



Conceptualizing the bending and breaking of rules in the heavy goods transport sector

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ABSTRACT

Heavy goods vehicles (HGVs) are a critical factor in road traffic safety for “Vision Zero-events”, defined as road accidents with fatalities and serious injuries. The bending and breaking of safety-related rules in the HGV-sector, such as not following rest and work hour regulations, not securing cargo sufficiently, or not following the regulations concerning cabotage, in the commercial goods transport sector is a cause for concern and has in a very limited degree been studied as a system problem. This paper suggests that deregulation and international competition in the transport sector are bringing about a working climate where even serious safety-minded actors in the HGV business find themselves needing to cut corners to stay in business. The current situation in the Norwegian HGV sector is such that the organization of the business, the market development and the regulatory regimes are in effect transferring the responsibility for traffic safety vertically downwards to the actors at the lowest levels of the transport system. These actors are the truck drivers, who often bend and break rules to perform their work on time. This paper presents a scoping study designed to address the concept of rule bending in the HGV transport sector, using a combination of peer reviewed literature and a heterogeneous sample of grey literature from the transport sector. The scoping study shows how the scientific literature discusses violations and transgressions as both intentional and nonintentional acts but does not adequately describe how certain types of behaviour differ from overt violations and transgressions. The actions are simply considered violations that are devoid of meaning and both systemic and cultural context. We suggest a conceptualization of rule bending and rule breaking as “Adaptive Non-conforming Behaviour (ANB)” that builds on the context found in the grey literature. Further, the conceptualization provides a framework for the recognition of ANB, dimensions for further study and an outlined research design. We believe there is a need to increase system knowledge because safety analysis lacks in-depth insight into how the system affect the working practices in the HGV sector. The justification of the ANB approach is that it can be incorporated into safety and risk assessments of the transport sector, to provide a framework for context-sensitive studies that are non-normative, less concerned with violations as rule breaking, and more concerned with rule bending as a system wide problem.

1. Introduction

In this paper we present a scoping study combining scientific literature, and various sources of grey literature from the transport sector, to investigate how rule bending and rule breaking are observed and perceived as a normal characteristic of day-today-work. In the transport context the term violation regularly refers the violation of rules and regulations concerning safety, while the term rule bending is more ambiguous and is a term loosely referring to not strictly following the rules.

While the recent EU mobility packages place new restrictions on certain activities such as cabotage, the strategy for the HGV transport sector has been the slow deregulation and steady increase of the flow of goods and workers across the EU’s national borders (Lafontaine and Valeri, 2009). According to political and professional actors in the HGV sector in Norway, the combination of the two factors of deregulation of the market and the increase in international competition is leading to significant differences in drivers’ salaries and working conditions (Nævestad et al., 2014, 2016), potentially impacting good and safe conduct in the transport business.

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Rule bending or breaking, intended or unintended, is rarely discussed in relation to safety-influencing factors. While the number of traffic fatalities in the EU has been decreasing since 2007, there has also been a recent slight increase in accidents in the HGV sector.¹ Examples of violations that might also be characterized as rule bending by actors in the sector are varied and include speeding, not following rest hours regulations, Failure to have the proper documentation for cargo, not providing vehicle maintenance (Kuran and Njå, 2016). Most accidents involving HGVs cannot be traced to a specific critical event or causal factor, but several factors are involved, cf. the investigations of the Accident Investigation Board Norway. However, as a phenomenon that has seldom been an object of study, it is difficult to infer that accident causation in HGV sectors involves rule bending, even in the most comprehensive accident investigations (Kuran et al., 2022).

A study by the Institute for Transport Economics (TØI) claims that heavy transport vehicles from the EU driving on Norwegian roads represent a 2.5 times higher (0.91) accident risk than Norwegian and Danish HGVs (0.32–0.35) (Nævestad et al., 2014)² The calculations of accident risk in the Nævestad study are based on estimates of transport services for freight cars from different nations in the period 2007–2012, compared with the accident data from official sources (Norwegian Bureau of Statistics) and police-reported road traffic accidents, given that the vehicles' country of registration was available for both traffic and accident data. Further, statistics from road-side controls and information from interviews with stakeholders show that rule bending in the HGV sector is so commonplace that rules are routinely broken as a matter of business as usual (Njå et al., 2012).

We claim that neither the actors' descriptions of rule bending and rule breaking behaviour in the grey literature nor the descriptions in the peer reviewed literature adequately frame and contextualize the true behaviour of actors in the transport system, as a systemic problem. We need a concept that encompasses the combined phenomenon of rule bending and rule breaking. A uniform conceptualization will make it possible to set a research agenda on how the phenomenon can be observed and expressed. Further, we need measures that enable assessments and associated interpretations. Thus, we need to conceptualize rule bending to increase knowledge and tools for assessing aspects of traffic safety, environment and transport work. We also need a concept that can be considered and effectively included in regulatory practice. There is a need to frame a set of useful indicators that capture rule bending to support safety-related interventions in the HGV sector.

In safety research, studies of violation and non-compliance have mainly been subjected to heavily regulated high-risk industries, such as in the work of James Reason (1990). A heavily regulated industry is one that is exposed to many detailed rules and requirements, and that is closely supervised by authorities. These industries are comprehended as units where the actions of individual workers are placed in the context of a single organization, and where the boundaries of the organizations can be delineated.

The HGV-transport sector is a complex system sociotechnical system, and should be considered to be loosely coupled (Perrow, 1999). The system is characterized by a complexity of actors, both horizontally and vertically, different technologies and with many unclear and unset boundaries. To explore behaviour in this system we need a concept that can describe characteristics such as rule bending that enables us to make judgements about how common it is. Furthermore, we need to pursue a concept that is less concerned with ethical, moral, or normative connotations, and try to identify assumptions and frames that characterize rule bending behaviour as in-system adaptations.

The aim of the paper is to establish a set of criteria to conceptualize

rule bending and rule breaking in sociocultural context in a way that is simultaneously useful for scientific studies of safety in the HGV sector, and ultimately for the management of safety. These should be criteria that describes the "real world" as observed by professionals and other actors involved in the HGV system and cannot be exclusively based on either theoretical constructions or empirical observations. Capturing the complexity of actors' behaviours in the heavy goods transport sector should combine the standards of a scientific term that enables context-sensitive empirical exploration.

2. Scoping study

The scoping study began with the term "rule bending", a euphemism used in the Norwegian HGV sector to describe behaviour that involves not strictly adhering to or selectively disregarding rules and regulations. We structured the scoping study to assess elements of rule bending, using the risk management framework as the analytical structure (Rasmussen and Svedung, 2000). Documents were collected with the intention of covering five levels of control in systems operations (congress and legislature, government regulatory agencies, company management, operations management and operating process) (Table 1). A scoping study is a method to comprehensively synthesize evidence across a range of data sources. Scoping studies can be understood as: "exploratory projects that systematically map the literature available on a topic, identifying key concepts, theories, sources of evidence and gaps in the

Table 1
Scoping literature categories in the RMF.

Levels of Control in Systems Operations	Sources for the study	Typical traits of literature on this level
Congress and legislature	Peer reviewed articles (A), Statistical data (B), Official white papers and policy documents (C).	Academic, Quantitative
Government regulatory agencies Industry associations User association unions, Insurance- companies, Courts	Peer reviewed articles (A), Statistical data (B), non-governmental documents (D), Controller and auditors' documents (E), Third party documents from consultancy firms (F), Magazines from the HGV sector (type G).	Discussing or promoting particular stakeholder interest
Company management	Peer reviewed articles (A), Non-governmental documents (D), Controller and auditors' documents (E), Third party documents from consultancy firms (F), Magazines from the HGV sector (type G).	Business related, Economic focus
Operation management	Peer reviewed articles (A), Controller and auditors' documents (E), Third party documents from consultancy firms (F), Magazines from the HGV sector (type G). Other documents (type H).	Discussing practical concerns, relating to interests of HGV sector employees and managers
Operating process	Peer reviewed articles (A), Non-governmental documents (D), Controller and auditors' documents (E), Third party documents from consultancy firms (F), Magazines from the HGV sector (type G). Other documents (type H).	Context sensitive, Qualitative

¹ EU Commission Annual Accident Report 2018 CARE (EU road accidents database) Last update April 2018.

