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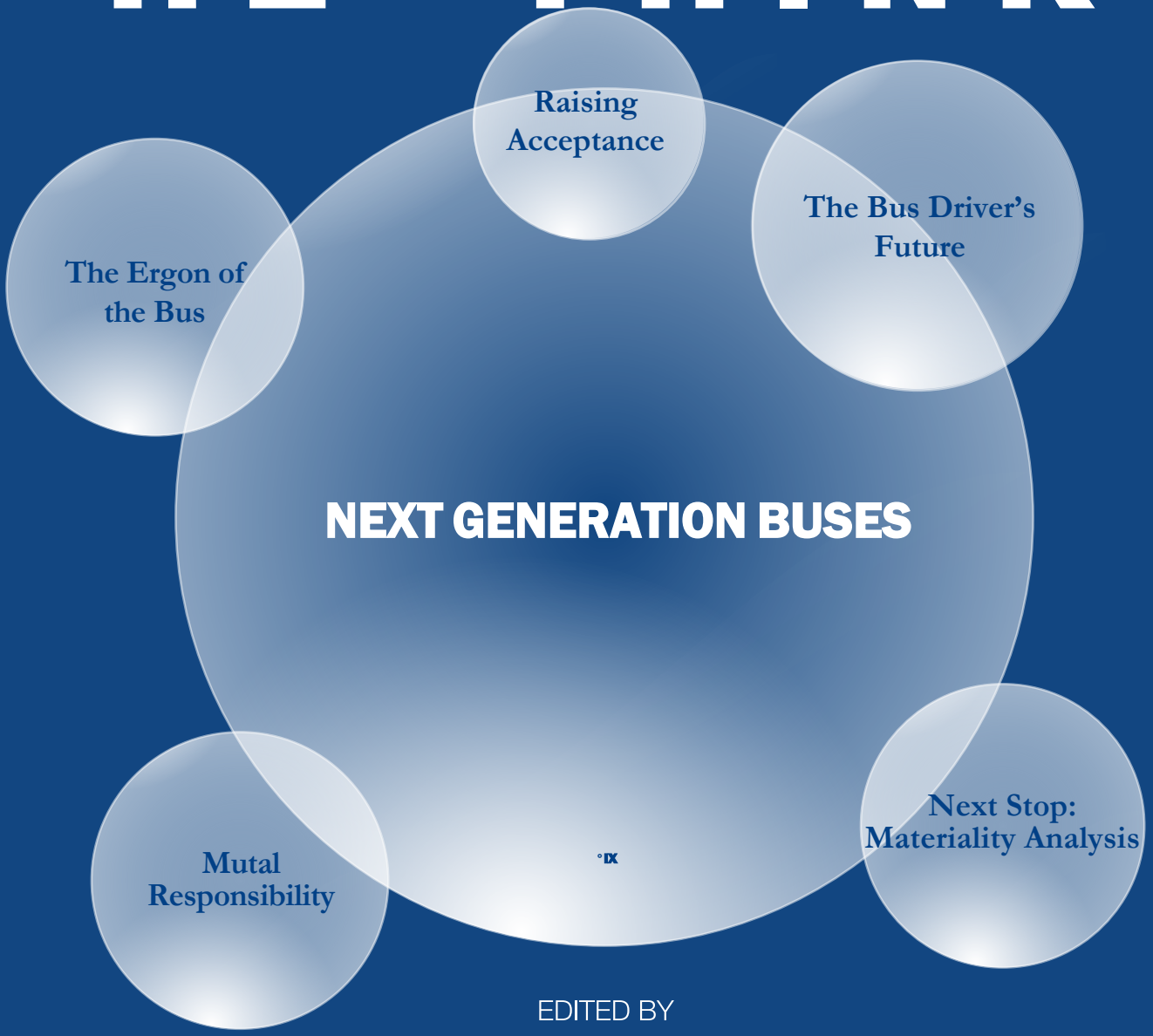

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ALEXANDER BRINK • DAVID ROHRMANN

Rethink –

Next Generation Buses

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RE • THINK
Next Generation Buses

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Preface

These lines are the last to be written, just a few weeks before publishing this book. It was hard work and meant a lot of dedication from all those involved. With them, we have finalised the ninth Rethink volume in a long tradition: we started the Think Tank in 2008, as part of the Philosophy & Economics" program at the University of Bayreuth. "Philosophy & Economics" provides a new qualification, combining economic and managerial problems with philosophical reflections to foster a deeper mutual understanding, and is a unique and highly recognised academic concept in Germany, introduced in 2000.

