The Use of Discourse Analysis in Sustainability Transition Studies: A Systematic Review

Discourse and innovation journeys: the case of low energy housing in the UK

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Abstract

This paper presents a comprehensive analysis of the role of discourse analysis in sustainability transition studies. It examines the use of discourse analysis in understanding the dynamics of innovation and change in the context of sustainable development. The paper highlights the importance of discourse analysis in identifying the key stakeholders and their perspectives, as well as the role of power and ideology in shaping the transition processes. It also discusses the limitations of discourse analysis and suggests possible avenues for future research.

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ABSTRACT
Several studies on sustainability transitions in socio-technical systems take into account the role of language and meaning in their empirical investigations, both in the study of past transition trajectories and ‘transitions-in-the-making’. These studies often declare the use of discourse analysis, but discourse analysis is a diverse field that offers heterogeneous theory and methodology for the study of language and meaning. Clarification on the different discourse analytical approaches is, therefore, required for supporting the upcoming field of sustainability transition studies focussing on agency and power dynamics in socio-technical transitions. This systematic review identifies how discourse analysis has been employed thus far in sustainability transition studies, and reflects on future implications of the use of discourse analysis for the field of sustainability transition studies.

Keywords
Innovation; Transition; Sustainability; Discourse; Systematic review;

1. INTRODUCTION
Sustainability transition studies (Markard et al., 2012) form a multi-disciplinary field that aims at understanding the critical patterns and complex dynamics of innovation and transition processes towards sustainability in socio-technical systems. The field is firmly rooted in inter-related research traditions employing approaches and perspectives such as the multi-level perspective on socio-technical transitions (MLP) (e.g., Geels, 2002; Geels and Schot, 2007), strategic niche management (SNM) (e.g., Geels and Schot, 2007), transition management (TM) (e.g., Loorbach, 2010; Rotmans et al., 2001), and technological innovation systems (TIS) (e.g. Bergek et al., 2008; Hekkert et al., 2007). While having gained substantial traction (Smith et al., 2010), sustainability transition research has also been subject to criticism with respect to a lack of attention for power and agency (e.g. Genus and Coles, 2008; Markard and Truffer, 2008; Shove and Walker, 2007; Smith et al., 2005; Smith et al., 2010; Voß et al., 2009). These critiques received response as well (e.g., Geels, 2010, 2011; Geels and Schot, 2007; Markard et al., 2015). In view of remedying weaknesses regarding attention to power and agency in sustainability transition research, recently more attention is given to power dynamics (Avelino and Rotmans, 2009, 2011), the role of actors acting as change agents in ‘transitions-in-the-making’ (Farla et al., 2012; Olsson et al., 2014), and to employing concepts such as ‘institutional entrepreneurship’ (Battilana et al., 2009; Dorado,
Within these agency perspectives, the role of discourse is central in light of framing and reframing positions in, and perspectives on sustainability transitions (Batilana et al., 2009; Bettini et al., 2015; Elzen et al., 2011; Hargreaves et al., 2013). Actors formulate and communicate their vision on change in discourse, but discourse also structures how actors formulate and communicate that vision. Consequently, discourse and discourse analysis are frequently mentioned in sustainability transition studies.

Several sustainability transition studies already took the role of language and meaning explicitly into account in their analyses, both in the study of past transition trajectories and in transitions-in-the-making (Lovell, 2008), for instance, looked at how discourse provided structure to an innovation journey towards low energy housing in the United Kingdom, and showed that discourse has the power to enable or constrain a past transition trajectory by framing and reframing the issues at stake. Scrase and Ockwell, (2010) studied the role of discourse and linguistic framing effects in sustaining current high carbon energy policy in the United Kingdom. They demonstrated how central elements of energy policies were discursively constructed to speak directly to core government priorities, and thereby sustained dominant policy positions and interests. Agency emerges in discourse, and the analysis of linguistic interactions can provide important clues for the micro- and macro-processes of agency (Ahearn, 2001; Åm, 2013). Close attention to linguistic structures and practices can shed light on how people’s actions are shaped, both in an enabling and a constraining way, by the very social structures that these actions then serve to reinforce or reconfigure (Ahearn, 2001; Pesch, 2015; Smith and Raven, 2012). Analysis of discourse is, therefore, analysis of how social reproduction becomes social transformation.

Discourse analysis offers both theory and methodology to approach the study of language and meaning, but there is a broad range of ontological and epistemological approaches to discourse analysis available. Many textbooks on discourse and discourse analysis, therefore, start with stating that discourse itself is not easy to define. It is used in a variety of ways, which may be contradictory, or even mutually exclusive. Discourse can refer to nearly its dictionary meaning, but also to diverse concepts, or various theories. It can concern research methodologies, or even a whole discipline. Potter and Wetherell, (1987) remarked in this respect: “It is a field in which it is perfectly possible to have two books [on discourse analysis] with no overlap in content at all.”. Nevertheless, researchers in general do often not make explicit what particular discourse analytical approach they use, or why and for what purpose they employed a certain discourse analytical approach in their empirical investigations (Alvesson and Karreman, 2000). It can be problematic for the understanding and scientifically sound re-use of empirical studies if concepts and methods are differently interpreted. This especially applies to discourse analysis, which is, as previously mentioned, an enormously diverse field characterised by heterogeneity and theoretical complexity.

Identifying which particular notions of discourse and discourse analysis have gained popularity in sustainability transition studies subsequently contributes to clearer and more transparent use of these notions and supports upcoming fields of sustainability transition studies focussing on agency and power dynamics. As both the field of sustainability
transitions studies, and the field of discourse analysis are recently established strands of research, building bridges between these fields cannot only provide stronger conceptual and methodological research approaches, but can also further empirical insights in the critical patterns and complex dynamics of innovation and transition processes in socio-technical systems. In order to inform future studies in the field of sustainability transition studies that intend to employ discourse analysis in their empirical investigations, this paper reports, therefore, on a systematic review that addresses the research question: “How have discourse and discourse analysis been used in sustainability transition studies thus far?”. We will first outline the theoretical lens that guided this systematic review, next explain the research method, and then present the findings. This paper will end with a discussion and future implications for the field of sustainability transition studies.

2. ANALYTICAL FRAMEWORK
As previously indicated, it is often ambiguous what is precisely meant by discourse and discourse analysis in empirical research. There is a diverse range of ontological and epistemological approaches to discourse and discourse analysis available, but in many cases authors of academic texts do not define or discuss their particular notion or interpretation of discourse or discourse analysis. Academic texts and debates generally treat discourse as having a clear and consensual meaning, which is just not the case (Alvesson and Karreman, 2000). For this reason, there is first a need to come to an overview of different discourse analytical approaches to be able to scrutinise later what discourse analysis actually entails in sustainability transition studies.

2.1 Discourse analysis
The contemporary emergence of discourse analysis must be sought in remarkably parallel developments in the humanities and social sciences between the mid-1960s and the mid-1970s. Discourse analysis developed from the mother-disciplines anthropology, linguistics, literary studies, sociology, cognitive and social psychology, communication studies, and political sciences; respectively and roughly in this order (Van Dijk, 2011). Van Dijk (2011) argues that Discourse Studies developed into a discipline in its own right since the end of the 1990s. Within decades of research, several properties of discourse analysis have been highlighted in various areas of the field: discourse as social interaction, discourse as power and domination, discourse as communication, discourse as contextually situated, discourse as social semiosis, discourse as natural language use, discourse as complex, layered construct, sequences and hierarchies in discourse, abstract structures versus dynamic strategies in discourse, and types or genres of discourse (Van Dijk, 2011). These properties of discourse are further elaborated in table 1. They are part and parcel of most discourse analyses, but discourse analytical approaches differ in regard to the extent and the way they take each property into account in their analyses. Furthermore, not all properties are always addressed by the different approaches, and some just focus on one of these properties in their analyses. As a consequence of the extended history of the field, identifying and categorising different discourse analytical approaches is not easy. Nevertheless, a first differentiation can be made based on their ontological premises.
Table 1. Properties of discourse analysis and their elaborations

<table>
<thead>
<tr>
<th>Property of discourse</th>
<th>Elaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discourse as social interaction</td>
<td>The interactional dimension of discourse defining the basis of the social order in human societies.</td>
</tr>
<tr>
<td>Discourse as power and domination</td>
<td>Discourse having a crucial role in the political order of human societies.</td>
</tr>
<tr>
<td>Discourse as communication</td>
<td>Discourse defining the cognitive order of human societies; socially shared and distributed knowledge coordinating social interaction.</td>
</tr>
<tr>
<td>Discourse as contextually situated</td>
<td>Discourse taking place in people’s everyday lives; language users engaging in talk and text as is appropriate in that particular social situation.</td>
</tr>
<tr>
<td>Discourse as social semiosis</td>
<td>Discourse not being limited to talk and texts, but including other meaningful social activity like visuals, sounds, and gestures.</td>
</tr>
<tr>
<td>Discourse as natural language use</td>
<td>Linguistics being of central relevance for the analysis of discourse.</td>
</tr>
<tr>
<td>Discourse as complex layered construct</td>
<td>Discourse integrating the three major dimensions of natural languages: form, meaning, and action.</td>
</tr>
<tr>
<td>Sequences and hierarchies in discourse</td>
<td>The investigation of the properties of talk and texts.</td>
</tr>
<tr>
<td>Abstract structures versus dynamic strategies in discourse</td>
<td>The syntactic structures or schematic formats of talk and texts versus talk-in-interaction.</td>
</tr>
<tr>
<td>Property of discourse</td>
<td>Elaboration</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Types or genres of discourse</td>
<td>The different sources producing discourse, such as the media, parliamentary debates, or everyday conversations.</td>
</tr>
</tbody>
</table>

### 2.2. Discourse analytical premises

The majority of the discourse analytical approaches can be placed in an axes system based on their main ontological premises. Arranging discourse analytical approaches on two axes enables the comparison between different approaches and provides insight in the similarities and differences between different approaches. Two key dimensions set out a continuum of different ontological positions within the field of discourse analysis. The one dimension considers the relationship between discourse and meaning, the other deals with the formative range of discourse (Alvesson and Karreman, 2000), see figure 1. The horizontal axis represents the relationship between discourse and meaning. At the left end of this axis, discourse analytical approaches consider discourse driving subjectivity. That is, human individuality is determined then by the structuring function of language. In other words, people’s conduct is here considered as being fully shaped by discourse. At the right end of this axis, people are conceived to possess autonomous control over the language they use for expressing themselves. As a consequence, discourse is constituted by the subject. People shape discourse in this case. In short, this dimension in discourse analysis refers to the level of agency the different discourse analytical approaches accredit to human beings. The different positions on this axis also determine to which extent discursive and extra-discursive phenomena (see e.g., Hardy, 2011; Laclau and Mouffe, 1985), or discursive and social practices (see e.g., Fairhurst and Putnam, 2004), collapse. To put it in another way, some discourse analytical approaches do not distinguish between these different phenomena or practices.

The vertical axis stands for the formative range of discourse. This axis is about the scope and scale of discourse. At the top end of this axis, discourse analytical approaches regard language as concerning a close-range interest within a local-situational context. This means that discourse only exist in a particular place, on a specific moment in time, and not beyond space and time. At the bottom end of this axis, discourse is considered to construct a particular phenomenon. In that case, it exists beyond specific human encounters, and language relates, therefore, to a long-range interest within a macro-system context (see e.g., Fairhurst and Putnam, 2004). The different ontological positions in the axis system affect the theoretical and practical concerns about how knowledge is constructed and obtained in discourse analysis. In other words, ontological and epistemological premises are closely related, but the practical aspects of doing a discourse analysis are not discussed now.
To put some flesh on the bones of the axes system in figure 1, three main discourse analytical approaches are first briefly discussed, and then positioned on the two key dimensions in discourse analysis: critical discourse analysis (CDA) (e.g., Fairclough, 1995; Fairclough and Wodak, 1997), discursive psychology (DP) (e.g., Edwards and Potter, 1992; Potter and Wetherell, 1987), and discourse theory (DT) (e.g., Laclau and Mouffe, 1985). These social constructionist approaches to discourse analysis were chosen for further elaboration because they are in line with key concepts within sustainability transition studies, such as transformative agency and power. They (1) share certain key premises about how entities such as language and the subject are to be understood, but are yet distinctive from each other, and (2) they carry out critical research, i.e., power relations in society are analysed in order to formulate normative critique on such relations for the possibilities of social change (Jørgensen and Phillips, 2002). Each approach has its distinctive philosophical and theoretical premises, including particular understandings of discourse, social practices, and critique. This has led to particular aims, methods, and empirical focal points (Jørgensen and Phillips, 2002). The three approaches are briefly discussed below. The ontological premises relating to the key dimensions in discourse analysis are summarised in table 2. CDA, DP, and DT are subsequently situated in the axis system in figure 1.
CDA acknowledges the active role of discourse in structuring the social world, but insists that discourse is just one among many aspects of social practice. For this reason, a distinction is made between discursive and non-discursive practices. A focal point for critical discourse analysis is the study of change. Concrete language always draws upon earlier discursive structures as language users build on already established meanings. Therefore, intertextuality, which shows how an individual text draws upon elements and discourses from other texts, is key for CDA. It allows the study of both the reproduction of discourses, whereby new elements are introduced, and discursive change through new combinations of discourse. DP considers individual human beings as both the product, and producers of discourse. Rather than analysing changes in discourse in society, it focusses on how individuals use discourses as constitutive parts of social practices situated in a specific context. DP analyses how people create and negotiate representations of the world. It looks at identities in talk-in-interaction, and the social consequences of this. The key principle of DT is that discourse constructs the social world in meaning, and that meaning can never be permanently fixed due to the fundamental instability of language. No discourse is a closed identity, and is, therefore, constantly transformed through contact with other discourses. The creation of meaning is a social process, and is about fixating a particular meaning by placing that meaning in specific relations to other meanings. Focal points for discourse theory are discursive struggles and hegemony. It considers human beings as subjects of discourse.

For all these three approaches, the functioning of discourse, or discursive practice, is a social practice that shapes the social world. CDA is placed at the centre of the horizontal axis in figure 1 because it distinguishes between discursive and non-discursive practices, and acknowledges that some aspects of the social world function according to a logic different from discursive logic (Jørgensen and Phillips, 2002). For instance, economic logic may be at play in the institutionalisation process of particular forms of social action. Discursive and non-discursive practices constitute the social world together, but discourse analysis might not be the appropriate tool to study economic logic then. DP is difficult to place in this scheme because it claims that discourse is both fully constitutive and embedded in historical and

<table>
<thead>
<tr>
<th>Relationship between discourse and meaning</th>
<th>Critical Discourse Analysis</th>
<th>Discursive Psychology</th>
<th>Discourse Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discursive and non-discursive practices constitute the social world together</td>
<td>Discourse is both fully constituted and embedded in historical and social practices</td>
<td>Discourse fully constitutes the social world</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Formative range of discourse</th>
<th>Critical Discourse Analysis</th>
<th>Discursive Psychology</th>
<th>Discourse Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discursive practices partly reproduce and change social and cultural phenomena</td>
<td>Discourse is created, maintained, and changed in talk-in-interaction in everyday life</td>
<td>Discourse fixates the meaning of social phenomena, which limits possibilities for action</td>
<td></td>
</tr>
</tbody>
</table>
social practices, which are not fully discursive (Jørgensen and Phillips, 2002). On that account, it is positioned at the centre of the horizontal axis. DT does not distinguish between discursive and non-discursive practices. This does not mean that nothing exists outside language. On the contrary, there is no dialectical interaction between discourse and something else. Discourse itself is fully constitutive of the social world (Jørgensen and Phillips, 2002). On that account, DT is placed at the uttermost left end of the horizontal axis. It has to be remarked that analytical approaches at the uttermost right end of this axis are, in fact, no discourse analytical approaches at all. If language is a neutral medium that just serves to transfer messages, and discourse is fully determined by something like economy, there is no point in doing a discourse analysis. An economic analysis, for instance, is much more appropriate in such a case.