² The accident risk number indicates the statistical number of accidents pr. million km driven.

research" (Canadian Institutes of Health Research, 2010). Thus, we combined elements from both integrative and interpretive reviews, formal database search and the snowballing method, resulting in various forms of both academic and grey literature (Arksey and O'Malley, 2005; Schöpfel, 2010). Scoping studies follow a similar path to that of integrative reviews (Whittemore, 2005), including the identification of research questions and of relevant studies, study selection and charting data. The scoping study also has similarities to thematic analysis, where recurring concepts and prominent themes have been isolated (Arksey and O'Malley, 2005; Mays et al., 2001). We have considered this study to be an iterative process (Arksey and O'Malley, 2005:22), in which the wide range of material has been read and re-read, with the initial concepts of rule breaking and rule bending being reconsidered in the various contexts presented in the material. It should be noted that the inclusion of a wide range of grey literature that is not peer-reviewed also makes the scoping study an empirical study.

2.1. The academic literature

Scientific peer reviewed literature included in the standard literature search was drawn from the following disciplines: Economics, Ergonomics, Ethics, Ethnography, Management Studies, Organization Studies, Psychology, Risk Management and Transdisciplinary Social Science.

We used the search terms "behaviour" AND "sociotechnical system" AND "rule bending" OR "rule transgression" OR "rule breaking" OR "noncompliance" OR "risk taking" OR "rule violation". The inclusion criteria were specified as: 1. Does the document discuss human behaviour in a sociotechnical system in relation to safety rules and or regulation? 2. Does the paper include the interaction of human actors with rules/regulation/procedures in a sociotechnical system? 3. Papers published before 1997 in languages other than English, Norwegian, Danish and Swedish were excluded from the search. 4. Does the paper discuss the transport sector? Initially the search terms "transport" and "road based transport" was also included, but removed in the process to include more relevant hits, and the inclusion criteria number 4 was added.

Databases used were Google Scholar, Socindex, Scopus, Jstor, Springer Link and Web of Science, which yielded the following hits: Socindex (3620), Scopus (135), Jstor (1126), Springer Link (28334), Web of Science (3342) and Google Scholar (428). With the total number of documents being 33365, a revision of the initial search terms, adding AND *Workplace, and Safety*, yielded the following results Socindex (398), Scopus (59), Jstor (158), Springer Link (751), Web of Science (2222), Google Scholar (498), totalling 3688 hits. While still large, the number was found to be manageable for a comprehensive initial screening of all 3688 hits, reading abstracts and titles and considering which were to be excluded, using the defined inclusion criteria above.

A total of 138 documents were included after the initial screening, and a further seven duplicates were removed. There was a secondary screening of the remaining 131 documents, including a judgement of eligibility, where only peer reviewed documents in full text were included. In this screening, a further 72 documents were excluded and 59 included in the study for qualitative assessment, using the NVIVO software. In addition, 26 scientific documents – articles, books and research reports – were selected by the snowball method and included in the corpus, due to their relevance and the researcher's previous knowledge of them. Finally, 33 of the documents were found that isolated rule bending- and/or breaking as a safety concern, and only five documents discussed the HGV sector.

2.2. The grey literature

Grey literature comprises documents that are neither academic scientific literature nor strictly empirical data. Complex sociotechnical high-risk industries such as the HGV sector continually produce

documents that are introspective, such as audits, or outside-in perspectives, such as scrutiny from media sources. Where to draw the line of inclusion in a scoping study is difficult. In this study, we used the Schöpfel definition of grey literature:

Grey literature stands for the manifold documents produced on all levels of Government, academics, business, and industry in print and electronic formats, that are protected by intellectual property rights, of sufficient quality to be collected and preserved by library holdings or institutional repositories, but not controlled by commercial publishers i.e., where publishing is not the primary activity of the producing body. (2010:11)

The main rationale for the inclusion of grey literature in the study was to sample non-academic literature to cover the five levels of the Risk Management Framework (RMF) (see Table 1 and Fig. 3). Documents were selected by the snowballing method, using search engines such as Google, Retriever and Oria, as well as using the literature reference lists in documents already included in the sample.

The grey literature consisted of documents from various Norwegian sources, official white papers and policy documents, non-governmental documents, controller data and auditors' documents, as well as third party documents from consultancy firms, newspaper and magazine articles, and teaching materials from the transport sector. Concerning statistical data, we have relied especially on Eurostat, Norwegian Statistics (SSB) and the Norwegian Public Roads Administration's (NPRA) database, Vadis, for changes in the economic and social scope of the business, as well as accident data (Eurostat, 2015; SSB, 2015). We surveyed Norwegian and the EU Commission's policy documents and white papers (type C in Table 1) relating to road-based transport, as well as documents from non-governmental organizations such as the ETSC and IRU.³

We included several Norwegian sources, especially reports from the NPRA and the police. A number of reports on certain aspects of the business, usually made for public or governmental organizations, were also included. Other sources included Norwegian newspapers, found both using the Retriever software and continuously monitoring the Norwegian media over a period of three years; magazines from the commercial goods' transport business: NLF⁴ Magasinet and Transportmagasinet⁵; teaching materials from the HGV sector; research reports; newspaper articles; and masters' theses.

Of the C, D, E, F and H categories (see Table 1 above), 91 documents were considered to be relevant. Documents discussed (47 total) one or more subjects relevant to traffic safety in the business of heavy freight transport on roads but excluded rule bending. Eleven documents considered rule bending in the transport system but not as a primary concern or research focus. Four documents had rule bending as the primary focus but not in relation to the HGV sector. Newspapers and HGV-trade magazines (H-category), on the other hand, often considered rule bending in the transport system and raised concerns about the state of the business. A complete overview of all literature in the study, both peer reviewed and grey literature, is shown in Table 2 below.

2.3. Analytical approach

The analytical approach is based on the iterative standard approach of Miles et al. (2014). The question of *how rule bending is described in the literature* was used throughout the close reading phases of the analysis, and the conceptualization of rule bending, and breaking was generated through a comparative method of qualitative analysis (Glaser and Strauss, 1967:101). As shown in Fig. 1, the centre of the analytical process has been to return to the collected literature, to check

³ European Transport Safety Council and International Road Transport Union.

⁴ Norwegian Truck Owners' Union.

⁵ <https://www.klikk.no/tungt/transportmagasinet/>.

Table 2

Type and number of documents included in the study.

Type of academic and grey literature in the scoping study	Number of documents included in scoping study
Included peer reviewed papers from literature review	33
Non-governmental documents	5
Controller and auditors' documents	4
Third party documents from consultancy firms	5
Magazines from the HGV sector	23
Newspaper articles from Norwegian press	38
Teaching materials from the HGV sector	5
Research reports	6
Official reports	5
Total	124

conclusions, after each iterative cycle of close reading, providing further insight into the literature. Since rule bending and breaking is discussed in different ways in the documents, the main focus in the iterative close reading was to consider how rule bending and breaking is described, if at all, what the authors of the document consider to be the normative consequences of rule bending and breaking, how common it is in the HGV sector, and whether any form of causality is attributed to it. The analytical approach was inherently inductive, and the analytical concepts arising from the analytical process should be considered products of the process, as it is applied to the literature, and not categories pre-conceived by the researchers.

Following this approach, the iterative analysis involved in the close reading of all literature of the peer reviewed category went through four initial steps in the analytical process (close reading, write up, display data and conclusions). This was done to:

1. Establish how rule breaking and rule bending actions and behaviour are described in each document.
2. To ask what assumptions are made about rule bending and rule breaking.
3. To iterate and to ask what categories are common to the literature and
4. To consider whether the peer reviewed literature that discussed rule bending and breaking, but not the HGV-sector context, could be considered to be relevant to the study.

Analysis of the grey literature from the HGV sector was performed in the same way as with the peer reviewed literature. Since the grey literature also included many different genres of documents, ranging from trade and trucker magazines to reports from transport research institutes, the grey literature added the necessity for a consideration of the perspective and potential stakeholder interests of the writers of the documents, as well as the stated interest of the organization publishing the documents.