This unique Rethink collection provides ideas from our students. Numerous multinational companies served as Think Tank sparring partners. For this year's Think Tank, we are very proud and thankful to be working together with Daimler Buses, an excellent partner that provided deep, practical insights and very fruitful grounds for theoretical research.

The volume **'Rethink – Next Generation Buses'** picks up a discussion which has become more than just that of current interest. It is embedded in a strong societal sustainability and responsibility movement. Our turbulent times have strengthened a younger generation to rethink business operations and stakeholder interactions, especially in the field of public mobility. We are in search of a new balance between various societal demands.

Theory and practice are often different, and not every idea is feasible. But it is this untouched and fresh view of a young generation on future topics which is so useful and is indeed visionary for both sides – theorists and practitioners.

To publish such a volume is a great pleasure, but it is also a lot of work, which can never be done alone. We were given considerable help by many people in finishing this volume. First of all, we want to thank Dr Jens Arnold and Alessa Holling for their strong commitment, support and content on the Daimler Buses side of the project. We can look back happily on this great time, with intensive discussions and helpful comments. We would also like to thank Daniel Meissner, our student spokesman and editorial assistant of the Rethink series. From his tireless effort and precise editorial work, this volume was realised. We have been equally lucky in the support we have received from Julius Habenschuss, who accurately designed the illustrations in the volume and those before. My special thanks go out to Catherine Irvine, who did the final

proof reading. And finally, we want to thank the authors, mostly from our Philosophy & Economics Program, for their great and valuable papers, patience, and overall engagement. Of course, their instructive and helpful comments for the ongoing project and their colleagues' papers were invaluable in helping us to revise and clarify some parts of the book.

Whoever approaches such an extensive project over a long period of time can satisfactorily look back for a moment on their past work. Hopefully, the ideas presented will help to improve the future of public mobility. We hope you take great pleasure in reading this book.

Alexander Brink and David Rohrmann

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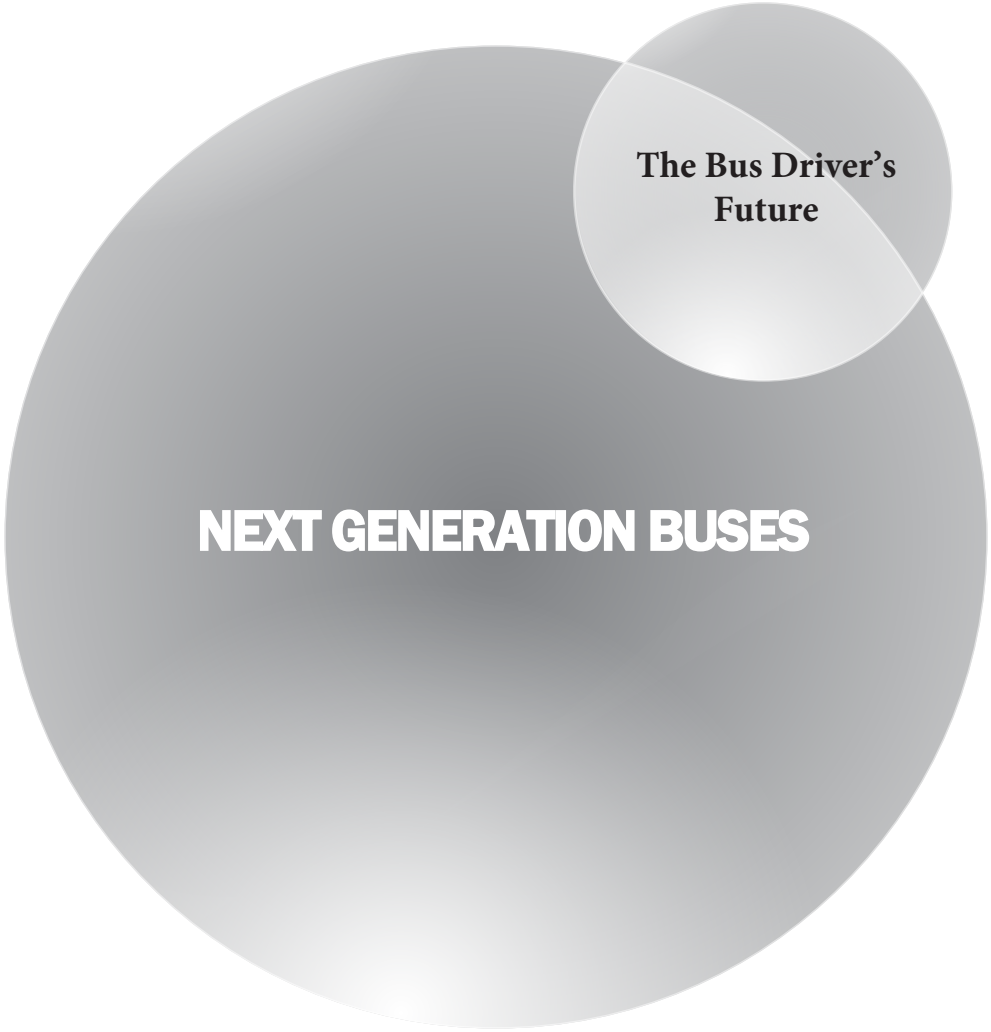
The Bus Driver's
Future
NEXT GENERATION BUSES