Some discourse analytical approaches stress the need for systematic and empirical analysis of people’s talk and written language, because discourse is created, maintained, and changed in everyday discursive practices. With regard to this, it is again difficult to position DP along an axis. DP analyses talk-in-interaction in everyday life, and people’s daily practices. Notwithstanding, it constantly implicates larger societal structures, on which people draw upon in discursive practice, in its analyses (Jørgensen and Phillips, 2002). For this reason, DP is placed between the top end and the centre of the vertical axis. Other discourse analytical approaches are more concerned with general, overarching patterns of discourses, and aim at a more abstract description of discourses that circulate in society. DT is particularly focussed on abstract discourses, and the idea that these discourses are created, maintained and transformed by people in their everyday lives is implicit (Jørgensen and Phillips, 2002). On that account, it is positioned at more or less the bottom end of the vertical axis. CDA fits somewhere in between DP and DT for the reason that it looks at discursive practices, through which social and cultural reproduction and change take place, in everyday life, but focusses on the analysis of social and cultural phenomena, and processes of change (Jørgensen and Phillips, 2002).

2.3. Discourse analytical approaches
Regardless of the precise relationship between discourse and meaning, or the exact formative range of discourse, several different categories of discourse analysis can be distinguished. First of all, discourse analytical approaches can be broken down in two major and quite different categories: (1) “the study of talk and text in its social interaction context”, and (2) “the study of social reality as discursively constructed and maintained” (Alvesson and Karreman, 2000). The first approaches are also referred to as the study of first-order discourses (Fischer, 2003), conversation (Taylor and Robichaud, 2004), or little-d-discourses (Gee, 2011). These approaches look at the communicative activities of agents. The latter refers to second-order discourses (Fischer, 2003), the study of texts (Taylor and Robichaud, 2004), or Big-D-Discourses (Gee, 2011). They regard the discursively based interpretations that define agents, purposes, and organisations (i.e., texts). Texts relate here to the process of human sense making, consisting of larger constellations of patterns of talk, and being part of the collective heritage and understanding of a social group (Taylor and Robichaud, 2004).
Texts simultaneously work on representations of the world, social relations, social identities, and cultural values (Fairclough, 2001). The different categories are denoted in Table 3.

Table 3. Different categories of discourse analysis

<table>
<thead>
<tr>
<th>Category</th>
<th>Elaboration</th>
<th>Sub-category</th>
<th>Elaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Little-d-discourses</td>
<td>The study of talk and texts in its social interaction context</td>
<td>1a Micro-discourses</td>
<td>Focus on language itself in a specific social interaction context</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1b Meso-discourses</td>
<td>Focus on language use in social interaction</td>
</tr>
<tr>
<td>2 Big-D-Discourses</td>
<td>The study of social reality as discursively constructed and maintained</td>
<td>2a Grand discourses</td>
<td>Focus on language use related to a particular topic or activity, and on assemblies of discourses constituting organisational reality.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2b Macro-discourses</td>
<td>Focus on societal discursive practices constituting social phenomena over time and space</td>
</tr>
</tbody>
</table>

Each of these two categories can be further divided into two sub-categories. Discourse analytical approaches focussing on little-d-discourses can be subdivided in: (1a) discourse analysis with a primary focus on language itself, and (1b) discourse analysis focussing on language use (Taylor, 2001). The first subcategory has an interest in the properties and structures of language, identifying patterns in language, and looking at the interrelationship between language and social situation. Here, the focus is on communication from one person to another, and on how language users encode and decode meaning through language. These approaches consider the regularities within an imperfect and unstable language system, and regard how language use varies in different social situations and environments. They can also be called micro-discourse approaches. Micro-discourses concern social texts that call for the detailed study of language use in a specific micro-context (Alvesson and Karreman, 2000). Rather than language itself, the main focal point of the second subcategory is interaction. The language user is here understood as constrained by the interactional context, or the conventional conversational practices. This implies that language use is an ongoing process and an activity in which people continuously react on each other. These approaches focus on what language users do when using language. They examine how people construct worldviews in the course of their interactions, and how these versions are established as solid, real, and independent of the speaker (Potter, 1996). They can be referred to as meso-
discourse approaches. Meso-discourses are relatively sensitive to language use in context, but the area of interest is rather finding broad patterns, going beyond the details of the text, and generalising to similar contexts (Alvesson and Karreman, 2000).

Discourse analytical approaches paying attention to Big-D-Discourses can be categorised in (2a) discourse analysis looking at language use related to a particular topic or activity, and (2b) discourse analysis concentrating on societal discursive practices (Taylor, 2001). The first subcategory of discourse analytical approaches understands language as constitutive and situated, but within a particular social and cultural context, rather than in a particular interaction. They are named Grand Discourse approaches as well. A Grand Discourse relates to an assembly of discourses, ordered, and presented as an integrative frame, which may refer to, or constitute organisational reality (Alvesson and Karreman, 2000). The second subcategory focusses on identifying language patterns and related social practices, and demonstrating how these constitute the social world. These approaches are referred to as Mega-Discourse approaches. A Mega-Discourse as an idea of a more or less universal connection of discourse material that typically addresses more or less standardised ways of referring to, or constituting, a certain type of phenomenon extending time and space (Alvesson and Karreman, 2000).

The categories and subcategories above are pragmatically presented as being distinctive, but are in fact implicated in one another. Just as the previously mentioned axes system, they rather form a continuum of different discourse analytical approaches. Furthermore, this oversimplified categorisation does not show the controversies within the field, or the criticisms each of the discourse analytical approaches levels to one another (Taylor, 2001). In addition, it should be remarked that discourse analytical approaches within a category do not necessarily share the same ontological or epistemological premises. This means that the approaches within a category share an area of interest, but might disagree on the precise relationship between discourse and meaning, the exact formative range of discourse, or on methodology and methods to study talk and texts.

The two main categories differ in their empirical focal points. Approaches focussing on micro- and meso-discourses emphasise the need to take discursive interactions and social context seriously. DP is a discourse analytical approach focussing on little-d-discourses for instance. Discourse is here treated as an emergent, locally constructed phenomenon. This does not mean that synthesis, or connections to more general patterns, is not possible, but the richness of the data and the consideration of uniqueness make general patterns less visible, and also somewhat beside the point. In a similar manner, approaches focussing on Grand Discourses and Mega-Discourses do mostly not deny local variations. The point is yet to address big issues, and not the delicacies and nuances that might embed them. CDA and DT are discourse analytical approaches focussing on Big-D-Discourses. These approaches usually start from a well-established a priori understanding of the phenomenon in questions (Alvesson and Karreman, 2000). As might be expected, there is a tension between studying little-d-discourses and Big-D-Discourses simultaneously, and there is a longstanding academic debate on the relationship between conversations in everyday life and society at
large (see e.g., (Fairclough, 1985; Kim and Kim, 2008; Taylor and Robichaud, 2004; Van Dijk, 2001).

2.4. Analytical concepts and research questions for the systematic review

Drawing on the theoretical aspects of discourse analysis above, several concepts are used for analysing sustainability transition studies that make use of discourse and/or discourse analysis. Since ontological premises are mostly implicit in academic studies, and on that account often not explicitly reported in academic papers, the two key dimensions in discourse analysis are merely intended to illustrate the differences in philosophical and theoretical approaches to discourse analysis. The four different subcategories of discourse analytical approaches are implicated in one another, and rather form a continuum of different approaches to discourse analysis (Taylor, 2001). Therefore, only the two main categories, which can more clearly be distinguished from each other, are employed. The sustainability transition studies are scrutinised for focussing on little-d-discourses or Big-D-Discourses.

Furthermore, a discourse analysis should acknowledge that language has a structuring role in society, and that language itself is also constructed. If an empirical study merely pays attention to who says what to whom, it rather resembles a content or a thematic analysis. This can be a first step to a full discourse analysis, but attention should then also be paid to how is it being said, why is it being said, and with what effect. Most importantly, a full discourse analysis explores the range of what can be said in that situation, how does this structure communicative and social practices, and how does this organise and provide systems of knowledge and meaning. Discourse analysis looks at the, mostly implicit, rules and roles that govern society. For this reason, the analysis below distinguishes between sustainability transition studies that conduct a mere content or a thematic analysis drawing on concepts from discourse analysis, and full discourse analysis that pays attention to the structuration of social practices by discourse. The analysis was guided by the following research questions:

RQ 1A: Which sustainability transitions studies report with sufficient detail on their research design to allow interpretation of the study in question?

RQ 1B: Which sustainability transition studies report with sufficient detail on their notion of discourse and/or discourse analysis to allow interpretation of the notion in question?

RQ 1C: Which notions of discourse and/or discourse analysis do these transparently reporting sustainability transition studies employ?

RQ 1D: Why do these transparently reporting sustainability transition studies employ discourse and/or discourse analysis?
3. MATERIALS AND METHODS

3.1 Systematic review
Systematic review identifies, critically appraises, and synthesis studies that are relevant to answer a predefined research question (Aveyard, 2010). It follows a strict protocol to ensure that the review process is transparent and reproducible. This protocol typically consists of strategies for data extraction and for analysing the extracted data. As for the data extraction, search strategies were developed, in which search terms and search strings were formulated for identifying potentially relevant studies in various information resources. Inclusion and exclusion strategies were set for reviewing whether or not the obtained studies were indeed relevant. Data analysis is an interpretative process and systematic review requires reliability, rigorousness, and comprehensiveness. Relevant studies were, therefore, coded following a pre-specified coding scheme and according to a detailed coding manual. Synthesis took place according to a pre-specified synthesis instrument. A technical report of this systematic review is available upon request from the corresponding author.

3.2 Data extraction
This systematic review describes how discourse and discourse analysis has been reported to be used in transition studies thus far. For this reason, the search strategies for this systematic review were structured to identify academic literature that addresses both discourse and/or discourse analysis and transition studies. Search terms were derived from both fields and were combined in search strings, which were carried out across different information resources. Different search terms, combined in different search strings, were first tested in an electronic search in the academic search engine and bibliographic database Scopus during an exploratory stage of this systematic review. The titles, abstracts, and keywords of the obtained studies were then screened for their relevance for answering the pre-defined research question. Details on the search strategies can be found in the technical report.

The final search terms were employed in three search strategies: electronic searching in the academic search engine and bibliographic database Scopus1, hand searching in selected academic journals2, and expert consultation3. Electronic searching resulted in 322 literature references. The academic journals were selected because they published several of the literature references in the electronic search and for the reason that expert consultation indicated that these academic journals were relevant and authoritative in the sustainability

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1 The search string for electronic searching, commanded in Scopus on May 6th, 2015: ([ TITLE-ABS-KEY ( discourse ) OR TITLE-ABS-KEY ( discursive )) ) AND ( ( ( TITLE-ABS-KEY ( "innovation system" ) OR TITLE-ABS-KEY ( "system innovation" ) OR TITLE-ABS-KEY ( transition ))) AND ( ( TITLE-ABS-KEY ( environment ) OR TITLE-ABS-KEY ( environmental ) OR TITLE-ABS-KEY ( sustainable ) OR TITLE-ABS-KEY ( sustainability ) OR TITLE-ABS-KEY ( socio-technical ))) ).

2 The search string for hand searching, commanded in Scopus on May 6th, 2015: (TITLE-ABS-KEY (( "innovation system" ) OR ( "system innovation" ) OR ( transition )) AND ( ( environment ) OR ( environmental ) OR ( sustainable ) OR ( sustainability ) OR ( socio-technical ))) ) AND (ISSN(0048-7333 OR 2210-4224 OR 0040-1625 OR 2071-1050 OR 1472-3425 OR 1465-3990 )). The ISSN correspond to: Environmental Innovation and Societal Transitions, Environment and Planning C: Government and Policy, Research Policy, Technology Analysis and Strategic Management, Technological Forecasting and Social Change, Sustainability, and Sustainability Switzerland.
transitions field. Hand searching resulted in 399 literature references. Experts were asked if they were acquainted with transition studies that also took into account the role of language and meaning. This resulted in 17 literature references.

These three search strategies identified potentially relevant studies, but did not yet determine whether or not these studies were indeed relevant. All the obtained literature references were, therefore, subjected to the same inclusion and exclusion strategies. The titles, abstracts, and keywords were read, and if these complied with the pre-specified and inductively adjusted inclusion and exclusion criteria, they were included in a preliminary dataset. If not, they were excluded. The preliminary dataset and the inclusion and exclusion criteria can be found in the technical report.

The literature references obtained by hand searching were first subjected to a quantitative analysis, because it was experienced in an exploratory stage of this systematic review that a study was not relevant for answering the research question if the search term discourse was mentioned less than 10 times. In these cases, discourse or discursive was often just mentioned in some frequently quoted citations, or used as an example or illustration of something. For that reason, it was decided to only include academic papers in which the search terms discourse or discursive were at least 10 times present. ATLAS.ti, a software program for qualitative data analysis, was used for this procedure.

3.3 Data analysis
A transparency assessment (da Silva et al., forthcoming; Delaney et al., 2014) was conducted to critically review the papers on their research design. Transparency assessment is not quality assessment, it just considers if a study reports with sufficient detail on its research design to allow interpretation or replication of the study in question. The papers were coded for several transparency criteria. Furthermore, the papers in the dataset were coded following a pre-specified coding scheme informed by the analytical framework. Inductive coding was additionally practiced to also be able to identify article-specific conceptualisations or operationalisations that were not covered by the a priori codes. ATLAS.ti was used for coding the papers in the dataset.

Both coding the papers for the transparency criteria and for the pre-specified coding scheme was approached in dichotomies. This means that the transparency criteria and the a priori codes were either applicable or not. For this reason, each code was formulated as a question to which the answer could be either yes or no. Only if the answer to a coding question was yes, the code was assigned to the corresponding piece of text. Dichotomies were chosen because the interpretation of theoretical or analytical concepts in academic literature can be quite complex. It can be difficult to trace back what an author precisely intended to say with his or her choice of words, but it is possible to assess the presence of certain features or characteristics that need to be present at least to be able to interpret that concept. For example, is a concept mentioned, is it defined, or is it discussed? The coding questions were accompanied by detailed instructions on how to interpret them exactly. The coding questions and the coding manual can be found in the technical report.
3.4. Data synthesis
ATLAS.ti was used to synthesise the data quantitatively and qualitatively. Using one of its analysis tools, the Codes-Primary-Documents-Table generated output for Microsoft Excel. The frequencies of all codes were listed for each individual paper in an Excel spreadsheet. This software program was used for calculations and providing graphical representations of the frequency distributions of the quantitative data. Qualitative output was generated by using the option to provide quotations by code. These were interpreted and synthesised according to the principles of a meta-ethnography (Britten et al., 2002).

Meta-ethnography is a method for combining qualitative data by translating key concepts across studies. In such a synthesis, “studies can relate to one and another in three ways: they may be directly comparable as reciprocal translations; they may stand in opposition to one and another as refutational translations; or taken together they may represent a line of argument” (Britten et al., 2002). The individual papers were placed in a grid to be explicit about how they relate to each other. The columns in this grid include the details of the studies that are essential contextual information for the synthesis, and address concepts from the analytical framework.