Finally in the analytical process, the categories of rule bending and rule breaking were established, and the findings were combined and considered not for their validity and objectivity, as is usual for quantitative studies, but for their *veracity*, *objectivity* and *perspicacity*, as is more common in ethnographic studies of complex sociotechnical systems (Kuran, 2021). The reasons for this are the recognition of the study as inductive and qualitative, as well as combining sources of data from

various levels of the system; the cultural complexity of the HGV sector; and fact that the initial terms of rule bending and rule breaking are cultural constructs. The terms 'veracity', 'objectivity' and 'perspicacity' were codified by Stewart (1998), who suggests that: *veracity* pertains to how the study in question is faithful to the truth or at least successful in its description, *objectivity* pertains to how the analysis gives conclusions that may be shown to transcend the perceptions of the individual research object, while *perspicacity* pertains to how the analysis contributes to creating understandings that are applicable to the study of human behaviour in other research settings. The RMF serves as the backdrop of this analytical approach, as the scientific and grey literature was included, in order to cover all levels of the RMF applied to the HGV sector (see Table 1).

3. Underlying comprehensions of the HGV-transport activities

We approached the system of the commercial goods transport sector, using systems theory and regulatory theory. Our approach to rule bending in the HGV sector is based on the premise that rule bending and rule breaking behaviours do not occur in a sociocultural vacuum but within systems and between actors. Although it is individuals that bend and break the rules, behaviour is always culturally and socially informed.

3.1. Premises in the regulatory context

The framework developed by Hood et al. (2001) describes regulatory regimes through the combination of three control components: information gathering, standard setting and behaviour modification. For a regulatory regime to function, it is necessary to know what kind of data shall be collected, how to adequately set a standard that fits the system and, finally, how to modify behaviour through a combination of compliance and deterrence. If rule bending is a systemic problem, regardless of regulatory regime, then the regulatory regime needs a unified concept to gather knowledge, develop standards and know what type of behaviours are to be modified.

Studies from other sectors, e.g., the petroleum industry, show that the design and function of the regulatory framework may be seen as a result of ambient expectations and societal factors (Hellebust and Braut, 2012). Then, for example, the degree of contact and mutual trust among the participants in a specific regulatory sector will have an impact on the processes of standard setting and the need to implement measures for behaviour modification. In a regulatory system with much contact and open flow of information, one might expect that the need to establish tight controlling mechanisms is less than in a system where the different actors do not interrelate on a regular or systematic basis.

Fig. 2 illustrates the regulated areas of the behavioural space of the HGV sector. Rules and regulations are mostly prescriptive regarding expected traffic behaviour and transport activities. They are oriented towards avoiding undesired events, described as Risk⁻, whereas Risk⁺ is connected to the potential gains of working in the HGV sector. The regulatory regime leaves much room for enterprise and individual adaptation. The numerous actors at all levels in the transport system optimize their behaviour according to values and preferences developed within certain sectors, businesses, groups, or individuals. It is a system where actors and their behaviour communicate and interrelate. This is

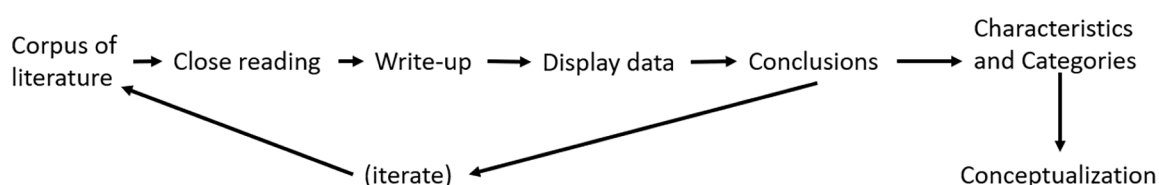


Fig. 1. Analytical process of the scoping study.

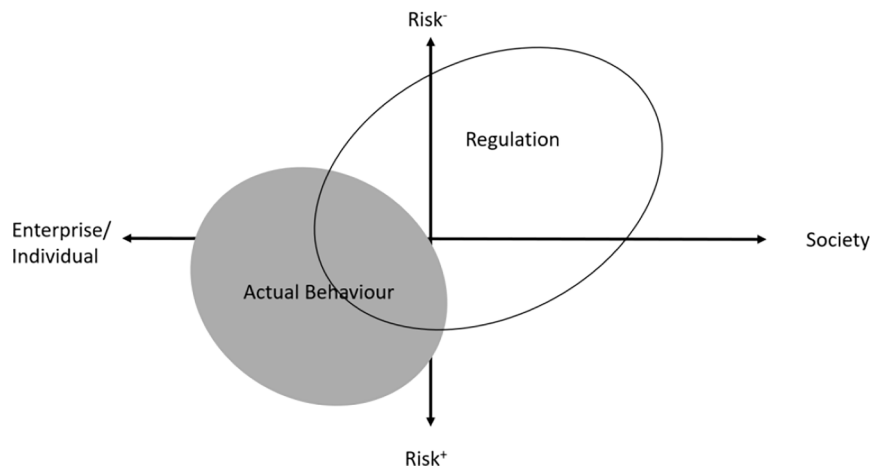


Fig. 2. Behaviour and regulation on the macro level of behaviour in the HGV sector.

shown as the “actual behaviour” in Fig. 2, which might deviate considerably from the regulation assumptions and societal responsibility.

Thus, we find that the regulatory regime need to be able to adequately gather information about rule bending and rule breaking and define the activity in a way that might be regulated, either by prescriptive definitions of behaviour that make compliance the only correct way to behave or to create broad categories that allow for the self-regulation of behaviour that include the companies in the HGV sector to a much larger degree.

3.2. Premises on the systems approach of the risk management of HGV transport

The HGV sector can be described as a system that involves a complex interplay of actors, technology and organizations to transfer goods. The HGV sector is a high-risk complex industry that includes considerable damaging energy quantities and toxic substances. The traffic flow might be tightly coupled, but the system is not. Also, the traffic system might include complex interactions between various actors within and outside HGV transport. The transport of goods should therefore be considered a hazardous process, and the HGV sector itself should be considered a multi-level sociotechnical system.

Rasmussen and Svedung (2000) risk management framework is used as the analytical core of the study, to describe the challenges in the HGV sector, especially acknowledging that rule bending and rule breaking behaviours are not isolated from the hazardous process at the sharp end but occur at multiple levels for various reasons, especially in contexts of rapid change and socioeconomic pressures (see Fig. 3). Control of the system and maintenance of safety are ensured when the feedback loops transport information from the various levels, ensuring that regulation, policy and control (illustrated by the downward pointing arrows in Fig. 3) are well informed and well maintained. There are many nested levels of decision-making influencing the risk management and the regulatory rule making. Currently, the world is even more dynamic than when Rasmussen and Svedung developed their model, regarding which they claim:

A very fast-paced change of technology is found at the operative level of society within all domains, such as transport, shipping, manufacturing and process industry. The pace of change is much faster than the pace of change presently in management structures. This trend is also found in legislation and regulation.

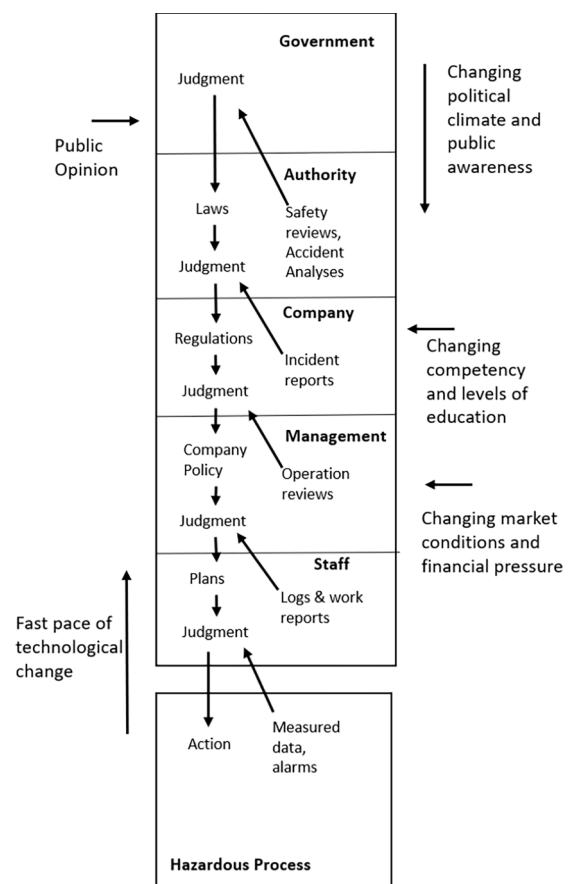


Fig. 3. Rasmussen’s risk management framework.

