs, 1976; Landeta and Barrutia, 2011), the approach now addresses the frequent critique that Delphi limits the interactive dialectical debate among the participants (Georgantzas and Acar, 1995; Story et al., 2001). During the workshops experts develop detailed descriptions of the implications of each of the PEST scenario matrices for the industry-focused stakeholder groups. All scenario texts are discussed by the experts and researchers and checked for inconsistency (Courtney, 2003). The scenario workshops further validate the Delphi results, and breed a deeper understanding of the focal industry dynamics (Story et al., 2001).

### 3.4.4 Correlation analysis and roadmaps

In addition to the described future developments and implications based on the qualitative arguments of the participants for each projection, we statistically identify relationships between the outcome (PEST) projections and the stakeholder projections. We apply correlation analysis to calculate interdependencies among outcome and enabler projections based on the probability assessments of the experts for each projection. With the support of existing but also additional experts, the identified interdependencies resulting from the correlation analysis are 'qualitatively' re-assessed with respect to their logical plausibility. Based on the identified and logically validated interdependencies the approach proposes to draw roadmaps to illustrate the analytical results. Roadmaps, also called causal maps, are a valuable amendment to the classical scenario analysis that facilitates the understanding and communication of complex

interaction structures and finally reduces equivocality (Comes et al., 2011; Montibeller and Belton, 2006).

## 3.5 Future-oriented Delphi studies in emerging markets: Case examples from India and China

To illustrate the potential of future-oriented Delphi studies as an information processing aid in emerging market settings, we draw on four case examples addressing the future of India's automotive industry, India's aerospace and defense industry, India's rural health insurance industry and the future of China's automotive industry in 2020. The various industry domains allow us to highlight how our Delphi-based analyses can be used to account for uncertainty and equivocality in different emerging market contexts.

**Table 8:** The four exemplary Delphi studies.

| Topic | Year Conducted | Projections | Panel size | Location of Panel/Workshop |
|---|---|---|---|---|
| ***China Auto 2020:*** China's Automotive Industry in 2020 (Focus: New Energy Vehicles) | 2011/2012 | 8 PEST Projections<br>18 Stakeholder Projections | 79 | Shanghai, China |
| ***India Auto 2020:*** India's Automotive Industry in 2020 (Focus: Small car segment) | 2010/2011 | 8 PEST Projections<br>12 Stakeholder Projections | 43 | Bangalore, India |
| ***India Aerospace 2020:*** India's Aerospace and Defense Industry in 2020 | 2010 | 8 PEST Projections<br>12 Stakeholder Projections | 29 | Bangalore, India |
| ***India Health Insurance 2020:*** India's Health Insurance Industry in 2020 | 2010 | 8 PEST Projections<br>12 Stakeholder Projections | 32 | Bangalore, India |

Focusing on a today only partially existing industry domain, Gnatzy and Moser (2012) examine the future health insurance market in rural India (India Health Insurance 2020). The authors demonstrate how a Delphi study can provide support to "successfully develop and adapt business models for emerging markets especially in

the case of evolving industries where fully developed business models do not exist yet" (Gnatzy and Moser, 2012, p. 689). Decision makers concerned with strategy development for India's future health insurance industry in rural areas are, from an OIPT perspective, particularly challenged by equivocality due to the nascent character of the domain. Similarly, a study on the future of China's new energy vehicle (NEV) sector (China Auto 2020) focuses on a market segment which is still rather negligible in terms of annual new car sales. Both industry domains hardly exist – as of today – which renders it almost impossible for decision makers to draw on historical fact-based insights or past experiences in order to assess or draw causal maps of potentially upcoming institutional changes. Here, the most pressing questions revolve around how to 'play the game' in 2020.

The case examples addressing the future of India's automotive (India Auto 2020) as well as the aerospace and defense industry (India Aerospace 2020) center on industry domains which are relatively mature compared with the previously discussed industry segments. However, they are still rapidly evolving and characterized by uncertainty and equivocality due to a dynamic institutional context. Yet, the likelihood that decision makers can draw on fact-based insights, existent databases or analogical reasoning increases. The 'fine art' is more concerned with the reduction of uncertainty about how the status quo might evolve in the future. Firms already know how to 'play the game' and the most pressing questions center on how the game might look like in 2020?

For example, the political projections of the four studies allow us to further highlight the different maturity levels and primarily associated information contingencies (Table 7). The mature level of the studies India Auto 2020 and India Aerospace 2020 allows to identify and incorporate detailed aspects. They are based on ongoing regulatory considerations and can be transformed into highly specific projections.

On the other hand, India Health Insurance 2020 and China Auto 2020 examine developments from a political perspective which are more difficult to grasp in terms of specificity. The political projections of India Health Insurance 2020 assess issues which are not yet existent and, hence, entail potential antecedents and consequences which are not easily foreseeable. For China Auto 2020 the standalone antecedents of the focal aspects emphasize the high equivocality for decision makers in this particular industry segment: one projection is anchored in the development of emission standards in China and other countries; the other projection, examining subsidized new energy

vehicle (NEV) purchase prices, stipulates a diminished purchase price difference compared to gasoline vehicles and is closely linked to both the technological advancements of the two propulsion systems and the overall market penetration rate of NEVs in China. The latter also depends on various facets such as societal trends, customer requirements and technological infrastructure considerations.

Following the congruent research design outlined above the four studies cope with uncertainty and equivocality through an improved understanding of future developments and underlying cause-effect relationships. From an OIPT perspective, the methodological approach exemplified in the four case examples supports firms in better meeting exogenously determined information processing requirements thereby improving decision making effectiveness.

However, applying a future-oriented research method, the Delphi case studies carry the particular challenge to prove their effectiveness in creating valuable insights that finally improve decision making. As the proposed Delphi study approach and the case examples were not performed until a few years ago and always look 10 years into the future, the results can actually not be validated before the future time horizon unfolds – a drawback common to all kinds of future-related research. However, there are examples for both Delphi approaches and scenario analyses that yielded very valid results (e.g. Jones and Xiao, 2004; Berman, 2004). However, the effectiveness of the Delphi approach is not limited to the accuracy of the predictions. The projection and scenario development process itself effectively enhances the understanding of the involved experts about more or less likely developments in the focal industry. Across all four Delphi studies and the subsequent scenario development workshops decision makers unanimously stressed that the online and offline exchange of viewpoints effectively reduced their uncertainty about future institutional developments as well as their equivocality about how changes in the environment affect each other. These statements can also be further confirmed by measuring the convergence rate during a Delphi study. The convergence rate is calculated as the delta between the initial and final probability assessment of a participating expert. Table 9 provides the convergence rates and other quantitative results of each projection for our case study “India Aerospace 2020”. The results indicate convergence rates for single projections of up to 20.9% .This means that experts are actually adapting their initial assessment based on the input of the other experts. Such results are a strong indication that Delphi studies can effectively contribute to the reduction of uncertainty.

**Table 9:** Quantitative results for the "India Aerospace 2020" study.

| Projection | Probability Final | Probability First | Convergence | Consensus (IQR) | Impact | Desirability |
|---|---|---|---|---|---|---|
| **OP1** | 46.3 | 45.3 | -7.1% | 45 | 3.8 | 3.5 |
| **OP2** | 60.3 | 63.9 | -8.5% | 25 | 3.6 | 4.0 |
| **OE1** | 70.3 | 68.3 | -4.0% | 20 | 4.0 | 4.0 |
| **OE2** | 60.7 | 60.8 | -1.9% | 25 | 3.3 | 3.3 |
| **OS1** | 46.6 | 47.4 | -8.0% | 20 | 3.3 | 2.2 |
| **OS2** | 44.7 | 47.8 | -4.1% | 20 | 3.6 | 3.9 |
| **OT1** | 42.1 | 42.2 | -12.5% | 20 | 3.9 | 2.4 |
| **OT2** | 55.2 | 54.3 | -9.9% | 30 | 3.4 | 3.3 |
| **ECu1** | 38.7 | 42.3 | -17.6% | 20 | 3.2 | 3.0 |
| **ECu2** | 50.9 | 52.2 | -8.2% | 20 | 3.5 | 3.1 |
| **ECu3** | 45.0 | 47.1 | -20.9% | 10 | 3.7 | 2.6 |
| **ESu1** | 53.6 | 54.8 | -17.5% | 20 | 3.8 | 3.9 |
| **ESu2** | 57.2 | 59.0 | -3.1% | 25 | 3.4 | 2.3 |
| **ECo1** | 57.1 | 55.5 | -6.0% | 35 | 3.7 | 3.8 |
| **ECo2** | 64.7 | 65.7 | -4.1% | 30 | 3.3 | 2.0 |
| **EGo1** | 58.3 | 57.6 | -14.4% | 25 | 3.2 | 2.7 |
| **EGo2** | 42.1 | 42.9 | -8.8% | 20 | 3.5 | 2.3 |
| **EGo3** | 50.3 | 52.1 | -6.8% | 30 | 3.6 | 3.3 |
| **ESo1** | 54.3 | 52.6 | -12.2% | 30 | 3.1 | 2.1 |
| **ESo2** | 54.7 | 54.5 | -10.8% | 10 | 3.7 | 3.3 |

Probability (0-100%); IQR: Interquartile range; Impact (5 pt. Likert scale; 5=very high); Desirability (5 pt. Likert scale; 5=very high)

## 3.6 Conclusion

Strategic decision making aims at aligning the operations of a company with its future business environment(s). Especially executives operating in emerging markets encounter high information contingencies and require therefore a profound understanding of how to improve their information processing capacities.

The objective of our paper was twofold: First, we briefly discussed the information gathering challenge of decision making with respect to distinct theoretical, organizational and procedural approaches and their contribution to coping with information contingencies in emerging markets. We found that predominant decision theories anchor a fixed or given information level in their underlying assumptions and direct little attention towards the question of how to actively cope with information contingencies. For organizational and procedural approaches we conclude that those may represent a necessary but insufficient step towards alleviating uncertainty and equivocality. Second, we presented how future-oriented Delphi studies can serve as an information gathering aid in emerging markets. Recent research acknowledges the potential of the Delphi methodology in emerging markets and points towards the applicability of Delphi-based scenario approaches. In this paper, we elaborated on how extensions of the conventional consensus-based Delphi method combined with future-oriented approaches (e.g. scenario planning) can yield improved information gathering activities. The four case examples show how systematic, future-oriented Delphi studies can contribute to the reduction of uncertainty and equivocality in emerging markets – in both nascent and relatively mature industry domains.

It should be noted that the potential of future-oriented Delphi studies is also strengthened by the discussed decision theories. More specifically, the four case examples demonstrate how some of CDT's shortcomings such as unknown alternatives, (probabilities of) future states and combined outcomes of both aspects, can be addressed systematically. Our case examples also account for the 'certainty' effects in light of the prospect theory by allowing an assessment of potential desirability biases for examined projections – indicative for associated gains or losses. In addition, some effects of regret theory's key assumption such as a reduced decision quality through decision makers' reflections in hindsight might diminish in our Delphi studies across multiple rounds conducted. Finally, with respect to bounded rationality, the projection assessments of the experts yielded positive convergence rates in all four Delphi studies thereby reinforcing the assumption that the participants were not perfectly informed about focal issues upfront.

## 3.7 Limitations and Implications

The case examples are limited in terms of the examined industry-country combinations and amount of integrated projections. These limitations point towards the crucial step of directing more research towards both a content-based as well as a process-based perspective in emerging market settings. Prior research has focused rather on an information content-based perspective, while the issue of how to gather and process information remains a pressing challenge in emerging markets. Moreover, the integration of alternative theoretical perspectives and conceptualizations can yield further insights into how to complement distinct approaches effectively. In addition, an empirical (re-)evaluation of the discussed theories and approaches with respect to their applicability and effectiveness in emerging market settings can lend further support to our assertions and create additional insights for decision makers.

We recommend further research to advance different ways of integrating future-oriented Delphi studies as an information gathering aid for long-term focused decision making in emerging markets. Yet, the challenge for decision makers confronted with uncertainty and equivocality in emerging markets will remain to determine and implement a balanced combination of those structural, procedural, and methodological approaches that best fit the individual information requirements of their companies.

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# 4 Coping with strategic uncertainty: Framework development for joint venture decisions abroad – The case of the truck industry in Russia

## Abstract

Across country and regional borders firms are faced with the question whether to address individual markets on a stand-alone basis or cooperatively. In order to support such strategic decisions we develop a decision framework accounting for the most relevant market dynamics affecting JV decisions, particularly in the truck industry. Moreover, we apply the framework to an expert Delphi and scenario approach in order to back a Western OEM's JV decision in the truck industry in Russia. Based on country-specific projections structured along the globally applicable decision framework, we serve executives' individual information demand in an institutionally unique emerging market environment.

## Key words

Delphi, scenarios, Russia, truck industry, market development, joint venture

## 4.1 Introduction

Russia and the other BRIC countries represent by their sheer size very attractive playgrounds for a variety of firms. Particularly for foreign players from the Triad countries those markets are highly interesting as they offer factor cost levels and business growth rates that are exceptionally rare in their home markets (Khanna et al., 2005). Additionally, companies from developed countries are often able to offer products, technologies, and services that face a decline in demand in their home markets but may experience a second life cycle in emerging markets representing a decisive competitive advantage towards domestic players (Wright et al., 2005; Wu and Pangarkar, 2006).

Despite this undisputable economic attractiveness, Western firms need to deal with liabilities of foreignness (Zaheer, 1995) and may, in accordance with institutional theory, not easily transfer their business models, structures and processes to emerging markets as these have their own specific characteristics and "rules of the game" (North, 1990; Khanna and Palepu, 1997; Williamson, 2010). Among those, immature institutions, underdeveloped factor and product markets, and an extraordinarily rapid pace of social developments are among the most prevalent (Hoskisson et al., 2000; Khanna et al., 2005). Facing these special conditions, managers experience substantial uncertainty concerning the future development of the emerging market's economy at large as well as of their relevant industries, competitors, and potential partners. As a consequence, firms need to develop strategies to align today's operations with their future business environments through long-term planning, strategizing and decision making under uncertainty.

According to organizational information processing theory (OIPT) uncertainty is rooted in information deficiency, i.e. the substantial, predominantly exogenously determined information requirements of firms in emerging markets are not matched by their available information resources and processing capacities (Egelhoff, 1991; Tushman and Nadler, 1978).

Following OIPT's insight that information collection and processing serve as an approach to cope with uncertainty, we develop a decision framework that focuses on and appropriately structures the most relevant information for a pending JV decision. The decision framework comprises the impact of regulatory changes, the development of the industry value chain, e.g. the supplier landscape, the emergence of new market segments, and the development of strategic groups including potential JV partners.

We demonstrate the applicability of the dedicated decision framework by applying it to a comprehensive Delphi study that serves the information demand of decision makers in the context of their JV deliberations. We present the results of an online real-time Delphi study executed in 2013 with a heterogeneous panel of 33 experts evaluating the probability, impact, and desirability of 20 projections each of which depicts a specific uncertain and relevant aspect for joint venture decisions in the context of the Russian truck industry. The quantitative and qualitative results of the Delphi along with the subsequent scenario analysis allow for a profound understanding of the Russian truck industry's likely development until 2025 and its underlying drivers. Following OIPT, the decision framework as well as the Delphi study represent helpful means to cope with the rising uncertainty and the subsequent information requirements.

The basic research questions addressed in this paper include the development of a decision making framework for a joint venture decision and how the decision-relevant information can be gathered and processed.

The large number of academic papers addressing the relationship between successful strategies and future-oriented questions in emerging markets (e.g. Gnatzy and Moser, 2012; Elliott et al., 2010) indicates the high relevance of such research. Strategic foresight is particularly important for firms with long product life cycles like in the automobile industry (Rothenberg and Ettlie, 2011). Our research describes likely developments in the macro- and micro-environment that are relevant for JV considerations. The research process and results create a profound understanding of relevant industry dynamics and directly feed into strategic decision making, thereby paving the way for sustainable market success and superior firm performance.

Although it is an industry of global significance and a major economic contributor in many countries, including BRIC as well as NAFTA, the EU, and Japan, the truck industry has been widely neglected by management research so far. To our knowledge, there is only one recent article on the Russian truck industry focusing on the effects of Russia's WTO accession in 2012 (Fashkiev, 2013) and only one Delphi study on the truck industry at all focusing on Brazil (Maia and D'Agosto, 2013). Hence, concerning country/industry focus we add to very scarce scientific research and follow Baur et al.'s (2012) recommendation to focus automotive research on certain markets as it is difficult to derive global implications. Furthermore, we are not aware of any Delphi approach designed for supporting a JV decision. Although there are some studies following a similar methodological approach as ours (e.g. von der Gracht

and Darkow, 2010; Gnatzy and Moser, 2012), we break new ground in developing a JV-dedicated decision framework and applying it to a special emerging market industry setup.

The remainder of the paper is structured as follows: First we elaborate on the theoretical basis of our paper. Afterwards we introduce the decision framework as well as its development process and the projections it comprises. Subsequently, we describe the applied Delphi methodology, its specific design features, and the results it yielded – with a special lens on the JV decision at hand. We further present the derived scenarios for the Russian truck industry in 2025, followed by a brief summary and conclusions. We close by outlining potential limitations and further research avenues.

## 4.2 Theoretical foundation

### 4.2.1 Institutional theory

Our research builds upon institutional theory that stresses the importance of institutions and points to the environmental uncertainty resulting from missing or underdeveloped institutions as they frequently occur in emerging markets. The study further integrates Organizational Information Processing Theory defining firms as information-processing units that collect and process information as a promising approach to cope with environmental uncertainty.

Institutional theory underlines the fundamental importance of institutions for answering crucial questions of strategic management like ‘How do firms behave?’ or ‘What determines the success of firms?’ (Peng et al., 2009). It regards institutions as independent variables (Peng et al., 2008) and directs attention to the impact of institutions on organizational behavior and performance (Peng et al., 2008, 2009). Institutional theory literature emphasizes that firms’ strategic choices are not only a result of a firm’s resources – as proposed by the resource-based view (Barney, 1991) – and competition-centered industry characteristics – as stipulated by the market-based view (Porter 1980) – but as well impacted by the institutional framework governing the environment a firm is operating in (Peng, 2002; Gao et al., 2010; Peng et al., 2008, 2009).

Following North (1990), institutions are defined as “the rules of the game” in a society or economy, i.e. the constraints that guide human and organizational behavior. Despite other valuable categorizations (e.g. by Scott, 1995), institutions are commonly

distinguished in formal (e.g. contracts, laws, state agencies, and regulatory agents like central banks) and informal elements (e.g. conventions and social norms) (North, 1990).