The Bus Driver's Future

Innovation's Effect on Profession

Nikolas Mattheis, Matthias Poerting and Felix Vieg

Keywords
Autonomous Driving, Buses, Employment, Mobility

Buses are becoming autonomous. This paper surveys the effects this innovation will have on a specific stakeholder group, bus drivers. First, the paper describes the profession's status quo, with special emphasis on bus drivers' self-conception. Then, how the progression towards new levels of automatisation affects bus drivers at several critical moments is shown. This paper argues that companies are responsible for assisting bus drivers throughout this process of change. A short-term approach is suggested, that incorporates gradual adaption, entirely new occupational tasks for bus drivers, and a correct bus design.

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1. Introduction

Bus driving will be radically altered by the advent of autonomous driving. Not for the first time, technological innovation will change job practices and employment perspectives in a long-lasting manner. Sewing machines have made trained sewers largely redundant, new techniques in coal extraction have made miners extinct, automobiles have replaced carters. In the mobility sector, we believe that new levels of automatisation within the bus industry, and ultimately completely autonomous vehicles, will have equally drastic effects on the bus driving profession. While they may not make bus drivers redundant altogether, they will bring about a volte-face in their professional tasks and self-conception.

This shock of technological innovation, as it has been the case so often before, will come exogenously and unexpectedly to those most affected. It seems that many bus drivers and some public transport institutions are not ideally prepared for such innovation, as we delineate in the following. This insight should, however, not discourage them from preparing for their future. Rather, it should serve as an incentive to be among the pioneers in managing the inevitable chance processes. In fact, as we shall argue presently, it appears possible for decision makers to facilitate adjustment processes in a way that will be beneficial to all parties.

In order to support this conclusion, in Section 2 we shall survey the profession of bus drivers in detail. We will illustrate bus driving in Germany by depicting facts and statistics, with a focus on bus drivers' professional ethos and their self-conception. Section 3 will follow an outline of the process of increased automatisation for vehicles. By applying a general scheme of six stages of the automatisation of buses, we show the effects it will have on bus drivers at several critical junctures. In Section 4, we will argue that it is imperative to prepare bus drivers for each of these instances. The argument draws on more general considerations of macroeconomic effects and the philosophy of technology. Building on this responsibility, we will propose concrete measures in Section 5. We will concentrate on the human resource management of bus producers and transport institutions (i.e. corporations, often supported by municipalities, which provide mobility services). The measures proposed relate to gradual adaption, the reorientation of occupational tasks, and bus design. Finally, we will conclude with possible extensions of the procedure to other professions in Section 6.