4. RESULTS
4.1. Quantitative results
The three search strategies together resulted in 735 literature references, of which 60 were included in a preliminary dataset after applying the inclusion and exclusion strategies. The first research sub-question aims at identifying sustainability transition studies that report with sufficient detail on their research design to allow interpretation of the study in question. On that account, the papers in the dataset were assessed on whether they transparently reported on their research question, research objective, data collection methods, sampling strategies, sampling seize, and data analysis methods. The presence of an empirical element was included to be able to distinguish between empirical and mere theoretical, normative, or prescriptive papers. Table 4 shows the score per transparency criterion of all sixty papers that were assessed. Ten of these papers are more theoretical, normative, or prescriptive.
Table 4. Distribution of the transparent papers per transparency criterion

<table>
<thead>
<tr>
<th>Transparency Criteria</th>
<th>Number of Papers Reporting On</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Question</td>
<td>24</td>
</tr>
<tr>
<td>Research Objective</td>
<td>56</td>
</tr>
<tr>
<td>Empirical Element</td>
<td>50</td>
</tr>
<tr>
<td>Data Collection Methods</td>
<td>37</td>
</tr>
<tr>
<td>Sampling Strategies</td>
<td>15</td>
</tr>
<tr>
<td>Sampling Seizes</td>
<td>18</td>
</tr>
<tr>
<td>Data Analysis Method</td>
<td>29</td>
</tr>
</tbody>
</table>

All papers report either their research question, their research objective, or both. The subject of all papers is therefore generally clear. However, how the studies are exactly conducted, is less transparent. Often, the papers do not transparently report on all their data collection methods, all their sampling strategies, all their sample sizes, or all their data analysis methods, but only on parts of these. This is especially the case for studies that combine different data sources, interviews and document analysis for instance. Frequently, the research design for the interviews is reported, while information about the document analysis lacks, or the other way around. The frequency distribution of the number of reported transparency criteria in the papers is shown in table 2.

All papers with the lowest score of one are mere theoretical, normative, or prescriptive papers. These papers do not have an empirical element. Therefore, it follows logically that these papers do not report on a research design, and consequently score low in this transparency assessment. This is not the case for all papers with a score of two. Only three of these papers do not have an empirical element. The remaining six papers do just not report on their research design. A paper is considered sufficiently transparent, if it has at least a research question or a research objective, and reports on at least three out of five of the other transparency criteria; including the presence of an empirical element. This results in twenty-eight papers reporting transparently on their research design out of the fifty papers that include an empirical element. This result cannot be appreciated in table 5 since this table...
does not distinguish between the two subsets of transparency criteria. The corresponding literature references are listed in the appendices.

Table 5. Frequency distribution of the number of reported transparency criteria

![Frequency distribution chart]

The second research sub-question aims at identifying sustainability transition studies that report with sufficient detail on their notion of discourse and/or discourse analysis to allow interpretation of the notion in question. For that reason, the papers in the dataset were assessed on whether they mentioned discourse and/or discourse analysis, defined discourse and/or discourse analysis, discussed discourse and/or discourse analysis, and operationalised discourse and/or discourse analysis. Table 6 and 7 show the results of this assessment. Fifty-eight out of the sixty papers mention discourse; the other two papers are included in the dataset because they mentioned ‘discursive’ in the quantitative analysis during the data extraction stage. Thirty-one out of these fifty-eight papers do not report on any of the other assessment criteria. Twenty-eight out of the sixty papers specifically mention discourse analysis. Fifteen out of these twenty-eight papers do not report on any of the other assessment criteria.

The papers are considered as treating their notion of discourse and/or discourse analysis transparently if they report on three out of the four assessment criteria. This results in seventeen papers reporting with sufficient detail on their notion of discourse to allow further interpretation. Eight papers transparently report on their notion of discourse analysis. Altogether, twenty-one papers report on their notion of discourse and/or discourse analysis with sufficient detail. Again, this cannot be appreciated in the provided tables since some papers treat both discourse and discourse analysis transparently, while others mention discourse, but not discourse analysis, or the other way round. The corresponding literature references are listed in the appendices.
The results of both assessments were merged to obtain a final dataset of transparent sustainability transition papers that allow further interpretation of the studies in question. Twelve papers report with sufficient detail on both their research design and their notion of discourse and/or discourse analysis. These papers were analysed in depth and are discussed in section 4.2. The corresponding literature references are listed in the appendices. A
quantitative flow-chart of the literature references throughout this systematic review is shown in figure 2.

**Figure 2. Quantitative flow-chart of the literature references in this systematic review**

4.2. Qualitative results
The third and the fourth research sub-question relate to how discourse and/or discourse analysis is employed in sustainability transition studies. Twelve papers were previously identified that report with sufficient detail to allow further interpretation of the studies in question. These papers were scrutinised for which notion of discourse and/or discourse analysis they employed in their empirical studies, and why they employed this notion. The twelve papers are briefly summarised in table 8.

**Table 8. Summary of transparent papers**

<table>
<thead>
<tr>
<th>Adams et al. (2004)</th>
</tr>
</thead>
<tbody>
<tr>
<td>consider the way in which flood defence engineers in the United Kingdom were resisting, and were gradually won over to aspects of a new restoration discourse. The role that champions played in this process was particularly investigated.</td>
</tr>
</tbody>
</table>
### Summary of transparent papers

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bosman et al. (2014)</td>
<td>Explore how prominent incumbents of the Dutch energy system discursively frame the energy transition by unravelling their existing and evolving storylines, found tensions within the dominant storyline, and emerging storylines with the potential to undermine the dominant one.</td>
</tr>
<tr>
<td>Caprotti (2012)</td>
<td>Analyses how the cleantech sector constructed meaning around this new, emerging socio-technological sector. This paper looks at the discursive logics and strategies that established a dynamic sectoral identity and legitimacy, and how they attracted capital flows and investment activity.</td>
</tr>
<tr>
<td>Cotton et al. (2014)</td>
<td>Explore three dominant storylines in the debate in shale gas, and discussed the role of these discourses in influencing shale gas policy in the United Kingdom.</td>
</tr>
<tr>
<td>Fuenfschilling and Truffer (2014)</td>
<td>Present a conceptual foundation based on institutional theory for the operationalisation and empirical assessment of the structuration of the socio-technical regime in the MLP. This paper analyses the transformation of the Australian urban water sector since the 1970s.</td>
</tr>
<tr>
<td>Genus (2014)</td>
<td>Proposes a discourse-institutionalist framework for considering the problems and possibilities connected with governing and realising sustainability transitions. This framework is illustrated by a case study of micro-generation in the United Kingdom.</td>
</tr>
<tr>
<td>Horsbøl (2013)</td>
<td>Conducts a frame analysis to investigate the role of media in constructing and distributing representations of climate change and sustainability in a local municipality initiative in Frederikshavn, Denmark.</td>
</tr>
<tr>
<td>Jhagroe and Loorbach (2014)</td>
<td>Explore the inherent democratic tensions of managing (socio-technical) transitions by looking at the relationship between TM and post-foundational democracy in an urban regeneration process in Rotterdam, the Netherlands.</td>
</tr>
<tr>
<td>Kern (2011)</td>
<td>Analyses from a discursive-institutionalist perspective the underlying political processes and their institutional contexts, which led to quite different approaches aimed at system innovations in the Netherlands and the United Kingdom.</td>
</tr>
<tr>
<td>Kern (2012)</td>
<td>Scrutinises the discursive politics of governing the transition to more sustainable energy systems by analysing a particular policy initiative in the United Kingdom.</td>
</tr>
<tr>
<td>Petrova et al. (2013)</td>
<td>Explore how climate change and sustainability narratives were implicated in the development of post-communist suburbanisation in the Czech Republic.</td>
</tr>
<tr>
<td>Späth (2012)</td>
<td>Highlights the value of argumentative discourse analysis (ADA) for understanding the social dynamics of energy regions that aim at contributing to the broader transition towards more sustainable energy systems, and analysed the discursive dynamics of a regional initiative for self-sufficient renewable energy sources in Murau, Austria.</td>
</tr>
</tbody>
</table>

### 4.2.1. Notions of discourse employed in the transparent papers

The concept of discourse is defined by nine of the transparent papers (i.e. Adams et al., 2001; Bosman et al., 2014; Caprotti, 2012; Cotton et al., 2014; Genus, 2014; Horsbøl, 2013; Jhagroe and Loorbach, 2014; Kern, 2011; Petrova et al., 2013; Späth, 2012). Seven transparent papers discuss the concept of discourse (i.e. Adams et al., 2001; Bosman et al., 2014; Cotton et al., 2014; Horsbøl, 2013; Kern, 2011; Petrova et al., 2013; Späth, 2012),
and three operationalise it (i.e. Bosman et al., 2014; Caprotti, 2012; Genus, 2014). The reported definitions of the concept of discourse can be found in table 9.

### Table 9. Reported definitions of discourse in the transparent papers

<table>
<thead>
<tr>
<th>Definitions</th>
<th>Transparent papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>“a specific ensemble of ideas, concepts, and categorizations that are produced, reproduced and transformed in a particular set of practices through which meaning is given to physical and social realities” (Hajer, 1995).</td>
<td>Adams et al. (2004)</td>
</tr>
<tr>
<td>“a specific ensemble of ideas, concepts and categories through which meaning is given to phenomena” (Hajer, 1995).</td>
<td>Bosman et al. (2014)</td>
</tr>
<tr>
<td>“ensembles of multiple understandings, framings and contexts that lead to the social construction of environmental problems by different actors” (Hajer, 1993).</td>
<td>Spåth (2012)</td>
</tr>
<tr>
<td>“recognising the role of text, discursive practice and social structures in framing the possibilities considered available and legitimate for governance”.</td>
<td>Caprotti (2012)</td>
</tr>
<tr>
<td>“signif[ing] conditions of possibility for meaning-making” (Foucault, 1969; Howarth, 2000).</td>
<td>Cotton et al. (2014)</td>
</tr>
<tr>
<td>“interactive processes through which ideas are conveyed” (Schmidt, 2001).</td>
<td>Genus (2014)</td>
</tr>
<tr>
<td>“a system of statements and practices that defines meaning and reasoning” (Hall, 1997).</td>
<td>Horsbøl (2013)</td>
</tr>
<tr>
<td>“interactive processes through which ideas are conveyed” (Schmidt, 2001).</td>
<td>Kern (2011)</td>
</tr>
<tr>
<td>“a system of statements and practices that defines meaning and reasoning” (Hall, 1997).</td>
<td>Petrova et al. (2013)</td>
</tr>
</tbody>
</table>

Five out of nine definitions of discourse in the papers are from Maarten A. Hajer. Another distinctive property of the twelve papers is that all but two (i.e., Jhagroe and Loorbach, 2014; Petrova et al., 2013) refer extensively to his work in general (e.g., (Hajer, 1993, 2006; Hajer and Versteeg, 2005; Hajer, 1995). For example, Bosman et al. (2014) discuss (and operationalise) discourse as follows: “Discourses become apparent through the language individuals and organisations use. This language takes the form of storylines, narratives with which actors provide meaning to the world around them.”. Whether just as explicit or not, most papers seem to more or less operationalise discourse by means of storylines. Kern (2011), however, explicitly distinguish “between the substantive content of ideas (e.g., “through the storyline concept” (Schmidt, 2001), and “discourses as interactive processes through which ideas are conveyed” (Schmidt, 2010)”.  

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In addition to the concept of discourse, the concepts of storyline or narrative are employed in all but one paper (i.e., Caprotti, 2012). The transparent papers make extensively use of these concepts. According to Hajer (1995), a storyline is ‘a generative sort of narrative that allows actors to draw upon various discursive strategies to give meaning to specific social phenomena’. They form a condensed shorthand of large amounts of factual information intermixed with normative assumptions and value orientations that assign meaning to them (Fischer, 2003). For this reason, Hajer’s analytical approach revolves around the identification of storylines, the discourse coalitions that arise around particular storylines, the struggle of discourse coalitions for discursive hegemony in a particular policy domain, and finally, the processes of discourse structuration and institutionalisation.

The concept of discourse coalition is also popular; it is used by eight papers. Most of the papers refer to Hajer for this concept (i.e. Adams et al., 2004; Bosman et al., 2014; Cotton et al., 2014; Kern, 2011; Kern, 2012; Späth, 2012), but Cotton et al. (2014) and Petrova et al. (2013) refer to Bulkeley (2000). Nevertheless, Bulkeley (2000) refers to Hajer’s work, which closes the loop to Hajer again. According to Späth (2012), actors engaged in a certain political struggle try to achieve dominance, or hegemony in the relating discursive space. Story-lines are then narrative constructs which are frequently reproduced, and through which elements of different discourses are bound together (Späth, 2012). Discourse coalitions consist of actors grouped around particular storylines. Usually, different actors attach different meanings to these storylines, but a discourse coalition suggests at least a common understanding of the issue at hand in this particular discourse analytical approach. Storylines are therefore “the discursive cement that keeps a discourse coalition together” (Hajer, 1995).

On that account, storylines and discourse coalitions can be used to analyse the emergence of new discourse coalitions, and the struggle for discursive hegemony in a particular policy domain.

Hajer’s related concepts discursive hegemony (i.e. Adams et al., 2014; Bosman et al., 2014; Späth, 2012), discourse structuration (i.e. Späth, 2012; Kern, 2012), and discourse institutionalisation (i.e. Späth, 2012; Kern, 2012) are not widely used. Discursive hegemony refers to a specific discourse coalition building up authority, and becoming dominant. Key actors within a discourse coalition are perceived to play a decisive role in determining issues that are considered relevant for discussion, or even predetermine the problem definition and direction, in which potential solutions are to be sought (Hajer, 1995; 2006). Both discourse structuration and discourse institutionalisation are considered preconditions for discursive hegemony. Discourse structuration occurs when a certain discourse starts dominating the way a social entity conceptualises the world. Discourse institutionalisation means that a discourse is manifested in social practices; it is attested then in specific institutional arrangements and organisational practices. Especially these latter concepts are advantageous for understanding how a discourse reproduces or challenges a particular social order.

4.2.2. Notions of discourse analysis employed in the transparent papers

With respect to discourse analysis, all but one transparent paper (i.e., Adams et al., 2004) explicitly mention discourse analysis. Nevertheless, this study uses the concept discourse, but
the authors do not call their qualitative research methods a discourse analysis. The study partly draws upon the work of Maarten A. Hajer. One paper (i.e., Horsbol, 2013) connects to discourse analysis, but conducts a frame analysis. Seven transparent papers name a specific discourse analytical approach: argumentative discourse analysis (ADA) (i.e., Bosman et al., 2014; Späth, 2012), an argumentative discourse analytical approach (ADAA) (i.e., Cotton et al., 2014), critical discourse analysis (CDA) (i.e., Genus, 2014; Jhagroe and Loorbach, 2014; Petrova et al., 2013), and Hajer’s discourse coalition framework (i.e., Kern, 2012). Three transparent papers do mention discourse analysis, but do not specify their specific discourse analytical approach (i.e., Caprotti, 2012; Fuenfschilling and Truffer, 2014; Kern, 2011). An overview of the different notions of discourse analysis is provided in table 10.

The transparent sustainability transition studies differ in regard to the extent and the way they take discourse analysis into account in their empirical investigations. For example, if ADA is mentioned as an analytical approach for data analysis, its concepts of storylines, discourse coalitions, discourse structuration, and discourse institutionalisation are generally also employed in that sustainability transition study. This is not the case for CDA. This discourse analytical approach is mostly not fully employed according to its formal analytical framework. This is also indicated by the papers themselves. They denote that their empirical analyses are informed by insights from this research perspective (i.e., Jhagroe and Loorbach, 2014; Petrova et al., 2013) by acknowledging the usefulness of Fairclough’s conception of the interaction between texts, discursive practice, and social practice for their empirical analysis, but they do not report on his relating concepts of intertextuality and interdiscursivity for instance. Notwithstanding these observations, CDA is fully integrated in a discourse-institutional approach for furthering the understanding of the governance of sustainability transitions (Genus, 2014). This will be discussed in section 4.2.3.

In accordance with the axis system in figure 1, both ADA and ADAA see actors as constituted by discursive practices (Fischer, 2003). This means that actors have to be understood through the languages and concepts they use to describe their activities. These discourse analytical approaches originate from public policy analysis, and are considered socio-interactive approaches for the analysis of macro socio-cultural discourses (Fischer, 2003). A socio-interactive approach for discourse analysis takes actors to be actively engaged in the political and rhetorical construction of discursive hegemony over a particular policy domain. Socio-cultural discourses provide, amongst other things, a society the basic stories that serve as models for behaviour. They supply the basic coordinating principles for social action, and have the formative or constitutive power that, often unconsciously, structures social definitions, meanings, and interactions in a socio-cultural system.