3.3. Sociocultural perspective premises

How can we explain the behaviour of actors in HGV transport? What circumstances influence the different behaviours observed? The socio-cultural rule-bending behaviour could be studied from three complementary perspectives: firstly, its functions through norms and beliefs; secondly, as actors’ espoused values, the artefacts in use in the HGV sector and basic assumptions of its actors; and, thirdly, as the context of meaning (Njå and Nesvåg, 2007).

3.3.1. The functional perspective

We can divide perceptions into *norms* and *beliefs*. Collective beliefs can be used to understand varying behaviours amongst actors, assuming that HGV-transport behaviour and comprehensions are learnt. Taking this approach, the behaviour is understood because of learnt assumptions and expectations regarding the outcome of behaviour. From this perspective, norms are understood as a “guide for the proper”, in which the appropriate and the inappropriate can be negotiated and modified to specific behaviour, adapted to HGV-transport situations. Individuals are assumed to use their own experience and observations of social models. Rule bending is thus functional.

3.3.2. Different levels of understanding

According to Schein (1990), norms are related to espoused values and artefacts, while beliefs are, to a higher degree, connected to core values.

In the main, norms are the expressed values of the individuals, but beliefs are the basic assumptions of the individual, which are not easily revealed. Schein (1990) makes a sharp distinction, indicating that what is seen and heard is not always the norms and beliefs that guide action. In short, norms and beliefs can be said to play a different role on the different levels of a certain culture. As in Schein’s model the level with the least influential force on actual behaviour can be termed espoused values, or “lip service”, as Strauss figuratively denotes it. On this level the espoused values, referring to dominant values in the larger society, function more as representations or (after-) rationalisation against others. Such values are often weakly linked to the rest of the belief-holder’s knowledge structure. On the next level, we find the values and beliefs shared by individuals and communities regarded as significant others (Mead 1934) by the actor. (Njå and Nesvåg, 2007)

Shared values and beliefs are expressed as artefacts and as shared basic assumptions, in Schein’s model, and it is shared values and beliefs that can be observed as having a motivational force in shaping the actions of a group or a community in uniform ways, in which bending rules plays an important role.

3.3.3. The context of meaning

Analyses of the observed functions of norms and expectations do not automatically give a deeper understanding of the shared meaning of actors’ behaviours or of how the meaning of HGV transport is created and how it influences the individual and collective behaviour that can be observed. Thus, we need to build our analysis of the role of the actors’ works upon observations and interpretations of interacting individuals and how webs of meaning (Geertz, 1973) are created over time. Different meanings of a phenomenon in a cultural group can influence the way the individuals or working groups understand the phenomenon. Through bricolage, individuals or businesses could construct their own meanings. These meanings can be in conflict with, or be ambivalent about, different meanings of HGV-transport activities (Stinchfield et al., 2013).

4. Trends seen in the literature

We distinguish the presentation of the scientific material and the grey literature. Firstly, we draw attention to the scientific literature’s framing of rule bending and associated values across the transport system. Secondly, we address the wider comprehensions of the rule bending phenomena in the grey literature.

4.1. Definitions of rule bending and breaking in the peer reviewed literature

We explored the literature and extracted perspectives of rule bending and breaking. There are various definitions and approaches to the rule bending and rule breaking phenomena found in scientific literature.

Relevant to the topic, we found descriptions of *noncompliance* (Dai et al., 2015), *risk taking* (Bosak et al., 2013; Dahlbäck, 2003; Stone and Allgaier, 2008; Zinn, 2015) and *voluntary risk taking* (Kirke, 2010; Martin et al., 2013; Parker and Stanworth, 2005) that might have positive gains for the risk taker (Westaby and Lowe, 2005). A common feature is the focus on risky choices that imply a risk taker conscious of their choices (Wang, 2004). However, should the assumption of conscious choices restrict the phenomenon?

4.1.1. Rule breaking

The phenomenon described is often related to the intentional violation of rules and regulations (Busby and Iszatt-White, 2016; Derfler-Rozin et al., 2016; Fadier et al., 2003; Hystad et al., 2014; Kluge et al., 2013; Laurence, 2005). Terms such as *moral disengagement* are used to describe how the actor rationalizes their choices. The terms *rule breaking* or *illegal actions* are used by some authors (Kamerdze et al., 2014; Polet et al., 2002; Zhang and Wu, 2014) to describe deviations from legal requirements (Cooper and Phillips, 2004; Sims, 2002) and ethical perspectives on rule breaking (Chen, 2014). This implies that safety-related rules can only be followed or broken and raise discussions on applicable sanctions (Warren and Smith-Crowe, 2008).

A portion of the sociological literature is devoted to the study of rule breaking in bureaucracies. It examines how rule breaking can be interpreted as resistance to rules in compliance with organizational goals, arguing that “(...) analysis of any type of rule-breaking at any level of the organization is incomplete without understanding how it fits within the broader constellation of organizational levels and interest” (Martin et al., 2013:553). Mock rules are rules that are not followed and not enforced through formal and informal sanctions. They exist in a cultural space where even the idea of their enforcement is met with ridicule. When rule breaking is considered a social action, authors discuss pro social factors (Dahling et al., 2012; Morrison, 2006; Xiaoguang and Jizu, 2015). Pro social rule breaking means that certain types of behaviour are sanctioned by the in-group, for either their presence or their absence: “for example, a highly cohesive workgroup that demands rule-breaking for the benefit of the group as a whole, may actively work to prevent individual acts of rule-breaking that could potentially draw unwanted attention to the group” (Martin et al., 2013:554).

4.1.2. Violation characterizing safety culture and safety climate

The literature on safety culture and safety climate seldom describes rule bending and breaking, focusing instead on the concept of compliant and mindful safety-related behaviour (Beus et al., 2015; Cooper and Phillips, 2004; Garcia et al., 2004; Lee and Harrison, 2000; Newnam et al., 2012; Parboteeah and Kapp, 2008; Probst et al., 2013; Prussia et al., 2003). James Reason’s work in the aftermath of the Chernobyl accident describes several types of violation and draws the distinction between necessary violations, violation without erring and erring without violation (1990); it is thus placed in the compliance literature. Lawton discusses these types and notes that violations vary according to intentionality and outcome (Lawton, 1998).

4.1.3. Organizational perspectives

The concept of organizational expedience explores the possibility of positive outcomes of rule breaking and ties the behaviour to the organization’s values, such as serving its loyal customers with prompt delivery: “a long haul trucker attempting to make a timely delivery who does not stop and rest as mandated has focused on prompt service (ends) without regard to safety rules limiting time on the road and thus could lead to negative results” (McLean Parks et al., 2010:703) but possibly also gains for the company, if there are no negative results such as a traffic accident or a significant fine.

Transporters in the Norwegian HGV sector claim that the high accident risk of foreign drivers is because new and unserious actors are not keeping up with regulatory standards in their effort to cut costs. These non-serious actors are described as companies that are not working with

traffic safety, not paying taxes and fines, and severely underpaying drivers, which can lead them to bend and break rules (Bråten et al., 2013; Jensen et al., 2014).