Although, institutions sometimes – in particular when working properly – seem to be taken for granted (Johanson, 2008; Peng et al., 2009), the insight that *institutions matter* is hardly controversial nowadays. The more relevant question is how they matter (Peng et al., 2008). Literature postulates that institutions function by conditioning humans' and organizations' behavior (Peng et al., 2009). By "defining the boundaries of what is legitimate" (Peng et al., 2009, p. 66) they provide information about the likely behavior of business partners and other relevant actors (Meyer et al., 2009). Consequently, information asymmetries as a major source of market failure are reduced (Arrow, 1971). Institutions provide stability, which in turn reduces uncertainty, renders the long-term environment predictable (Fedderke and Luiz, 2008), and facilitates transactions as well as investments (Scheela and Jittrapanum, 2012; Meyer, 2001; Meyer et al., 2009). Accordingly, the reduction of uncertainty is uniformly seen as the key purpose of institutions (e.g. Beyer and Fening, 2012; Peng et al., 2009).

### 4.2.2 Institutions in emerging markets

This institutional perspective largely contributes to explaining the special characteristics of emerging economies as their institutional frameworks substantially differ from that of developed countries (May et al., 2000; Peng and Heath, 1996; Peng et al., 2008, 2009). Emerging economies are usually characterized by weak institutional frameworks. In particular, their formal institutions are considered underdeveloped or even missing in some domains (Wright et al., 2005; Beyer and Fening, 2012). As many emerging economies grew out of highly government-controlled, planned economies where competition was not a common feature (Johanson, 2008) institutions regulating and supporting free market exchange relationships among economic actors still need to develop (Ericson, 1991; Hoskisson et al., 2000). Moreover, factor and product markets must largely be assessed as immature from a Western point of view (Khanna and Palepu, 1997; Wright et al., 2005). Such institutional "voids" (Khanna et al., 2010; Wright et al., 2005) and differences are not limited to the economic domain. They are equally conspicuous along all PESTEL dimensions including social, technological, environmental, legal and political aspects as well. Concerning the latter two, emerging economies are

oftentimes characterized by ample and opaque regulations (Hoskisson et al., 2000; Peng et al., 2008), untransparent and hard-to predict decisions of public institutions such as authorities or courts (Khanna and Palepu, 1997; Peng et al., 2008), and strong governmental involvement in elsewhere rather freely developing realms (Wright et al., 2005; Hoskisson et al., 2000; Khanna and Palepu, 1997). As a direct consequence of their partial immatureness, institutions in emerging markets show continuous development dynamics. As opposed to the relatively stable institutional environments in developed countries, many facets, conditions and interdependencies in the institutional context of emerging markets are portrayed by rapid, often non-linear, change (Wright et al., 2005; Hoskisson et al., 2000).

Both the immature state and the rapid development of the institutional framework in emerging markets render those environments highly uncertain. As institutions are not completely developed, they are not able to deploy their full uncertainty-reducing potential as stipulated by institutional theory. Additionally, as the institutional framework is not stable but continuously maturing, its non-linear changes complicate predictions about institutions' future character and effect (Peng et al., 2008). Collecting and processing information about the institutional environment and deriving sound strategic decisions becomes a key challenge for organizations and executives in emerging markets (Johanson, 2008).

### 4.2.3 Organizational Information Processing Theory (OIPT)

According to Organizational Information Processing Theory (OIPT), environmental uncertainty can largely be ascribed to the information deficiencies a company faces. OIPT considers organizations as information processing systems (Tushman and Nadler, 1978), i.e. open social systems which collect and process information to complete or coordinate tasks (Daft and Lengel, 1986). If firms lack information, e.g. about organizations, activities, and environmental events, they are confronted with the inability to accurately predict the organization's environment. This inability is equivalent to environmental uncertainty (Milliken, 1987).

Milliken distinguishes three types of uncertainty – state, effect, and response uncertainty – each of which represents a different kind of missing information. State uncertainty concerns the future character of an organization's environment, including environmental changes (e.g. technological trends), actions of other players (e.g. suppliers), and interrelationships between environmental components (e.g. reaction of

a competitor on a regulatory change) (Milliken, 1987). Effect uncertainty – being akin to ambiguity – concerns uncertainty about the effects of an environmental change on the industry and the focal company, including nature, timing, and severity of these effects (Milliken, 1987; Cadeaux and Ng, 2012). Finally, response uncertainty is uncertainty about a firm's alternative responses to environmental changes, and the consequences those responses would have (Milliken, 1987; Vecchiato and Roveda, 2010). Following the understanding that each kind of uncertainty constitutes some kind of information deficit, Galbraith (1974) suggests information processing as an uncertainty-reduction strategy. If firms acquire sufficient and adequate information, they can reduce and eventually eliminate uncertainty (Galbraith, 1974; Georgantzas and Acar, 1995; Sharfman and Shaft, 2011; Leblebici and Salancik, 1981). OIPT further constitutes that the effectiveness of decision outcomes and the overall performance of the organization are largely driven by the 'fit' between information processing requirements and information processing capacities (Keller, 1994; Daft and Lengel, 1986). This fit has been shown to improve the quality of strategic decision making and to positively impact company performance (Kuklinski et al., 2013). As information processing requirements of firms operating in emerging markets are largely exogenously pre-determined due to the dynamic institutional context, firms have little choice but to adapt their information processing capacities in order to manage environmental uncertainty. Since in emerging economies institutions and intermediaries providing sufficient and accurate information in a reliable manner can widely not be expected (May et al., 2000; Khanna et al., 2005; Khanna and Palepu, 1997), firms need to apply more sophisticated and individualized approaches for information collection and processing (Tushman and Nadler, 1978; Galbraith, 1974).

Literature stresses the importance of filtering, aggregating, and prioritizing information (Ackoff, 1967; Meyer, 1998; Eppler and Mengis, 2004) in order to reduce large amounts of information to a manageable bundle (Cook, 1993) and to reach a better fit between information requirements and capacities. We propose to apply thoroughly designed decision frameworks that filter and aggregate the most decisive information, arrange them along an appropriate structure, and help focusing limited information processing capacities (i.e. time and human resources) on the most decision-relevant issues (Cummings and Holmberg, 2012). This contributes considerably to OIPT's basic recommendation to match limited information capacities to the according requirements in order to cope with uncertainty.

## 4.3 Framework and projection development

Framework development was initiated by the guiding question "Which factors exert most impact on industry characteristics and firms' strategies in 2025?" With this questions and the JV decision as major filters, we executed an extensive desk and database research including academic publications, market studies, and corporate publications of global and local industrial corporations. As a result, an industry's future development and the necessity/attractivity of a JV setup are mainly driven by five generic factors which we used to build the decision framework: political powers interfering with economy, legal requirements, the value chain setup (both at industry and firm level), market segment development, and strategic group development.

*Political and legal environment* are deemed particularly influential as they set the regulatory boundary conditions for doing business in any focal country-industry setup (Engau and Hoffmann, 2011). As emerging markets' governments are very powerful player, interactions between the state and the economy are frequent and pervasive (Levin and Starov, 2000; Kuznetsov and Kuznetsova, 2003; Aidis et al., 2008) and political leaders frequently demonstrate their willingness to protect local manufacturers against increasing foreign competition (Fashkiev 2013). Therefore, political and legal developments need to be considered when evaluating potential JV relations with a local manufacturer.

*The value chain setup* comprises important issues and developments, both concerning the industry value chain, e.g. the supplier landscape or customers' buying criteria, and the value chain of the group of potential JV partners, e.g. R&D capabilities and sales potential. Although a value chain assessment must be performed for a potential JV partner individually in a later step, the decision whether or not to engage in a JV at all, can be evaluated from an industry perspective.

The third part of the decision framework addresses *strategic group developments* like consolidation processes and collaboration tendencies, as well as *market segment developments*. The focus on market segments was found to be important as each strategic group and potential JV partner typically addresses certain market segments. The strategic group and market segment developments, as well as the question whether to face them on a stand-alone basis or with a JV partner, will have a decisive impact on firms' future market success and company performance.

For each of those framework sections, we developed more precise questions (cf. figure 5) in order to identify the most relevant and most uncertain factors driving the

future of a focal industry and affecting an imminent JV decision. These questions along with the overall framework are generally applicable across industries and countries.

In the paper at hand they are applied to the specific case of the Russian truck industry. The questions were answered by desk research efforts and multiple interviews with selected experts from a large German truck manufacturer's corporate strategy department engaged in strategic projects in Russia and other major truck markets. All of those experts can draw on many years of experience in the truck industry. Experts' inputs were used to identify the most relevant and uncertain factors driving the future of the truck industry and affecting the JV decision at hand. These factors were transformed into 20 projections building the basis for the Delphi survey. The individual decomposition in 20 projections ensures contentual comprehensiveness and methodological rigor (Durance and Godet, 2010).

Political and macro-economic factors are included in the projections as international markets and firms should not be looked at in isolation of those determinants (Nielsen and Thangadurai, 2007). Nevertheless, as in emerging markets perceived environmental uncertainty in the task environment is usually higher than in the general environment, most projections are rather industry-specific (Sawyerr, 1993).

To ensure proper formulation of the projections we consulted researchers from two independent universities experienced in expert surveys like ours. The final formulations are neither too short or long, ambiguous, nor unnecessarily compound or conditional (Ecken et al., 2011; von der Gracht, 2008; Salancik et al., 1971). As recommended by the literature, the set of projections was pretested (by a truck manufacturer's strategy experts) for potential misunderstandings and interpretation issues (von der Gracht, 2008). Throughout the entire development process the projections were continually improved. We decided to limit the number of projections to 20 as experts are busy people and might be reluctant to take part in a more voluminous study (Webler et al., 1991).

Figure 5 gives an overview of the steps followed and guiding questions used during framework and projection development. The derived projections dedicated to the Russian truck industry are depicted in Table 10. As prescribed by the framework, projections cover political and legal developments (projection 1-4), technological and economic developments along the entire value chain (projections 5-13), and market segment as well as strategic group developments (projections 14-20).

**Figure 5:** Guiding questions for framework and projection development.

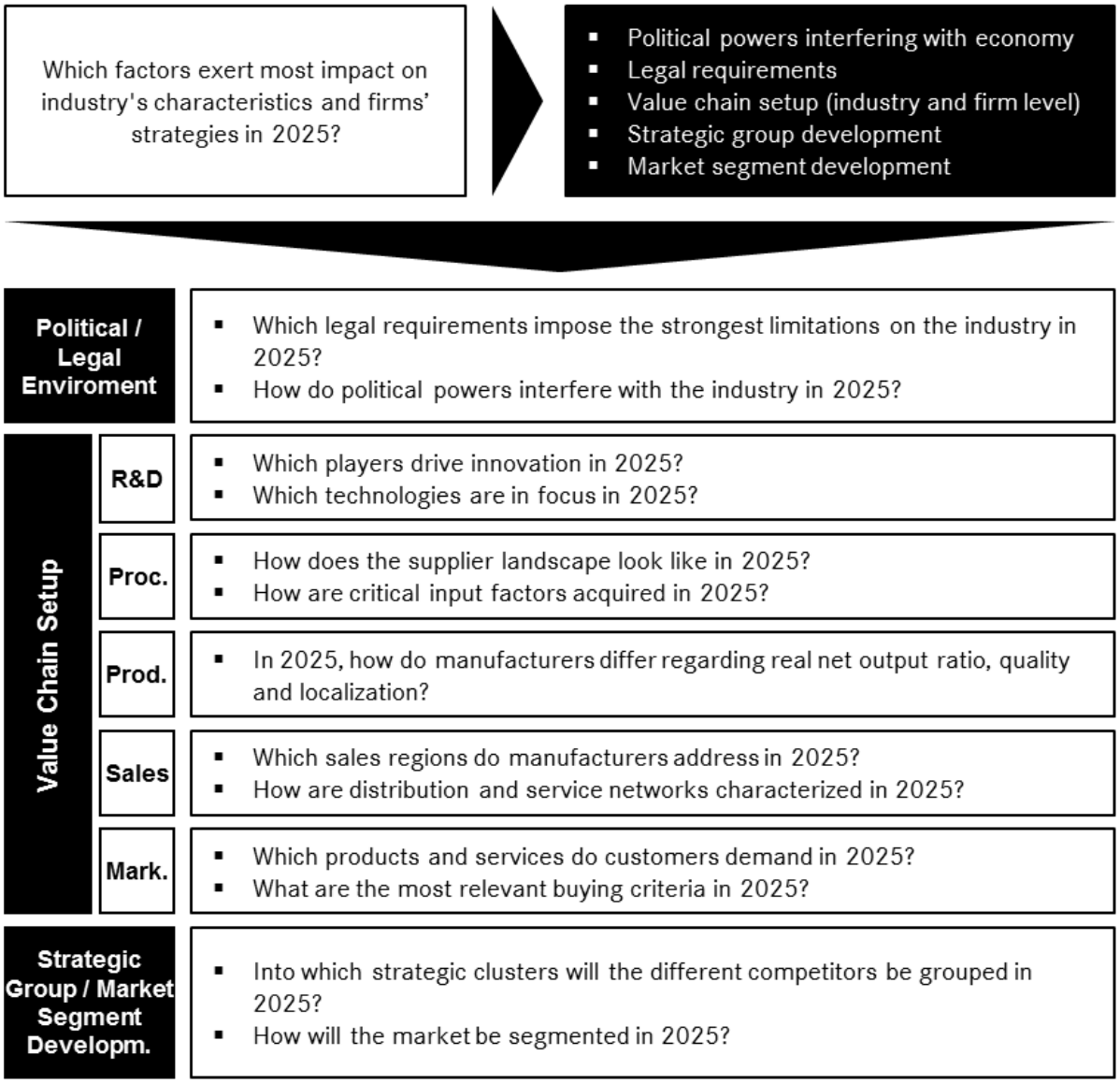


**Table 10:** Framework and projections.

| Framework | | Projections |
|---|---|---|
| Political / Legal Environment | | 1 In 2025, the Russian government has introduced an explicitly regulated local content quota of at least 50% in order to support Russian OEMs. |
| | | 2 Euro 5 & Euro 6 emission standards are introduced – as planned – in 2015 and 2020 respectively. |
| | | 3 In 2025, Russian truck OEMs engage in extensive lobbyism aimed at limiting business opportunities for foreign OEMs. |
| | | 4 In 2025, due to their stricter compliance regulations, Western OEMs have to give away many attractive business deals. |
| Value Chain Setup | R&D | 5 In 2025, there are sufficient well-educated & technologically up-to-date engineers in Russia enabling all Russian truck OEMs to develop most relevant parts and technologies on their own. |
| | Proc. | 6 In 2025, all Russian truck OEMs source more than 50% of their components (e.g. engines, axles) from foreign suppliers or cooperation partners.[a] |
| | | 7 In 2025, there are only few suppliers located in Russia that OEMs can count on concerning product quality, volumes and supply reliability on a Western standard. |
| | Prod. | 8 In 2025, all Russian truck OEMs produce at the same quality and efficiency levels as Western OEMs do in Russia. |
| | | 9 In 2025, each foreign OEM (Western & Asian) that is a major player in Russia has established at least one production plant in Russia covering all major production steps (not just CKD or SKD assembly).[b] |
| | Sales | 10 In 2025, the 3 largest Russian truck OEMs report one third of their sales in developing countries outside the CIS region. |
| | | 11 In 2025, the 3 largest Russian truck OEMs report at least 5% of their sales in developed countries such as in NAFTA, Western Europe or Japan. |
| | | 12 In 2025, Russia shows an east-west-split concerning sales/aftersales network & volumes, i.e. Western truck brands dominate Western Russia while Russian & Chinese truck brands are in clear lead in Eastern Russia.[c] |
| | Markg. | 13 In 2025, latest technology standards ensuring fuel efficiency and high resale values are much more important buying criteria for customers in Russia than the purchase price. |
| Market Segment & Strategic Group Development | | 14 In 2025, the Russian truck industry has undergone a major consolidation process decreasing the number of independent Russian truck OEMs to not more than three.[d] |
| | | 15 In 2025, each Russian truck OEM intensively collaborates with Western Joint Venture partners for components delivery and technology transfer. |
| | | 16 In 2025, a gap between the high-tech market and the low-cost segment has evolved resulting in a considerable middle market segment. |
| | | 17 In 2025, Russian truck OEMs are not technologically competitive in the high-tech segment and struggle in price-competition with Chinese OEMs in the low-cost segment. |
| | | 18 In 2025, the high tech segment is exclusively covered by Western truck brands while the low cost market is covered completely by Russian and Chinese OEMs/brands. |
| | | 19 In 2025, 50% of total new truck sales in Russia are Western branded trucks leaving only half the market for Russian and Chinese brands. |
| | | 20 In 2025, Chinese OEMs sell at least as many trucks in Russia as Russian OEMs do. |

a) In this projection a supplier or cooperation partner is considered foreign when it initially originates from abroad, regardless of where the components are produced. (An originally foreign firm that supplies components from its Russian subsidiary is nevertheless considered foreign.)

b) CKD = Completely Knocked Down, SKD = Semi Knocked Down

c) The Ural Mountains may be considered as the borderline between what is meant by Western Russia and Eastern Russia.

d) An OEM is considered independent if there is no other OEM holding a majority stake in this respective OEM.

## 4.4 Methodology

### 4.4.1 Delphi

We conducted an expert-based Delphi study as this approach has proven effective in other strategic foresight research projects (e.g. Gnatzy and Moser, 2012; von der Gracht and Darkow, 2010). It is particularly valuable in situations of high uncertainty (Pill, 1971) where fact-based information is rare (Donohoe and Needham, 2009; Gray and Hovav, 2008). Hence, Delphi is most appropriate for our research domain as it combines the uncertainties of a rapidly changing emerging market environment and the evident uncertainties of long range planning and strategizing (Day, 1975). In such situations where precise analytical techniques are not applicable, a Delphi-based scenario approach may – by systematically obtaining expert judgments – assess the likely evolution of drivers of change (→ state uncertainty), investigate those drivers' impact (→ effect uncertainty), and evaluate possible reactions to the changes (→ response uncertainty) (Vecchiato and Roveda, 2010).

Grounded on the assumption of group assessments being superior over individual estimates (Hill, 1982; Parente et al., 1984; von der Gracht, 2008; Yaniv, 2011), Delphi evolved as a forecasting and decision-aiding tool (Rowe and Wright, 1999) that aggregates disparate points of view and their underlying conjectures from various experienced persons in a systematic and interactive fashion (Gupta and Clarke, 1996; Hallowell and Gambatese, 2010). It aims at deepening the understanding of the focal matter (e.g. the likely development of a firm's environment) and delivering accurate inputs for decision-making processes (Daft and Lengel, 1986; Rowe and Wright, 1999). Among the most prominent features of Delphi are the iterative character of the process, the anonymity of respondents, and the controlled intermediate feedback given to experts (Story et al., 2001; von der Gracht, 2008; Rowe and Wright, 1999).

Within and beyond the scope of these established characteristics Delphi has experienced many modifications to its original design (von der Gracht, 2008). We applied an online real-time Delphi, i.e. participants provided their inputs via an online questionnaire and received immediate feedback in the form of a compilation of group responses (Gordon and Pease, 2006; Linstone and Turoff, 1975; von der Gracht, 2008). This procedure was initially introduced by Gordon and Pease and successfully applied to emerging markets research by e.g. Gnatzy and Moser, 2012. It enhances the process in terms of convenience, speed and efficiency (Klenk and Hickey, 2011;

Gordon and Pease, 2006; Linstone and Turoff, 1975) while providing profound and extensive information (Brüggen and Willems, 2009).