Macro discourses form according to these discourse analytical approaches the collective memory of society and social entities that guides ways of thinking and acting. ADA and ADAA focus, therefore, on Big-D-Discourses since they help to identify how particular policy issue framings render particular problem understandings, and analyse what sorts of institutional arrangements make this possible. Both approaches carry out critical research because they aim at understanding how social actors contribute to the production and potential
transformation of a particular discourse. Furthermore, they aim at identifying which institutional dimensions are firmly entrenched and which structural elements are more open to change (Fischer, 2003). ADA and ADAA revolve around the concepts of storylines and narratives.

The discourse analytical focus of all twelve transparent papers is predominantly on Big-D-Discourses. Considering the interest of sustainability transition studies in socio-technical systems and processes of societal change and transformation, it comes as no surprise that little-d-discourses are hardly addressed in these empirical studies. Moreover, ADA, ADAA, and CDA do not deny the influence of little-d-discourses on Big-D-Discourses and vice-versa. Despite this, it is simply not the analytical focal point of ADA and ADAA (Fischer, 2003). Concerning CDA, this matter is slightly more complicated. CDA is in fact both a specific discourse analytical approach and a field in itself (Jørgensen and Phillips, 2002; Rogers et al., 2005). This field is referred to as cda (Gee, 2004). Both CDA and cda theoretically bridge the gap between micro-, meso-, and macro-levels of discourse analysis, but differently (Fairclough, 2003; Rogers et al., 2005; Van Dijk, 2001). The empirical investigations of the three transparent papers employing insights from CDA, however, remain at a macro-level of analysis. Nevertheless, discourse analytical approaches focussing on little-d-discourses can make their contribution to the understanding of the critical patterns and complex dynamics of innovation and transition processes in socio-technical systems. The added value of involving little-d-discourses in sustainability transition studies will be reflected upon in section 5.
<table>
<thead>
<tr>
<th><strong>Transparent paper</strong></th>
<th><strong>Interpreted general focus</strong></th>
<th><strong>Interpreted discourse analytical focus</strong></th>
<th><strong>Reported discourse analytical approach</strong></th>
<th><strong>Reported transition studies concepts, approaches, or perspectives</strong></th>
<th><strong>Other reported concepts, approaches, or perspectives</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Adams et al. (2004)</td>
<td>Exploring the ideas of environmental professionals and the dynamics of ideological change within the organisations they work</td>
<td>Big-D-Discourses</td>
<td></td>
<td></td>
<td>Storylines, discourse coalitions (Hajer, 1995)</td>
</tr>
<tr>
<td>Bosman et al. (2014)</td>
<td>Exploring how prominent incumbents discursively frame a sustainability transition by unravelling their existing and evolving storylines</td>
<td>Big-D-Discourses</td>
<td>Argumentative discourse analysis (ADA) (Hajer, 1995; 2006)</td>
<td>Regimes within social-technical systems (Rip and Kemp, 1998)</td>
<td></td>
</tr>
<tr>
<td>Caprotti (2012)</td>
<td>Exploring the discursive emergence, the sectoral definition, and the production of materialities of a sector that did not exist in its current form before</td>
<td>Big-D-Discourses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cotton et al. (2014)</td>
<td>Analysing the social construction of environmental problems in a specific discourse</td>
<td>Big-D-Discourses</td>
<td>An argumentative discourse analytical approach (ADAA) (Fischer, 1995; Hajer, 1995; Hajer and Versteeg, 2005; Majone, 1989)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuenfschilling and Truffer (2014)</td>
<td>Improving the operationalisation and empirical assessment of the concept of the socio-technical regime</td>
<td>Big-D-Discourses</td>
<td>Discourse analysis is mentioned as a methodological cornerstone, but not further specified</td>
<td>MLP (Geels, 2002; 2004) SNM (Kemp et al., 1998) TM (Loorbach, 2007; Rotmans et al., 2001) TIS (Bergek et al., 2008; Hekkert et al., 2007)</td>
<td>Degrees of institutionalisation: habitualisation, objectification, and sedimentation (Tolbert and Zucker, 1999) Institutional logics (Thornton and Ocasio, 1999)</td>
</tr>
<tr>
<td>Transparent paper</td>
<td>Interpreted general focus</td>
<td>Interpreted discourse analytical focus</td>
<td>Reported discourse analytical approach</td>
<td>Reported transition studies concepts, approaches, or perspectives</td>
<td>Other reported concepts, approaches, or perspectives</td>
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</tr>
<tr>
<td>Genus (2014)</td>
<td>Introducing a discourse-institutional approach for furthering the understanding of the governance of sustainability transitions</td>
<td>Big-D-Discourses</td>
<td>Critical discourse analysis (CDA) (Fairclough, 2001; 2005)</td>
<td>Social-technical systems (Geels, 2004) TIS (Bergek et al., 2008a; Bergek et al., 2008b) Institutional entrepreneurship (Wolthuis et al., 2013)</td>
<td>Carriers: symbolic systems, relational systems, routines, and artefacts Mechanisms: coercion, normative commitment, and imitation Processes: habitualisation, objectification, sedimentation (Scott, 2008)</td>
</tr>
<tr>
<td>Horsbøl (2013)</td>
<td>Analysing how a local sustainability initiative emerged and was established as a public phenomenon in media coverage</td>
<td>Big-D-Discourses</td>
<td></td>
<td></td>
<td>Frame analysis (Gamson, 1992; Gamson and Mogliani, 1989; Entman, 1993; Gerhards et al., 1998; Reese, 2010)</td>
</tr>
<tr>
<td>Jhagroe and Loorbach (2014)</td>
<td>Addressing the challenges in the relationship between TM and democracy by means of introducing a post-foundational understanding of democratic politics</td>
<td>Big-D-Discourses</td>
<td>Insights from critical discourse analysis (CDA) (Fairclough, 1992; Fairclough et al., 2011) TM (Loorbach, 2010; Rotmans et al., 2001)</td>
<td></td>
<td>Post-foundational perspective on democracy (Deveaux, 1999; Fritisch, 2002; Laclau and Mouffe, 2001; May, 2008; Rancière, 1999; Van der Veeke, 2013)</td>
</tr>
<tr>
<td>Kern (2011)</td>
<td>Analysing the interplay between ideas, institutions, and interests</td>
<td>Big-D-Discourses</td>
<td></td>
<td>Socio-technological system innovation (Geels, 2004) Fostering system innovations (Foxon, 2003) TM (Kemp et al., 2007; Loorbach, 2010; Tukker and Butter,</td>
<td>Ideas, institutions, and interests (Campbell, 1998; Hay, 2004; Poteete, 2003; Schmidt, 2001; Scott, 2008)</td>
</tr>
<tr>
<td>Transparent paper</td>
<td>Interpreted general focus</td>
<td>Interpreted discourse analytical focus</td>
<td>Reported discourse analytical approach</td>
<td>Reported transition studies concepts, approaches, or perspectives</td>
<td>Other reported concepts, approaches, or perspectives</td>
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</tr>
<tr>
<td>Kern (2012)</td>
<td>Analysing the interplay between new storylines and existing discourses and institutions</td>
<td>Big-D-Discourses</td>
<td>Discourse coalition approach (Hajer, 1995)</td>
<td>TM (Kemp and Rotmans, 2005; Hisschemoller et al., 2006; Loorbach and Rotmans, 2006; Rotmans et al., 2001)</td>
<td>Discursive institutionalism (Schmidt, 2008)</td>
</tr>
<tr>
<td>Späth (2012)</td>
<td>Highlighting the importance of argumentative discourse analysis for understanding the social dynamics in sustainability transitions</td>
<td>Big-D-Discourses</td>
<td>Argumentative discourse analysis (ADA) (Hajer, 1995; 2006)</td>
<td>Governance of socio-technical transitions (Smith et al., 2005) TM (Loorbach, 2007)</td>
<td></td>
</tr>
</tbody>
</table>
4.3. Reported reasons for employing discourse and/or discourse analysis

Discourse and/or discourse analysis is associated with six sustainability transition studies that take institutions or institutionalisation into account in their analyses (i.e., Fuenfschilling and Truffer, 2014; Genus, 2014; Jhagroe and Loorbach, 2014; Kern, 2011; Kern, 2012; Späth, 2012). These papers are chronologically discussed because they may build on each other’s work, and reflect on that account a theoretical development in the field of sustainability transition studies. The remaining six sustainability transition studies (i.e., Adams et al., 2004; Bosman et al., 2014; Caprotti (2011); Cotton et al., 2014; Horsbøl (2013); Petrova et al., (2013) vary in the reasons and ways they employed discourse and/or discourse analysis. These papers are again alphabetically discussed as was customary up till now in this section.

Kern (2011) aligns with the critique on sustainability transition studies that transition processes are not politically neutral, and contributes to this debate by analysing the underlying political processes and their institutional contexts in shaping policy initiatives that promote system innovations from a discursive-institutional perspective. This paper shows that that policy change depends then on the relationship between a new discourse and existing institutions, and on the relationship between a new discourse and existing interests of the main actors involved in the policy field. Only if a new discourse is able to successfully challenge existing institutional arrangements, and is capable of transforming existing interests, radical policy change can be expected to take place (Kern, 2011). Continuing on this trail of thought, Kern (2012) argues that sustainability transitions require both changes in policy and institutions, and developed an analytical framework to shed light on the interplay between new storylines that argue for a policy change, and existing discourses and institutions that influence policy making processes, but are also changed through policy developments. Discourse analysis is here particularly useful for analysing the discursive processes of framing and reframing problems in TM and how particular understandings of a problem come to dominate the way policy makers view a problem, and accordingly try to solve that problem (Kern, 2012).

Mapping relevant actors and scrutinising the more or less formal structures that are strategically created to manage the transformation of a socio-technical system are crucial steps towards understanding these phenomena, but such an actor and institution oriented approach fails to comprehend a very important aspect of sustainability transitions (Späth, 2012).

Späth (2012) reasons that specific discursive and normative dynamics are highly important for the potential of a sustainability initiative to contribute to the transformation of an entrenched socio-technical system. This paper highlights, therefore, the importance of ADA for understanding the transformative potential of sustainability initiatives. Especially the systematic assessment of processes of discourse structuration and institutionalisation can contribute to the evaluation of emergent momentum that may eventually lead to a sustainability transition Späth (2012). An explicit connection to MLP is made by Fuenfschilling and Truffer (2014). This paper ties in with the criticism on the rather unsystematic operationalisation and delineation of the different analytical levels, especially of
the socio-technical regime, in most sustainability transition studies. Furthermore, it states that most studies disregard a thorough description of the structures in a socio-technical system, and neglect how these affect or interact with actors and activities. On that account, the paper presents a conceptual foundation based on institutional theory for the operationalisation and empirical assessment of the structuration of socio-technical systems with a special focus on the socio-technical regime. Discourse analysis is proposed as a methodological corner stone for the analysis of the specific content and coherence of structures in socio technical systems because of its usefulness for studying institutions and institutionalisation processes, but is not further elaborated upon Fuenfschilling and Truffer (2014).

Genus (2014) calls for a greater depth and sophistication of sociological institutions in the analysis of socio-technical transitions, and proposes a discourse-institutional approach for improving the understanding of the governance of transitions towards sustainability. This paper argues that CDA and neo-institutional theory can complementary account for discursive and non-discursive aspects of institutions and institutionalisation processes that constitute, and are constituted by, individual and collective behaviour. Discourse analysis is elaborately operationalised in this discourse-institutional approach. The relationship between TM and post-foundational democracy is regarded by Jhagroe and Loorbach (2014) to address the inherent democratic tensions of managing socio-technical transitions are addressed. CDA is reasoned to be particularly useful because it enables to grasp institutional as well as extra-institutional democratic practices related to TM, but is not fully employed since that is not the aim of the paper. Nevertheless, it contributes to the analysis by sensitising democratic policy by shedding light on different framings of problems and solutions without a priori understandings of democracy (Jhagroe and Loorbach, 2014).

The next sustainability transition studies do not specifically address institutions or institutionalisation processes. Adams et al. (2004) use discourse as a concept in a qualitative research looking at the dynamics of ideological change within organisations, and to consider the power of commonly held discursive ideas to influence the way policy and practice are enacted in a particular field. The need for a more refined understanding of socio-technical regime is also addressed by Bosman et al. (2014). This paper draws upon ADA for analysing the dynamics in a socio-technical regime and investigates the language incumbents use to give meaning to the changing world around them. It studies whether changing discursive positions amongst incumbents might offer opportunities for a more radical transformation of that socio-technical regime. The processes of the discursive sectoral definition of an emerging socio-technical sector, the construction of a distinctive sectoral identity, and processes of making sense of a diverse set of technologies and materialities is studied by Caprotti (2011). This paper analysis discursive and social practices, but does not connect to a specific discourse analytical approach.

Cotton et al. (2014) reasons that the entanglement of divergent stakeholder interests reveals a divide between competing world views, and contested problem framings. The argumentative struggle in a policy debate is, therefore, a matter of discourse. ADAA is
employed in this sustainability transition study. **Horsbøl (2013)** states that most studies investigate the role of the media in producing, constructing, and distributing representations of sustainability and climate change addressed media representation at a national or international level. However, international decision-making processes move slow and many local and regional sustainability initiatives are arising. This paper is informed by discourse analysis, but conducts a frame analysis to investigate on that account how a local sustainability initiative emerged and was established as a public phenomenon through local and regional media coverage. Reasoning that the lessons learnt from post-communist transformations can be expanded to sustainability transitions, **Petrova et al. (2013)** analyse the different ways in which political, cultural, and ideological interests expressed in policy-oriented sustainability narratives at different policy scales influenced socio-spatial trends in post-communist cities. This paper uses insights from CDA.

All twelve transparent sustainability transition studies employ their notions of discourse and/or discourse analysis to study social reality as discursively constructed and maintained. They focus, therefore, on Big-D-discourses. Discourse analysis is conceived as complimentary with (neo)-institutional theory, and as theoretical and methodological appropriate for the analysis of institutions and structures, and institutionalisation and structuration processes. Furthermore, it is used for the analysis of the power of ideas and interests, and for investigating processes of sense making of, and meaning giving to socio-technical sustainability phenomena. All twelve transparent sustainability transition studies acknowledge on a theoretical level the structuring role of discourse in society, and analyse societal transformation and processes of change. They are on that account considered as conducting full discourse analyses.

5. DISCUSSION

This systematic review identified sustainability transition studies that report with sufficient detail on their research design and notion of discourse and/or discourse analysis to look at how discourse and/or discourse analysis is employed in these studies. Our search strategies identified 735 academic papers that are potentially relevant for answering our main research question. After applying our inclusion and exclusion strategies, sixty papers were included in a preliminary dataset. These sixty papers were scrutinised for the identification of transparently reporting sustainability transition studies that allowed further interpretation of the study in question. Twenty-eight papers report transparently on their research design. Twenty-one papers report transparently on their notion of discourse and/or discourse analysis. Merging these two transparency assessments resulted in a dataset of twelve transparent papers for the interpretation of how discourse and/or discourse analysis are employed in their empirical investigations.

As regard to the research design of this paper, traditional literature reviews can be somewhat opaque in their research design, and in fact reflect an unrepresentative sample of studies summarised in an unsystematic and uncritical way (Petticrew and Roberts, 2008c). Systematic reviews explicitly aim at limiting systematic errors or biases by attempting to identify, critically appraise, and synthesise all studies that are relevant for answering a
particular predefined research question (Aveyard, 2010). Above all, they aim at being transparent in the way their findings are reached. The identification of relevant sustainability transition studies depended to a great extent on an academic search engine and bibliographical database. It is, therefore, influenced by the presence of our search terms in the title, abstract, and keywords (Petticrew and Roberts, 2008b), and by publication bias (Petticrew and Roberts, 2008a, b). This may not be an issue if a field has a consistent language use, but we experienced that the usual suspects were not always present in our preliminary datasets in an exploratory stage of this systematic review. For that reason, we attempted to overcome this sampling problem by employing data triangulation by means of different search strategies, and to report transparently on our research design to be clear on which studies or included and excluded in our data sample.