4.1.4. Drivers' focus – Operational triggers

Most of the literature from the HGV sector shows how rule breaking or rule bending is commonplace and how drivers take full advantage of all opportunities given, both within and often outside the existing rules and regulations (Nævestad et al., 2017; Njå et al., 2012; Sternberg et al., 2015). In the literature, behaviours such as exceeding speed limits, ignoring rest hour/regulations and not using seat belts are traced to unclear chains of responsibility and ambiguous rules that create opportunities for rule breaking (Martin et al., 2013:557). A few notable exceptions in the peer reviewed literature do concern the day-to-day life of HGV drivers, although they do not discuss rule bending or rule breaking at all (Askildsen, 2011). Also, the idea of the hazardous driver does exist as a cultural phenomenon, highlighted by how rule breaking cowboys and rogues are despised by other drivers.

4.1.5. Rule bending

The term *rule bending* is explicitly described in only five documents and expressed as a sociocultural process (Kirke, 2010; Sanne, 2008). In this literature, rule bending is highlighted as behaviour that is shaped by storytelling, social bonding and local environments, using ethnographic methodology over several years (Ripamonti and Scaratti, 2015). Workers' lack of compliance with safety rules is not presented as the behaviour of individuals who are unconcerned with safety but "(...) can be conceptualized as a collectively shared, historically developed and well recognized aspect for local work practice" (Ripamonti and Scaratti, 2015:533).

4.1.6. Summary

The scientific contributions on rule bending in the HGV sector describe various forms of rule breaking as violations of safety rules and, with a few notable exceptions, not in a context-rich way. Safety violations or the absence of safe behaviour are mainly described in the scientific literature as a safety problem (Langeland and Phillips, 2016; Xiaoguang and Jizu, 2015), and various forms of interventions are suggested. The literature also discusses how safety behaviour and safety culture are affected by managers' involvement (Newnam et al., 2012; Newnam et al., 2008; Young and Salmon, 2015). Emphasis is rarely placed on how beliefs, attitudes and values are shared in the organizations (Edwards et al., 2014).

The scientific literature in general does not discuss rule bending as a situated behaviour in communities of practice (Wenger and Snyder, 2000). The literature discusses various definitions of violations, deviances and transgressive behaviours. The breaking of rules is connected to causes of accidents and leads to the tightening of safety-related rules and regulation (Vardaman et al., 2014). The safety aspect of rules and violations is thus, in most instances, isolated to the lowest levels of the risk management framework, the drivers. How these violations might be ingrained in essential sociocultural contracts for how business is done, and how actors themselves see their roles in the system are not discussed. Thus, we cannot see any evidence in the peer reviewed literature of rule bending as a system characteristic within the commercial HGV sector. The understanding of the dual concepts of rule bending and rule breaking in the peer reviewed literature seems to be limited to considering the ontological status of the concepts and not their epistemology. We find it necessary to scrutinize the grey context-rich literature, to strengthen the conceptualization.

4.2. Descriptions of rule bending and breaking in the grey literature

Unlike most of the peer reviewed literature included in the study, the grey literature exclusively uses the HGV sector as its basis for data, descriptions, and narratives as it is selected as empirical data of the study.

4.2.1. Rule bending as recognized behaviour

Violations of safety-related rules and regulations are reported from road-side controls in Norway and the EU and make up the bulk of the statistical sources, as well as that of the controller and auditor documents, such as those from the NPRA and Norwegian labour inspection. Violations of rules and regulations concerning the neglect of Health, Safety and Environment (SHE) regulation, illegal cabotage and not securing cargo are described as very common. Such violations are also discussed in official white papers and policy documents but only considered to be a major safety hazard when statistics or reports are commented on by media articles, especially in documents from the trade press. Instead, the policy documents are more concerned with various public accomplishments in the enhancement of safety in the sector, and how these positive trends will continue. The topic of rule bending is, instead, approached in research reports by research consultancies, which describe rule bending: for example, that low standards of maintenance are common and that they can be viewed as possible opportunistic actions, motivated by profit.

At the sharp end (see Fig. 3 and Table 1), there are observations of truck- and driver conditions, indicating social dumping and that a considerable portion of the actors in the HGV sector operate in the grey areas of established rules and regulations. For example, a roadside control of trucks performed at two different locations along the Norwegian border by the NPRA and police in 2015 concluded that 225 of the 700 trucks controlled were unfit for purpose and considered threats to road safety. Another control in the same year checked 655 trucks, of which 113 was deemed unfit for duty, and legal charges were brought against 26 drivers.⁶ Similarly, a few months later, 282 trucks were controlled, of which 91 either lacked essential equipment or were otherwise considered to be threats to road safety.⁷ Data from roadside controls in EU member states (2012–2014) showed a decrease of 31.5% in roadside checks of HGVs, compared to the previous period. The proportion of vehicles considered to be unfit for further transportation shows sizeable variations among member states (EU, 2017).

In the trade press, such as magazines and newspapers that are written and published for the HGV sector, the idea that rule bending is recognized behaviour is obvious. The term *rule bending* is used explicitly when describing actions that drivers and managers regularly do. This behaviour is described as reactions to auditors not familiarizing themselves with the sector they are to audit, or that the rules regarding rest hours are regularly not followed, and that especially international freight companies encourage drivers to sleep in their trucks, in defiance of established regulation.⁸ Examples of rules not being followed to the letter are many, with drivers and company leaders describing how hard it is "to follow rules",⁹ either because actors higher up in the risk management framework find it "difficult to sanction international companies",¹⁰ and, as a consequence, drivers find that they are sometimes "forced to break the rules".¹¹ One example in the trade press that exemplifies this is as follows: "Through several years the Company X has used judicial grey zones and disguised national transport missions as international to illegally operate with a fleet of international HGVs in Norway".¹² The recognized widespread practice of rule bending is open to much speculation but also to the recognition that an established convention of rules exists in the HGV sector that it "is easy to cheat".¹³

Also, outside the trade press, in the Norwegian press, the bending

⁶ <https://www.klikk.no/tungt/transportmagasinet/article1618933.ece>.

⁷ <https://www.lastebil.no/Aktuelt/Nyhetsarkiv/2015/Kontroller-For-mange-vognog-faar-kjoereforbud>.

⁸ NFL Magasinet 2018 no. 3/ NLF 2020 no. 7/.

⁹ NLF Magasinet 2015 no. r 6.

¹⁰ NLF Magasinet 2020 no. 7.

¹¹ NLF Magasinet 2016 no. 6.

¹² NLF Magasinet 2021 no. 2.

¹³ NLF Magasinet 2021 no.1.

and breaking of rules is described as normal behaviour but also as “cheating” and “violation”, attributed to “lack of knowledge” but also to HGV companies speculating in order to get ends to meet. Thus, the basic assumption of rule bending as established practice not only informs the espoused values of actors in the sector but also, as seen in the regular press, the broader assumptions the wider society has of the sector.

4.2.2. Rule bending affects safety

That rule bending affects traffic and transport safety in various ways is widely described in the grey literature of non-governmental documents from the international transport union and also from other sources that mention rule bending and discuss it as both a safety issue and a widespread and embedded phenomenon in the sector. One example is the unions’ use of the European truck accident causation study, citing that human error is the main cause of 85.2 % of road accidents involving HGVs (IRU, 2016). Pictures of truck accidents in the regular press can, in many ways, be considered to be violent imagery, and they regularly create discussions in social and standard media about the dangers the HGV sector regularly exposes people to. The use of alcohol during driving and not resting or sleeping for long periods of time are often used as examples.

Examples from the trade press include discussions on the lacklustre use of winter tires¹⁴ and that not following safety-related rules can result in drivers losing control of the vehicle and driving off the road.¹⁵ The trade press regularly favours the idea that that regulations are becoming stricter,¹⁶ but in this regard is worth mentioning that the unions in the Norwegian context may find it beneficial that the intentional bending of rules by foreign actors gives them a bad reputation compared to Norwegian actors. Marketing the Norwegian-owned part of the sector as less prone to rule bending, more serious and therefore safer can be seen as a media strategy that justifies higher wages and prices for Norwegian-owned transport.¹⁷

The regular media often uses crashes, accidents and near-accidents involving HGVs as an entry to discuss safety in the HGV sector. Such reports often include interviews not only of leaders in companies and official regulators but also of family members of those involved in accidents. In Facebook groups such as “Stop the death trucks on Norwegian roads”, the same types of discussions are fronted, and the habitual rule-bending and breaking by foreign and Norwegian actors in the HGV sector is regularly connected to challenges in traffic safety.