By applying an expert-based Delphi scenario approach on an uncertain and rapidly-developing emerging market industry we contribute to institutional theory and OIPT perspectives by demonstrating how industry- and country-specific information requirements can be profoundly served by a thoroughly conceptualized Delphi approach. As the Delphi provides superior expert knowledge on the most relevant and uncertain aspects of the regarded industry's institutional features it perfectly serves OIPT's basic idea to face major uncertainties by dedicated information collection and processing. While the decision framework introduced above helps to filter and structure information bundles, the Delphi helps to understand the industry institutions' likely development and to gain insights into how they will matter for the pending JV decision. Hence, strategic decision making and firm performance can be substantially improved.

### 4.4.2 Expert selection

Potential participants were identified via desk research and personal contacts, including pyramid search – a search method where the already identified experts recommend other experts (Baur et al., 2012). Experts were contacted via phone or e-mail and – in case of sufficient expertise and willingness to participate – send an individual link to the online questionnaire. Another important criterion for expert selection was panel heterogeneity as we wanted to incorporate multiple different perspectives – a key success factor in emerging markets research (Turoff, 1970; von der Gracht, 2008; Yaniv, 2011). In order to ensure validity but also expertise we targeted a panel of 30 participants – a usual panel size in this kind of research (von der Gracht, 2008; Donohoe and Needham, 2009). In the end, 33 experts completed the online survey – all of them with direct and in-depth experience related to the Russian truck industry. The panelists came from various professions and institutional actors, e.g. truck manufacturers, parts/components suppliers, trailer companies, road freight logistic providers, research institutes, and strategy consultancies.

### 4.4.3 Online real-time procedure

The experts were given access to the online questionnaire and asked to assess the twenty projections on the future development of the Russian truck industry concerning

their probability, impact on industry, and desirability – each measured on a 5-point Likert scale ranging from 1 “very low” to 5 “very high”. Likert scales were “found to be quick, easy to comprehend, and psychologically comforting.” (Scheibe et al., 1975, p. 267). The assessment of impact aims at the relevance of the respective projection for the industry’s development. Desirability was included to avoid a potential desirability bias (cf. limitations) (Windschitl et al., 2010).

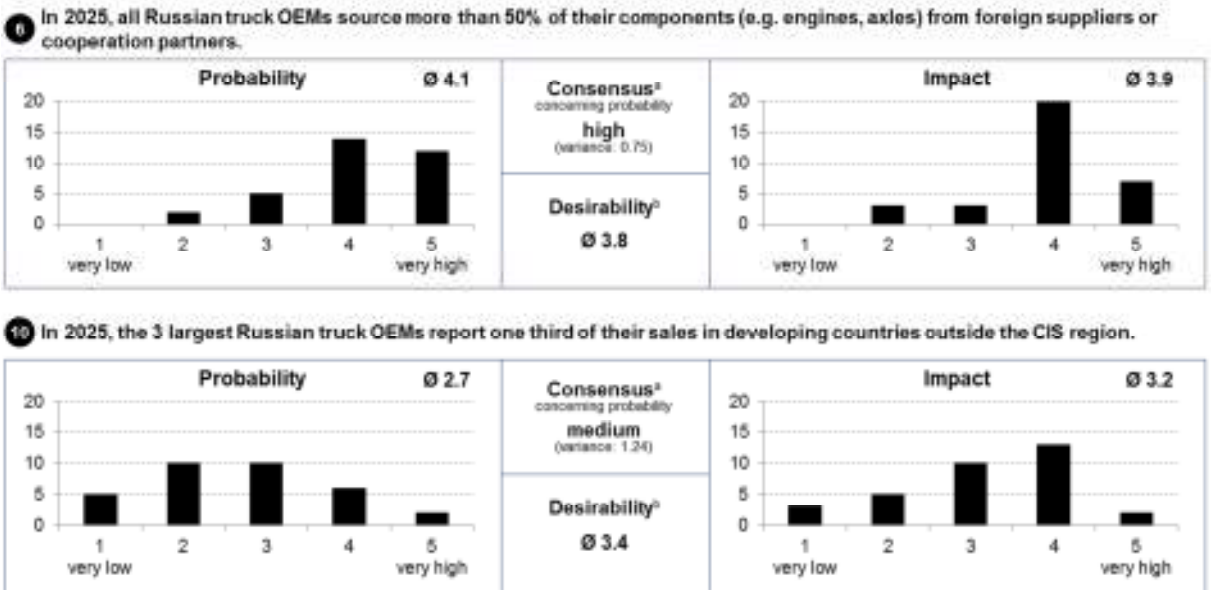
Following a recommendation by Nielsen and Thangadurai (2007), we combine quantitative and qualitative inputs to enhance the strengths of the Delphi approach. Besides the quantitative estimates experts were encouraged to provide written qualitative arguments for each of their probability and impact estimates. The qualitative arguments aimed at underlining the quantitative estimates and explaining the prospected developments as well as their underlying drivers and interdependencies. Moreover, these statements are an excellent basis for the scenario development following later in the process.

Having completed the questionnaire each participant received immediate feedback in form of panel statistics and arguments of the other panelists. Experts were able to see whether their evaluations matched the group opinion. Each participant was encouraged to rethink her/his own contributions in light of the other panelists’ inputs and given the immediate opportunity to restate her/his initial estimates, if desired. This constitutes the real-time character of the Delphi (Linstone and Turoff, 1975; Gordon and Pease, 2006). Compared to classical Delphi iterations participants do not get distracted by lengthy feedback loops and require less time for completion. Hence, the process is simplified while efficiency increases (Klenk and Hickey, 2011) and results are not negatively affected. After these two estimation rounds, we did not initiate any further one, as usually most or all improvement takes place between the first and the second estimation (Woudenberg, 1991; Parente et al., 1984). Moreover, we intended to avoid drop-outs and fatigue (von der Gracht, 2008). Additionally, considering the heterogeneous panel and the study’s subject, strong consensus – usually reached by multiple iterations – was neither likely nor our primary objective. As In situations of high uncertainty dissent is inevitable (Woudenberg, 1991) Delphi rather serves the purpose of making the plurality of opinions visible (Landeta and Barrutia, 2011; Story et al., 2001). Exploring the underlying assumptions as reasons for the disagreement among experts is far more insightful than consensus (Story et al., 2001; Gordon and Pease, 2006).

## 4.5 Results

Each expert rated probability, impact on industry, and desirability for each of the 20 projections on a 5-point Likert scale ranging from 1 “very low” to 5 “very high”. We determined the consensus for each projection by calculating the variance between the 33 respective probability estimates – a usual measure for consensus (Hallowell and Gambatese, 2010). Figure 6 provides an overview of the quantitative results for projections 6 and 10 that were selected as illustrative samples yielding fairly different outcomes and insights.

**Figure 6:** Quantitative results for projections 6 and 10.




a) Variance (Consensus): 0.00 - 1.00 high consensus, 1.01 - 1.30 medium consensus, 1.31 - 4.00 low consensus.

b) Impact / Desirability: 1.00 - 2.49 low, 2.50 - 3.49 medium, 3.50 - 5.00 high.

Projection 6 is an example for a high probability / high consensus projection. Experts agree on Russian OEMs’ inability to develop and manufacture major components like engines and axles on their own. They will have to turn to foreign suppliers or cooperation partners for components delivery and technology transfer (corroborated by ratings and comments for projection 15). In case of a joint venture, a Western truck manufacturer will most likely play that role and would have to invest a lot of resources (knowhow, time, human resources, financing) into the technological ramp-up of the Russian partner in order to maintain its competitiveness.

In contrast, projection 10 is characterized by medium consensus, wide-spread probability estimates and an average probability score of 2.7 that is rather close to the center of the scale. That is indicative of above-average uncertainty concerning the export sales performance of Russian OEMs in 2025. Further insights on this are provided by experts' written arguments (cf. table 11) and the integration of projection 10 into the scenario analysis described below. The relevance of projection 10 for the JV decision stems from the potential market presence in other emerging markets and the subsequent scales improvement that a Western OEM might target via a Russian manufacturer's lower profile products and brand.

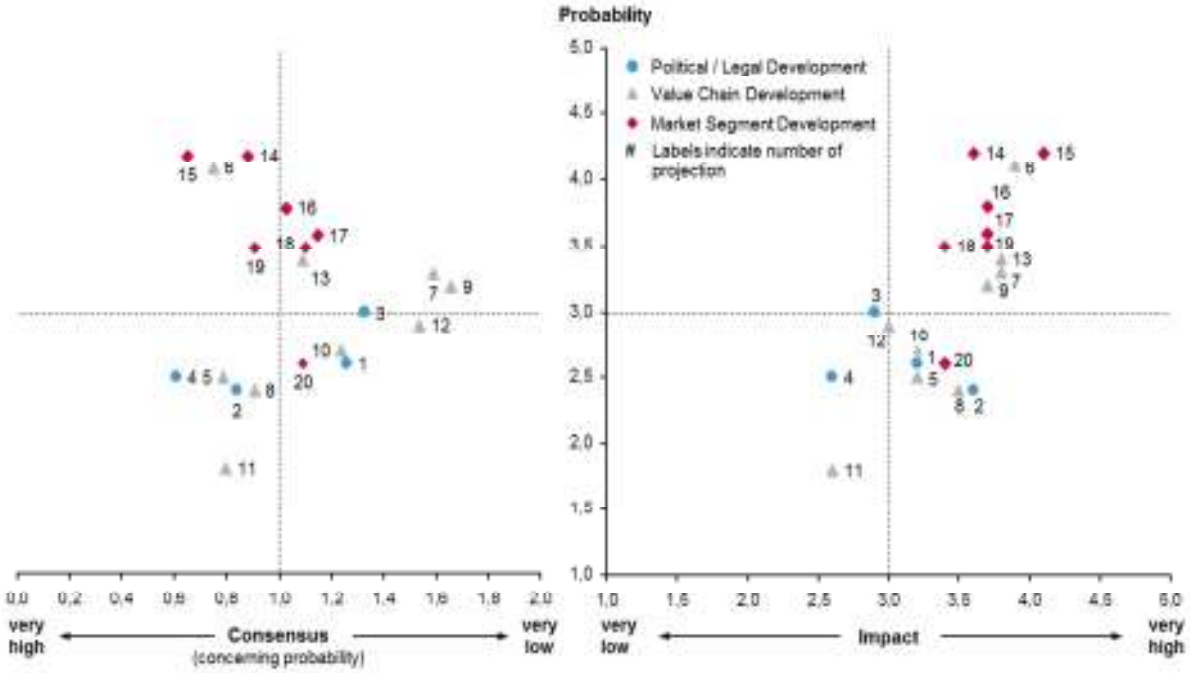
While the occurrence of projection 6 is supposed to have high impact (27 out of 33 experts rated 4 or 5), projection 10 is expected to be less influential. Logical reasoning as well as experts' arguments for their impact scores provide the explanation that foreign sales – being the subject of projection 10 – only indirectly affect the truck industry in Russia itself.

**Table 11:** Experts' arguments for the probability of occurrence of projection 10.

| 10 Key arguments for *HIGH* probability | 10 Key arguments for *LOW* probability |
|---|---|
| ▪ Export chances for low to medium-sophisticated trucks worldwide<br>▪ Russian technology may better serve the needs of less developed regions<br>▪ All CIS OEMs have ambitious global targets.<br>▪ Products are good enough for developing countries. With the right mind set and proper management commitment this is realistic<br>▪ They are already exporting nowadays<br>▪ The industry needs to increase exports to stay alive as imports & locally assembled foreign brands increasingly attack their position at home<br>▪ Decline of domestic sales will help to reach this quota | ▪ Even though they currently have export sales, I'd assume that other 'budget' OEMs may be more competitive in international markets<br>▪ Compared to just 5-10 years ago, Chinese brands are now much more capable of going after budget customers in emerging markets.<br>▪ The competitiveness of the Russian industry regarding factor costs and exchange rates prohibits large export rates to non-CIS countries.<br>▪ Russian OEMs can't compete with foreign manufacturers in terms of technology, ecology and fuel consumption<br>▪ Within CIS, Russian brands have an advantage due to brand recognition, proximity, parts availability, existing networks. Outside CIS conditions worse. |

In order to identify and illustrate the most probable, most influential and most uncertain developments, we mapped experts' quantitative estimates in a probability-impact matrix and a probability-consensus matrix (von der Gracht and Darkow, 2010). Figure 7 shows those matrices based on the mean probability and impact scores for each projection as well as the respective consensus values.

**Figure 7:** Probability-Consensus Matrix (left) and Probability-Impact Matrix (right).




Regarding our framework and its different groups of projections, we find the projections on "Strategic Group & Market Segment Developments" being assessed most probable and most influential, i.e. most important for the JV decision, with medium to high consensus among experts. The "Political / Legal" projections were considered less probable and less influential. The projections on "Value Chain Development" yielded mixed results. Looking at the upper outer corners of the matrices we constitute – for Russian OEMs – that experts agree on high probability and high impact of intensive cooperation with Western OEMs (projection 15), sourcing of components from foreign suppliers/partners (projection 6), and industry consolidation (projection 14), each with high consensus. All three developments seem to indicate a Russian OEM's need for partnerships that might create favorable negotiation conditions for Western OEMs willing to partner up in JVs.

Sales of Russian OEMs in Triad countries (projection 11) are deemed most improbable, with limited impact on Russia's truck industry and rather high consensus. Furthermore, experts strongly agree that compliance issues will not cause competitive disadvantages for Western OEMs (projection 4). The highest dissent (i.e. uncertainty) is reported for the question whether or not all major foreign OEMs establish full-scale production plants in Russia (projection 9).

To illustrate the contentual strength of the collected knowledge, we elaborate further on one of the most striking results. The Delphi study shows that, within the upcoming years, Russian OEMs will face increasing competition from foreign OEMs, both from Asian and from Western countries, most likely considerably diminishing their market shares across multiple segments and applications (e.g. projections 8, 17, 19). Possible responses by Russian OEMs include:

- consolidation among each other, particularly for the sake of scales and market power (projection 14).
- intensive cooperation (or consolidation) with a Western partner (OEM or OES), particularly for the sake of technology transfer (projections 6 and 15)
- fleeing competition in traditional markets towards:
  a) a newly establishing middle market (emerging between low-cost & high-tech) (projection 16)
  b) foreign markets in developing economies (projection 10)
  c) foreign markets in developed countries (projection 11)

Experts' qualitative Delphi inputs clearly indicate that the probability of success is deemed rather high for a) as Russian OEMs' products seem to properly suit this segment that will nevertheless be highly competitive with brands approaching from "high and low". The probability of success of b) is supposed to be moderate as Russian trucks suit those markets but sales and service networks as well as brand recognition are limited and would urge large investments. Concerning c) Russian OEMs are judged to be unable to sell any noteworthy volumes in competitive and mature developed countries as they e.g. lack technological sophistication, brand recognition, and networks.

Combining the experts' assessments and arguments for several projections, one of the most striking outcomes is that experts stress the fact that free market competition might heavily threaten Russian OEMs survival, but comments on projection 3 and 20 expressly declare that the Russian government is a very powerful player willing to hamper foreign competition in order to support the local industry base. Self-evidently, Russian OEMs' ability to compete and survive, as well as the Russian governments will and power to support them, are highly relevant factors that need to be considered in the context of a JV decision.

## 4.6 Scenario analysis

### 4.6.1 Basis and purpose

Although the Delphi results itself are of enormous value for developing a profound understanding of the Russian truck industry's future dynamics and the drivers contributing to its maturation, the Delphi results ought not only be considered output but also input, e.g. for further scenario analyses (Day, 1975). Von der Gracht and Darkow (2010, p. 49) constitute: "The development of Delphi-based scenarios is an approach that has been explicitly recommended by numerous authors because […] Delphi delivers valuable, valid, and reliable data for scenario construction". Our Delphi results provide both a quantitative and a qualitative basis for the scenario analysis. Based on the projections and experts' rich inputs we created multiple scenarios containing descriptions of possible industry developments and likely implications for the different key stakeholder groups, i.e. Western OEMs, Russian OEMs, Chinese OEMs, suppliers and customers in order to support the decision making against or in favor of a JV in Russia.

Scenarios built upon the results of an expert-based Delphi analysis were found to be particularly creative, objective, and credible – all being important quality criteria for scenarios (Nowack et al., 2011). Creativity is enhanced by Delphi's drawing on a heterogeneous panel of experts contributing diverse backgrounds and perspectives. As scenarios are based on broad independent expert knowledge and not developed behind closed university doors, the subjective influence of the researcher is diminished, thereby increasing objectivity. Finally, credibility again benefits from the broad expert base as the probability to omit important aspects decreases (Nowack et al., 2011).

While reducing complexity the resulting scenarios sharpen and visualize single aspects of those projections that are of special relevance for the JV decision at hand. Moreover, the scenarios can be perfectly used to dive deeper into those uncertainties that could not be entirely resolved by the Delphi analysis itself, e.g. projection 10 with rather disparate probability estimates, resulting in limited consensus (cf. figure 6). Additionally, the combination of multiple projections within one scenario allows for an integrated analysis. Considering possible interdependencies between projections goes way beyond the isolated consideration of each single projection.