It is a finding in itself that only twelve out of sixty sustainability transition studies were assessed as reporting transparently on their empirical investigations. A common and fundamental critique on social scientific research is that the entire research processes is subjective and biased by implicit theoretical positions and assumptions, worldviews, ideologies and political perspectives, and interests, prejudices and one-sidedness of the researchers (Diefenbach, 2009). In addition, it can be problematic if a reader of an academic paper with a fundamentally different notion of knowledge assumes that the empirical foundation of a social scientific claim is comparable to its own (Kampen and Tamás, 2014). On that account, transparently reporting on research design and conceptualisations and operationalisations of employed concepts and constructs can contribute to allaying confusion and unnecessary controversies amongst scientists (Diefenbach, 2009; Kampen and Tobi, 2011). Furthermore, transparent academic papers are not only beneficial for readers, they also enable scientifically sound re-use of the author’s empirical efforts in, for example, systematic reviews (da Silva et al., forthcoming). Nevertheless, this lack of transparency is not a specific characteristic of the field of sustainability transition studies. In general, social scientific research can benefit from more transparency in reporting because it increases the possibilities for more rational critique on, and critical attitudes towards methodologies and methods employed in academic research and publications (Diefenbach, 2009).

The twelve transparently reporting sustainability transition studies are to a great extent influenced by argumentative discourse analytical approaches (ADAA), particularly by argumentative discourse analysis (ADA). These discourse analytical approaches originate from public policy analysis. ADAA regard the political and rhetorical construction of discursive hegemony over a particular policy domain. They revolve around the identification of storylines or narratives, and discourse coalitions that arise around particular storylines. A cautious remark may be in its place here. These ADAA and ADA related concepts are widely used in the twelve transparent papers, but the accompanying concepts of discursive hegemony, discourse structuration, and discourse institutionalisation receive far less attention. A sustainability transition study can only take full advantage of the insights a discourse analysis can offer in the critical patterns and complex dynamics of innovation and transition processes if it also pays attention to the particular social order a discourse
reproduces or challenges. In addition to the identification of storylines and discourse coalitions, explicit attention to these latter ADAA and ADA related concepts can, therefore, be advantageous for the understanding of socio-technical processes of transformation and change. Despite this caution, the twelve transparent papers all acknowledge on a theoretical level that language has a structuring role in society, and go beyond the mere identification of actors, content, and themes related to socio-technological processes of transformation and change. Critical discourse analysis (CDA) is another discourse analytical approach that is present in the dataset of this systematic review. It is recently introduced to the field of sustainability transition studies, but has yet to be turned to good account in the field. CDA is not yet fully employed as a theoretical and methodological approach to discourse analysis. Nevertheless, theoretical and methodological insights deriving from CDA are informing sustainability transition studies.

One of the transparent papers employs a frame analysis. This theoretical and methodological approach merits a little more attention considering its use for agency-sensitive and actor-oriented empirical analyses in sustainability transition studies, and because storylines and narratives are often used to look at the ways a particular problem or issue is framed in more public policy-oriented analyses. Just as with discourse analysis, there are divergent ontological, theoretical, and methodological approaches to the notions of frame and framing. These notions are commonly used in negotiation and communication research for analysing how individuals place interpretive and linguistic boundaries around phenomena, objects, or events (Donohue and Rogan, 2011). Frames connect to dominant discourses and macro-institutional phenomena and developments (Aarts et al., 2011), while framing relates to the ordering processes through which people structure their understanding of and give meaning to a particular situation, and behave accordingly (van Herzele and Aarts, 2013). (Dewulf et al., 2009) delineate six different approaches to frame analysis and identify research opportunities within and across these approaches. These six approaches suggest a potential for improving the understanding of negotiation and conflict resolution in institutional processes of socio-technological transformation and change by analysing issues, identities, relationships, and re-alignments of differences between people and organisations through interaction processes.

Discourse analysis is employed to analyse institutions and structures, institutionalisation and structuration processes, the power of ideas and interests, and to investigate processes of sense making of, and meaning giving to socio-technical sustainability phenomena. They focus on the study of Big-D-Discourses (i.e., social reality as discursively constructed and maintained). Considering the interest of sustainability transition studies in processes of societal transformation and change in socio-technical systems, it comes as no surprise that little-d-discourse (i.e., talk and text in its social interaction context), are hardly addressed in the twelve transparent papers. Nevertheless, discourse analytical approaches focussing on little-d-discourses contribute to the understanding of power and agency in innovation and transition processes in socio-technical systems. Innovation studies are already recognised as being well placed to address sustainable development and socio-technical transitions (Geels,
Innovation studies suggest that everyday communicative exchanges are likely to be of critical importance in re-ordering social and contextual relationships in multiple social networks (Leeuwis and Aarts, 2011; Leeuwis and van den Ban, 2004). Discursive psychology is a discourse analytical approach for analysing institutional talk (i.e., the operation of normative structuring and logics of particular courses of social action in specific institutional contexts (Heritage, 2005)) and communication in everyday life (te Molder, 2015). It can shed light on the discursive space for manoeuvring that is available in currently dominant discursive structures that demarcate issues in relation to innovations for sustainability transitions (Swierstra, 2013; Swierstra and te Molder, 2012). Furthermore, the use of discursive psychology as a technology assessment tool (Mogendorff et al., 2014; Veen et al., 2011) and as an interaction-based intervention tool (Lamerichs et al., 2009; Lamerichs and te Molder, 2011) indicates that it can contribute to future research on the role of actors in ‘transitions-in-the-making’.

6. CONCLUSIONS AND RECOMMENDATIONS

This systematic review identified sustainability transition studies that employ notions of discourse and/or discourse analysis in their empirical investigations. These sustainability transition studies were assessed on whether they reported with sufficient detail on their research design and notion of discourse and/or discourse analysis to allow interpretation of their employment of discourse and/or discourse analysis. Out of the sixty identified academic papers, only twelve papers transparently reported on their research design and notion of discourse and/or discourse analysis. On that account, improving reporting on research design and conceptualisations and operationalisations of employed concepts or constructs would considerably support the interpretation of sustainability transition studies in general. This would contribute to allaying confusion and unnecessary controversies on understandings of academic papers, and to improving rational critique on, and scientifically sound re-use of empirical findings.

The twelve transparent papers were to a great extent influenced by argumentative discourse analytical approaches. These approaches derive from public policy analysis, and Revolve around the identification of storylines or narratives, and discourse coalitions that arise around particular storylines. They, however, did not all appear to make full use of these discourse analytical approaches. In order to take full advantage of these, explicit attention should also be paid to their related concepts of discourse institutionalisation and discourse structuration. Critical discourse analysis was recently introduced to the field of sustainability transition studies, but was not yet fully employed as a theoretical and methodological approach to discourse analysis. Nevertheless, insights deriving from this discourse analytical approach were already used in empirical investigations.
Discourse analysis was employed to analyse institutions and structures, institutionalisation and structuration processes, the power of ideas and interests, and to investigate processes of sense making of, and meaning giving to socio-technical sustainability phenomena. All twelve sustainability transition studies perceived discourse analysis as the study of social reality as discursively constructed and maintained. However, the diverse field of discourse analysis also recognises discourse analysis as the study of talk and text in its social interaction context. These latter discourse analytical approaches can contribute to a further understanding of power, agency, and the role of actors in ‘transitions-in-the-making’. Discursive psychology was proposed in this paper as a discourse analytical approach with a potential for furthering the understanding of the critical patterns and complex dynamics of innovation and transition processes towards sustainability in socio-technical systems.

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APPENDICES
A technical report is available of this systematic review and can be requested from the corresponding author of this paper. This technical report includes: (1) inclusion and exclusion criteria, (2) coding questions, (3) coding instructions, (4) literature references of sustainability transition papers transparently reporting on their research design, (5) literature references of sustainability transition papers transparently reporting on their notion of discourse, (6) literature references of sustainability transition papers transparently reporting on their notion of discourse analysis, and (7) literature references of sustainability transition papers transparently reporting on their research design and notion of discourse and/or discourse analysis.

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The Use of Discourse Analysis in Sustainability Transition Studies: A Systematic Review

MSc Thesis

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Theoretical Framework

1. INTRODUCTION

How do people give meaning to social transitions in their everyday lives? Why are certain new technologies smoothly adopted in everyday life while others do not thrive at all? Which discursive dynamics are at play in such transitions-in-the-making?

1.1 Background
Several studies on sustainability transitions in social-technical systems have recently taken into account the role of language and meaning, both in the study of past transition trajectories and in transitions-in-the-making. Discourse analysis offers both theory and methodology to approach the study of language and meaning. Discourse analysis is, however, a broad and diverse field characterised by theoretical complexity. There is a diverse range of ontological and epistemological approaches to discourse analysis, and different approaches can be incommensurate.

Both the fields of discourse analysis and transition studies are established strands of research, and building bridges between them could not only provide stronger conceptual and methodological research approaches, but also further empirical insight in the critical patterns and complex dynamics of innovation and transitions processes in society. Therefore, researchers who wish to use discourse analysis must understand the implications, and justify their choice of a particular discourse analytical approach.

My MSc thesis aims at describing how discourse analysis has been used in transitions studies. It reports on a systematic review that identifies how discourse is conceptualised and operationalised, and reflects on the use of discourse analysis in future studies in the field of sustainability transitions. On that account, a thorough understanding of discourse analysis is required, and this preparatory literature review will provide the background and foundation for the coding scheme for interpreting and coding the literature in the subsequent systematic review.

1.2 Problem Statement
Many textbooks on discourse or discourse analysis start with stating that discourse itself is not easy to define. It is used in a variety of ways, which may even be contradictory. Discourse can refer to diverse concepts, or to various theories. It can even concern research methodologies, or in fact a whole discipline. Potter and Wetherell (1987) remark to this respect: “It is a field in which it is perfectly possible to have two books [on discourse analysis] with no overlap in content at all”.

Van Dijk (2011) stated that the contemporary emergence of discourse analysis must be sought in remarkably parallel developments in the humanities and social sciences between the mid-1960s and the mid-1970s. He put forward that discourse analysis developed from
the mother-disciplines anthropology, linguistics, literary studies, sociology, cognitive and social psychology, communication studies, and political science; respectively and roughly in this order. These mother-disciplines are increasingly overlapping, and merging into very diverse sub- and cross-disciplines, which all influence each other in turn, and result in new areas of interest. On that account, he argued that Discourse Studies is, in fact, a discipline in itself since the end of the 1990s.

As a consequence, it is often ambiguous what is precisely meant by discourse or discourse analysis in the humanities and social sciences. Alvesson and Karreman (2000) remarked that in many cases authors do not define or discuss their interpretation of discourse, and that academic texts and debates treat discourse as having a clear and consensual meaning. Phillips and Jørgensen (2002) added to this: “The concept [discourse] has become vague, either meaning almost nothing, or being used with more precise, but rather different, meanings in different contexts”.

Identifying and categorising different discourse analytical approaches is not easy. Van Dijk (2012) even states that “it is usually a rather pointless enterprise” to define such a complex notion as discourse, but agrees that at least “the major properties that have been highlighted within decades of research in various areas of the field” should be enumerated to comply with the requests regarding the definition of discourse.

Van Dijk’s (2012) seven properties of discourse¹ are a fine starting point for identifying, and clarifying discourse analytical areas of interest, but do not yet suffice to categorise the diverse range of ontological and epistemological discourse analytical approaches. On that account, there is still a need for further systemising the different approaches to discourse analysis.

1.3 Research Objective
This literature review aims at identifying, and clarifying the diverse range of ontological and epistemological approaches to discourse analysis. It intends to give several categories, or dimensions, to distinguish different discourse analytical approaches, and to provide the foundation for the coding scheme for the subsequent systematic review. This systematic review will report on identifying how discourse and discourse analysis are employed in transition studies.

1.4 Research Question
The problem statement and research objective lead to the following research question:

“What are the differences between discourse analytical approaches, and how can these be distinguished from each other?”

¹ Van Dijk (2012) lists the following seven properties of discourse: (1) discourse as social interaction, (2) discourse as power and domination, (3) discourse as communication, (4) discourse as contextually situated, (5) discourse as social semiosis, (6) discourse as natural language use, and (7) discourse as complex, layered construct.
2. RESEARCH DESIGN

2.1 Literature Review
A literature review is the comprehensive study and interpretation of literature for the purpose of answering a particular research question (Aveyard, 2010). Many literature reviews are in fact narrative reviews without a focused research question, or pre-defined search strategies or synthesis methods (Aveyard, 2010).

This literature review does not take a full systematic approach, but is systematically undertaken. It consists of a search strategy, which ensures that relevant data is extracted, and irrelevant literature is discarded, and that the search is transparent and reproducible.

On that account, a search string, and inclusion and exclusion criteria are developed. Search terms for the search string derived from the research question. The data set is interpreted rather than summarised, and thus resembles a simplified meta-ethnography (Aveyard, 2010).

2.2 Search Strategy
Several studies This literature review aims at identifying and clarifying the diverse range of ontological and epistemological approaches to discourse analysis. The search string commanded in the library catalogue of Wageningen UR was quite straightforward. It first consisted of the search terms discourse analysis, which resulted in 87 hits, and was further specified by adding theory OR methodology. This resulted in 13 literature references. These were reviewed in accordance with the inclusion and exclusion criteria set in table 1 below.

The search string for the academic search engine and bibliographic database Scopus was divided into two parts. The first search string consisted of the search terms discourse analysis and theory. This resulted in 1,703 hits, searching in title, abstract, and keywords. Limiting the search to key words only resulted in 402 hits, and automatically excluding non-English documents, and document types other than articles resulted in 23 documents. These were further reviewed on their title and abstract in accordance with the inclusion and exclusion criteria set in table 1 below.

The second search string consisted of the search terms discourse analysis and methodology. This resulted in 988 hits, searching in title, abstract, and keywords. Limiting the search to key words only resulted in 187 hits. Automatically excluding non-English documents, and document types other than articles, resulted in 138 hits. These were further reviewed on their title and abstract in accordance with the inclusion and exclusion criteria in table 1 below.
Table 1. Inclusion and Exclusion Criteria

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
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<tbody>
<tr>
<td>English.</td>
<td>Non-English.</td>
</tr>
<tr>
<td>Published in a book or an academic journal.</td>
<td>Unpublished or grey literature. Conference proceedings are excluded as well.</td>
</tr>
<tr>
<td>Should be available through Wageningen UR Library.</td>
<td>Not available through Wageningen UR Library.</td>
</tr>
<tr>
<td>The title or abstract should clearly show that the literature reference provides an overview of the field of discourse analysis.</td>
<td>The title or abstract does not make clear that the literature reference provides an overview of the field of discourse analysis</td>
</tr>
</tbody>
</table>

2.3 Synthesis Method

Narrative literature reviews summarise earlier studies on a particular research subject, and allow the researcher to make an informed judgement on the current state of knowledge (Britten et al., 2002). However, the aim of synthesis is to go beyond summarising, and to determine the relationships between the studies, and to identify consistencies and differences between them.

Aveyard (2010) states that “meta-ethnography involves determining keywords, phrases, metaphors and ideas that occur in all or some of the studies and to interpret these in the light of those identified in the other studies”. Meta-ethnography is a method for synthesising qualitative research, and involves some degree of conceptual innovation (Strike & Posner, 1983 in: Britten et al., 2002). This relates to the aim of this literature review: providing the foundation for a coding scheme for the literature in the subsequent systematic review. The different approaches to discourse analysis must be integrated in one coding scheme. However, the focus is not on integrating empirical data, but on identifying theory.