4.2.3. Rule bending as the result of economic pressures

Rule bending in the HGV sector is the result of, or at least heavily affected by, the economic pressures on the various HGV companies. This is an explanation found throughout the grey literature. Some examples from the trade press include that the control authorities have little leeway and the unserious actors and the criminal actors use that limited area of maneuverability is repeated that the unserious actors use the grey zone. *And might make the grey zone larger by doing so. The explanation for this is that: Health, Safety and Environment are terms that many workers in the sector have in the back of their heads but not always highest on the agenda. This is because the flow of money has a higher priority than all other aspects, and this is transferred as a pressure to the drivers. This also shows that the unserious actors are not necessarily criminal and vice versa. As such, there is a recognized grey zone of rule bending.*¹⁸

This idea of a grey zone includes many different types of activities such as *slavery contracts*, manipulating freight letters, packaging dangerous goods as non-dangerous and neglecting taxation. In this context, it is difficult for Norwegian controllers to perform audits of

international companies.¹⁹ In the trade press, the question of responsibility is often raised. Is it the responsibility of the buyer of transport services to consider the rule bending in the sector, and to know whether the seller they use is “unserious or serious”.²⁰ Rather, it is recognized as normal that “Transport buyers knowingly choose unserious actors, to save money”.²¹ Also described in the grey literature is how actors in the sector themselves describe the safety problem caused by rule bending and breaking. The descriptions are similar to the way the safety challenges associated with rule bending are described in the few scientific empirical studies of the phenomenon (Kuran and Njå, 2016; Sørli, 2005). Rule bending and rule breaking is not discussed in the teaching materials from the transport sector.

4.2.4. The informal hierarchy of rule bending

The concept of rule bending challenges moral boundaries, both within and outside the HGV sector (Njå et al., 2012). The argument often found in the grey literature stresses that most HGV drivers and companies want to follow the rules and regulations, but that *unserious actors* make this difficult, and thus threaten other *serious actors*.

In the newspaper and magazine articles of the grey literature, the division between serious and unserious actors is clear, with particular companies being called out as unserious and court cases that include one or more companies being scrutinized over several issues, with some companies being branded unsafe and unserious. This is especially true for the HGV companies from mainly East European nationalities, which are described as more “unserious” than others. Fredrik Barth (1998) theory on the establishment of ethnic boundaries on an Us/Them divide seems to be appropriate, as the unserious actors are branded as having taken rule bending too far and no longer able to be considered serious actors. The newspaper and magazine articles in this study can be divided into two sections, the first of which is the trade press, which describes rule breaking as normal among the unserious actors in the business but also acknowledges that rule bending is common, and that it is a major safety issue. The second section is the Norwegian online press, in the form of newspaper reports on how accidents involving HGVs have broken regulations. Rule bending and breaking is also described as common behaviour in the HGV sector, with the unserious actors being responsible for the more serious violations, but with the more serious actors sometimes “bending the rules” or “doing a Spanish”, when for example postponing maintenance, overloading trucks past regulation capacity, or skipping mandatory sleep and rest hours.

In the trade press, there are many descriptions of behaviour that is illegal, such as *fuel-thievery*, *smuggling*, *cargo thievery* and *chip trimming*,²² separating the unserious from the serious actors, since social dumping or just paying fines instead of ensuring proper maintenance are more in the grey area of rule bending. This is exemplified in the following quote from a manager at an HGV company: “if you make a continuum between completely legal and completely illegal management then there are unprofitable companies on both sides. We try to find a place in the middle, just on the border of the illegal.”²³

The regular press also describes rule bending actors in the sector as *creative souls* that regularly fool the controllers and auditors, but the press also states that many who are fined for violation are simply unlucky and not necessarily nefarious in their rule bending. This seems to confirm that there is a normative hierarchy of rule bending actions in the HGV sector.

4.2.5. Rule bending as a systemic problem

In the grey literature, rule bending is described as a systemic problem

¹⁴ NLF Magasinet 2015 no. 7.

¹⁵ NLF Magasinet 2021 no. 2.

¹⁶ NLF Magasinet 2020 no. 1.

¹⁷ NLF Magasinet 2020 no. 6.

¹⁸ NLF Magasinet 2021 no. 2.

¹⁹ NLF Magasinet 2017 no. 6.

²⁰ NLF Magasinet 2019 no. 3.

²¹ NLF Magasinet 2018 no. 3.

²² NLF Magasinet 2016 no. 8 and 2017 no. 6.

²³ NLF Magasinet 2018 no. 7.

of the entire sector. Especially in the trade press, this is a prominent ongoing discussion. One example is how “transport buyers should be more responsible, since actors have little control of working hours”²⁴ and that outsourcing affects “how much risk is transferred down to the last chain in the transport hierarchy. Everyone who can earn something, and in the final links of the chain it is probable that there is no surplus left, only risk as costs that are not covered by the earnings. I belong to that final link”.²⁵ This disconnected link between earnings on one side and the risk and cost on the other leaves the operators in the lower links the losers of the system.

Also in the regular press, the systemic aspect of rule bending is often discussed, suggesting that even though drivers of trucks are responsible for the safety of their vehicles, they do not exist in a vacuum. Finally, often discussed in the grey literature is that safety-related rules and regulations are not well formulated and thus often misunderstood.²⁶

4.3. Summary

In the iterative analytical process of the study, the trends derived from the literature were considered for their veracity (e.g., how they pertain to how rule bending is depicted in the literature), their objectivity (e.g., how the analysis gives conclusions that may be shown to transcend the perceptions of the individual documents) and their perspicacity (e.g., how the analysis contributes to creating understandings that are applicable to the study of human behaviour in other research settings).

The descriptions of the analysis of rule bending in the grey literature show us an understanding of the industry in which there are serious and unserious players, and where informants and actors sharing cultural knowledge (Schein, 1990) seem to have a shared conceptual framework that is common. This implies that a strong belief in rule bending is an essential characteristic of the HGV system. Actors in the HGV sector that do bend rules and regulations share many similarities, such as understanding rule bending as behaviour that affects safety, and that different behaviours are more morally acceptable than others and, finally, that it is the unserious actors, the others, that push the limits of morally acceptable rule bending too far. The behaviour is described as necessary adaptations and recognized as such by large groups of people in the HGV sector. This is in sharp contrast to malevolent rule breaking and violations. In addition, the grey literature and the context-sensitive studies are similar regarding how rule bending is described as hazardous to traffic safety. Differences in how rule bending and -breaking is discussed in the peer reviewed literature and in the grey literature are shown in Table 3.

Table 3

Similarities and differences in the descriptions of rule bending and breaking in the peer reviewed and the grey literature.

Theme	Grey literature	Scientific literature
Rule breaking is discussed	Yes	Yes
Rule bending is discussed	Yes	Yes, but only in a few ethnographic descriptions
Rule bending and breaking is considered to be adaptations to the socioeconomic context of the HGV sector	Yes	Yes, but only in one ethnographic description
Rule bending is considered to be a common and acknowledged practice in the HGV sector	Yes	No

²⁴ NLF Magasinet 2018 no. 7.

²⁵ NLF Magasinet 2021 no. 2.

²⁶ NLF Magasinet 2021 no. 1.

5. Towards a uniform concept of rule bending

We started the scoping study with the term rule bending, which is often described as a euphemism used by transport workers and transport managers in the Norwegian HGV sector to describe a type of behaviour that entails not always or not strictly following, or conveniently forgetting, the rules and regulations. The scoping study shows that the use of the term can be considered an artifact, based on the basic assumption described above (Schein, 1990), concerning the distinction of unserious and serious actors in the system. The term has also been described in a few context-sensitive ethnographic studies in the HGV sector. The term is used to describe various forms of rule breaking, violations, etc., using rule bending as our starting point, grounded in the life-worlds of the actors in the sector, as seen most clearly in the grey literature. With the aim of the paper, to pursue a concept that is less concerned with ethical, moral or normative connotations, and to try to identify assumptions and frames that characterize rule bending behaviour as in-system adaptations, we concluded on a conceptualization of rule bending as “adaptive non-conforming behaviour” (ANB). We believe that, as a concept, ANB can aptly describe the phenomenon. This section discusses the framing of the concept and how it is recommended for use in safety analyses in the transport sector, with the aim to understand and manage the HGV-transport system.