However, none of the scenarios is intended to comprise the true future in its entirety. "The 'real' future will likely contain elements of all scenarios. The goal is to learn from the scenarios, to gain insights on what could change, why it could change

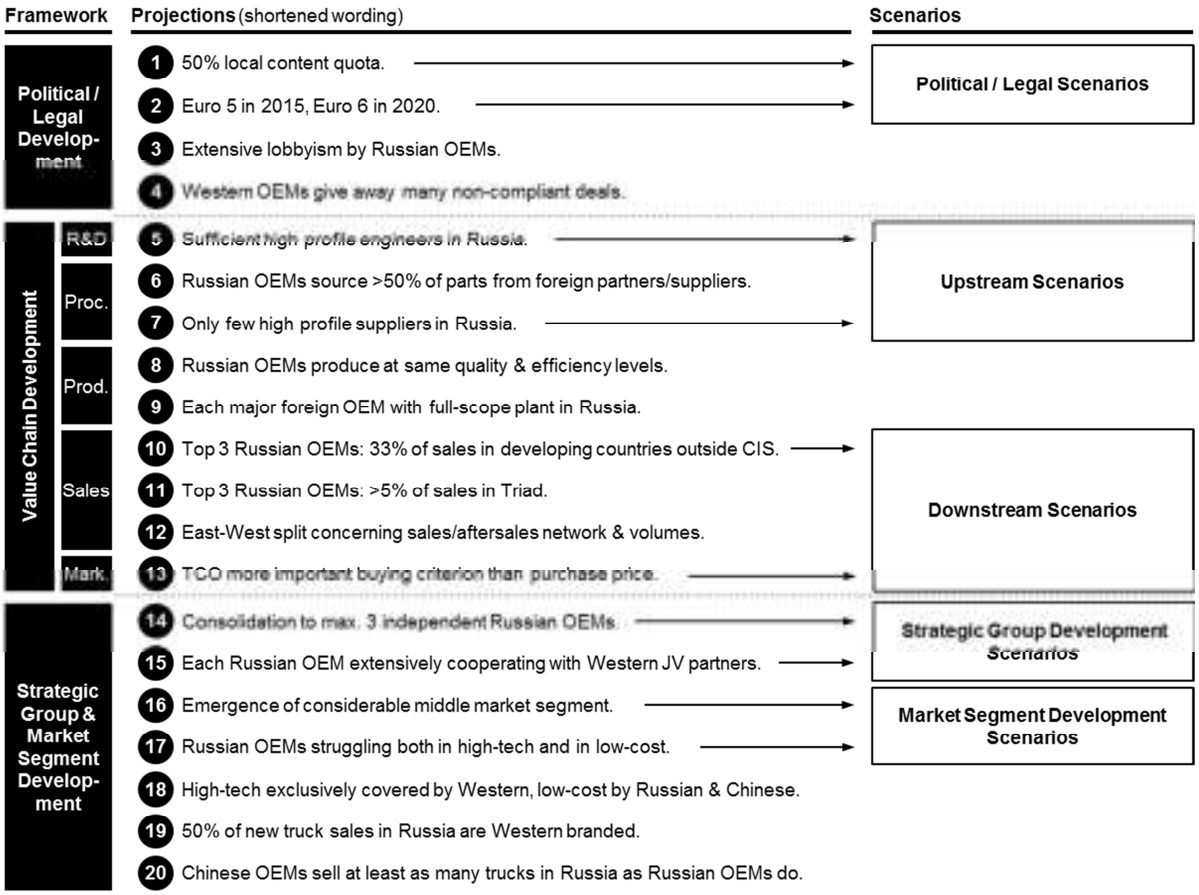
and what this knowledge might mean for strategic decisions" (Brummell and MacGillivray, 2008, p. 5) such as joint ventures.

### 4.6.2 Development procedure and results

During the process of scenario development we abandoned the Delphi-specific anonymity and invited selected experts to a scenario workshop that took place after the termination of the Delphi survey. During the workshop experts and researchers reviewed the findings of the Delphi, intensively discussed face-to-face, and dynamically interchanged comments (Melnyk et al., 2009). The workshop aimed at deepening the understanding of differing opinions and perceptions, and provided valuable inputs for the completion and validation of the scenario descriptions. Experts and researchers discussed the created scenarios and checked scenario descriptions for inconsistencies. Additionally, by conducting the expert workshop we addressed the critique that Delphi methods, due to experts' anonymity, do not allow for sufficient debate and interaction among the participants (e.g. Georgantzas and Acar, 1995).

Our first step towards the development of sound future scenarios was the creation of five scenario matrices, each comprising four explorative scenarios. A scenario matrix is constituted by the combination of two critical uncertainties, i.e. two of our Delphi projections (Postma and Liebl, 2005). Table 12 shows the five scenario types and the contributing Delphi projections.

**Table 12:** Scenario types and contributing Delphi projections.

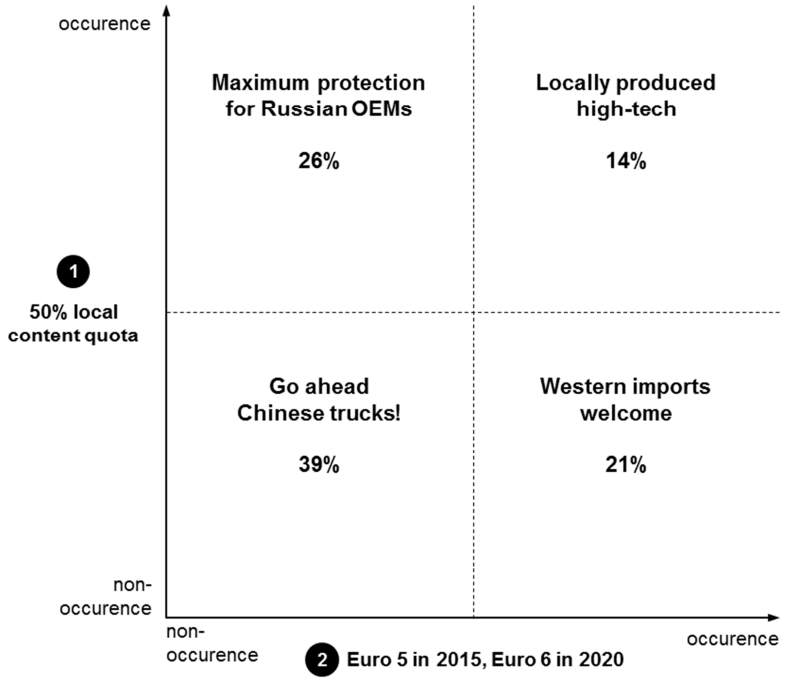



Through these scenario matrices we account for further analysis of those projections that yielded remarkable results during the Delphi or are of special relevance for the JV decision. Following Peter Schwartz' scenario approach (Schwartz, 1991), each matrix depicts the occurrence of one projection at the upper part of its abscissa, and its non-occurrence at the lower part, while the occurrence and non-occurrence of the other projection is shown on the ordinate's left and right part, respectively. This integrative combination of different projections allows for the consideration of their interaction – a considerable contribution to a sound environmental analysis (Burt et al., 2006). Figure 8 shows the matrix containing the four political / legal scenarios as an example.

Each scenario was given a catchy name putting the key consequence of this specific scenario in a nutshell. The depicted percentage value represents the mathematical probability of this scenario, based on the mean probability estimates for each of the separate projections. Those probabilities were later validated during the

expert workshop. Accordingly, the scenario "Go ahead Chinese trucks" representing the combined non-occurrence of projection 1 and 2, is the most probable (39%).

**Figure 8:** Political / legal scenario matrix.




Experts' key argument for rating the probability of projection 2 as rather low (on average 2.4 on a 1-5 scale) is that Russian OEMs (and fuel providers) would be severely struggling with the technological challenges of introducing Euro 5 and particularly Euro 6 emission standards. The key reasoning for rating the probability of projection 1 as rather low (on average 2.6 on a 1-5 scale) was experts' hope that the WTO regulations will prohibit state interventions like this although it might be in the interest of truck manufacturers and the Russian government, as experts indicated.

Concerning the strategic considerations of a Western truck OEM, the Political / Legal Scenario Matrix draws a moderately negative picture of the Russian truck industry's future development. A JV with a Russian truck OEM would probably be an attractive setup to manage the situation in the upper right corner ("Locally produced high-tech") with a Western JV partner providing the technology needed for Euro 5/6 vehicles and the Russian JV partner ensuring sufficient domestic value added to comply with the local content quota. As this scenario is the least probable within the

Political / Legal Matrix, a Western-Russian JV seems less attractive than e.g. a Western-Chinese JV.

For reaching even deeper strategic insights, we worked out thorough descriptions structured along the key industry stakeholder groups, i.e. Western OEMs, Russian OEMs, Chinese OEMs, suppliers and customers for each of the scenarios from all 5 scenario matrices, i.e. 20 scenario descriptions in total. Content-wise the scenario descriptions focus on the main consequences the regarded combination of projections would have for each of the major stakeholder groups in the Russian truck industry. Figure 9 shows, as an illustrative sample, the description for the lower right scenario of the Political / Legal Scenario Matrix depicted in figure 8. This scenario combines the non-occurrence of a 50% local content quota (projection 1) and the introduction of Euro 5/6 emission regulations in 2015 and 2020 (projection 2), respectively. As this scenario allows truck imports and requires Euro 5/6 technology that is nowadays dominated by Western truck OEMs, the scenario was named "Western imports welcome". As the scenario description shows, this scenario would severely endanger Russian truck OEMs' competitiveness. Hence, the occurrence of this scenario would render a JV with a Russian truck OEM largely unattractive (from a Western OEMs perspective).

**Figure 9:** Sample scenario "Western imports welcome".

**Political / Legal Scenario "Western imports welcome" (21%)**


***Impact on / Relevance for Key Industry Players:***

**Russian OEMs**
- Russian OEMs face strong competition, both from locally produced foreign trucks and imported CBUs and SKD/CKD units assembled in Russia.
- Russian OEMs need to source Euro 5/6 technology from foreign suppliers / JV partners. Consequently their cost levels will increase substantially.
- The combination of Euro 5/6 requirements and the non-existence of local content requirements will heavily challenge Russian truck OEMs' survival.

**Western OEMs**
- Assuming moderate customs duties, Western OEMs may freely choose between CBU imports, SKD/CKD assembly, and full-scope production plants.
- Western OEMs can transfer their established Euro 5/6 technologies and benefit from experiences made in Europe.
- As Russian and Chinese OEMs struggle with Euro 5/6 technology, Western OEMs can increase their market shares.

**Chinese OEMs**
- If Chinese OEMs are able to provide Euro 5/6 they lack the long-term ex-perience of Western OEMs, and Euro 5/6 fit their low-cost focus much less.
- Assuming moderate customs duties, Chinese OEMs benefit from their home market's low labor cost level.

**Suppliers**
- Suppliers benefit from the demand of Euro 5/6 components.
- Foreign OEMs localization degree determines necessity and attractivity of localization for suppliers.

**Customers**
- Customers are forced towards TCO orientation → price increase, pre-buys.
- Assuming moderate customs duties, customers may freely choose between local brands, locally produced foreign trucks, and import vehicles.

## 4.7 Conclusions

Emerging markets like Russia incessantly exert a strong pull on foreign companies that want to get their share of the attractive sales potential being available nowadays and in the future. Across industries and entry modes, foreign firms experience institutional frameworks to be decisively different from what they are familiar with out of developed economies. Firms need to acknowledge, understand, and adapt to those unique institutional setups that are typically characterized by underdeveloped formal and informal institutions, immature factor and product markets, strong governmental involvement, and extraordinarily rapid change across all institutional dimensions.

The institutional framework's immatureness along with the continuously changing "rules of the game" in emerging economies cause challenging levels of state, effect, and response uncertainty for decision makers and their organizations. Those uncertainties are largely attributable to information deficiencies that are particularly prevalent when predicting a firm's future macro and industry environments. Firms are advised to apply sophisticated and customized information acquisition and processing approaches in order to cope with the externally determined environmental uncertainties.

In this paper, we developed a dedicated decision framework considering political/legal aspects, value chain considerations, and market segment as well as strategic group developments in order to support JV decisions in the Russian truck industry, a question of relevance to many OEMs engaged in that market. The framework comprises 20 thoroughly designed projections addressing relevant and uncertain aspects of the Russian truck industry's future development until 2025. Data was collected through an online real-time Delphi conducted in 2013. A heterogeneous panel of 33 experts rated probability, impact and desirability of each projection and provided numerous written arguments underlining their probability and impact estimates. These inputs allow for a profound understanding of the industry's likely development, as well as its drivers, effects and possible responses. The insights provided by the Delphi were fed into the JV considerations of a Western truck OEM's executives. They can now better understand the industry and its institutional features, leading to reduced state, effect, and response uncertainty, and a more profound decision basis in favor of or against a JV with a local OEM.

Among other insights, the results predict hard times for Russian OEMs as they will likely face strong foreign competition leading to decreased sales volumes and

market shares. While some experts doubt the survival of several Russian truck manufacturers, the Delphi sheds light on possible strategic responses including consolidation, cooperation, or focusing on new markets. While Western OEMs partnering up with a local manufacturer may benefit from that OEM's market knowhow, network, and local brand reputation, the Western JV partner will probably have to invest substantial knowhow, time, financing and human resources into the long-term viability and competitiveness of its Russian JV partner.

Based on the Delphi results and an additional expert workshop we draw multiple scenarios addressing particularly uncertain aspects of the industry's development and their likely impact on the key stakeholder groups, including Russian OEMs as potential JV partners. The derived scenarios can effectively be used for addressing future-related uncertainties, enhancing managers' mental models, and triggering organizational learning (Postma and Liebl, 2005; Zentner, 1982). Since emerging markets like Russia do not develop in a linear or completely predictable way, managers need to consider alternative futures. The scenarios provided through our approach are a highly valuable basis for the derivation of firm-specific implications and sound strategic decisions like the one at hand, i.e. whether or not to engage in a JV with a local manufacturer.

Referring back to the theoretical foundation provided by OIPT introduced at the outset, our distinct decision framework helps to structure and focus on the informational aspects most relevant to the decision-making challenge at hand, thereby contributing to the match between externally given information-processing requirements and limited information-processing capacities. Additionally taking the institutional theory perspective into account, our research makes a significant contribution to understanding how customized information about specific institutional features may substantially reduce emerging market uncertainties and lead to superior decision making and performance. Adding to the uncertainty-reducing function of those results, the derived scenarios provide further information on these institutions' interplay and their distinct impact on the different stakeholder groups. Additionally, our research contributes to the field by demonstrating the integrative application of Delphi with other complementing research methods, i.e. expert workshops and interviews as well as scenarios, in order to cope with emerging market uncertainties and support strategic decision making.

## 4.8 Limitations and future research

Our approach yields some limitations. We were partly able to directly address some of these limitations by specific research design considerations.

First, the Russian truck industry's future development is influenced by numerous factors that could not all be integrated in one study (Pomerol, 2001). In order to keep complexity at a manageable level and take experts' time constraints into account, we had to narrow the scope of the study to the most relevant and uncertain factors. We are confident that the projection development procedure, particularly the discussions with a truck OEM's strategy experts, enabled us to identify the key factors driving the industry's development. Feedback from participating experts and the average impact score of at least 2.6 for all 20 projections, and above 3.0 for 16 projections, indicate proper selection of relevant aspects for inclusion in the study. Nevertheless there are for sure minor factors beyond the study's scope.

Second, results are based on the perceptional inputs of the participating experts. Those inputs rest on experts' personal experiences and knowledge, and can, as any future-oriented inputs, hardly be validated by factual information before the actual future emerges (Dalkey, 1975). We tried to minimize this limitation by compiling a very heterogeneous panel of experts. Participants have various professions and work for different kinds of institutional actors. Concerning the number of participating experts, we did not want to extent the panel size to the disadvantage of the level of expertise (Donohoe and Needham, 2009). Furthermore, we applied different forms of interaction (interviews, questionnaire, and workshop) in order to diminish common method bias in this study.

Third, Delphi studies are usually criticized for limiting interactive exchange between the experts as those remain anonymous to each other throughout the process (e.g. Brüggen and Willems, 2009; Story et al., 2001). While benefitting from the advantages of anonymity (e.g. avoidance of bandwagon effects) during the Delphi study itself, we addressed this limitation by the expert workshop conducted after the termination of the online survey. During that workshop, experts openly discussed results, assumptions, and implications as part of the scenario development process.

Fourth, research in foresight, decision making, and psychology points to the possibility of a desirability bias in predictions, i.e. experts' probability estimates for a certain event might be influenced by their desire for this event to occur (e.g. Windschitl et al., 2010; Ecken et al., 2011; Olsen, 1997). Empirical evidence indicates

that probability of occurrence and desirability of occurrence can be positively correlated (Ecken et al., 2011; Olsen, 1997). Using SPSS, we ran a correlation analysis across all 660 probability-desirability pairs included in the study. The according Pearson correlation coefficient was 0.37 (significant at the 0.01 level). Similar correlation analyses for each single projection yielded correlation coefficients between 0.023 (projection 11) and 0.709 (projection 15), part of which were significant. These values do not indicate an exceptionally high desirability bias for our results (Olsen, 1997). Furthermore, McGregor (1938) has shown that the degree of desirability bias increases with the level of uncertainty and importance of the predicted events. As these were the two major criteria for inclusion of aspects in our projections, a certain desirability bias must naturally occur. Ecken et al. (2011) point to the possibility to counter desirability bias by expert heterogeneity, a fact that we successfully accounted for during our expert selection procedure.

Dealing with the long-term future of a rapidly developing emerging market setup provides ample room for further research as there are by nature several uncertainties to remain. We encourage researchers to further address these uncertainties as well as the mentioned limitations. We would appreciate any work adding to the scarce scientific research in the truck industry – both in developed and emerging markets. Furthermore our approach can be flexibly transferred to other industries or countries and applied to a promising variety of research questions.

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# 5 Biases in future-oriented Delphi studies: A cognitive perspective

## Abstract

Delphi is an established information gathering and forecasting approach that has proven to deliver valuable results in a wide variety of specialist fields. Yet, Delphi studies have also continuously been subject to critique and doubt, particularly concerning its judgmental and forecasting accuracy. To a large part this can be attributed to the substantial discretion researchers have in their design and implementation. Awkwardly designed Delphi studies may lead to severe cognitive biases that adversely affect the research results. This paper takes a cognitive perspective by investigating how different cognitive biases take effect within future-oriented Delphi studies and how their unfavorable impacts can be mitigated by thoroughly adapting specific Delphi design features. The analysis addresses cognitive biases affecting panelists' initial estimates – namely framing and anchoring as well as the desirability bias – as well as such cognitive biases taking effect during feedback and revision loops – namely the bandwagon effect and belief perseverance.

## Key words

Delphi, cognitive biases, framing, anchoring, desirability bias, bandwagon effect, belief perseverance, accuracy

## 5.1 Introduction

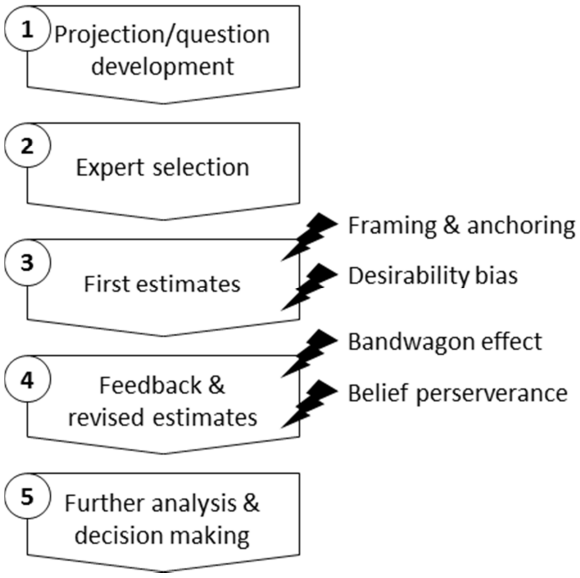
Delphi processes have been used for decades in a variety of fields and methodological variations. As a structured information gathering and forecasting approach it still enjoys unabated interest as indicated by recent applications (Wester and Borders, 2014; Álvarez et al., 2014) and design considerations (e.g. Förster and von der Gracht, 2014; Gallego and Bueno, 2014). Delphi studies regularly deliver accurate and valuable results (e.g. Holmes et al., 2002; Parente and Anderson-Parente, 2011) but continue to be criticized as well. The major concern of practitioners and academics is Delphi's judgmental and forecasting accuracy (Shanshan et al., 2014; Parente and Anderson-Parente, 2011; Fildes and Goodwin, 2007). Researchers investigating the impact of different design features, e.g. statistical vs. argumentative feedback, on Delphi results' accuracy found contradictory results (e.g. Rowe et al., 2005; Rowe and Wright, 1996). However, these studies frequently do not apply a strong cognitive perspective on Delphi processes, i.e. they do not link the design choices to cognitive processes and biases they may cause or mitigate. Therefore, we argue that more conceptual and empirical work in this area is required as Delphi's accuracy depends on i) how researchers use (or abuse) their high degree of discretion in terms of study design and execution (Rowe and Wright, 1999; Story et al., 2001), and ii) to which extent several cognitive biases take effect at different stages of the process; the latter being to a large part dependent on the former.