It is the main conviction of this paper that focussing on the specifics of a profession and on the identification of individuals with their occupation can yield the most fruitful suggestions for adjustment processes. By rejecting one-size-fits-all solutions, we encourage stakeholder group-specific studies. Of course, this procedure comes with restrictions: it is limited to one professional group and relies on heuristics. (We can only *try* to adequately represent the people we want to help.) On the other hand, as the observations and suggestions we recommend are case-tailored, change makers can probe the effects of measures more directly. Furthermore, our study of bus drivers shares some parallels with other developments (e.g. occupational transformations in the energy sector). As such, we believe that the general procedure may also be insightful for readers interested in other professions. The method's general characteristic will be, ironically, the focus on specifics. Let us then turn to the specifics of the bus driving profession.

2. Bus Driving Profession

Buses are a highly relevant means of transport for two main reasons. Firstly, buses are relatively safe. Accident statistics prove this. An indicator of comparative safety is to take the number of casualties per billion kilometres. In 2011, the Federal Statistical Office calculated these values for five means of transport: cars, buses, trains, trams and aircraft. For buses per billion kilometres, there were 73.9 injured passengers, of which 0.17 were fatal. The risk of a fatal accident in a car is 16 times higher than on a bus (cf. Statistisches Bundesamt 2011: 5). Secondly, buses are a sustainable means of transport. The bus turns disadvantages for train and air transport (high capital cost, inflexibility and lack of penetration) into advantages. This, among other reasons, is why it makes up large amounts of urban public transport. In Germany alone, buses transport more than five billon passengers per year.

For these reasons, it is imperative to investigate the profession that keeps buses running. What does it mean to be a bus driver? We will present some facts and statistics of the occupation and outline skills bus drivers typically have. Also, we will investigate the professional ethos of the bus driver. The discussion is focused on Germany, but similar results should apply to other countries.

2.1 General Overview

"A bus driver is a person whose job is to drive buses" (Oxford Dictionary 2018). While this may sound trivial, the definition's emphasis on *job* is informative. Bus drivers usually earn their living by 'driving buses' – although, as we will see, various tasks are connected to this activity – and they are therefore subject to regulations. In many jurisdictions, bus drivers must have a special license in addition to a regular driver's license. Bus drivers usually drive their vehicles between bus stops where they drop off and pick up passengers, usually on a predetermined route and to a predetermined schedule. Most German bus drivers are male (according to one study which surveyed many transport institutions, about 90 percent [cf. IBV 2014]).[1] The majority of bus drivers are relatively old. Some 50 percent are between 46 and 60 years old, and less than one tenth are younger than 30. Gross salaries in Germany vary from about €1,500 to about €3,000 on average per month, with regional deviations (cf. Gehaltsvergleich 2018).[2] Thus, many bus drivers have to be considered workers in the low-wage sector. In total, there are some 100,000 bus drivers in Germany. 40,000 work in local public transport (cf. Verband Deutscher Verkehrsunternehmen 2015b: 30). However, fewer and fewer drivers are becoming bus drivers: there is currently a recruitment shortage.

How does one become a bus driver? To become a bus driver in Germany, one can either be trained as 'Fachkraft im Fahrbetrieb' (literally: specialist for vehicle operation) or as 'Berufskraftfahrer' (literally: professional driver). In both cases, one must have a special license for driving buses. The latter qualification concentrates on driving properly, and these bus drivers are trained as all-rounders who can also work in areas such as administration, planning, service and public relations. Both training programs last between one and three years, depending on the trainees' pre-qualifications. The 'Fachkraft im Fahrbetrieb' program was first introduced in 2008 (cf. BAG 2018).

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1 A couple of figures we refer to in this section rely on this study. The study is not representative: only a limited number of traffic companies were surveyed, and responses to the study were voluntary. Thus, the study's scope is restricted and should be taken with caution.

2 For an example, see: FAZ (2018): Irgendwann regelt das der Markt. Die schwierige Suche nach Busfahrernachwuchs, URL: http://www.faz.net/aktuell/rhein-main/region/ irgendwann-regelt-das-der-markt-die-schwierige-suche-nach-busfahrer-nachwuchs-11109560.html (accessed: 10.03.2018).