5.1. Conceptualization

If the overall goal is to create safer systems, then concepts need to be described in such a way that they are useful to actors involved in the HGV sector, such as academics, professionals and lawmakers. A conceptualization of rule bending in the HGV-sector’s behaviour should ideally be able to explain behaviour and actions on all levels of the risk management framework, in the context of the interrelation of actors framed by established norms, rules and regulations. As Rasmussen and Svedung (2000:10) explain:

“The rapid development of transport systems, information technology, and just-in-time schemes leads to a high degree of integration and coupling of systems and the effects of a single decision can have dramatic effects that propagate rapidly and widely through global society. Furthermore, companies today live in a very aggressive and competitive environment that will focus the incentives of decision-makers on short term financial criteria during economic crisis rather than on long term criteria concerning welfare, safety, and environmental impact”

The consequence of the rapid development is adaptation within the HGV-transport system, where the actors balance their behaviours between risks in various formats, from health-related risks to socially driven success stories. The phenomenon of rule bending can be explored as a systemic characteristic and cannot be reduced to a version of *bad apple theory*, allowing for meaningful changes in regulation of the HGV sector. The dynamic changes in the transport system, as opposed to the regulation regime, provide opportunities for emerging adaptations, the rationalities for which might not be so easy to understand.

Rule bending in the colloquial sense in the grey literature is a widely used euphemism, referring to violations of rules and regulations, ranging from the benign and victimless to acts that might be ultimately dangerous for the safety of individuals and groups. The scoping study shows how the scientific literature discusses violations and transgressions as both intentional and nonintentional acts but does not adequately describe how certain types of behaviour differ from overt violations and transgressions. The actions are simply considered violations that are devoid of meaning and both systemic and cultural context. We believe the term *adaption* might fit the description of the behaviour in the grey literature. In the scientific literature, the term *adaption* is often associated with positive and safety-enhancing behaviour and not with safety hazards, as described in the grey literature. If rule bending is adaption to a complex work environment, similar to such terms as

established practice, then what about the economic aspect and the fact that rule bending admittedly is thought to increase risk?

The value-laden concepts – rule bending, rule breaking and violations – disturb analyses and interpretations. Here we redefine the concept, as activities that for various reasons do not conform to established formal rules and regulations and accepting that most of the non-conforming behaviour is not malevolent activity with the intent of increasing risk, but adaptations to various pressures and constraints. Adaptive non-conforming behaviour is not limited to the lowest level of the reference framework but is common to all levels of the hierarchy in the HGV sector.

There is a need for an improved understanding of the transport sector and especially the performance of the HGV sector, which might influence safety. The mere recognition of the widespread understanding of rule bending in the grey literature points to the fact that the feedback loops in the risk management framework are not functioning. Instead, that rule bending is widespread becomes a basic assumption that informs the values and behaviours/artifacts of actors on different levels, hence the need to define criteria for the rule-bending concept that it is possible to observe, express, measure and interpret in a unified way. The concept should not only be clearly defined but also relatively easy to use in qualitative and quantitative research, and it must have a good resonance with how actors in the systems see themselves and their daily work.

What happens when behaviour that would be considered violations in the peer review literature and by actors at the higher end of the RMF (see Fig. 3) are not seen as concrete violations by actors at the sharp end, but as something different? A better understanding of the HGV system as a risk management framework should lead to better safety performances. Risk analyses are scenario-driven, but would scenarios be a relevant starting point when addressing rule bending as a system characteristic? What happens to the safety analysis, when deviance or rule breaking in the guise of rule bending has not only been normalized over time as assumed but has, as far as the actors recognize, always been a stable characteristic of the system? Our concept must interact with approaches that challenge system thinking and human behaviour in systems.

We suggest ANB, as a term that can be used to uncover and assess rule bending behaviour at all levels of the risk management framework when performing system analysis for regulatory premises, safety functions and resilient behaviours of HGV transport. Despite all attempts in the scientific literature to define and generalize the bending, the violation or the breaking of rules in the HGV sector, we claim that the scoping study shows that the phenomenon must always be analysed in context. ANB is behaviour that is experienced and described as adaptations to economic and sociocultural pressures by concrete actors, and which is experienced as meaningful adaptations by actors in their contexts. Note that the use of the term *meaningful* in our definition should not be taken as a positive judgement of the normative aspects of the behaviour, as normative judgements can vary from companies to individuals and between actors at all levels of the RMF. In the description of a sociocultural perspective are not just ad hoc artifacts but part of the basic cultural assumptions (Njå and Nesvåg, 2007; Schein, 1990).

5.2. Definition and framework for ANB

To be useful, a framework for ANB must define and delimit the concept, so it can enable clear communication and analysis. The following definition is intended to communicate this:

Adaptive Non-conforming Behaviour (ANB) refers to behaviour that is not only accepted within varying socially constructed limits but is also collectively recognized, by participants in the industry and by public controllers and auditors, as actions that involve the subversion, violation or transgression of either formally established or informal rules, regulations, procedures or processes, intended to avoid unwanted and potentially costly and/or dangerous incidents.

Further, based on the above definition, there is a need to establish criteria that further explain the phenomenon, and that can be used to identify ANB in the HGV or any other sector. These are criteria that will aid in analysis, as well as be refined with further exploration, of ANB:

1. ANB is a reaction to pressures in the HGV sector that could be inter alia economically, socio-culturally or practically driven.
2. ANB is collectively recognized by participants in the industry as a mode of practice available to individuals under certain circumstances.
3. ANB is collectively recognized in the industry as actions that can influence safety.
4. ANB is collectively recognized in the industry as actions that result from economic pressures
5. ANB can be placed in a socially constructed normative hierarchy, in which some actions are socially accepted in some quantities while others are not as accepted.
6. ANB can occur on any level of an organization of the HGV sector
7. ANB can be measured quantitatively but must be expressed in its system context and related to the set of rules, regulations and standards identified by the actors in the system.

5.3. Consequences for safety research

ANB is not limited to the lowest level of the risk management framework of the HGV sector, and we believe it should be studied as the actions of individuals at the micro level, as well as normalized praxis at the company and macro levels of the HGV-transport system as the number of actors and stakeholders increases. Also, studies of ANB at the management and macro levels of systems are practically non-existent in the literature. In Fig. 4., by modifying Rasmussen's migration model, we show how this behaviour is understood by actors in the HGV sector. The model illustrates that ANB can vary in how safe the activities are considered by the actors performing them, ranging from within the boundary of what society (and regulation) consider safe behaviour to what they themselves consider within the boundary of acceptable behaviour. And, as previously shown, the perception of where that boundary is, is not universally shared by actors involved in ANB. While some might consider their "rule bending" to be within (or on the edge of) acceptable behaviour, others might find it to represent the actions of an "unserious" actor.

Finally, in Fig. 5, we also suggest a three-dimensional way of describing ANB that can be considered in further studies of ANB in broad scoping and qualitative studies, regardless of micro-, meso- and macro levels. The smart-dumb dimension describes how adaptive non-

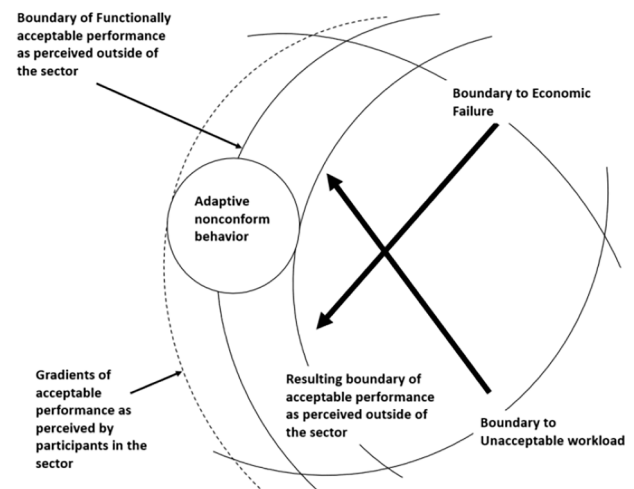


Fig. 4. Modified migration model (Rasmussen and Svedung, 2000).