As research in psychology and cognition sciences has identified hundreds of biases that could potentially take effect in some Delphi constellation as well, it is beyond the scope of a single study to provide a comprehensive overview on all cognitive biases without being overly superficial. We therefore decided to elaborate on the four cognitive biases encountered by Delphi participants that seem to be most frequent and most impactful in Delphi applications, namely framing and anchoring, the desirability bias, the bandwagon effect, and belief perseverance. We believe that researchers controlling for these biases via specific Delphi design decisions could not increase accuracy much further by controlling for additional cognitive biases. Following our focus on participants' cognitive biases, we do not address other issues such as sampling biases, i.e. the selection of proper experts, that have been studied elsewhere (e.g. Okoli and Pawlowski, 2004; Rowe and Wright, 1999). Concerning the kind of Delphi studies, our analysis is focused on expert-based future-oriented studies looking at least five years ahead from today. For researchers applying other kinds of Delphi

studies, for example such including laymen assessing contemporary almanac questions, other cognitive biases might be of relevance.

We structure our analysis along the typical process steps of a Delphi study, and indicate which biases may occur at which stage of the process. As illustrated in figure 10, framing and anchoring as well as the desirability bias impact experts' first estimates, while the bandwagon effect and belief perseverance come into effect during stage 4 which includes feedback and potential revisions of estimates. As participants are usually not involved in process steps 1, 2, and 5, cognitive biases on their side only occur in stages 3 and 4.

**Figure 10:** Delphi process steps and biases.




By bridging literature on Delphi research and the fields of cognition and psychology we hope to make a methodological contribution that is of value to both academics and practitioners applying Delphi studies in a variety of fields by a) discussing different cognitive biases and their modes of operation during Delphi applications, b) elaborating on the impact of certain design choices on the prevalence of cognitive biases in Delphi processes and c) developing design recommendations that aim to mitigate or avoid the negative effects of cognitive biases and work towards increasing Delphi accuracy.

## 5.2 Delphi

The Delphi methodology is a structured, interactive group communication and judgmental forecasting process aiming at systematically exchanging informed opinion concerning an uncertainty-bearing field of interest among a panel of selected experts and developing consensual understanding that reduces uncertainty and finally enhances decision quality (Hallowell and Gambatese, 2010; Donohoe and Needham, 2009; Dunn, 2004; Linstone and Turoff, 1975). In future-oriented Delphi studies the field of interest may concern issues lying as far as several decades ahead. Delphi rests on the assumption that structured group approaches provide more accurate judgments than a single expert (Donohoe and Needham, 2009; Linstone and Turoff, 1975) and are more appropriate than traditional meetings (Graefe and Armstrong, 2011). Another underlying assumption is that, even in highly uncertain environments, some features of the future are predetermined and foreseeable (Walsh, 2005).

A typical Delphi proceeds as follows. After designing a survey of questions or projections (Klenk and Hickey, 2011) it is sent to a group of experts, each of whom provides individual evaluations, ratings or rankings (Chiravuri et al., 2011), e.g. concerning the probability or feasibility of the items under investigation (Klenk and Hickey, 2011). Additionally, experts may be asked to provide qualitative arguments supporting their individual estimates (Graefe and Armstrong, 2011). Having received all answers, the Delphi administrators consolidate and analyze the contributions (Klenk and Hickey, 2011) and feed the results back to the experts, sometimes with a reworked questionnaire. Respondents are asked to review the estimations (and arguments, if any) of the other anonymous participants (Hallowell and Gambatese, 2010), encouraged to reconsider their own contributions (Landeta and Barrutia, 2011; Sharfman and Shaft, 2011; Linstone and Turoff, 1975) and given the opportunity to revise their estimates (Georgantzas and Acar, 1995; Rowe and Wright, 1999). This process can be repeated several times until a pre-determined criterion, e.g. a certain level of consensus, is met (Klenk and Hickey, 2011).

Such a procedure comprising at least one round of reconsidering and possible adaption of prior estimates (Landeta and Barrutia, 2011) constitutes the iterative character of Delphi that allows for accuracy-improving social learning (Dunn, 2004; Hallowell and Gambatese, 2010) and the reduction of noise (Strauss and Zeigler, 1975) but also bears the risk of cognitive biases taking unfavorable effect as discussed below. Besides its iterative fashion the key characteristics of Delphi are controlled feedback, and the anonymity of participants (von der Gracht, 2008; Elliott et al., 2010; Story et al., 2001;

Rowe and Wright, 1999; Georgantzas and Acar, 1995; Yang et al., 2012). Controlled feedback means that the Delphi administrators decide on how feedback is provided and which aspects of the group's responses are included (von der Gracht, 2008).

Anonymity of participants is probably the most controversially discussed characteristic of Delphi as it brings along a number of advantages but also drawbacks. In general it is said that Delphi uses the positive attributes of structured group interaction while mitigating or avoiding the negative social, psychological, and power effects of direct confrontation (Kauko and Palmroos, 2014; Graefe and Armstrong, 2011; Klenk and Hickey, 2011). To be more concrete, anonymity avoids experts' statements to be biased by dominant personalities, panelists from higher hierarchy level or social status ("halo effect"), or such with strong oratorical abilities (Landeta and Barrutia, 2011; Tersine and Riggs, 1976). Furthermore, anonymity creates a free thinking space that reduces the unwillingness to give estimates on uncertain issues (Häder, 2002), encourages to express and challenge unconventional opinions and alternative viewpoints (Roxburgh, 2009; Donohoe and Needham, 2009), and offers the opportunity to change a stand once taken without losing face (von der Gracht, 2008; Rowe and Wright, 1999; Okoli and Pawlowski, 2004).

Delphi is best suited to fields and circumstances of application where objective factual data is scarce (Gray and Hovav, 2008; Daft and Lengel, 1986) and knowledge necessary to make profound decisions is incomplete (Skulmoski et al., 2007; Amos and Pearse, 2008). Delphi is highly valuable in situations of severe uncertainty stemming from rapidly unfolding, non-calculable dynamics, or uncertainty originating from large multidisciplinary problems in highly complex environments (Yang et al., 2012; Donohoe and Needham, 2009; Ziglio, 1996). In these situations precise analytical data processing techniques are not applicable (Melnyk et al., 2009; Donohoe and Needham, 2009; Ziglio, 1996) and trend extrapolation is mostly inadequate (Melnyk et al., 2009; Linstone and Turoff, 1975). Instead, information collection and knowledge must be built on informed opinion and subjective expert judgments as well as experience-based interpretations (Yang et al., 2012; Melnyk et al., 2009; Linstone and Turoff, 1975).

The major disadvantages attributed to the Delphi methodology comprise difficulties in assessing participants' level of expertise, the potential of anonymity and iteration to lead to compromise rather than consensus, and limitations in assessing result accuracy and reliability – particularly when an issue in the long-term future is investigated (Story et al., 2001).

Comparisons of Delphi and other techniques in terms of accuracy came to discordant results. Although there are several examples of Delphi studies delivering accurate results (Czinkota, 1986; Czinkota and Ronkainen, 1992,, 1997,, 2005; Gray and Hovav, 2008; Holmes et al., 2002; Parente and Anderson-Parente, 2011), and some researchers come to the conclusion that "Delphi's effectiveness over comparative procedures, at least in terms of judgmental accuracy, has generally been demonstrated" (Rowe et al., 2005: 378), others state that "In comparison to other techniques aimed at enhancing judgmental accuracy, again Delphi's worth has not been convincingly demonstrated" (Windschitl et al., 2010: 239). In their review of the literature, Rowe and Wright (1999) found that Delphi outperformed both the statistical average of participants' estimates and face-to-face discussions in terms of accuracy. Similarly, recent studies report Delphi's superiority compared with staticized groups, i.e., simple one-round surveys (Graefe and Armstrong, 2011, Parente et al., 2005, Song et al., 2013). On the other hand there are several researchers doubting Delphi's accuracy and reliability (e.g. Simoens, 2006, Ayton et al., 1999). The equivocal nature of these results is indicative of Delphi's high flexibility in terms of design features and application (Rowe et al., 1991). Hasson and Keeney (2011: 1701) speak of the "'greyness' of the technique, viewed by some as a key benefit allowing flexibility in its application but leading to serious repercussions for the technique's scientific respectability".

Several researchers argue that Delphi critique and findings shedding doubt on Delphi's accuracy are not induced by the Delphi method itself but by examples of inappropriate application (Rowe and Wright, 1999; Landeta, 2006; Wakefield and Watson, 2014). Among others, Rowe and Wright (1999) name features such as the use of non-experts like students, professionals from a single domain, or almanac questions (i.e. not addressing uncertain issues) as examples for misapplication (Rowe and Wright, 1999). At this point of the dispute over Delphi accuracy we want to take Delphi's flexibility and researchers' discretion to the positive by recommending appropriate design choices that mitigate the negative impact of cognitive biases and work towards increased accuracy of future-oriented Delphi studies.

## 5.3 Biases in initial estimates

We first elaborate on anchoring and framing as well the desirability bias because such cognitive biases predominantly take effect on experts' initial estimates, i.e. in stage 3 of the standard Delphi process. We describe how they take effect, discuss in how far they are mitigated by usual Delphi design features like feedback processes, and, in particular, how they can be further controlled by specific design choices. We conceive anchoring and framing to be related as they share a mode of operation where pre-given information known to the experts influences their judgment of some contextually, temporally or otherwise related issue.

### 5.3.1 Framing and anchoring

***Framing***

Framing refers to the phenomenon that a modification in the presentation of an issue under consideration changes people's assessment of this issue. That means that – without changing the issue itself – a different depiction of it causes the characteristics, likelihood of appearance, favorability (Cheng and Wu, 2010) or degree and nature of impact etc. to be estimated differently than by applying a different depiction (frame) (Yaniv, 2011). Cheng and Wu (2010) distinguish three different kinds of framing: Attribute framing whereby a single attribute of an issue or object is framed positively or negatively; goal framing which refers to the – positively or negatively framed – consequences of an issue; and risky choice framing which occurs when the choice between a risky and a riskless option of equal expected value is influenced by the applied frame (Cheng and Wu, 2010). Framing violates the normative principle of description invariance which requires rational decisions to be invulnerable to superficial changes in an issue's description, i.e. its depiction in terms of gains or losses (Kahneman and Tversky, 1984).

In the context of Delphi studies – and other group judgment processes – framing may be particularly disturbing as frames shared by group members tend to be magnified, i.e. individuals' pre-discussion attitudes are amplified by group interaction and lead to polarized group judgments (Whyte, 1989; Paese et al., 1993). Judgments made by groups composed of like-minded individuals tend to be more extreme than the average of individuals' judgments (Isenberg, 1986; Myers and Lamm, 1976). Kerr and Tindale (2011) speak of dysfunctional shared representations that bias group judgment by amplifying the framing effect. For example, a group composed of individuals disposed

toward risk is likely to reach a consensus that is even riskier than the average of the individual pre-discussion dispositions (Whyte, 1989).

Concerning the effect at work, informational influence theories suggest that in groups of similarly framed members there is a preponderance of arguments supporting the dominant initial position which will therefore be amplified (Dequech, 2006). The mode of operation lying behind is similar to that of 'confirmatory search' (Chapman and Johnson,, 1994) and 'selective accessibility' (Strack and Mussweiler,, 1997) as also described for anchoring and belief-perseverance below. Groups of similarly framed members only have access to others sharing their perspective and are only confronted with confirmatory arguments, and they typically do not search for and access contradictory accounts from outside the group. These effects will increase both the judgment itself to a more extreme level and also group members' (potentially unjustified) confidence in the accuracy of their own judgments (Bolger and Wright, 2011).

First empirical proofs of the framing bias were provided by Tversky and Kahneman (1981) who described measures against a disease either in terms of the likelihood of lives saved or the likelihood of lives lost. Depending on the frame used the relative attractiveness of options was evaluated significantly different by participants of their experiment (Tversky and Kahneman, 1981).

Empirical research also provides evidence for individuals preferring the risk-free option significantly more often when the options are positively framed in terms of gains as opposed to a negative framing in terms of losses (cf. Yaniv, 2011). Concerning the polarization effect in group judgments studies yielded diverging results. While Neale et al. (1986) found that group interaction mitigated the individual level framing effect, Milch et al. (2009) reported that individual framing effects were neither amplified nor hampered in groups. Paese et al. (1993) found that individual frames were amplified in groups that were presented the same frame, and reduced when the group was presented the opposite frame of the individual. Recently, Yaniv (2011) reported similar effects by distinguishing between homogeneous groups composed of similarly framed members and heterogeneous groups with divergently framed individuals. "[H]omogeneous groups' preferences were polarized, and thus the framing effect was amplified; in contrast, the heterogeneous groups' preferences converged, and thus the framing effect was reduced to zero" (Yaniv, 2011: 41).

Empirical research identified some variables such as the level of involvement (Maheswaran and Meyers-Levy; Rothman et al., 1993) and attention (Sieck and Yates,

1997; Smith and Levin, 1996) that influence the magnitude of framing effects. Involvement – defined as "a person's perceived relevance of the object based on inherent needs, values, and interests" (Zaichkowsky, 1985: 342) – seems to have a positive effect, i.e. more involved Delphi participants are less susceptible to framing effects (Cheng and Wu, 2010). These findings are supported by Wright and Goodwin (2002) who reported significant framing effects for undergraduates (low involvement) and no framing effect for experienced respondents (high involvement).

The most important and most obvious cure against the polarization of framing effects in Delphi panels is group heterogeneity. As group judgments were shown to be significantly better or worse than individual judgments depending on the diversity of group members' frames (Yaniv, 2011), Delphi participants should be selected to be as heterogeneous as possible to ensure that frames brought into the group interaction process by individual panelists are confronted by diverging frames eventually resulting in the neutralization of any framing bias (Yaniv, 2011; Paese et al., 1993). Otherwise shared individual frames might even be amplified during group interaction (Paese et al., 1993).

We recommend ensuring a high degree of heterogeneity within Delphi panels and the inclusion of participants known to have a maverick perspective on issues under investigation (Bolger and Wright, 2011) as they add fruitful controversy to the group interaction which works against a framing bias.

We even propose to sort arguments in a way that such stemming from known mavericks are listed on top. This way even busy participants that only read the first few of their fellow panelists' arguments are confronted with controversial input and incentivized to rethink their – potentially framed – views. For real-time Delphi studies (Winkler et al.,, 2015) mavericks could be invited first so that each following participant receives their fruitfully provoking inputs.

We further suggest not applying pyramid search of experts, i.e. a search method where the already identified experts recommend other experts (Baur et al.,, 2012). Friends, colleagues and other contacts might be similarly framed with regard to several aspects, leading to a "cozy group of like-thinking individuals which excludes mavericks and becomes a vehicle for inbreeding" (Linstone, 1975: 568).

Cheng and Wu (2010) provide interesting insights on how warning works against framing. They found that framing effects were attenuated with weak and completely eliminated with strong warning conditions (Cheng and Wu, 2010), i.e.

warnings indicating that a decision or judgment might be subject to a framing effect. Referring to the impact of involvement they found that weak warning messages were sufficient to eliminate framing effects for high involvement participants but stronger warning messages were needed to eliminate the framing effect for low involvement participants (Cheng and Wu, 2010). Similarly Wright and Goodwin (2002) show that the framing effect (which they only found for non-expert participants) can be eliminated by "think harder manipulations" (p. 1059). The warning about the possibility of a bias – potentially including a description of its direction (Cheng and Wu, 2010) – makes people think more thoroughly about their judgments (Sieck and Yates, 1997; Smith and Levin, 1996). Participants suspected to have fallen victim to framing effects may also be prompted to provide or consider arguments countering their presumably biased view (Baron, 2003). Daft and Lengel (1986) found that "the failure to think of arguments on the other side is typically not the result of not knowing them" (Hallowell and Gambatese, 2010: 105). Further, Delphi panelists should have a high level of expertise as this provides a higher level of involvement and attention, conditions that were shown to effectively mitigate framing effects.

### *Anchoring*

The anchoring bias, or anchoring-and-adjustment as it was termed by Tversky and Kahneman (1974), refers to a situation where the value of a variable is estimated or forecasted by referring to a known previous value of that same variable (Harvey, 2007). People making estimates often start off with an anchor, i.e. an initial value – available from their own knowledge or given to them in the context of the judgment task – and then adjust it in order to yield the final answer (Tversky and Kahneman,, 1974; Harvey, 2007). While this heuristic can be very effective and efficient, the result is often biased because the anchor value is adjusted insufficiently (Harvey, 2007; Furnham and Boo, 2011) as people overweight the anchor and underweight other information (Campbell and Sharpe, 2009). Accordingly, "predictions by individuals systematically deviate too little from seemingly arbitrary reference points" (Campbell and Sharpe, 2009: 371).

Insufficient adjustment can be attributed to several mechanisms. Proponents of the scale distortion theory of anchoring (Frederick and Mochon, 2012) suggest that anchors do not affect one's beliefs about an issue under judgment but rather the response scale on which judgments are considered. They provide the example of a 70-

mile anchor provided to people asked to guess the length of the Mississippi river (2,320 miles). Provided with an anchor as small as this, people's guesses tend to be on a much lower scale (i.e. only some hundred miles) compared to non-anchored people who, on average, provide significantly larger, i.e. more accurate, estimates (Mochon and Frederick, 2012).

Some researchers suggest anchoring processes to be akin to satisficing (Simon, 1979), i.e. one moves from the anchor in the direction of the correct value and stops at the first value which seems to be a plausible answer (Chapman and Johnson, 2002; Epley and Gilovich, 2005). Consequently, persons provided with an anchor above (below) the true value systematically come to an estimate higher (lower) than the true value. That explains why participants in Tversky and Kahneman's (1974) experiment that were asked for the number of African countries in the UN estimated it to be on average 25 (when provided with an anchor of 10), and on average 45 (when provided with an anchor of 65). The answers of both groups are biased towards the respective anchor (George et al., 2000).

An alternative, or complementary, explanation is provided by confirmatory search and selective accessibility arguments (Chapman and Johnson, 1994,, 1999; Mussweiler and Strack,, 1999; Strack and Mussweiler,, 1997). They suggest that people only access and consider information that is consistent with the anchor that they started off with (Furnham and Boo, 2011). Hence, they disregard information that could serve as an incentive to move further away from the anchor.