Surprisingly, many bus drivers are lateral entrants. Only few have a 'linear career' or are in the business for life. The bus industry has a tradition of lateral recruitment rather than specific training. In order to compete with related industries like logistics and mobility, companies have to improve their commitment in training, according to some experts (cf. IBV 2014).

In order to better understand this phenomenon, it is helpful to consider bus drivers' employers, which are either (municipal) transport companies, public transportation services, or bus operators and private companies who offer intercity bus service. The latter experienced a boom in Germany when the market was liberalised by an act amendment in 2013 (cf. Buzer 2018). Even if some players control huge parts of the market, they still run services in cooperation with regional bus companies (subcontractors). Therefore, many bus companies are medium-sized businesses – 95 percent have less than 100 employees (cf. ibid.).

While the bus driver's job is to 'drive buses', this is connected to a host of activities. Which tasks do bus drivers perform aside from driving? Generally, one can distinguish two main types of transport in which bus drivers are employed: short and long distance. Tasks may differ greatly for each of the two types. In this paper, our main focus lies on city bus drivers, although we will later draw some connections to long distance drivers. However, whether short or long distance, driver activities include some or all of the following: inspecting buses prior to driving in order to ensure they are ready for use, loading passenger luggage, selling tickets to passengers, giving information to passengers, occasionally even delivering a commentary on the surroundings, and keeping a logbook.

Correspondingly, bus drivers must have specific skills and knowledge. These include excellent driving skills, knowledge of traffic rules and transport regulations, in-depth knowledge of the area they work in, understanding of basic bus maintenance, knowledge of sites and attractions along their route, in addition to a basic knowledge of people, culture and history. Advanced technical knowledge is neither necessary nor available.[3] Nonetheless, the activities and skills required have developed over time. For instance, in the 20th century it was common for bus drivers to be accompanied by conductors, who checked and sold passengers' tickets. At some point, and as a means of rationalisation, these activities were delegated to bus drivers.

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[3] For more information, see: Onetonline (2018): Bus Drivers, Transit and Intercity, URL: https://www.onetonline.org/link/details/53-3021.00 (accessed: 08/03/2018).

Because of the activities demanded of them today, bus drivers' working conditions are relatively tough cf. Berufenet 2018). Usually, they work in shifts which include nights, weekends and split shifts (shifts that 'destroy one's private life', as several drivers remarked). They have to drive in stressful circumstances, including all weather conditions and busy traffic. Tour bus drivers travel between cities, and often have to spend several nights a week away from home (as one driver remarked, in the long-distance sector one is home 'almost never', and 'mustn't have a family). Bus drivers work in closed vehicles, perform tasks in close physical proximity to other people, spend time sitting, and deal with time pressure. Furthermore, the job is notably challenging, because it involves spontaneous decision-making. Weighing up alternative courses of actions in difficult situations, e.g. heavy traffic, plays an important role in the bus driver's daily routine.

2.2 Self-conception

In order to assist bus drivers throughout the process of adaption to innovation, a thorough understanding of their profession is essential. Facts and figures can tell us a lot about the surrounding, but only a little about a bus driver's actual self-conception. Therefore, we need to investigate the professional ethos of bus drivers.

While there is plenty of literature available on professional ethics in general, the findings relating to bus drivers are fairly limited. We spoke to bus drivers in different cities ourselves, in order to gain first-hand accounts of the issue.[4] These interviews are of course restricted in their local scope, and do not satisfy strict scientific standards. Nonetheless, they can serve as a first approximation to the profession's self-understanding and their posture towards new developments in the market. We were able to identify three major trends throughout our conversations with city bus drivers. Each of these trends is related to a core value related to profession:

- 'Discipline': Like many people in other jobs, bus drivers work mostly to make a living. Generally, the bus drivers we interviewed were not overly enthusiastic about their job and some were outright

[4] We spoke at length with bus drivers in Bayreuth and Bamberg. Transcripts of our interviews are available here: http://bit.ly/2v413FM. We also spoke to managers at VAG Nuremberg (who operate driverless underground trains) and Daimler's OMNI-plus program (who train bus drivers).

frustrated by the hard work. One driver commented that 'under the current circumstances', he wouldn't take up the profession again. While some mentioned that 'it is a nice job when one takes pleasure in driving', the drivers' reports indicated that they were primarily following a feeling of duty in order to provide a living for themselves and their family.