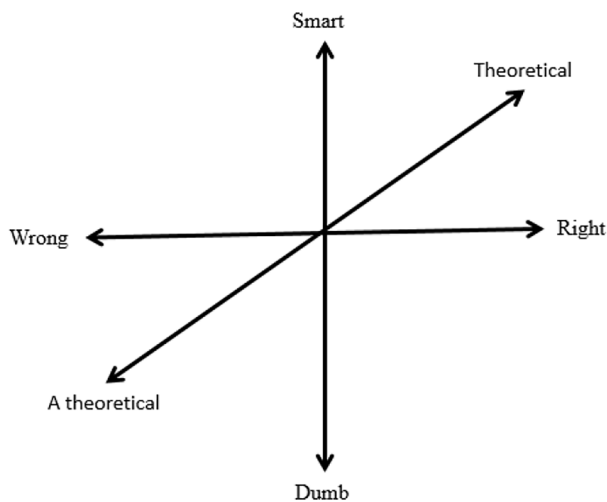


Fig. 5. Three dimensions of adaptive Non-conforming behaviour.

conforming actions are considered by the individuals performing them. Are they clever adaptations to economic restraints and social pressure or individually expedient behaviour increasing the risk of company and personal loss and the risk of accidents? The atheoretical-theoretical dimension is used to classify how the behaviour is described in either the grey or the peer reviewed literature, suggesting that, when approaching a sector such as HGV, then an atheoretical approach like the one used in this paper, starting with the emic descriptions and building a concept on the premises of the actors involved in the sector, is perhaps preferable. The wrong-right dimension is used to describing the regulatory and legal definition of various actions. The intention is to use these dimensions in the further exploration of ANB in the HGV context. In studies of ANB, one could go from purely exploratory studies to the purely figurative. While atheoretical exploratory studies are much more data-driven than the theoretical, it would still be possible to use the definition and the seven clarifications in chapter 5.2 as a guide.

Finding road safety performance indicators across various companies is not easy (F. Chen et al., 2016), but if the conceptualization of ANB is to be useful for safety work, the three dimensions should be useful for creating indicators of ANB. In the study of behaviour in the HGV sector or a similar decentralized, loosely coupled sociotechnical system with a high degree of complexity, the conceptual framework presented in this paper can be used as a guide to distinguish what types of behaviour are considered ANB. Also, the way the informants – through either grey or scientific literature or by other methods of data gathering – describe behaviour in the three dimensions can be used as an indicator that ANB is common in the system. Even if we take as true that estimations of risk will never be more than estimates (Leveson, 2015), at least demonstrating that certain types of behaviour are common in the sector (ANB), and that there are associated risks, will make the system description more accurate, with greater *veracity, objectivity, and perspicacity* than not. The use of the scoping study in this paper is novel and is also an argument for the inclusion of grey literature in the descriptions of behaviour in the HGV sector and probably other systems, especially to look at how the behaviour of actors, and safety concerns related to that behaviour, is described. Table 4 shows the considerations of researchers approaching an industry sector from with an adaptive non-conforming perspective on behaviour.

Further, to be valuable in a regulatory context, it is necessary to know which kinds of data are an indication of ANB as a systemic problem and which parts of the regulations are regularly bent and broken. This will aid in the development of standards that are able to modify the ANB in more productive and safer directions. By using the framework in Table 4 as indicators in regulatory work, the regulatory regime in the HGV sector could possibly obtain adequate information on

Table 4
Approaching adaptive non-conforming behaviour in safety research.

Research aim	Inquiry question
Establish the observed system's normative hierarchy of non-conforming acts	Which non-conforming acts are collegially allowed or understood under certain circumstances?
Establish the economic and social pressures involved in non-conforming acts	Why do the circumstances make it collegially accepted and understood to perform certain non-conforming acts?
Establish the risk acceptance involved in collective risk perception	When is an act of non-conforming behaviour not socially collegially acceptable?
Establish the normative boundaries of acts	Which circumstances are necessary for non-conforming acts to be collegially allowed or understood as dubious but still applicable?

the rule bending and rule breaking in the sector, thus making it possible to set standards for either adequately prescriptive or normative modifications of behaviour (Hood et al., 2001). It would therefore be valuable to indicate in studies whether a sector under scrutiny (such as the HGV, construction or railway-based transport industry) has a **high or low degree of ANB**, based on the seven points in the framework (5.2) and answers derived from Table 4. A **high degree of ANB** would suggest the need for comprehensive cooperation between public and private actors to improve safety.

ANB will be useful in research as it helps to explain why individuals may engage in nonconformist behaviour, even though it may not be socially accepted outside of the sector. It also provides insight into the situational and systemic factors that may contribute to such behaviour. In policy, understanding adaptive non-conform behaviour can inform the development of programs and initiatives aimed at encouraging positive change. For example, if non-conforming behaviour is found to be adaptive in certain situations, then policy makers may look to create opportunities for individuals to engage in such behaviour in an acceptable manner. In practice, understanding adaptive non-conforming behaviour can help individuals, organizations, and auditors to better understand the motivations and context of “rule bending”, and to respond in ways that are both effective and respectful. Overall, the concept of adaptive non-conforming behaviour provides a framework for understanding the interplay between social norms, individual behaviour, and situational context, and systemic pressures and has implications for a range of fields including safety, regulation, psychology, sociology, and organizational behaviour.

6. Conclusion

This study shows a severe lack of research into concepts of rule bending and rule breaking in a sociocultural context. There is a need to increase system knowledge because safety analysis lacks in-depth insight into current practices in the HGV sector, especially that rule bending behaviour is a characteristic of the sector. We have conceptualized this behaviour as adaptive non-conforming. The findings show that the current academic research on non-conforming behaviour as an adaptation to economic constraints in the transport sector is almost non-existent, instead focusing on other traffic safety factors, presuming that actors in the heavy goods road-based commercial transport sector are actually motivated to follow rules and regulations. There is extensive scientific and grey literature on violation rule bending and breaking but very little on the meso- and macro levels of the HGV sector. Contrary to the current academic topics of interest concerning the road-based transport sector, there are many opportunities to bend safety-related rules in all phases of the transport chain: a legitimate and pressing safety concern, as indicated in the grey literature, and it is reasonable to conclude that the HGV sector has a **high degree of ANB**.

We suggest that a conceptualization of rule bending and rule breaking as adaptive non-conforming behaviour that resonates with both the grey literature and the scientific literature provides a

framework for the recognition of ANB. Further, we suggest dimensions for the further study of ANB (Fig. 5) and provide an outlined research design (see Table 4). Study of ANB should be context-sensitive, building on a wide selection of literature, as well as qualitative and quantitative data sources. We conclude that adaptive non-conforming behaviour should be incorporated into the safety and risk assessments of the transport sector, as it provides increased understanding of the system, and that further study, empirical as well as theoretical criticism, of the conceptualization of ANB is necessary.

We consider that the need for this concept is to give researchers and risk managers a non-normative term for violations or rule bending. Adaptive non-conforming behaviour is in the paper described an emergent quality of the system, and as such a challenge not for the lowest levels of the risk management framework but for all stakeholders. It includes the emic context in the systems analysis. Behaviour that falls in the ANB category is behaviour that can be explained away in audits and accident investigations as “background noise” not directly a reason for the accidents but to measure the expression of behaviours of actors who conforms and adapt to pressures such as time and economic constraints. By identifying a high degree ANB in a sector, it will allow for research and analysis that support open conversations between practitioners, regulators, and researchers.

CRedit authorship contribution statement

Christian Henrik Alexander Kuran: Conceptualization, Data curation, Methodology, Writing – original draft, Writing – review & editing. **Ove Njå:** Conceptualization, Writing – original draft, Supervision, Writing – review & editing. **Geir Sverre Braut:** Supervision, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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