Mussweiler and Strack (2001) also conceptualize anchoring as a form of availability or accessibility bias and provide multiple arguments. "[A]nchoring effects are indeed knowledge accessibility effects in essence" (Mussweiler and Strack, 2001: 238). Epley and Gilovich (2001,, 2005) find that selective accessibility is particularly relevant when anchors are not self-induced but externally provided by the experimenter or some other external source.

Mussweiler and Strack (2001) demonstrated that anchoring effects may also occur for non-numeric stimuli and that this semantic anchoring can even be more potent than purely numeric effects. This view is supported by Oppenheimer et al. (2007).

Empirical research reported anchoring biases in performance judgments (Thorsteinson et al., 2008), time estimation (Thomas and Handley, 2008), and probability estimates (Plous, 1999); both within and outside the laboratory. Several studies showed that even irrelevant, contextually independent anchors may cause an anchoring bias (Tversky

and Kahneman, 1974; Englich and Mussweiler, 2001; Englich et al., 2006; Critcher and Gilovich, 2008). Empirical findings concerning the impact of implausible and extreme anchors are controversial. Some researchers argue that these anchors lead to a larger anchoring effect than plausible anchors (Strack and Mussweiler, 1997; Wegener et al., 2010). In contrast, Mussweiler and Strack (2001) and Wegener et al. (2001) found no increase in anchoring bias when anchors were manipulated to be extreme and beyond the range of plausible values. They argue that people generate counterarguments or ignore the values if they are too extreme (Wegener et al., 2001).

Mussweiler and Strack (2001) found that the provision of a very implausible anchor may lead to a contrast effect which is the opposite effect to anchoring, i.e. an over-adjustment of the anchor. They provide the example of experiment participants asked for the mean winter temperature in Hawaii. Estimates of participants provided with an anchor of -50°C were higher than those provided with a substantially higher anchor. The applicability of the anchor to the judgment task seems to make the difference (Mussweiler and Strack, 2001).

Several situation-specific and person-specific characteristics were found to influence the level of anchoring. Anchoring effects were found to be more pronounced in case of high ambiguity, low familiarity with the issue under judgment, and a more trustworthy source of the anchor (Van Exel et al., 2006). People being in a sad mood (Bodenhausen et al., 2000; Englich and Soder, 2009), having high conscientiousness, high agreeableness, or low extraversion (Eroglu and Croxton, 2010), or having high openness-to-experience (McElroy and Dowd, 2007) were found to be more susceptible to an anchoring bias. Participants with high expertise (Wilson et al., 1996) and high cognitive abilities (Bergman et al., 2010, Stanovich and West, 2008) were found to be less susceptible to anchoring. However, the anchoring bias cannot be eliminated; there are still significant anchoring effects for experts with high degrees of knowledge (Englich and Mussweiler, 2001; Englich et al., 2006) and high cognitive abilities (Bergman et al., 2010; Oechssler et al., 2009).

How to then design a Delphi study to mitigate anchoring effects as much as possible? Just as with framing, a very effective cure for anchoring in Delphi studies is ensuring sufficient heterogeneity among the panelists, so that very different anchors are in play, and group polarization is avoided (Belsky and Gilovich, 1999).

Several studies found warnings to be effective in mitigating anchoring effects. George et al. (2000) reported that experiment participants who received warnings provided final values further away from the anchor than those who did not receive any warning

(George et al., 2000). Although their findings were not statistically significant they were supported by other studies that found significant reductions in anchoring effects following warnings (LeBoeuf and Shafir, 2009; Block and Harper, 1991).

However, anchoring could not be eliminated completely through warnings (Tversky and Kahneman, 1974; Wilson et al., 1996; Block and Harper, 1991; George et al., 2000). George et al. (2000) showed the anchoring bias to be robust within decision support systems. Epley and Gilovich (2005) find that forewarning is only effective with self-generated anchors; they argue that those are known to be inaccurate by the persons who apply them.

Consequently, we recommend the use of warnings making Delphi participants aware of their own potential anchors. Furthermore, we suggest avoiding the provision of any kind of anchor in Delphi studies. Particularly, when experts are asked for future developments, states or characteristics under investigation (e.g. for the year, 2025), Delphi administrators at times provide some additional information concerning the current manifestation of the asked future variable (i.e. the according, 2014 value). Although this might be a very helpful starting point for the participant's estimate – particularly in case of lower expertise – it provides a fruitful ground for a strong anchoring bias. Moreover, according to Epley and Gilovich (2005) this kind of anchoring effect can hardly be tackled by warning as the anchor is externally provided by the Delphi itself. Admittedly, "One may argue that it is "better" to provide a reasonable anchor and allow people with strong preferences to deviate, than to loose many respondents and have the remaining respondents using their own (uncontrolled and perhaps irrelevant) anchors" (Van Exel et al., 2006: 849).

In this context we further recommend to use the level of expertise as a strong filter for participation in any Delphi study as the above-mentioned empirical findings show that panelists with high levels of knowledge and cognitive abilities are less susceptible to anchoring effects.

We also propose to present Delphi questions/projections in an order that assures that each question/projection is as unrelated to the preceding one as possible. In this way, the Delphi questionnaire does not provide any anchor or other kind of context-induced disturbance (Hallowell and Gambatese, 2010).

Finally, it might be helpful to ask participants for a proper argumentation of their estimates as an indication of whether the provided answer is thoroughly reasoned, which might not be possible for a sloppily adjusted anchor value (Shanshan et al.,

2014). Mussweiler et al. (2000) who suggested a consider-the-opposite strategy where respondents are asked to provide an anchor-inconsistent argument in order to debias their responses, found it to be ineffective. However, in some cases it might be helpful as the consider-the-opposite approach works against the mechanisms of confirmatory search and selective accessibility.

### 5.3.2 Desirability bias

Another bias potentially impacting Delphi results is the desirability bias. It occurs when "participants systematically estimate the probability of occurrence for desirable (undesirable) future projections higher (lower) than the probability for projections with neutral desirability" (Ecken et al., 2011: 1654). Thus, the individual desirability of an event positively influences a person's likelihood judgment (Krizan and Windschitl, 2007). Accordingly, the desirability bias can be seen as a special kind of motivated reasoning (Kunda, 1990; Krizan and Windschitl, 2007). Delphi results that are affected by desirability could lead to biased decision making and might be inadequate to cope with the developments under investigation (Ecken et al., 2011).

Several theoretical concepts have been used to explain the occurrence of a desirability bias. We want to briefly introduce the three concepts that seem most applicable to Delphi studies addressing highly uncertain future developments. First, researchers suggest that confirmatory search and selective accessibility may cause Delphi participants to predominantly select and consider information that is consistent with their personal desires (Krizan and Windschitl, 2007). Recently, Lench et al. (2014) raised a similar argument. They suggest that people perceive available information to be more open to interpretation when they are motivated and are therefore more likely to make judgments consistent with their preferences (Lench et al., 2014).

Second, Delphi participants might apply strategic optimism or pessimism. Strategic optimism was found to support people in developing action plans, retain an appropriate level of persistence and deal with negative outcomes (Armor and Taylor, 1998), i.e. it is particularly applicable when respondents have some control over the development (Krizan and Windschitl, 2007). Others argued that people might sometimes be overpessimistic in their likelihood judgments (Shepperd et al., 2000; Golub et al., 2009). This can be attributed to strategic pessimism that serves to protect them against disappointment when unfavorable outcomes materialize (Krizan and Windschitl, 2007; Shepperd et al., 2000). Shepperd et al. (2000) provide the example

of financially needy students being more pessimistic about their chances of receiving a scholarship than less needy students. As experts participating in Delphi studies commonly have some stake in the developments that they are to judge within the Delphi (Vosgerau, 2010) these strategic optimism or pessimism accounts might well be in play.

Third, humans tend to unconsciously approach "good" events and avoid "bad" events (Ecken et al., 2011; Lench, 2009). Some argue this tendency can be ascribed to affective reactions to good (desirable) or bad (undesirable) events (Ecken et al., 2011). Accordingly, judgmental processes like Delphi studies can be affected in terms of estimates biased by the desirability of the event addressed by a question/projection (Ecken et al., 2011). Vosgerau (2010) applies a similar argumentation in the context of his stake-likelihood-hypothesis. He postulates that people having a stake in the outcome of an event misattribute arousal regarding the stake itself to the likelihood of the outcome (Windschitl et al., 2013). He assumes that "[w]henever a future outcome is desirable (i.e., denotes a success) or undesirable (i.e., denotes a failure), a decision maker has a stake in the outcome that causes arousal. Arousal is hypothesized to be misattributed to likelihoods, thereby making people more optimistic and more pessimistic depending on what outcome, success or failure, they focus on" (Vosgerau, 2010: 34).

Desirability bias is suggested to increase with the level of uncertainty and ambiguity as the amount of guessing increases; this is true no matter whether uncertainty is due to dynamism or complexity (Ecken et al., 2011; Armor and Taylor, 1998). Another driver promoting the desirability bias is the prospect horizon. Literature suggests that the prevalence of desirability bias increases the farther one looks ahead in the context of the judgmental tasks (Trope and Liberman, 2003; Armor and Taylor, 1998). In light of shorter prospect horizons people are less likely to fall victim to desirability bias as they are aware that the moment of truth when their estimates are judged against reality is closer (Krizan and Windschitl, 2007; Windschitl et al., 2013). Therefore, they will be more careful to select a balanced set of information including information that both support and challenge their desired outcome (Tyler and Rosier, 2009; Sweeny and Krizan, 2013). Hence, they will provide a more humble and moderate answer.

Studies examining whether likelihood judgments are affected by desirability have produced mixed results (Bar-Hillel and Budescu, 1995; Krizan and Windschitl, 2007; Vosgerau, 2010) and the strongest evidence comes from one specific paradigm – the marked card paradigm (Windschitl et al., 2010). Participants predict a marked card to

be drawn significantly more often when it is related to some kind of incentive, e.g. a monetary gain (Windschitl et al., 2010).

However, the generalizability of these laboratory results and their practical implications are limited (Ecken et al., 2011) as it was found that optimistic predictions are more common when stochastic outcomes are concerned compared to situations when non-stochastic, epistemic uncertainty is prevalent. The latter is the case in most decision-making situations outside the laboratory (Windschitl et al., 2010). Likewise, the desirability biases found by Windschitl et al. (2010) vanished when they switched from marked-card experiments to scaled likelihood judgments in otherwise unchanged setups.

Apart from the marked-card paradigm there is no strong evidence for desirability bias in Delphi-typical judgment tasks (Bar-Hillel and Budescu, 1995; Krizan and Windschitl, 2007; Vosgerau, 2010; Windschitl et al., 2010,, 2013). Krizan and Windschitl (2007) conclude that there is a dearth of studies manipulating the desirability of non-stochastic outcomes, people asked for likelihood estimates very limitedly show a desirability bias, and the average desirability effect in their meta-analysis is significant but small.

Windschitl et al. (2013) provide empirical evidence for the selective accessibility and confirmatory search arguments by showing that people tend to select information that provides additional arguments for the occurrence of their desired outcomes. They suppose that other studies have failed to find a substantial desirability bias because they did not include the selection of additional information in the experimental design (Windschitl et al., 2013).

The validity of the arguments for a relationship between affective reactions and the desirability bias has been shown by Lench (2009). Her empirical findings support the notion that people approach positive and avoid negative outcomes, and that this tendency also affects judgments of the likelihood of future events (Lench, 2009). She further shows that the desirability bias can be reduced when participants misattribute affective reactions to an object other than the one they make estimations about (Lench, 2009).

As in the case of framing and anchoring, bias in the results of a Delphi study is supposed to be particularly prevalent when panelists are too similar to each other – in terms of profession, origin, education and other attributes depending on the researched topic. Regarding the desirability bias “the quality of decisions based on Delphi results

may be adversely affected if experts share a pronounced and common desirability for a future projection" (Ecken et al., 2011: 1654). Hence, our recommendations of Delphi design features mitigating the desirability bias start with the advice to ensure a proper level of heterogeneity among participants (Ecken et al., 2011).

Given considerable panel heterogeneity, the Delphi-typical feedback and iteration process itself already provides some cure to the desirability bias. Although, Delphi is not generally capable of eliminating it completely, the built-in reconsideration feature causes second and further estimates to be less infected by desirability than first-round estimates (Ecken et al., 2011; Rowe and Wright, 1996).

Concerning expert selection it was shown that a high level of expertise does not prevent respondents from the influence of desirability bias (Massey et al., 2011). Yet, Vosgerau (2010) found that arousal is less likely to be misattributed to judgments when participants have the cognitive abilities and motivation to engage in effortful deliberation. We expect this to be more frequently provided by experts in a field of investigation than by non-expert panelists.

Babad et al. (1992) showed that making panelists aware of biases and instructing them to be objective is not effective in reducing the desirability bias. Although research on the effect of warning messages on the desirability bias in predictions is very limited, we hypothesize warnings explicitly pointing to the potential impact of preferences to have some positive effect, particularly in Delphi studies asking participants for less arousal-bearing topics than the prediction of political election outcomes, as was the case in Babad et al.'s (1992) study.

As a means beyond classical warning we suggest to ensure profound understanding of the process and purpose of future-oriented Delphi studies on the part of the panelists. Quantitative inputs are necessary but thoroughly considering other panelists' inputs and backing the own estimates with rich arguments is the key to gaining valuable insights – for both the Delphi administrators and the participants. Experts being aware of this are assumed to be less susceptible to cognitive biases such as the desirability bias as they are less driven by their desires than by neutral curiosity.

Ecken et al. (2011) suggest asking Delphi participants for their desirability of each projection along with their probability estimates. They suppose a post-hoc procedure to quantify the desirability bias in Delphi studies and apply a statistical approach to adapt panelists' probability estimates in accordance to the identified level of desirability bias (Ecken et al., 2011). In light of the above-mentioned mixed empirical

results for the desirability bias we share the recommendation to quantify the desirability bias in Delphi studies and suggest to apply the post-hoc procedure in case of an unacceptable degree of desirability bias. As the desirability bias was shown to increase with the time left to the occurrence of the specific event (e.g. Trope and Liberman, 2003), this will be particularly advisable in case of long prospect horizons. In this regard we also suggest not to extent the prospect horizon farther than necessary for the issue under investigation as this will arguably increase uncertainty and promote the biasing effect of desirability.

## 5.4 Biases in opinion change

Any improvement in Delphi accuracy occurring after the initial estimates must necessarily stem from opinion change during subsequent iterations. Accuracy improvement through the revision of initial estimates requires that not all panelists perform an equally large change towards the average of first-round estimates (Bolger and Wright, 2011). Unless the average of first round estimates and the accurate value are very close this would only increase (mistaken) consensus but not accuracy (Bolger and Wright, 2011). Accuracy improvement during second and later iterations requires some participants to change their initial judgment more than others (Bolger and Wright, 2011).

The theory of errors – which constitutes a basic principle underlying Delphi – postulates that more knowledgeable participants that provided more accurate estimates during the first round change their opinion less than panelists that submitted more erroneous inputs (Dalkey, 1975). It is supposed that respondents who are aware of the fact that they have limited expertise or applied little consideration are more willing to modify their response (Kauko and Palmroos, 2014). In parallel, panelists that provided the most accurate inputs ideally do not change anything (Kauko and Palmroos, 2014). If this logic applies the iterative process leads to stepwise accuracy improvement of the group estimate. Provided that there are sufficient rounds allowing the less expert panelists to change their opinions as much as they are prepared to, Delphi delivers accurate results (Bolger and Wright, 2011). However, there are some cognitive biases at play that might prevent the mechanism from working properly. The question arising is formulated in Rowe and Wright (1999: 139): “Which individuals change their judgments in response to Delphi feedback – the least confident, the most dogmatic, the least expert?”.

Empirical research provides evidence for the theory of errors. Hussler et al.'s (2011) empirical study found that experts' estimates remained rather stable even when confronted with contradictory judgments. Only 3% of opinions given by experts were changed during the second round, as opposed to 21% of the laypersons' responses (Hussler et al., 2011). Rowe and Wright (1996) found a significant negative correlation between the level of objective expertise and the propensity to change initial estimates. Rowe et al. (2005) report that participants who provided more accurate probability forecasts in the first round exhibited least opinion change afterwards. Similar results are reported by Yaniv and Milyavsky (2007). However, the mechanism necessary for the theory of errors to be fulfilled cannot be taken for granted. Doubt concerning Delphi and the theory of errors is promoted by findings that "change toward the fed-back value also occurs when this value is false" (Woudenberg, 1991: 140). Such unfavorable dynamics may occur when it is not the least knowledgeable Delphi participants that change their mind but, for instance, the least confident.

If confidence – conceived as "subjects' beliefs about their decisional performance and their perception of the probability that their decisions are correct" (Huang et al., 2012: 440) – is well related to expertise, accuracy will improve when the least confident ones change their opinion in the direction of the estimates of the more confident (Bolger and Wright,, 2011). Yet, empirical research yields mixed results. While some find that the propensity to change increases with decreasing confidence (Bolger et al., 2011; Bolger and Wright, 2011) and that more confident judges tend be followed more (e.g. Sniezek and Van Swol, 2001; Van Swol and Sniezek, 2005), others explicitly do not find any relation between confidence and opinion change (Rowe et al., 2005; Rowe and Wright, 1996). Even worse, empirical studies show that there is no significant relation between confidence and expertise/accuracy (Rowe et al., 2005; Rowe and Wright, 1996,, 1999). It seems confidence is more related to status (Bolger and Wright, 2011) or personality traits like self-esteem (Rowe et al., 2005; Bolger and Wright, 2011) than to expertise. That means accuracy is not necessarily increased and might even be adversely affected if the least confident participants are the ones that change their minds most. Hence, as confidence does not seem to be a proper indicator for accuracy another Delphi design recommendation is not to include any indication of confidence in Delphi feedbacks (Rowe et al., 2005; Bolger et al., 2011).

It was proposed that feedback – quantitative or argumentative – is a more reliable indicator of accuracy than statements of confidence (Bolger and Wright, 2011). In general, feedback is found to be a valuable corrective feature for inaccurate first-round

estimates by less knowledgeable or biased respondents (Rowe et al., 2005; Yaniv and Milyavsky, 2007; Bonaccio and Dalal, 2006). Yet, research on which kind of feedback provides the best indication of expertise and the most improvement of accuracy yields conflicting results. While Rowe and Wright (1996) found greater accuracy improvement for qualitative feedback (only arguments, no statistics), Rowe et al. (2005) found that qualitative feedback had no benefits – neither in terms of opinion change nor accuracy. Bolger et al. (2011) found similar results to Rowe et al. (2005). Equally contradictory, the iteration condition (just another Delphi round, neither quantitative nor qualitative feedback) once improved accuracy (Rowe and Wright, 1996), and once did not (Rowe et al., 2005).