“In a synthesis, studies can relate to one and another in three ways: [1] they may be directly comparable as reciprocal translations, [2] they may stand in opposition to one and another as refutational translations, or [3] taken together they may represent a line of argument” (Britten et al., 2002). Noblit and Hare (1988) described seven steps for conducting a meta-ethnography (Britten et al., 2002). These can be found in table 2 below.
Table 2. Seven Steps of Meta-Ethnography

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>Getting started.</td>
</tr>
<tr>
<td>2.</td>
<td>Deciding what is relevant to the initial interest.</td>
</tr>
<tr>
<td>3.</td>
<td>Reading the studies.</td>
</tr>
<tr>
<td>4.</td>
<td>Determining how the studies are related.</td>
</tr>
<tr>
<td>5.</td>
<td>Translating the studies into one another.</td>
</tr>
<tr>
<td>7.</td>
<td>Expressing the synthesis.</td>
</tr>
</tbody>
</table>

(Noblit & Hare, 1988 in: Britten et al., 2002)
3. FINDINGS

3.1 Introduction
Language is by no means a neutral medium that just serves to transfer information. Of course, it allows us to inform each other, but it serves much more functions. It is not exclusively used to describe what we see, feel, think, or believe. We say things with language, we do things with language, and we are things with language (Gee, 2011). It allows us to engage in social action and activities, and to take on different socially situated identities. There are important connections between saying, doing and being, and discourse analysis provides theory and methods to study these connections, which are the functions of language in use (Gee, 2011).

Discourse analysis is the close study of text and talk. It is a broad field, in which this, in fact, may be the only similarity. Discourse analysis is characterised by theoretical complexity, and therefore it is difficult to come to a clear definition of it. Potter (2004), however, provides an authoritative, an often used version (in: Silverman, 2011), which will function as a working definition for now:

“DA [discourse analysis] has an analytic commitment to studying discourse as text and talk in social practices. That is, the focus is not on language as an abstract entity such as a lexicon and a set of grammatical rules (in linguistics), a system of differences (in structuralism), or a set of rules for transforming statements (in Foucauldian genealogies). Instead, it is the medium for interaction; analysis of discourse becomes, then, analysis of what people do.” (Potter, 2004 in: Silverman, 2011; emphasis in original)

It is important to remark that discourse analysis cannot be used with all kinds of theoretical frameworks because of its different and specific ontological positions. “Crucially, it is not to be used as a method of analysis detached from its theoretical and methodological foundations” (Phillips & Jørgensen, 2002). Each approach to discourse analysis should be considered “a theoretical and methodological whole — a complete package” (Phillips & Jørgensen, 2002).

This literature review aims at identifying, and clarifying the diverse range of ontological and epistemological approaches to discourse analysis. Nevertheless, this is not the place to go through all the differences between the various approaches in detail. Only the key differences are briefly addressed below to give yet a sense of the diversity within the field.

3.2 Two Dimensions of Discourse Analysis
Alvesson and Karreman (2000) identified two major and quite different approaches to discourse: (1) the study of talk and text in its social interaction context, and (2) the study of social reality as discursively constructed and maintained. Furthermore, they proposed two key dimensions on which the majority of the different discourse analytical approaches can be placed. The one dimension considers the relationship between discourse and meaning, the
other deals with the formative range of discourse (see figure 1 below). This axis system sets out a continuum of different ontological positions within the field of discourse analysis.

![Figure 1. Key Dimensions in Discourse Analytical Approaches](image)

**Figure 1. Key Dimensions in Discourse Analytical Approaches**
*(Based on Alvesson and Karreman, 2002)*

The horizontal axis represents the relationship between discourse and meaning. At the left end of this axis, discourse analytical approaches consider discourse driving subjectivity. That is, human individuality is determined then by the structuring function of language. At the right end of this axis, people are conceived to possess autonomous control over the language they use for expressing themselves. As a consequence, discourse is constituted by the subject.

The vertical axis stands for the formative range of discourse. At the top end of this axis, discourse analytical approaches regard language as concerning a close-range interest within a local-situational context. This means that discourse only exist in a particular place, on a specific moment in time, and not beyond space and time. At the bottom end of this axis, discourse is considered to construct a particular phenomenon. In that case, it exists beyond specific human encounters, and language relates therefore to a long-range interest within a macro-system context.

### 3.3 Four Different Categories of Discourse Analysis
Alvesson and Karreman (2002) specified four different categories of discourse analysis, each differing in its scope and scale of discourse:

- **Micro-discourse approach.** Social texts calling for the detailed study of language use in a specific micro-context.
- **Meso-discourse approach.** Being relatively sensitive to language use in context, but interested in finding broader patterns, going beyond the details of the text, and generalising to similar contexts.
• Grand Discourse. An assembly of discourses, ordered and presented as an integrative frame. It may refer to, or constitute, organisational reality.
• Mega-Discourse. An idea of more or less universal connection of discourse material. It typically addresses more or less standardised ways of referring to, or constituting, a certain type of phenomenon, and extends time and space.

These versions differ on its empirical focal points. Approaches focussing on micro- and meso-discourses emphasise the need to take social context and interactions seriously. However, this does not mean that synthesis, or connections to more general patterns, is not possible. Nevertheless, the richness of the data and the consideration of uniqueness make general patterns less visible, and also somewhat beside the point. These approaches correspond to what Gee (2012) called “little-d-discourses”, or the study of talk and text in its social interaction context.

In a similar manner, approaches focussing on Grand Discourses and Mega-Discourse do not deny local variations. The point is yet to address big issues, and not the delicacies and nuances that might embed them. Gee (2012) might refer to these discourses as being “Big-D-Discourses”, or the study of social reality as discursively constructed and maintained. Figure 2 shows the different categories for discourse analysis schematically. The relationship between discourse and meaning is left out of this scheme because approaches within these four different categories can yet have different views on this relationship.

Figure 2. Different areas of interest in discourse analysis

*(Based on Alvesson & Karreman, 2002)*
It should be remarked that there is a tension in studying little-d-discourses and Big-D-Discourses simultaneously, because the first treats discourse as an emergent and locally constructed phenomenon, while the latter usually starts from a well-established a priori understanding of the phenomenon in question (Alvesson & Karreman, 2000). Consequently, the differences in the scale and scope of discourse influences how a discourse analysis is conducted in practice.

3.4 Another Four Different Approaches to Discourse Analysis
Taylor (2001) also presented four different approaches to discourse analysis, which largely agree with the previously mentioned categories, but are slightly more elaborated on their ontological premises:

- Discourse analysis with a primary focus on language itself. There is an interest in the properties and structures of language. It looks at the identification of patterns in language, and the interrelationship between language and social situation. It considers the regularities within an imperfect and unstable language system.

- Discourse analysis focusing on language use. Interaction is the main focal point, rather than language itself. The language user is understood as constrained by the interactive context, or the conventional conversational practices.

- Discourse analysis looking at language use related to a particular topic or activity. Language is understood as constitutive and situated, but within a particular social and cultural context rather than in a particular interaction.

- Discourse analysis concentrating on societal discursive practices. It focusses on identifying language patterns and related practices, and demonstrates how these constitute the social world.

Although these discourse analytical approaches are presented as being distinct, they are implicated in one another. It is again a continuum of different positions. For example, there is an overlap between the second and the third approach because they both look at language in use. Again, the third and the fourth approach both focus on language on its social and cultural context. Taylor (2001) remarked that this oversimplified categorisation does not show the controversies in the field of discourse analysis, or the criticisms each levels to one another.

3.5 Discourse Analytical Research Questions
Regardless of the precise relationship between discourse and meaning, or the exact formative range of discourse, language allows us to communicate with each other. Gee (2011) stated that whenever we use language, we work always, and often simultaneously, on constructing seven areas of reality: significance, practices (or activities), identities, relationships, politics (or the distribution of social goods), connections, and sign systems and knowledge. He calls these seven areas the building tasks of language, and stated that a discourse analyst can ask seven different thematic questions about any piece of language in use. The building tasks of language, and their definitions are listed in table 3 below.
Table 3. Seven Building Tasks of Language

<table>
<thead>
<tr>
<th>Building Task of Language</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Significance</strong></td>
<td>Using language to make things significant or important, or to lower their significance or importance.</td>
</tr>
<tr>
<td><strong>Practices (or Activities)</strong></td>
<td>Using language to enact specific practices (or activities) alone, or with others.</td>
</tr>
<tr>
<td><strong>Identities</strong></td>
<td>Using language to enact specific socially situated identities, or to project such identities on to others, or to (dis)privilege such identities.</td>
</tr>
<tr>
<td><strong>Relationships</strong></td>
<td>Using language to create or sustain social relationships, or to end or harm them.</td>
</tr>
<tr>
<td><strong>Politics (or Distribution of Social Goods)</strong></td>
<td>Using language to give or take away social goods, or projecting how social goods are, or ought to be, distributed.</td>
</tr>
<tr>
<td><strong>Connections</strong></td>
<td>Using language to make things (dis)connected, or (ir)relevant to each other.</td>
</tr>
<tr>
<td><strong>Sign Systems and Knowledge</strong></td>
<td>Using language to create, sustain, revise, change, or (dis)privilege a language or sign system or characteristic way of knowing the world or making claims about the world.</td>
</tr>
</tbody>
</table>

(Based on Gee, 2011)

These seven building tasks of language relate to seven different thematic discourse analytical research questions. Since discourse analysis is always, to some degree, a move from language to social context, and from social context to language, Gee (2011) also listed contextual research questions related to the seven building tasks of language. Table 4 below lists the seven different thematic discourse analytical research questions, and their related contextual research questions.
<table>
<thead>
<tr>
<th>Building Task of Language</th>
<th>Discourse Analytical Question</th>
<th>Contextual Research Question</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Significance</strong></td>
<td>How is this piece of language used to make certain people and things (in)significant, and in what ways?</td>
<td>Which people and what things are (in)significant in this context, and in what ways are they (in)significant? How is the language user trying to give this (in)significance?</td>
</tr>
<tr>
<td><strong>Practices (or Activities)</strong></td>
<td>What practices is this piece of language enacting?</td>
<td>What practices are relevant in this context, and how are they enacted?</td>
</tr>
<tr>
<td><strong>Identities</strong></td>
<td>What identity (or identities) is this piece of language enacting?</td>
<td>What identity (or identities) are relevant for the language user and others in this context?</td>
</tr>
<tr>
<td></td>
<td>What identity, or identities, is this piece of language attributing to others, and how does this help enacting the own identity?</td>
<td></td>
</tr>
<tr>
<td><strong>Relationships</strong></td>
<td>What sort of social relationship(s) is this piece of language seeking to enact with others (present or not)?</td>
<td>What relationships are relevant in this context, and how are these enacted, recruited, and used?</td>
</tr>
<tr>
<td><strong>Politics (or Distribution of Social Goods)</strong></td>
<td>What perspective on social goods is this piece of language communicating?</td>
<td>What social goods are relevant and at stake in this context, and how are they distributed, or how is their distribution viewed?</td>
</tr>
<tr>
<td><strong>Connections</strong></td>
<td>How does this piece of language (dis)connect people or things? How does it make one or another (ir)relevant?</td>
<td>What are the (ir)relevant (dis)connections between people or things in this context, and how are these (dis)connections made or implied?</td>
</tr>
<tr>
<td><strong>Sign Systems and Knowledge</strong></td>
<td>How does this piece of language (dis)privilege specific sign systems, or different ways of knowing and believing, or claims tot knowledge and belief?</td>
<td>What are the sign systems, or forms of knowledge and belief that are (ir)relevant in this context, and how are they used and (dis)privileged?</td>
</tr>
<tr>
<td>Building Task of Language</td>
<td>Discourse Analytical Question</td>
<td>Contextual Research Question</td>
</tr>
<tr>
<td>---------------------------</td>
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<td>-----------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Based on Gee, 2011)</td>
</tr>
</tbody>
</table>
4. DISCUSSION AND CONCLUSIONS

This literature review aimed at identifying, and clarifying the diverse range of ontological and epistemological approaches to discourse analysis. It intended to give several categories, or dimensions, to distinguish the different discourse analytical approaches, and to provide the foundation for a coding scheme for the literature in the subsequent systematic review. The research question was on that account:

“What are the differences between discourse analytical approaches, and how can these be distinguished from each other?”

The majority of the discourse analytical approaches can be placed in two major and quite different categories: the study of talk and text in its social interaction context, and the study of social reality as discursively constructed and maintained. To these two categories is also referred as studies with a focus on little-d-discourse or Big-D-Discourse respectively. These two categories can be further specified in focussing on micro-discourse or meso-discourse in the first, and in focussing on Grand Discourses or Mega-Discourse in the latter.

Discourse analytical approaches can be put into a two dimensional axis system, of which the one axis relates to the relationship between discourse and meaning, and the other to the formative range of discourse. The axis system shows the ontological differences within the different approaches, and provides a continuum on which the different discourse analytical approaches can be placed to distinguish one from another.

Categories of discourse analytical research questions were identified relating to the seven building blocks of language: significance, practice, identities, relationship, politics, connections, and sign systems and knowledge. These research questions concern either the piece of language itself, or the related social context.
5. RECOMMENDATIONS

5.1 Introduction
During this literature review, a specific category of discourse analytical approaches was identified. This category can also be classified and categorised within the previously mentioned structure. Nevertheless, it is worthwhile to mention this category separately, and to briefly elaborate on these particular discourse analytical approaches, because these are specifically focussing on social change, which fits in with the aim of sustainable transition studies.

5.2 Social Constructionist Discourse Analysis
Social constructionist approaches to discourse analysis share certain key premises about how entities as language and the subject are to be understood. In addition, these approaches have in common that they carry out critical research. That is, power relations in society are analysed in order to formulate normative perspectives from which a critique on such relations can be made with an eye on the possibilities of social change (Phillips & Jørgensen, 2002). However, each approach has its distinctive philosophical and theoretical premises, including particular understandings of discourse, social practices, and critique. This has lead to particular aims, methods, and empirical focal points. Phillips & Jørgensen (2002) describe three approaches to social constructionist discourse analysis: (1) Laclau and Mouffe’s discourse theory (Laclau & Mouffe, 1985), critical discourse analysis (Fairclough 1995), and (3) discursive psychology (Potter & Wetherell, 1987; Edwards & Potter, 1992).

The key principle of discourse theory is that discourse constructs the social world in meaning, and that meaning can never be permanently fixed due to the fundamental instability of language. No discourse is a closed identity, and is therefore constantly transformed through contact with other discourses. The creation of meaning is a social process, and is about fixating a particular meaning by placing that meaning in specific relations to other meanings. Focal points for discourse theory are discursive struggles and hegemony. It considers human beings as subjects of discourse.

Critical discourse analysis acknowledges the active role of discourse in structuring the social world, but insists that discourse is just one among many aspects of social practice. For that reason, a distinction is made between discursive and non-discursive practices. A focal point for critical discourse analysis is the study of change. Concrete language always draws upon earlier discursive structures as language users build on already established meanings. Intertextuality is key for critical discourse analysis, and shows how an individual text draws upon elements and discourses from other texts. It allows the study of both the reproduction of discourses, whereby new elements are introduced, and discursive change through new combinations of discourse.

Individuals are seen as both the product, and producers of discourse in discursive psychology. The aim of this approach is not so much to analyse changes in discourses in society, but to focus on how individuals use discourses as constitutive parts of social practices.
situated in a specific context. Discursive psychology analyses how people create and negotiate representations of the world, and looks at identities in talk in interaction and the social consequences of this.

For all three approaches, the functioning of discourse, or discursive practice, is a social practice that shapes the social world. Figure 3 shows on a continuum how discourse constitutes the world according to the approaches. However, discursive psychology is difficult to place in such a scheme since it claims that discourse is both fully constitutive, and embedded in historical and social practices, which are not fully discursive. It has to be remarked that approaches on the right end of the axis are not discourse analytical approaches, because these claim that discourse is just a mechanical reproduction of other social practices. Discourse is in that case fully determined by something else, and for that reason there is obviously no point in conducting a discourse analysis.

![Figure 3. Discourse Analytical Approaches and the Functioning of Discourse](Based on Phillips & Jørgensen, 2002)

Some of the three approaches focus on the fact that discourses are created and changed in everyday discursive practices, and therefore stress the need for systematic empirical analysis of people’s talk and written language. Other approaches are more concerned with general, overarching patterns, and aim at more abstract mapping of discourses that circulate in society in a particular moment in time, or within a specific social domain. On a continuum, these differences between the approaches are represented in figure 4.