- 'Autonomy': Bus drivers greatly value their mobility. This gives them a sense of freedom. We presume that bus drivers are prone to be nomadic, particularly long-distance drivers. When asked what he would do if he weren't a bus driver, one person answered that he 'would then probably be on the road'. Bus drivers value their mobility and the daily variation in their job. As one driver remarked, one of the things he appreciates most about his job is that he 'is his own boss'.
- 'Responsibility': Bus drivers care about getting people safely from A to B: 'Avoiding personal damage is the greatest challenge', commented one driver. Bus drivers are aware of the huge responsibility they bear. While 'nobody notices' when bus drivers master the most difficult situations, 'one knows it for oneself and takes pride in it', said one driver.

These three trends reflect conflicting and ambiguous aspects about the bus driving profession. They create a complex picture of a multi-faceted profession. Also, they may vary greatly for different types of bus drivers, especially depending on them being employed for short or long distances. The trends serve as a central criterion to be considered when thinking about the future of the profession in a world of autonomous driving.

As shown by the first trend, bus drivers tend to have a 'minimalistic' attitude towards their jobs. This is in contrast to the emerging needs of the so-called Generation Y (who are said to care more about flexible working, time to travel, creativity at work and a better work-life balance [cf. Martin 2005]) (cf. Guardian 2018). Bus drivers, on the other hand, seem to be rather conservative regarding new developments. Some were very sensitive about the social implications of digital transformation. For instance, one bus driver we spoke to was preoccupied with the fact that, since the rollout of smartphones, communication inside the vehicle had diminished, and people stopped greeting each other when entering the bus. He lamented that, in comparison to earlier times, 'nobody shows any consideration of the person behind the steering wheel'. (Another, however, remarked that people did treat him with 'respect'.) Correspondingly, bus drivers still picture the bus as a place of social encounters. Many drivers know the regulars on different routes. Different individuals with various attitudes come together in the social environment of the bus. This conservative attitude to technological progress clashes with more progressive views – which are

often supported even within the same company. While the employers view change rather positively or at least neutrally, the employees are rather more defensive.

Asked about their profession's future, drivers regard most potential future tasks somewhat sceptically, and early retirement while getting the same amount of money sounded fine to some of them. Bus driver seem very confident with regard to their own driving skills and were doubtful about the increased automatisation of city buses vehicles: "I don't trust the system [of an automatised bus]", one driver commented. This self-confidence regarding technology and the clash between bus drivers' self-conception and technoogical progress might prove to be a challenge for employers during the transformational process. In Section 5, we will present measures for mediating these difficulties. However, we first need to understand exactly how the process of automatisation will take place.

3. Autonomous Driving

Media and academic debate are full of discussions about the upcoming automatisation in industries in general, and especially in the automotive sector (cf. Maurer et al. 2015). According to DIN V 192333, an automated process is one that works on its own, without human involvement. Generally, automatisation can have many positive effects. For example, it is better for the environment, since autonomous vehicles can optimise efficiency. Autonomous vehicle technology promises significant economic and societal benefits by preventing accidents (cf. Anderson et al. 2014: 9).[5] Yet there are also risks with autonomous vehicles. Not all circumstances can be anticipated. Errors in programs controlling the system can cause accidents which would not have occurred had they not been in use. Also, the more autonomous vehicles are connected to other systems, the higher the danger of cyber risks (cf. MunichRe 2018).

While dealing with questions of how to mitigate these risks is of huge importance, we will focus here on the occupational issues connected to this innovation. For this, it is important to note that automatisation won't come overnight. An American advertisement from 1956 proves that the vision of driverless mobility concepts is nothing new (Saturday Evening Post 1956: 7). Although the harsh international competition in this area has led to rapid progression in

[5] For a figure on the safety potential for cars, see: Levinson 2015: 795.

technological and legal terms, the development towards ultimately autonomous vehicles is gradual. Within this gradual development, it is possible to distinguish various stages. The "Bundesanstalt für Straßenwesen" (BASt) has proposed a six-fold classification on autonomous driving (cf. BASt 2014: 7).