Unfortunately, Rowe and colleagues did not include a feedback that combines quantitative and qualitative features which could be recommendable as it provides the most comprehensive information. Further, they did not link their results to the distinct impact and mode of operation of cognitive biases. We aim to provide further insights on the impact of design features in the feedback-and-revision phase by applying a strong cognitive bias lens. We propose that people show substantial flexibility in selecting and processing new information (Hart et al., 2009; Jonas et al., 2006). Hence, these processes can be considerably impacted by biases (Jonas et al., 2006; Carlson and Russo,, 2001; DeKay et al., 2009; Russo et al., 2008; Russo et al., 1996). Particularly, it may occur that people (with accurate first-round estimates) follow majority opinion too much (bandwagon effect), or participants (with inaccurate first-round results) change their opinion too little (belief perseverance). We will elaborate on these two biases in the next sections.

### 5.4.1 Bandwagon effect / groupthink

The bandwagon effect refers to the phenomenon that at times a person's behavior – including decision behavior – strongly conforms to the behavior of a group or the majority of a group, merely based on the information that this thinking or behavior is pursued by the majority (Zimmermann et al., 2012). It can be seen as a pressure to adopt oneself to a standard belief or conduct (Hallowell and Gambatese, 2010). In terms of Delphi processes this means that participants go along with the majority opinion instead of championing their own take (Tsikerdekis, 2013). This phenomenon seems to be particularly prevalent in case of a strong initial group preference (Henningsen et al., 2006).

Several theoretical arguments have been suggested in order to explain why concurrence seeking may be stronger than accuracy seeking (Bolger and Wright, 2011). First, Janis' (1973) groupthink theory is frequently cited in the context of bandwagon effects. Janis argues that people adapt to group opinion out of a moral obligation grounded in group loyalty (Janis, 1973). Consequently group members do not raise controversial issues or question weak arguments (Janis, 1973), particularly in case of high group cohesiveness and homogeneity, insulation from outside experts, authoritarian leadership, and lack of methodical decision-making procedures (Janis, 1973,, 1982). The theory – which has been subject to harsh critique (e.g. Fuller and Aldag, 1998) – is grounded on retrospective sensemaking of disastrous political decisions by face-to-face groups. It seems only limitedly applicable to Delphi panels for which the above-mentioned conditions are usually not fulfilled (e.g. Fuller and Aldag, 1998).

Second, some researchers have adduced social pressure arguments. As Delphi participants remain anonymous social pressures should be less immediate and strong than in face-to-face groups (Rowe et al., 1991; Bolger and Wright, 2011). Yet, they may not be eliminated entirely but still be felt and taking according effect. Due to social comparison processes and social desirability objectives people strive to perceive and present themselves in a favorable light compared to others (Whyte, 1989; Myers et al., 1977). Group interaction may therefore motivate group members to follow socially desired or shared opinions (Myers et al., 1977) to minimize conflict and reach consensus. In Delphi studies this may lead to opinion change on the side of those who held minority positions in the first round (Bolger and Wright, 2011), no matter how accurate this minority position was. Bolger and Wright (2011) add that those holding outlying opinions are the most likely to feel marginalized and drop out. Yet, as they challenge conventional thinking, they might be the most important participants for reaching accurate results (Bolger and Wright, 2011). Particularly in our research context of future-oriented Delphi studies consensus is not an objective worth striving for (Woudenberg, 1991). Considering diverging perspectives, arguments and futures is way more valuable than unanimity (Rowe et al., 2005). Unfortunately, human psychology is first and foremost a pragmatic survival mechanism rather than a truth detection device (Friedrich, 1993). Therefore, people might be more concerned with producing desirable outcomes than accurate ones (Nickerson, 1998).

Third, uncertainty has been put forward as an explanation for bandwagon effects. In contexts of high uncertainty or ambiguity – like future-oriented issues – people tend to

copy the approaches of others (Bolger and Wright, 2011; Whyte, 1989). This 'informational social influence' (Deutsh and Gerard, 1955: 630) is particularly promising and prevalent when others are perceived to be experts (Bolger and Wright, 2011). As future-oriented Delphi studies usually deal with highly uncertain or ambiguous issues and use expert panels to approach them, informational social influence may be particularly high.

In any of the three explanations, satisficing (Simon, 1979) may play a key role. People accept an easily retrievable answer that fulfills a satisfying level of plausibility and do not engage in any further search or optimizing (Myers et al., 1977). This may lead to mistaken consensus around "the first solution that greatly offends no one, even though no one may agree with that solution wholeheartedly" (Rowe et al., 1991).

Janis' groupthink theory was partially supported by empirical investigations (e.g. Callaway and Esser, 1984; Hodson and Sorrentino, 1997). For instance, it was confirmed that group cohesiveness exerts significant influence on the quality of a group's decision-making with highest quality being reported for groups of intermediate cohesiveness (Callaway and Esser, 1984). Several researchers refined Janis' theory (e.g. Henningsen et al., 2006; Hodson and Sorrentino, 1997), e.g. regarding the impact of personality traits like group members' uncertainty orientation (Hodson and Sorrentino, 1997).

With respect to Delphi studies, Rowe et al. (2005) find that "majorities, whether accurate or otherwise, exerted a significant pull on minorities to the consensual position, even when that position was fallacious" (p. 397). This result was irrespective of the nature of the feedback provided (Rowe et al., 2005). Similar results were found by Myers et al. (1977). Bolger et al. (2011) also confirm these results as they find that panelists who provided minority opinions were more likely to change their positions and that the consequential convergence of opinion does not necessarily imply improved accuracy. They even conclude that "majority opinion is the strongest influence on panelists' opinion change" (Bolger et al., 2011: 1671). Obviously Delphi practitioners must be aware that bandwagon effects may exert substantial influence on Delphi results. Although anonymity was found to limit bandwagon processes (Postmes and Lea, 2000; Tsikerdekis, 2013) convergence of opinion across Delphi iterations does not necessarily imply increased accuracy (Rowe et al., 2005). Some design features may help to mitigate the bandwagon effect.

The major means against the bandwagon effect is the configuration of the provided feedback as it brings the information that causes participants to either change their

opinion in the one or other direction, or not. Feedback must provide good cues about where the most accurate answers lie. As elaborated above, confidence or majority do not seem to be reliable indicators in this regard. Although it is an open empirical question how good people are in distinguishing good from bad advice on the basis of rationales (Bolger and Wright, 2011), we agree with Bolger et al. (2011) that argumentative feedback can at least to some degree be a good cue to truth. Assuming panelists are able to distinguish good from bad advice, it might be an additional feature to let experts rate their fellow panelists qualitative inputs by quality and let the Delphi software sort arguments by this rating, i.e. the most persuasive arguments are positioned on top of the list, irrespective of whether they support or challenge a specific opinion.

Even though the studies by Rowe and Wright (1996), Rowe et al. (2005) and Bolger et al. (2011) have reported at best mixed results for the accuracy-improvement potential of qualitative feedback, we believe it to be highly valuable if properly configured. Our hope is backed by findings that "the quality of other panelists' rationales was significantly positively correlated with the more valid tip" (Bolger et al., 2011: 1678), and that opinion change as a reaction to 'reasons feedback' tended to be for the better (Rowe and Wright, 1996).

However, argumentative feedback should not be provided to other panelists unfiltered. Similar and duplicate entries should be eliminated in order not to disclose whether the argument is shared by many or not (Bolger et al., 2011). As panelists are not provided with any indication of majority they cannot fall victim to the bandwagon effect; they can only rethink their own estimates on the basis of other arguments' persuasive power. Here, again, panel heterogeneity is advisable as the inclusion of heterogeneous participants with diverging perspectives challenges conventional thinking and fosters fruitful controversy (Förster and von der Gracht, 2014).

Additionally, we recommend not including any statistical information in the feedback. As numerical feedback almost always provides an indication of consensus or majority it does in fact operate as a clear incentive to agree rather than to be accurate (Bolger and Wright, 2011). If panelists do not see any mean, median or consensus value there is no obvious bandwagon they can jump on. Outliers – i.e. the ones most relevant to challenge conventional thinking (Bolger and Wright, 2011) – are much less likely to feel marginalized, drop out or decide for mistaken opinion change because it is not readily visible they are outliers at all. This way, Delphi participants can only evaluate

the accuracy of their own initial estimates on the basis of argumentative feedback provided by their fellow panelists. Hence, the bandwagon effect is diminished.

Admittedly, this might hamper the formation of consensus. However, we do not consider consensus a proper aim for Delphi studies (Woudenberg, 1991), particularly not for future-oriented Delphi studies as addressed in this paper. While many authors consider consensus something worth striving for and conceive the lack of it as undesirable (Elliott et al., 2010; von der Gracht, 2008), our elaborations on the bandwagon effect elucidate the frequent tradeoff between consensus and accuracy (Janis, 1973; McAvoy et al., 2013). We advocate that neither Delphi administrators nor panelists should have a too strong desire for unanimity but rather strive for stability in group opinion, e.g. two or more opinion clusters, and allow for informative dissent (Rowe et al., 2005).

### 5.4.2 Belief perseverance

Belief-perseverance, or advice-discounting, refers to the observation that decision makers being confronted with unconfirmatory advice overweight their own judgmental performance and underweight (or discount) the available advice (Bonaccio and Dalal, 2006). This overconfidence leads to final judgments being significantly closer to one's own estimate than to the advice, even if the advice is more accurate (e.g. Gardner and Berry, 1995, Harvey and Fischer, 1997, Yaniv and Kleinberger, 2000). Similar to anchoring people systematically disregard new information to a certain degree and do not sufficiently move away from a pre-existent point of departure. In its extreme form belief-perseverance means entirely sticking with one's initial estimate while completely ignoring any kind of advice and new information (Yaniv and Milyavsky, 2007).

In terms of belief adaption there are two psychological mechanisms competing with one another. On the one hand humans need some degree of stability in their beliefs in order to benefit from past experience (Drake, 1983). Moreover, people value consistency and consider it an important cornerstone of rationality (Nickerson, 1998). On the other hand a certain amount of flexibility and change in beliefs is necessary to benefit from new experiences and information (Drake, 1983). Obviously, there is the frequent tendency to maintain a stand once taken. At times, it even seems that a person's sole objective is to defend and justify the own position (Nickerson, 1998; Kauko and Palmroos, 2014).

Besides arguments pointing to the primacy effect (Nickerson, 1998), i.e. the overweighing of knowledge that was acquired earlier rather than later, and to anchoring-and-adjustment as described above with the judge's initial estimate serving as an anchor which is insufficiently adjusted to the advice (Harvey, 2007; Block and Harper, 1991; Bolger and Wright, 2011; Bonaccio and Dalal, 2006), there are three main lines of argumentation explaining the systematic intransigence underlying the belief-perseverance effect: selective accessibility/confirmatory search, information asymmetries, and egocentrism. We will elaborate on these explanations by referring to Delphi literature, cognitive and psychological research as well as literature on judge-advisor systems (JAS) as this research paradigm offers some similarities with Delphi procedures and particularly addresses belief-perseverance.

As in the case of anchoring and framing or desirability, belief-perseverance can be explained by selective accessibility and confirmatory search arguments. Here, the unwillingness to admit the inaccuracy of one's own prior inputs leads people to selectively access and scrutinize information that is consistent with their initial estimates (Windschitl et al., 2013; Rabin and Schrag, 1999) and discount or even ignore unconfirmatory evidence (Huang et al., 2012; Kauko and Palmroos, 2014). Further, they perceive and interpret information in a manner supporting their beliefs (Nickerson, 1998) and discredit sources of contradictory information (Kulik, 1986).

This "hypothesis-based filtering" (Rabin and Schrag, 1999: 46), where supporting information becomes appealing (e.g. Scherer et al., 2013; Krizan and Windschitl, 2007) and conflicting information becomes dissonance provoking (Hart et al., 2009; Jonas et al., 2006; Kunda, 1990), serves to perpetuate one's self-conceptions (Kulik et al., 1986). With regard to Delphi that means that panelists "selectively attend to feedback that agrees with their stated position and ignore feedback that disagrees with it" (Rowe and Wright, 1996: 76). Consequently, more arguments in favor of the initial position are collected, commitment to that position increases, confidence is strengthened, and opinion change becomes less likely (Rabin and Schrag, 1999).

A second theoretical explanation for belief-perseverance is information asymmetry. Although the judge's initial estimate and an advisor's estimate may seem equally valid from an external perspective, they are not from the judge's perspective (Yaniv and Milyavsky, 2007). The judge has full access to the reasoning and evidence underlying his or her own estimate but only incomplete, if any, insight in the advisor's rationales (Yaniv and Kleinberger, 2000; Yaniv, 2004; Yaniv and Milyavsky, 2007; Bolger and Wright, 2011). As the weight assigned to a judgment depends on the evidence that can

be acquired in support of it, the differential information about the underlying justifications causes decision makers to discount the advice relative to their own opinion (Yaniv and Kleinberger, 2000).

A third explanation for belief-perseverance is egocentrism (e.g. Yaniv and Kleinberger, 2000; Yaniv and Milyavsky, 2007). It postulates that "a judge adheres to a default belief in the inherent superiority of his or her own judgment" (Bolger et al., 2011: 1672) simply because it is his or her own (Bolger and Wright, 2011). Psychological explanations contend that people do so to protect their ego (Nickerson, 1998), appear consistent in social settings and maintain their self-esteem (Yaniv and Milyavsky, 2007). Some argue that egocentrism is particularly likely when working with experts as they – being aware of their expert status – might be particularly unwilling to admit that their initial estimates were wildly inaccurate (Kauko and Palmroos, 2014). Literature indicates that egocentrism expresses itself via egocentric trimming, i.e. the farther an opinion is away from one's own the more it is discounted and the more is its source disparaged (Yaniv, 2004; Yaniv and Milyavsky, 2007). Yaniv and Milyavsky (2007: 105) state that "Trimming is indeed a good strategy that could be used beneficially to improve accuracy, as long as it is conducted objectively rather than egocentrically".

Empirical evidence shows that taking advice substantially increases accuracy (Yaniv and Milyavsky, 2007) and that advice is less discounted by judges that have less experience/knowledge than their advisors (e.g., Harvey and Fischer,, 1997) or less than other judges (Harvey and Fischer,, 1997; Yaniv and Kleinberger, 2000). While this provides some support for the theory of errors, research also shows that judges discount advice to the disadvantage of accuracy gains. Although accuracy increases somewhat due to the discounted usage of advice (Yaniv and Milyavsky, 2007), judges by far fail to exhaust the entire accuracy improvement potential (Yaniv and Kleinberger, 2000, Yaniv, 2004; Yaniv and Milyavsky, 2007). Yaniv and Kleinberger (2000) found that respondents' and advisors' estimates were, on average, equally accurate. Yet, just as Harvey and Fischer (1997) they find that own estimates are given a weight around 70% and advisor's estimates are discounted to a weight of approximately 30% (Yaniv and Kleinberger, 2000).

Windschitl et al. (2013) provide clear evidence for the selective accessibility and confirmatory search arguments brought forward earlier. Unlike many other studies they include an "information-buffet paradigm" (Windschitl et al., 2013: 75) in their study, i.e. after making an initial prediction, participants may choose which

information out of many they use in order to verify or challenge their own prediction. They find that people significantly favor information supporting rather than contradicting their prediction (Windschitl et al., 2013). Further evidence for similar selective-exposure paradigms is reviewed by Hart et al. (2009) and Jonas et al. (2006).

Empirical research indicates that egocentrism might be more applicable as an explanation for belief-perseverance than information asymmetry as advice-discounting also occurs in novel situations where judges can be assumed not to have any evidence to support their own estimate (Cadinu and Rothbart, 1996; Krueger, 2003; Bolger and Wright, 2011). Further, the egocentrism argument may be more compelling than anchoring-and-adjustment as advice-discounting also occurs when the advice is given before the judge even sees the decision task such that the judge cannot (mis)use his initial judgment as an anchor (Clement and Krueger, 2000; Harvey and Harries, 2004). Further direct support for egocentrism comes from Bonaccio and Dalal (2006) who found that "decision-makers gave greater weight to someone else's forecasts incorrectly labeled as their own than to correctly labeled others' forecasts" (p. 130). Bolger et al. (2011) contend that it is an open research question whether information asymmetry or egocentrism arguments are superior.

Empirical studies on belief-perseverance further show that discounting increases with a growing distance between the judge's and the advisor's estimate (egocentric trimming) (Yaniv, 2004; Yaniv and Milyavsky,, 2007) and growing distance to other advisors' recommendations (outlying advice) (Harries et al., 2004). Some hope is given by studies reporting that better advice is less discounted than bad advice, although it is still discounted (Yaniv and Kleinberger, 2000; Yaniv and Milyavsky, 2007; Gardner and Berry, 1995). With regard to most Delphi studies, it is particularly relevant to acknowledge that advice discounting is more prevalent in judgment than in choice tasks (Klayman et al., 1999; Soll and Klayman, 2004).

Concerning the question which design choices may help to mitigate belief-perseverance, we first have to point to the fact that Delphi's anonymity plays a controversial role in this regard. On the one hand it offers participants the chance to change their opinion without losing face. On the other hand it undermines other participants' (i.e. advisors') credibility. People might be reluctant to change their own judgment in light of advice given by advisors whose identity remains undisclosed (Rains, 2007; Tsikerdekis et al., 2013; Ziegler et al., 2006).

As empirical evidence showed good advice is less discounted than bad advice (Yaniv and Kleinberger, 2000; Yaniv and Milyavsky, 2007; Gardner and Berry, 1995) belief-

perseverance should be countered with high-quality argumentative feedback (Bolger and Wright, 2011) in order to signal a high degree of expertise and provide a convincing challenge to others' beliefs. However, it was found that the majority of rationales provided by Delphi panelists were of low quality (Bolger and Wright, 2011; Bolger et al., 2011; Rowe et al., 2005). A large number merely reported unbacked personal views or textually repeated the quantitative estimate ('I think that this is more likely …' (Rowe et al., 2005: 396)) rather than presenting compelling causal reasoning (Bolger and Wright, 2011).

Hence, we recommend striving for enhancing the quality of argumentative feedback. A simple way to do so is giving participants one or two examples for good and poor reasons, respectively, in order to raise awareness for the significance of each type of input (Bolger and Wright, 2011). Additionally, we again recommend not providing feedback in an unfiltered manner. We suggest Delphi administrators to thoroughly review panelists' arguments and to delete uninformative inputs, i.e. low-quality inputs that do not provide causal reasoning (Bolger et al., 2011). If Delphi administrators succeed in eliciting high-quality arguments to be used as feedback, this may work against several of the above-mentioned mechanisms underlying belief-perseverance, i.e. anchoring, information asymmetry, and egocentrism.