![Figure 4. Empirical Focal Points for Discourse Analysis](Based on Phillips & Jørgensen, 2002)
6. References


Research Design

1. SYSTEMATIC REVIEW

Systematic review identifies, critically appraises, and synthesis studies that are relevant to answer a predefined research question (Ayevard, 2010). It follows a strict protocol to ensure that the review process is transparent and reproducible. That protocol typically consists of strategies for data extraction and for analysing the extracted data.

As for the data extraction, search strategies are developed, in which search terms and search strings are formulated for identifying potential relevant studies in various information resources, and inclusion and exclusion criteria are set out for deciding whether or not the obtained studies are relevant indeed.

Data analysis is an interpretive process, and systematic review requires reliability, rigorousness, and comprehensiveness. On that account, data analysis should take place transparently to enable replication. For example, data can be coded following a pre-specified coding scheme and according to a detailed coding manual.

2. DATA EXTRACTION

2.1 Search Strategies

This systematic review describes how discourse analysis has been used in transition studies. For that reason, the search strategies for this systematic review should identify academic literature that addresses both discourse analysis and transition studies. Search terms derived from both fields. This is visualised in figure 1 above; relevant academic papers are found where the two circles overlap in the Venn diagram.

Search terms were combined in search strings, which were carried out across different information resources. Three search strategies were employed to identify relevant academic literature: (1) electronic searching in the academic search engine and bibliographic database Scopus, (2) hand searching in selected academic journals, and (3) expert consultation. The search strategies are elaborated below.
2.1.1 Electronic Searching
After testing different search strings in Scopus, it was decided to not further specify the search term *discourse* to *discourse analysis* because this would narrow down the obtained literature references overmuch. Discourse analysis itself is, even while being conducted, not always mentioned in the title, abstract or key words of an academic paper. In these cases, relevant literature references will not be identified if the search term is specified to *discourse analysis*.

For a similar reason, it was decided to broaden the initial search terms deriving from transition studies. Markard et al. (2012) identified four theoretical frameworks in the field of sustainability transitions: *the multi-level perspective on socio-technical transitions* (MLP), *transition management* (TM), *strategic niche management* (SNM), and *technological innovation systems* (TIS). However, authors do not always mention these theoretical frameworks in their title, abstract or key words. Relevant articles remain therefore unidentified if the search terms are limited to these theoretical frameworks only.

On that account, the more general search terms *transition*, *innovation system* and *system innovation* were chosen. However, this resulted, especially for the search term *transition*, in an extensive list of literature references, of which many, after quickly scanning their titles, abstracts and keywords, were not relevant for answering the research question of this systematic review.

![Figure 2. Search Terms](image)

For that reason, it was decided to further adjust and specify the search string. The literature references deriving from transition studies should now also include the search terms
These search terms are inspired by the assumptions Markard et al. (2012) made in the search string for their literature review on sustainability transitions, but their search term renew* is substituted by socio-technical. Relevant academic papers are found where the three circles overlap in the Venn diagram in figure 2 above.

The final search string was commanded in Scopus on May 6th, 2015. It searched for the search terms in the titles, abstracts and keywords of the literature references in this bibliographic database. The search command resulted in 322 literature references, and can be found in the text box below.

<table>
<thead>
<tr>
<th>Table 1. Electronic Searching – Final Search String</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic Searching – Final Search String</td>
</tr>
<tr>
<td>( ( TITLE-ABS-KEY ( discourse ) OR TITLE-ABS-KEY ( discursive ) ) ) AND ( ( TITLE-ABS-KEY ( &quot;innovation system&quot; ) OR TITLE-ABS-KEY ( &quot;system innovation&quot; ) OR TITLE-ABS-KEY ( transition ) ) ) AND ( ( TITLE-ABS-KEY ( environment ) OR TITLE-ABS-KEY ( environmental ) OR TITLE-ABS-KEY ( sustainable ) OR TITLE-ABS-KEY ( sustainability ) OR TITLE-ABS-KEY ( socio-technical ) ) ) )</td>
</tr>
</tbody>
</table>

### 2.1.2 Hand Searching
The limitation of the previous search strategy is that it assumes that the title, the abstract, and the key words of a literature reference accurately reflect its content. If this is not the case, potentially relevant studies will not be identified in this search. To overcome this limitation, selected academic journals were also hand searched.

These academic journals were selected because they published several of the literature references in the electronic search, and because expert consultation indicated that they were relevant and authoritative in the field. On account of the research question, the field of transition studies is meant here; not discourse analysis. The selected academic journals can be found in the text box below.

<table>
<thead>
<tr>
<th>Table 2. Hand Searching – Selected Academic Journals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand Searching - Selected Academic Journals</td>
</tr>
<tr>
<td>Environment and Planning C: Government and Policy</td>
</tr>
<tr>
<td>Environmental Innovation and Societal Transitions</td>
</tr>
<tr>
<td>Research Policy</td>
</tr>
<tr>
<td>Sustainability (Switzerland)</td>
</tr>
<tr>
<td>Technological Forecasting and Social Change</td>
</tr>
<tr>
<td>Technology Analysis and Strategic Management</td>
</tr>
</tbody>
</table>
Using Scopus, the titles, abstracts and keywords of literature references within these academic journals were searched for the search terms *innovation system*, *system innovation* and *transition*, but constrained by the search terms *environment*, *environmental*, *sustainable*, *sustainability*, or *socio-technical*. In this way, all the obtained literature references would fall within the search terms previously set from transition studies.

The final search string was commanded on May 6th, 2015, and resulted in 399 literature references. It can be found in the text box below. To determine if the obtained literature references would also fall within the search terms previously set from discourse analysis, they were hand searched for the presence of *discourse* or *discursive*. This procedure is elaborated in the paragraph on quantitative analysis in the next section on inclusion and exclusion strategies.

**Table 3. Hand Searching – Final Search String**

| ISSN 1472-3425 | Environment and Planning C: Government and Policy |
| ISSN 2210-4224 | Environmental Innovation and Societal Transitions |
| ISSN 0048-7333 | Research Policy |
| ISSN 2071-1050 | Sustainability (Switzerland) |
| ISSN 0040-1625 | Technological Forecasting and Social Change |
| ISSN 1465-3990 | Technology Analysis and Strategic Management |

**2.1.3 Expert Consultation**

To identify relevant academic literature that remained unnoticed thus far by the previous search strategies, expert consultation was employed as well. These experts mainly consisted of the authors of this article, but colleagues and other peers were also consulted.

These experts in the field of transition studies were asked if they were acquainted with transition studies that took into account the role of language and meaning in transition
processes, and more specifically, transition studies that paid attention to discourse analysis. This resulted in 17 literature references.

2.2 Inclusion and Exclusion Strategies
The three search strategies above identified potentially relevant studies for answering the research question, but did not yet determine whether or not these literature references are relevant indeed. Inclusion and exclusion strategies were therefore developed. All literature references were subject to the same inclusions and exclusion strategies.

Inclusion and exclusion criteria were set to determine which literature references were potentially relevant for inclusion in the final data set, and which ones could already be excluded, after reading their titles, abstracts and keywords.

A subsequent quantitative analysis on the presence of the search terms discourse and discursive in the full papers determined which literature references were included in, and which were excluded from, the final dataset. The inclusion and exclusion strategies are elaborated below.

2.2.1 Inclusion and Exclusion Criteria
The literature references were imported into Endnote; a software program for literature reference management. Each search strategy was allocated its own separate folders. The obtained literature references were stored according to the search strategy that had originally obtained them. These folders were called Scopus ALL, Journals ALL, or Experts ALL. The titles, abstracts, and keywords of the literature references were read in Endnote, and reviewed according to the inclusions and exclusion criteria in the text box below. Some of the inclusion and exclusion criteria were inductively adjusted while reading the titles, abstracts, and keywords of the literature references.

Table 4. Inclusion and Exclusion Criteria

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>Non-English.</td>
</tr>
<tr>
<td>Published in an academic journal. Articles in press are allowed.</td>
<td>Unpublished or grey literature. Conference proceedings are excluded as well.</td>
</tr>
<tr>
<td>The title, abstract, or key words show that the study concerns a sustainability transition with socio-technical elements.</td>
<td>Books and book sections.</td>
</tr>
<tr>
<td>It is generally impossible to determine what discourse indicates by reading the title, abstract, or key words. Therefore, the mere presence of the search terms discourse or discursive is sufficient at this stage.</td>
<td>Studies concerning life course transitions, feminist transitions, gender transitions, or sexual transitions.</td>
</tr>
<tr>
<td></td>
<td>Studies concerning transitions from socialism to capitalism, or transitions from</td>
</tr>
</tbody>
</table>
If the inclusion criteria were met after reading a literature reference’s title, abstract and keywords, it was copied to its corresponding folder MAYBE. (That is, Scopus MAYBE, Journals MAYBE, or Experts MAYBE.) If not, it was copied to its corresponding folder NO. (That is, Scopus NO, Journals NO, or Experts NO.)

By doing so, the risk was reduced that potentially relevant papers were excluded because of an ambiguous title, abstract or keyword. If such a paper should have been excluded from the final dataset, this would yet become apparent in the quantitative analysis of the papers, or after reading the whole paper in the next stages of the systematic review.

**2.2.2 Quantitative Analysis**

In a previous exploratory stage of this systematic review, it was experienced that a paper was not relevant for answering the research question if the search term discourse was mentioned less than 10 times. For that reason, it was decided to exclude papers in which the search terms discourse or discursive were present less than 10 times. ATLAS.ti, a software program for qualitative data analysis, was used to identify how many times these search terms appeared in the papers corresponding to literature references in Endnote.

The papers corresponding to the literature references in the folders Scopus MAYBE, Journals MAYBE, and Experts MAYBE were retrieved, and were subjected to a quantitative data analysis using ATLAS.ti. The papers were retrieved as PDF files, and were assigned as Primary Documents (PDs) to an ATLAS.ti project file; also known as a Hermeneutic Unit (HU).

Using the Auto Coding Tool, the PDs were automatically coded for the Search Expressions discourse and discursive. A quotation was created for each Exact Match. If discourse was

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
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<tbody>
<tr>
<td>post-socialism, post-communism or post-capitalism.</td>
<td></td>
</tr>
<tr>
<td>Studies concerning transitions towards democracy, or post-conflict transitions.</td>
<td></td>
</tr>
<tr>
<td>Studies concerning financial or economic transitions, or transition countries.</td>
<td></td>
</tr>
<tr>
<td>Studies concerning transitions towards new media, digital media, or social media.</td>
<td></td>
</tr>
<tr>
<td>Studies concerning learning environments, or digital environments.</td>
<td></td>
</tr>
</tbody>
</table>
present in this quotation, it was coded *discourse*, if *discursive* was present, it was coded *discursive*.

Using one of the Analysis Tools, Codes-Primary-Documents Table provided an overview of the codes frequencies for each PD. The frequencies of the codes *discourse* and *discursive* were formatted into a Microsoft Excel file; a spread sheet software program. The frequencies of both codes were added up.

In order to maintain an overview of the full data set, the next step of the data extraction took place in Endnote. The literature references that corresponded to the PDs in which *discourse* or *discursive* were mentioned together less than 10 times, were copied to the folders *Scopus NO*, *Journals NO*, or *Experts NO*. The folder depended on the search strategy that had obtained the literature reference.

The literature references that corresponded to the PDs in which *discourse* or *discursive* was mentioned over 10 times, were copied to the folders *Scopus YES*, *Journals YES*, or *Experts YES*. The folder depended on the search strategy that had obtained the literature reference. These folders contained the literature references that were up for further analysis, and were therefore copied to the folder *Final Dataset*. Duplicates were removed from this folder.
3. DATA ANALYSIS

3.1 Coding Manual
ATLAS.ti is used for data analysis. The papers corresponding to the literature references in the Endnote folder Final Dataset were retrieved as PDF files, and were assigned as PDs to a HU. The PDs were coded using a pre-specified coding scheme for which detailed instructions are given in this coding manual. In addition, inductive coding was applied to also identify article-specific conceptualisations and operationalisations that were not covered by the pre-specified coding scheme.

Coding the texts in the dataset was approached in dichotomies. This means that a code was either applicable to a text or not. For that reason, each code was formulated as a question on which the answer could be either YES or NO. Dichotomies were chosen because the interpretation of theoretical or analytical concepts in academic literature can be quite hard. It can be difficult to trace back what an author precisely intended to say with his choice of words.

The coding questionnaire was divided into different coding categories. Each coding category corresponded to a code family in ATLAS.ti, each coding question corresponded to a code in these code families. Detailed coding instructions can be found in the text box below.

<table>
<thead>
<tr>
<th>Table 5. Coding Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>The PDs are interpreted per coding category. This means that the coding questions belonging to a category are first asked to each of the PDs in the HU before moving on to the next category.</td>
</tr>
</tbody>
</table>

| If the answer to a coding question is YES, the corresponding code will be assigned to the piece of text that supports this interpretation. |

| If the answer to a coding question is NO, neither a code will be assigned, nor a piece of text will be selected to support this interpretation. |

| If the answer to a coding question is ambiguous, or it is no clear YES, neither a code will be assigned, nor a piece of text will be selected to support this interpretation. By doing so, the dichotomic classification remains ensured. |

| Multiple codes can be assigned to a piece of text. |

| If necessary, remarks can be directly appended to the quotation to which a code is assigned, and comments can also be made in a coding diary. |

| Relevant pieces of text that do not fit within the pre-specified coding scheme should be coded RELEVANT, and will be looked into later on. |
3.2 Coding Questionnaire

The coding questionnaire is divided into different coding categories: discourse, discourse analysis, theoretically informed questions, other concepts, and transparency assessment. These corresponded to code families in ATLAS.ti.

The coding questions belonging to these coding categories can be found in the text boxes below. Each coding question corresponded to a code in the code families. These were the codes that were assigned when the answer to a coding question was YES.

The left column of these boxes shows the coding question itself, the right column explains how this coding question should be interpreted. Each coding question corresponds to a code in the code manager in ATLAS.ti.