3.1 Stages of Autonomous Driving

Following the BASt (cf. Verband Deutscher Automobilindustrie 2015a), one can distinguish different stages of automatisation by answering two questions. First, is the driver in charge of speed and/or of steering the vehicle? Secondly, does the driver have to constantly monitor the vehicle? Accordingly, six stages of automatisation emerge:

- In *Stage Zero* ("drivers only"), there is no assistance at all. The driver is in full control of the vehicle and responsible for its speed (including breaking, slowing down accelerating). They also have to steer the vehicle to the left or the right. The only possible assistants do nothing other than expand drivers' senses, such as in the visual sense, for the blind angle. For instance, *Stage Zero* vehicles could feature well-known notification systems, signalling to the driver if the vehicle comes too close to other objects when reversing. The system could also warn the driver if the car unintentionally changes lane. Basically, vehicles have been in this mostly unassisted stage over the course of a century since their invention. It is the stage at which most vehicles still are today.
- In *Stage One* ("assisted"), the driver can decide whether they want to yield control over either speed or steering the system. Handing over the steering means the vehicle moves to the left or right by itself, while the driver only accelerates and brakes. They are also responsible for steering if the system is in control of the speed. Currently, German law requires driver to be in charge of one or the other part. Everything that might happen is in their legal responsibility (cf. Bundesministerium für Verkehr und digitale Infrastruktur 2017).
- In *Stage Two* ("partly automated") for specific and not overly complex circumstances, the vehicle controls both speed and steering on its own. Most premium vehicle manufacturers already offer vehicles with this technology onboard. It can be relieving, especially in traffic jams, when the vehicle can drive on its own up to a certain speed. However, constant monitoring by the driver is necessary. Currently, legal regulation in Germany requires the human driver to frequently touch the steering wheel, signalling their attention. Another scenario for *Stage Two* of

autonomous driving is parking. The vehicle can park entirely on its own. However, in *Stage Two* the driver still needs to constantly monitor the system.

- In *Stage Three* ("highly automated"), the vehicle can operate safely on its own while in automated driving mode. As long as the system is active, there is no need for the driver to constantly monitor the system or traffic. However, *Stage Three* is designed for predictable and therefore 'easy' roads. Once driving on a suitable road, visual indicators like lines on the street serve as a framework for the vehicle's system, so that the system's sensors can recognise and identify everything in the surroundings. If there are incidents or events during which the system cannot maintain driving automatically, it instructs the driver to take over the car. Suitable streets and highways which fit the conditions of *Stage Three* driving can be registered in special maps. On selected roads no human driving is needed, but as soon as the car leave these roads, the driver must take over.
- In *Stage Four* ("fully automated"), the vehicle does everything autonomously in specific situations. In these situations, there is no need for the driver's presence behind the steering wheel. For example, on motorways, all driving functions can be automated at this stage and perform safely on their own. In these situations, there is no need for a driver to intervene. However, drivers are still necessary for situations the system can't handle, e.g. city traffic. This stage is expected to be marketable by around 2030 (cf. VDA 2015: 15).
- *Stage Five* ("driverless") means that the automated system can handle all potential traffic situations on its own, not just some specified ones. Here, we can expect scenarios in which vehicles will drive entirely on their own from one point to another, even without any passengers or human beings on board. This last stage is what engineers are striving for. In addition to the comfort of not driving on your own anymore, it also opens a wide range of new business models for different kinds of vehicles. Cars can become cheap, autonomous taxis, which would lead to a decrease in car ownership, especially in cities. Buses can be used for other transportation in addition to their public transport function.

In sum, technological progress bears game-changing possibilities for driving. Initially, technical assistants only extended human senses. Current and future systems, however, will replace our senses and reduce humans to passengers.

The stage innovation is currently at depends on the kind of vehicle and its circumstances. *Stage Three* is already used, for example, in the latest version of Mercedes-Benz' E and S-Class (cars) (cf. Daimler 2018a). According to a recent McKinsey study, autonomous vehicles won't

have high shares of sale before 2020, but "once technological and regulatory issues have been resolved, up to 15 percent of new sold cars sold in 2030 could be fully autonomous" (Gao et al. 2016: 11). For buses, too, the extent of diffusion over the next years will depend on overcoming a wide range of barriers (regarding regulations, consumer acceptance and, to a lesser extent, technological challenges). However, the concrete development for buses may differ.