It is argued that Delphi participants' propensity to generate poor-quality reasoning is fostered by a lack of expertise, lack of motivation and involvement, and the nature of the task (Bolger and Wright, 2011). While a proper level of expertise can be assured early on during the expert-selection procedure, motivation and involvement can be raised by offering financial rewards or social incentives like acknowledging the names of the most engaged panelists within the publication of the Delphi results (Bolger and Wright, 2011). The rating and ordering of arguments by their quality (persuasiveness) that we already suggested earlier might also be effective here. The nature of the task is usually not susceptible to changes; Delphi studies addressing long-term future issues are obviously ambiguous in nature and limitedly amenable to causal reasoning.

Kauko and Palmroos (2014) suggest a post-survey adjustment procedure to mitigate the belief-perseverance bias mathematically. Grounded on the basic insight of belief-perseverance that "Most modifications in individual forecasts will be in the right direction but too small" (Kauko and Palmroos, 2014: 315), they scale up modifications in individual forecasts ex post. Change in each answer of each respondent is multiplied by a suitable constant, in their empirical study this constant was 4.39 (Kauko and Palmroos, 2014). While the identification of a proper constant remains a considerable

challenge, they note that even marginal upscaling with a constant of 1.1 resulted in better forecasts than in the condition without any de-biasing (Kauko and Palmroos, 2014).

If the procedure is kept secret so that respondents cannot strategically adjust their answers (Kauko and Palmroos, 2014) it may be a promising solution – one being exclusively designed for Delphi studies as other techniques (like face-to-face groups) do not provide the necessary data, i.e. initial and revised estimates from each participant. However, referring back to our earlier elaborations on the bandwagon effect, we note that Delphi administrators would still have to make sure that participants adjust their initial estimates in the right direction. Otherwise the post-hoc procedure could scale up an opinion change away from the accurate value and, say, towards the flawy value provided by a mistaken majority. In order to avoid such undesirable amplification of biases, Kauko and Palmroos' (2004) procedure would have to be combined with other design features as recommended in this paper such as high expert heterogeneity.

Researchers further suggest the use of warning and counter-argument to reduce belief-perseverance bias (Huang et al., 2012). As mechanisms such as confirmatory search are unconscious processes (Nickerson, 1998), warning alone may already provide some cure against belief-perseverance. Block and Harper (1991) found that for subjects being warned of the potential influence of the belief-perseverance bias overconfidence was reduced (but not eliminated). By asking people for counter-arguments Delphi administrators may go one step further. As the quality of estimates largely depends on the variety of information considered during the judgment process (Kray and Galinsky, 2003), encouraging panelists to think of alternative hypotheses and counter-argument is a valid way to enhance judgmental accuracy and mitigate belief-perseverance (Nickerson, 1998; Huang et al., 2012). This consider-the-opposite intervention (Windschitl et al., 2013) particularly works against confirmatory search as it provides a clear stimulus to consider information that might otherwise be neglected (Huang et al., 2012). The direct provision of counter-argument (by Delphi administrators) as suggested by Huang et al. (2012) is not recommended as it is difficult to identify those experts who are biased (since the true value is regularly unknown). One would have to supply counter-argument to all participants which would hold the risk that accurate estimates are revised as well and non-confident panelists might be more susceptible / responsive to counter-argument than confident panelists – regardless of expertise / accuracy.

Another cure against confirmatory search, and implicitly belief-perseverance, is disfluency, i.e. providing feedback in a disfluent format, as suggested by Hernandez and Preston (2013). They argue that "the effort associated with disfluency prompts a deeper, more analytical and critical processing of the information itself" (Hernandez and Preston, 2013: 178; see also Oppenheimer, 2008; Alter and Oppenheimer, 2008). While disfluency yields interesting effects in laboratory settings, we are reluctant to advice Delphi administrators to present feedback in a disfluent way as this might cause increased fatigue and drop-outs rather than an increase in accuracy.

## 5.5 Summary: Design features countering cognitive biases

Based on the elaborations above, table 13 summarizes the major design recommendations and illustrates which design features work against which bias(es).

**Table 13:** Main design features and their effects on cognitive biases.

| | **Framing and anchoring** | **Desirability bias** | **Bandwagon effect** | **Belief perseverance** |
|---|---|---|---|---|
| **Panel composition**<br>- high heterogeneity<br>- inclusion of mavericks<br>- avoid pyramid search<br>- role-playing | ✓ | ✓ | ✓ | ✓ |
| **Warning and eliciting counter-argument** | ✓ | ✓ | ✓ | ✓ |
| **Participants' traits**<br>- high expertise<br>- high cognitive abilities<br>- high involvement | ✓ | ✓ | ✓ | ✓ / × |
| **Post-hoc procedure** | ø | ✓ | ø | ✓ |
| **Unrelated order** | ✓ | ø | ø | ø |
| **Feedback**<br>- argumentative only<br>- no double entries<br>- no non-causal entries | ø | ø | ✓ | ✓ |

✓ Positive effect ø No effect × Detrimental effect

The most important design recommendation derived from our cognitive biases perspective on Delphi processes is the composition of a panel that is very heterogeneous, includes mavericks and does not apply pyramid search. If heterogeneity cannot be sufficiently ensured by selecting participants it is recommended to assign roles to participants in order to create artificial heterogeneity (Yaniv, 2011; Green and Armstrong, 2011). Although panel heterogeneity has been suggested before (Ecken et al., 2011; Mannix and Neale, 2005; Sommers, 2006) our analysis shows that it is valuable in mitigating all of the major biases that are at play in Delphi studies. As heterogeneity provides a wide range of frames, anchors, and desirability perspectives it enhances initial estimates that "bracket" the real value (Förster and von der Gracht, 2014). Some participants' estimates will be positioned above, some below the accurate value. Such heterogeneity-induced bracketing mitigates biases that would take effect in more homogeneous panels of like-minded

participants (Förster and von der Gracht, 2014). Ecken et al. (2011) provide an example how heterogeneity leads to bracketing and, hence, to the elimination of the desirability bias. Bracketing equally applies to framing (Yaniv, 2011) and anchoring. However, it is especially the different perspectives of such heterogeneous groups that is valuable when identifying potential future outcomes.

Of course, Delphi administrators should avoid providing any frame, anchor, or desirability impulse via the Delphi itself because such an input would be received by all panelists irrespective of their diversity. That means heterogeneity predominantly works against pre-existent frames, anchors and desirability perspectives but not against Delphi-induced ones. In order to avoid Delphi-induced frames or anchors, we recommend presenting Delphi questions or projections in an unrelated order, i.e. each question or projection should be as contextually detached from its preceding one as possible.

In stage 4 of the standard Delphi process (feedback and revised estimates) the divergent perspectives provided by a heterogeneous panel create fruitful disagreement, evoke controversial thinking and promote judgmental accuracy (Yaniv, 2011).

Warning participants of the existence and effects of biases and asking them for counter-arguments also has the potential to reduce the impact of each bias. However, it needs to be noted that, in order to take proper effect, each bias would require a different bias-specific warning, respectively (Furnham and Boo, 2011). Yet, confronting participants with several individual warnings is supposed to be rather annoying for them. Delphi administrators are recommended to ensure proper understanding of Delphi procedures and purposes at the side of the participants. Furthermore, they could focus on one or two biases that are particularly likely to occur for the specific judgmental task of their Delphi, and limit warning to these biases. Contrastingly, asking participants to think about and consider counter-arguments can be done in a general manner that works for all biases alike.

Participants' personal traits, i.e. high expertise, high cognitive abilities, and high involvement, take effect with regard to the mitigation of framing and anchoring, the desirability bias, and the bandwagon effect but may have controversial effects on belief perseverance. While these traits foster the provision of high-quality arguments that serve against belief-perseverance of other participants, highly experienced panelists – being aware of their strong knowledge base – might be particularly reluctant to change their mind and preserve their beliefs instead.

Post-hoc procedures only take effect for the specific bias they were designed for. However, they should not negatively impact the other biases as they are applied after the completion of the Delphi.

Finally, feedback can naturally not take effect with regard to framing and anchoring or the desirability bias as those operate prior to the provision of feedback. However, feedback is of enormous relevance to the mitigation of the bandwagon effect and belief-perseverance (Wright and Rowe, 2011). It confronts participants with "a new anchor, a different frame, or a piece of disconfirming information, [and] can trigger beneficial thought processes" (Yaniv and Milyavsky, 2007: 119). As argued above, we recommend providing only argumentative feedback, i.e. no statistics that could pull panelists to the majority. Further, double entries of arguments should be deleted, also to avoid bandwagon-specific majority effects, and non-causal arguments should not be provided in order to enhance feedback quality. This way, participants can focus on the content of high-quality arguments and thoroughly consider a proper opinion change instead of following the crowd or just sticking to their initial estimate.

We might also note that the addressed cognitive biases do not take effect in isolation but may occur in parallel as well as in sequence and impinge on each other. There are several kinds of potential co-effects. First, participants' initial estimates (Delphi stage 3) may be simultaneously influenced by anchoring and framing as well as desirability bias. Second, it may of course be that initial estimates are biased by framing and anchoring or desirability and participants subsequently also fall victim to either the bandwagon effect or belief-perseverance. Third, biases prevalent in the initial estimates (Delphi stage 3) may even be polarized in subsequent feedback and revision rounds (Delphi stage 4) by multiple biases interfering with one another. For instance, a Delphi panel comprising a majority of like-minded experts sharing a certain desirability perspective will probably provide initial estimates being desirability-biased. The consequently biased feedback could make desirability contagious (Ecken et al., 2011) as other experts converge towards this biased feedback value (Kerr and Tindale, 2011; Yaniv, 2011), e.g. because the bandwagon effect makes them move away from their un-biased minority opinion (while the belief-perseverance bias keeps the majority participants at their erroneous position).

## 5.6 Conclusion

Research provides fairly diverging evaluations of the accuracy of Delphi studies in general and has identified contradictory results concerning the effects of certain design features (Rowe and Wright, 1996; Rowe et al., 2005). These inconclusive results supposedly mainly stem from the discretion in design choices researchers have when planning and conducting Delphi studies. While being difficult when striving for a general accuracy assessment of Delphi studies, its flexibility is also one of Delphi's major advantages. We tried to take advantage of design flexibility of Delphi studies by proposing several features whose advantages and drawbacks in countering cognitive biases we discussed in this study. We structured our analysis along the typical process steps of a Delphi study, and indicated which biases may occur at which stage of the process. We addressed the two main cognitive biases impacting initial Delphi estimates (stage 3); i.e. framing and anchoring as well as the desirability bias, and the two main biases taking effect during feedback and revision activities (stage 4); i.e. the bandwagon effect and belief-perseverance. We explained the mode of operation of each effect as well as underlying mechanisms leading to the respective psychological and cognitive phenomena. For each bias we also discussed several design features that may serve as remedies against unfavorable effects. We finally recommended a set of design features that partially mitigate the effects of several biases in parallel. As there is not much literature focusing on the enhancement of the accuracy of future-oriented Delphi studies through the avoidance of cognitive biases, we tried to contribute to this research stream by applying a strong cognitive bias perspective on Delphi processes and design features. This perspective leaves still much room for further research such as empirical investigations of the new design features recommended in this study, analyses of the interdependencies between different cognitive biases being at play in parallel, or considerations of other distinct biases that might be relevant in specific research contexts.

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# 6 Conclusion

The first part of the thesis illustrated the development of institutional theory, its major concepts and related organizational responses to institutional pressures. It became obvious that new institutionalism's initial focus on passive organizational acquiescence – which leads to structural and behavioral isomorphism – has been complemented by several reactive responses to institutional pressures as well as proactive ones that span from institutional entrepreneurship, over political strategies, to cognitive and discursive approaches influencing institutional setups. These responses account for institutionalists' recent interest in explaining structural and behavioral heterogeneity instead of isomorphism, self-interested agency instead of obedience, and change rather than stability (Boxenbaum and Jonsson, 2013; Wooten and Hoffman, 2013). Moreover, the first part of the thesis offered responses to institutional voids, i.e. immature or missing institutions as they predominantly – but not solely – appear in emerging markets. In such a context, the key institutions-related challenge for organizations is not dodging institutional pressures but working around or filling institutional voids. After years of intensive development today's institutional literature offers a rich portfolio of organizational responses to institutional pressures as well as institutional voids. The variety of approaches supports managers in both developed and emerging markets in reacting appropriately to the different institutional environments applying distinct passive, active or proactive responses, or a combination of them. Whenever appropriate, enabling conditions or limitations to the applicability of the approaches were also discussed. These are of particular relevance for institutional actors that want to engage in institutional change but also for policy makers that want to support or hinder specific institutional developments.

Within the second part of the thesis, the objective was twofold: First, the information gathering challenge of decision making with respect to distinct theoretical, organizational and procedural approaches and their contribution to coping with information contingencies in emerging markets was discussed. It was found that predominant decision theories anchor a fixed or given information level in their underlying assumptions and direct little attention towards the question of how to actively cope with information contingencies. Moreover, organizational and procedural approaches seem to represent a necessary but insufficient step towards alleviating uncertainty and equivocality. Second, future-oriented Delphi studies were shown to be a valuable information gathering aid in emerging markets. The thesis elaborated on how extensions of the conventional consensus-based Delphi method

combined with future-oriented approaches (e.g. scenario planning) can yield improved information gathering activities. The four case examples showed how systematic, future-oriented Delphi studies can contribute to the reduction of uncertainty and equivocality in emerging markets—in both nascent and relatively mature industry domains. Furthermore, the four case examples demonstrated how some of Classical Decision Theory's shortcomings such as unknown alternatives, (probabilities of) future states and combined outcomes of both aspects, can be addressed systematically. The case examples also accounted for the 'certainty' effects in light of the prospect theory by allowing an assessment of potential desirability biases for examined projections – indicative for associated gains or losses. In addition, some effects of regret theory's key assumption such as a reduced decision quality through decision makers' reflections in hindsight might diminish in the Delphi studies across multiple rounds conducted. Finally, with respect to bounded rationality, the projection assessments of the experts yielded positive convergence rates in all four Delphi studies thereby reinforcing the assumption that the participants were not perfectly informed about focal issues upfront.

Based on the theoretical/conceptual elaborations on the future-oriented Delphi approach that were performed in the second part, this approach was then applied to a specific emerging market context in the third part of the thesis, namely the truck industry in Russia. The institutional framework's immatureness in Russia causes challenging levels of state, effect, and response uncertainty for decision makers and their organizations. Those uncertainties are largely attributable to information deficiencies that are particularly prevalent when predicting a firm's future macro and industry environments. Firms are advised to apply sophisticated and customized information acquisition and processing approaches in order to cope with the externally determined environmental uncertainties. A dedicated decision framework considering political/legal aspects, value chain considerations, and market segment as well as strategic group developments was developed and applied within the Delphi approach in order to support joint venture decisions in the Russian truck industry, a question of relevance to many manufacturers engaged in this market. The framework comprised 20 thoroughly designed projections addressing relevant and uncertain aspects of the Russian truck industry's future development until 2025. Data were collected through an online real-time Delphi conducted in 2013. A heterogeneous panel of 33 experts rated probability, impact and desirability of each projection and provided numerous written arguments underlining their probability and impact estimates. These inputs

allow for a profound understanding of the industry's likely development, as well as its drivers, effects and possible responses. The insights provided by the Delphi were fed into the joint venture considerations of a Western European truck manufacturer's executives who can now better understand the industry and its institutional features, leading to reduced state, effect, and response uncertainty, and a more profound decision basis in favor of or against a joint venture with a local player.

Among other insights, the results predict hard times for Russian OEMs as they will likely face strong foreign competition leading to decreased sales volumes and market shares. While some experts doubt the survival of several Russian truck manufacturers, the Delphi sheds light on possible strategic responses including consolidation, cooperation, or focusing on new markets. Moreover, the scenarios developed based on the Delphi results can effectively be used for addressing future-related uncertainties, enhancing managers' mental models, and triggering organizational learning (Postma and Liebl, 2005). Since emerging markets like Russia do not develop in a linear or completely predictable way, managers need to consider alternative futures. The provided scenarios are a highly valuable basis for the derivation of firm-specific implications and sound strategic decisions like the one at hand, i.e. whether or not to engage in a joint venture with a local manufacturer. Additionally, the thesis contributes to the field by demonstrating the integrative application of Delphi with other complementing research methods, i.e. expert workshops and interviews as well as scenarios, in order to cope with emerging market uncertainties and support strategic decision making.

In order to further improve the value of Delphi studies – as the one applied in part three of the thesis – part four took a strong cognitive perspective on Delphi studies by analyzing the impact of cognitive biases and recommending design features that work towards mitigating the unfavorable effects of these biases. The analysis was structured along the typical process steps of a Delphi study, and indicated which biases may occur at which stage of the process. It addressed the two main cognitive biases impacting initial Delphi estimates (stage 3), i.e. framing and anchoring as well as the desirability bias, and the two main biases taking effect during feedback and revision (stage 4), i.e. the bandwagon effect and belief-perseverance. The elaborations included the mode of operation of each effect as well as underlying mechanisms leading to the respective cognitive phenomena. For each bias several design features that may serve as a remedy against its unfavorable effects were discussed. The analysis resulted in a recommended set of design features that mostly mitigate the effects of several biases

in parallel. As literature aiming at the enhancement of Delphi accuracy mostly does link the tested design features to the mode of operation of cognitive biases (e.g. Rowe and Wright 1996; Rowe et al., 2005), the thesis is supposed to make a valuable contribution by applying a strong cognitive bias lens on Delphi processes and design features.

The most important design recommendation derived from the cognitive biases perspective on Delphi processes is the composition of a panel that is very heterogeneous, includes mavericks and is not composed by the use of pyramid search. If heterogeneity cannot be sufficiently ensured by selecting according participants it is recommended to assign roles to participants in order to create artificial heterogeneity (Yaniv, 2011; Green and Armstrong, 2011). Although panel heterogeneity has been suggested before (Ecken et al., 2011; Mannix and Neale, 2005; Sommers, 2006) the analysis showed that it is valuable in mitigating all of the major biases that are at play in Delphi studies. As heterogeneity provides a wide range of frames, anchors, and desirability perspectives it enhances initial estimates that "bracket" the real value (Förster and von der Gracht, 2014). Further design recommendations include warnings concerning the existence and effects of biases, mathematical post-hoc procedures, and providing only argumentative feedback.

So far, research provides fairly diverging evaluations of Delphi accuracy in general and contradictory results concerning the effects of certain design features like the form of feedback (Rowe and Wright, 1996; Rowe et al., 2005). These inconclusive results supposedly mainly stem from the discretion in design choices researchers have when planning and conducting Delphis. While being difficult when striving for a general accuracy assessment for Delphi, its flexibility is also one of Delphi's major advantages. The thesis tried to take advantage of Delphi's design flexibility by proposing several design features whose advantages and drawbacks in countering cognitive biases were discussed.

Overall the thesis makes a substantial and multifaceted contribution as it organizes the literature on organizational responses to institutional pressures and voids, develops theory in the field of decision making under uncertainty further, empirically applies a Delphi approach to a relevant but under-researched industry in a demanding emerging markets setup and provides a methodological analysis referring to cognitive biases within Delphi-based decision making.

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