<table>
<thead>
<tr>
<th>Coding Questions</th>
<th>Discourse</th>
</tr>
</thead>
</table>
| **Is discourse mentioned?** | • Just the word in itself.  
• Apply Auto Coding to All current PDs. Exact Match for: “discourse”. |
| **Is discourse theoretically defined?** | • Theoretical: concerned with, or involving, the theory of the concept discourse, rather than its practical application. |
| **Is discourse discussed?** | • Discussion: talking or writing about discourse in detail, taking into account different issues or ideas.  
• For example, by means of quotations or literature references.  
• If more than one literature reference is mentioned, it is considered being discussed. |
<p>| <strong>Is discourse operationally defined</strong> | • Operational: relating to the practical application of the theoretical concept discourse. |
| <strong>Does discourse focus on content or themes?</strong> | • (For consistency, this code should also be assigned if the similar code for discourse analysis is assigned.) |
| <strong>Does discourse take the structuring</strong> | |</p>
<table>
<thead>
<tr>
<th>Coding Questions Discourse Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Role of language and meaning into account?</strong></td>
</tr>
</tbody>
</table>
| **Is discourse analysis mentioned?** | • Just the words in themselves.  
  • Apply Auto Coding to All current PDs. Exact Match for: “discourse analy” to cover both discourse analysis and discourse analytical approach. |
| **Is discourse analysis theoretically defined?** | • Theoretical: concerned with, or involving, the theory of discourse analysis, rather than its practical application. |
| **Is discourse analysis discussed?** | • Discussion: talking or writing about discourse analysis in detail, taking into account different issues or ideas.  
  • For example, by means of quotations or literature references.  
  • If more than one literature reference is mentioned, it is considered being discussed. |
| **Is discourse analysis operationally defined?** | • Operational: relating to the practical application of discourse analysis. |
| **Does the analysis focus on examining patterns, relations, or themes within, and between texts in the dataset?** | • In other words, does it look like a content or thematic analysis?  
  • (For consistency, the similar code for discourse should be assigned if this code is assigned.) |
| **Does the analysis take the structuring role of language and meaning into account?** | • In other words, is it a discourse analysis?  
  • (For consistency, the similar code for discourse should be assigned if this code is assigned.) |
<table>
<thead>
<tr>
<th>Coding Questions</th>
<th>Theoretically Informed Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is discourse considered a little-d-discourse?</td>
<td>• In other words, does the study analyse talk and text in its social interaction context?</td>
</tr>
<tr>
<td>Is discourse considered a Big-D-Discourse?</td>
<td>• In other words, does the study analyse talk and text as discursively constructed and maintained?</td>
</tr>
<tr>
<td>Is a specific discourse analytical theme being studied?</td>
<td>• In other words, does the study focus on a specific structuring function of language and meaning?</td>
</tr>
<tr>
<td>If so, is the BTL Connections being studied?</td>
<td>• In other words, does the study focus on language making things (dis-)connected or (ir-)relevant to each other?</td>
</tr>
<tr>
<td>If so, is the BTL Identities being studied?</td>
<td>• In other words, does the study focus on language enacting specific social identities, projecting social identities onto others, or (dis-)privileging social identities?</td>
</tr>
<tr>
<td>If so, is the BTL Politics being studied?</td>
<td>• In other words, does the study focus on language giving, or taking away, social goods, or projecting how social goods ought to be distributed?</td>
</tr>
<tr>
<td>If so, is the BTL Practices being studied?</td>
<td>• In other words, does the study focus on language enacting specific practices?</td>
</tr>
<tr>
<td>If so, is the BTL Relationships being studied?</td>
<td>• In other words, does the study focus on language creating, sustaining, harming, or ending social relationships?</td>
</tr>
<tr>
<td>If so, is the BTL Sign Systems and Knowledge being studied?</td>
<td>• In other words, does the study focus on a language or sign system for</td>
</tr>
</tbody>
</table>
Theoretically Informed Questions

Knowing the world or making knowledge claims about the world?

- In other words, does the study focus on language making things (in-)significant?

If so, is the BTL Significance being studied?

- In other words, does the study have a focus that is not recognised as a BTL?

If so, is something else than the BTLs above being studied?

Table 8. Coding Questions – Other Concepts

<table>
<thead>
<tr>
<th>Coding Questions</th>
<th>Other Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are any other theoretical or analytical concepts mentioned that focus on the role of language and meaning in transitions studies?</td>
<td>- Just assign this code to the quotation that supports this interpretation of that piece of text.</td>
</tr>
<tr>
<td></td>
<td>- These concepts will be looked into later on.</td>
</tr>
</tbody>
</table>

3.3 Transparency Assessment

Systematic review does not just identify and synthesise academic literature in order to answer a predefined research question. It also critically appraises the academic literature included in the final dataset. In essence, critical appraisal is a structured process to determine the strength and limitations of an academic paper.

However, this systematic review does not aim at assessing the quality of the transition studies in question. It aims at describing the use of discourse analysis in transition studies. On that account, it critically appraised whether authors reported how they operationalised discourse and discourse analysis with enough detail to effectively support interpretation or replication of their studies.

Delaney et al. (2014) refer to this as transparency assessment. Their transparency assessment instrument examines whether an author reported on (1) data collection methods, (2) sampling strategies, (3) sample sizes, and (4) data analysis methods. In addition, it examines whether (5) operationalised constructs were defined by the author, and whether
(6) it was reported how the operational questions or data collection methods represent the construct.

This transparency assessment instrument is based on that designed by Delany et al. (2014) with few adaptations. The presence of a research question, and its relation with discourse and discourse analysis, is emphasised here. The transparency assessment is similarly approached as the coding questions. In fact, it can be considered just another coding category. The specific coding questions can be found in the text box below.

**Table 9. Coding Questions – Transparency Assessment**

<table>
<thead>
<tr>
<th>Coding Questions</th>
<th>Transparency Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Is a research question mentioned?</td>
<td>• If not, is it indirectly mentioned by a research objective?</td>
</tr>
<tr>
<td>• Is an empirical element present?</td>
<td>• If so, are data collection methods reported?</td>
</tr>
<tr>
<td></td>
<td>• If so, are sampling strategies reported?</td>
</tr>
<tr>
<td></td>
<td>• If so, are sampling seizes reported?</td>
</tr>
<tr>
<td></td>
<td>• If so, are analysis methods reported?</td>
</tr>
</tbody>
</table>
4. SYNTHESIS METHOD

4.1 Quantitative synthesis
ATLAS.ti was used to synthesise the data quantitatively and qualitatively. Using one of its analysis tools, the Codes-Primary-Documents-Table generated output for Microsoft Excel. The frequencies of all codes were listed for each individual paper in an Excel spreadsheet. This software program was used for calculations and providing graphical representations of the frequency distributions of the quantitative data. Qualitative output was generated by using the option to provide quotations by code. These were interpreted and synthesised according to the principles of a meta-ethnography (Britten et al., 2002).

4.2 Meta-ethnography
Meta-ethnography is a method for combining qualitative data by translating key concepts across studies. Aveyard (2010) states that “meta-ethnography involves determining keywords, phrases, metaphors and ideas that occur in all or some of the studies and to interpret these in the light of those identified in the other studies”. In such a synthesis, “studies can relate to one and another in three ways: they may be directly comparable as reciprocal translations; they may stand in opposition to one and another as refutational translations; or taken together they may represent a line of argument” (Britten et al., 2002).

Noblit and Hare (1988) described seven steps for conducting a meta-ethnography (Britten et al., 2002). These can be found in table 1 below. The individual transparent papers were placed in a grid to be explicit about how they relate to each other. The columns in this grid include the details of the studies that are essential contextual information for the synthesis, and address concepts from the analytical framework.

Table 1. Seven Steps of Meta-Ethnography

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Getting started.</td>
</tr>
<tr>
<td>2.</td>
<td>Deciding what is relevant to the initial interest.</td>
</tr>
<tr>
<td>3.</td>
<td>Reading the studies.</td>
</tr>
<tr>
<td>4.</td>
<td>Determining how the studies are related.</td>
</tr>
<tr>
<td>5.</td>
<td>Translating the studies into one another.</td>
</tr>
<tr>
<td>7.</td>
<td>Expressing the synthesis.</td>
</tr>
</tbody>
</table>

(Noblit & Hare, 1988 in: Britten et al., 2002)
5. REFERENCES


Results

1. QUANTITATIVE RESULTS FOR THE CODING QUESTIONS

1.1 Discourse

Table 1. Frequency distribution of papers

<table>
<thead>
<tr>
<th>transparently treating discourse per assessment criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of papers:</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Mentioning Discourse: 58</td>
</tr>
<tr>
<td>Defining Discourse: 21</td>
</tr>
<tr>
<td>Discussing Discourse: 18</td>
</tr>
<tr>
<td>Operationalising Discourse: 6</td>
</tr>
<tr>
<td>Focusing on Content of Themes: 27</td>
</tr>
<tr>
<td>Focusing on Structure: 21</td>
</tr>
</tbody>
</table>
1.2 Discourse Analysis

Table 2. Frequency distribution of papers
transparently treating discourse analysis per assessment criterion

<table>
<thead>
<tr>
<th>Mentioning Discourse Analysis</th>
<th>Defining Discourse Analysis</th>
<th>Discussing Discourse Analysis</th>
<th>Operationalising Discourse Analysis</th>
<th>Focussing on Content or Themes</th>
<th>Focussing on Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28</td>
<td>6</td>
<td>12</td>
<td>17</td>
<td>13</td>
</tr>
</tbody>
</table>
2. QUANTITATIVE RESULTS FOR THE CODING QUESTIONS PER LITERATURE REFERENCE

2.1 Discourse
If a row in the table below is marked dark grey, this means that discourse is mentioned in the corresponding literature reference, but is not further specified. If a row is marked red, this means that discourse is not mentioned in the corresponding literature reference, but that discursive was mentioned. That is why the literature reference is yet included in the final dataset.

Table 3. Dichotomic results of the coding questions for discourse per literature reference

<table>
<thead>
<tr>
<th>Literature Reference</th>
<th>D1 - Mentioned</th>
<th>D2 - Theoretically Defined</th>
<th>D3 - Discussed</th>
<th>D4 - Operationally Defined</th>
<th>D5 - Content / Themeatic</th>
<th>D6 - Structure</th>
<th>SUBTOTA LS</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 1: Adams-2004-Conservatives and champions_River.pdf</td>
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<td>1</td>
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<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>P 2: Audet-2014-The double hermeneutic of sustainab.pdf</td>
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<td>1</td>
<td>3</td>
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<td>5</td>
</tr>
<tr>
<td>P 5: Beers-2010-Future sustainability and images.pdf</td>
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<td>0</td>
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</tr>
<tr>
<td>P 6: Bell-2014-Renegotiating urban water.pdf</td>
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<td>3</td>
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<tr>
<td>P 8: Bettini-2013-Exploring the limits of peak oil_.pdf</td>
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<tr>
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<tr>
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<td>Authors</td>
<td>Year</td>
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<td>Johannisson-2009-Bridging the functional and</td>
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<td>Lawhon-2013-Dumping ground or country-in-trans.pdf</td>
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<td>Lenihan-2010-Ecological modernization and the</td>
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<tr>
<td>P42</td>
<td>Moss-2014-Whose energy transition is it, anywa.pdf</td>
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2.2 Discourse Analysis
If a row in the table below is marked dark grey, this means that discourse analysis is mentioned in the corresponding literature reference, but is not further specified. If a row is marked red, this means that discourse analysis is not mentioned in the corresponding literature reference.

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3. QUANTITATIVE RESULTS FOR THE TRANSPARENCY ASSESSMENT

Table 5. Distribution of the transparent papers per transparency criterion

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<th>Research Question</th>
<th>Research Objective</th>
<th>Empirical Element</th>
<th>Data Collection Methods</th>
<th>Sampling Strategies</th>
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Table 6. Frequency distribution of the number of reported transparency criteria

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<th>Number of transparency criteria</th>
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![Bar chart showing the frequency distribution of the number of reported transparency criteria]
4. QUANTITATIVE RESULTS FOR THE TRANSPARENCY ASSESSMENT PER LITERATURE REFERENCE.

If a row in the table below is marked dark grey, this means that there was no empirical element present in the corresponding literature references.

Table 7. Dichotomic results of the coding questions for the transparency assessment per literature reference

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<th>TT1B - Research Objective(s)</th>
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<th>TT2A - Data Collecting Methods</th>
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P29: Hoes-2015-Adoption of Novelties in a Pluralist.pdf
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5. TRANSPERANTLY REPORTING PAPERS

5.1 Papers Transparently Reporting on their Research Design


5.2 Papers Transparently Reporting on their Notion of Discourse


5.3 Papers Transparently Reporting on their Notion of Discourse Analysis


5.4 Fully Transparently Reporting Papers


# 6. Qualitative Results for the Transparent Papers

## Table 10. Overview of the Qualitative Analysis

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<th>Transparent paper</th>
<th>Interpreted general focus</th>
<th>Interpreted discourse analytical focus</th>
<th>Reported discourse analytical approach</th>
<th>Reported transition research concepts, approaches, or perspectives</th>
<th>Other reported analytical concepts, approaches, or perspectives</th>
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<td>Adams et al. (2004)</td>
<td>Exploring the ideas of environmental professionals and the dynamics of ideological change within the organisations they work</td>
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<td>Storylines, discourse coalitions (Hajer, 1995)</td>
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<td>Bosman et al. (2014)</td>
<td>Exploring how prominent incumbents discursively frame a sustainability transition by unravelling their existing and evolving storylines</td>
<td>Big-D-Discourses</td>
<td>Argumentative discourse analysis (ADA) (Hajer, 1995; 2006)</td>
<td>Regimes within social-technical systems (Rip and Kemp, 1998)</td>
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<tr>
<td>Caprotti (2012)</td>
<td>Exploring the discursive emergence, the sectoral definition, and the production of materialities of a sector that did not exist in its current form before</td>
<td>Big-D-Discourses</td>
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<td>Discursive core, discursive agents, discursive arena, and discursive strategies (Dekker et al., 2001)</td>
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<td>Cotton et al.</td>
<td>Analysing the</td>
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<td>An</td>
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<td>al. (2014)</td>
<td>social construction of environmental problems in a specific discourse</td>
<td>Discourses</td>
<td>argumentative discourse analytical approach (ADAA) (Fischer, 1995; Hajer, 1995; Hajer and Versteeg, 2005; Majone, 1989)</td>
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<td>Fuenfschilling and Truffer (2014)</td>
<td>Improving the operationalisation and empirical assessment of the concept of the socio-technical regime</td>
<td>Big-D-Discourses</td>
<td>Discourse analysis is mentioned as a methodological cornerstone, but not further specified</td>
<td>MLP (Geels, 2002; 2004) SNM (Kemp et al., 1998) TM (Loorbach, 2007; Rotmans et al., 2001) TIS (Bergek et al., 2008; Hekkert et al., 2007)</td>
<td>Degrees of institutionalisation: habitualisation, objectification, and sedimentation (Tolbert and Zucker, 1999) Institutional logics (Thornton and Ocasio, 1999)</td>
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<td>Genus (2014)</td>
<td>Introducing a discourse-institutional approach for furthering the understanding of the governance of sustainability transitions</td>
<td>Big-D-Discourses</td>
<td>Critical discourse analysis (CDA) (Fairclough, 2001; 2005)</td>
<td>Social-technical systems (Geels, 2004) TIS (Bergek et al., 2008a; Bergek et al., 2008b) Institutional entrepreneurship (Wolthuis et al., 2007)</td>
<td>Carriers: symbolic systems, relational systems, routines, and artefacts Mechanisms: coercion, normative commitment, and imitation</td>
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<td>Transparenent paper</td>
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<td>Horsbøl (2013)</td>
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<td>Big-D-Discourses</td>
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<td>al., 2013)</td>
<td>Processes: habitualisation, objectification, sedimentation (Scott, 2008)</td>
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<td>Jhagroe and Loorbach (2014)</td>
<td>Addressing the challenges in the relationship between TM and democracy by means of introducing a post-foundational understanding of democratic politics</td>
<td>Big-D-Discourses</td>
<td>Insights from critical discourse analysis (CDA) (Fairclough, 1992; Fairclough et al., 2011)</td>
<td>TM (Loorbach, 2010; Rotmans et al., 2001)</td>
<td>Post-foundational perspective on democracy (Deveaux, 1999; Fritisch, 2002; Laclau and Mouffe, 2001; May, 2008; Rancière, 1999; Van der Veeke, 2013)</td>
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<td>Big-D-Discourses</td>
<td>Socio-technological system innovation (Geels, 2004) Fostering system innovations (Foxon, 2003) TM (Kemp et al., 2007;</td>
<td>Ideas, institutions, and interests (Campbell, 1998; Hay, 2004; Poteete, 2003; Schmidt, 2001; Scott, 2008)</td>
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<td>Transparent paper</td>
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<td>Analysing the interplay between new storylines and existing discourses and institutions</td>
<td>Big-D-Discourses</td>
<td>Discourse coalition approach (Hajer, 1995)</td>
<td>TM (Kemp and Rotmans, 2005; Hisschemoller et al., 2006; Loorbach and Rotmans, 2006; Rotmans et al., 2001)</td>
<td>Discursive institutionalism (Schmidt, 2008)</td>
</tr>
<tr>
<td>Späth (2012)</td>
<td>Highlighting the importance of argumentative discourse analysis for understanding the social dynamics in sustainability transitions</td>
<td>Big-D-Discourses</td>
<td>Argumentative discourse analysis (ADA) (Hajer, 1995; 2006)</td>
<td>Governance of socio-technical transitions (Smith et al., 2005) TM (Loorbach, 2007)</td>
<td></td>
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