In public transport, there are already pilot projects using autonomous small buses that are able to carry 12 passengers in limited districts, such as a campus (cf. Welt 2018). There are also innovations such as trackless, autonomous trains in China, which might also be public transport solutions which compete with buses (cf. Wired 2018). For standard size buses, the state of the art is Daimler Buses 'Future Bus'. Daimler Buses positions its so-called City Pilot System, the driving assistant of the 'Future Bus', somewhere between *Stage Two* and *Stage Three*. Due to legal restrictions and for security and public acceptance reasons, bus drivers still have to be on board, sitting behind the steering wheel, able to take over. The City Pilot is a semi-autonomous driving system. This means that the driver is still fully responsible and capable of overruling the assistance system at any time. Multiple cameras, including some 3D vision mirror cameras which replace the rear-view mirror, cameras for lane recognition and radars covering ranges from 25cm to 200m and ultimately high precision GPS make the bus autonomous, according to *Stage Two* and *Stage Three*. All the sensors and cameras work together to build a network of different assistant systems, which act together as the City Pilot System. With a maximum speed of 70 km/h, the bus already manages a 20 km/h track including 11 stops, 22 traffic lights and 3 tunnels on the way. The bus scans its surroundings, identifies pedestrians and communicates with traffic lights through its sensors and cameras (Daimler 2018b).

Should one of the sensors, cameras or individual assistants no longer work, the City-Pilot System deactivates itself and the driver must take over. If the driver does not take over, the system initiates a controlled emergency brake. In general, the driver is observed by sensors and is not allowed to leave their working station or engage in any other task than observing the system. Currently, the system only works under predefined conditions like a Bus Rapid Transit (BRT). BRT is a roadway designed specifically for and limited to buses. The routes are normed not only with visual guidance for the sensors but also in terms of the whole framework. In BRT, buses do not have to interact with other traffic. This reduces delays. BRT systems combine the advantages of a metro, speed and capacity, and the advantages of a bus, namely low costs, high flexibility, and

system simplicity. In comparison to highways or interstates, cities are much more complex in regard to variables to be considered (e.g. jaywalkers or cyclists).

As highlighted at the beginning of this section, these developments bear both huge potential and huge risk for society. By focussing entirely on these effects, however, those most immediately affected by the innovation's disruptive power are often neglected: those who earn their living by driving. The next subsection considers this innovation's effect on the bus driver.

3.2 Effects of Autonomous Driving on Bus Drivers

If the technology behind autonomous driving advances to *Stage Five*, its ultimate consequence is the abandonment of drivers. This holds true for all kinds of vehicles – cars, trucks and buses. Again, we have to note that this doesn't process doesn't occur overnight. In the following section, we will show how current bus driver's work will change along the stages of autonomous driving. Understanding these changes can then help us see how to facilitate adaption.

- Most current buses are *Stage Zero* buses. The driver is responsible for every element of the bus's movement. Especially in city traffic, this can be exhausting (just think of autonomous buses rushing through the centre of Rome). The bus driver's eyes have to be everywhere. They must be aware of the street ahead and of their surroundings. Often, this can lead to stressful situations, e.g. when children run in front of the bus. Also, they have to observe the interior of the vehicle. Unlike a car, a bus driver cannot simply brake – a passenger may be standing, unsecured. It is the bus driver's responsibility to evaluate and estimate how they should act and drive to minimise the risk of accident and injuries, in the vehicle as well as outside.
- *Stage One* could be of ease to the driver in terms of everyday stress. In certain situations, there is no need to focus both on speed and steering, because the system does it. For some segments of routes, for instance on the highway, cruise control is helpful. It can decrease the stress that bus drivers experience when they have to cover too many things simultaneously. However, increased assistance systems should be reflected on carefully. In order to be helped by the system, the driver must be open to the technology. If the incessant monitoring of the system stresses the driver more than driving, it would give the opposite of the relief that was intended for.
- *Stage Two* brings further changes to the bus driver's tasks. Especially in unpleasant situations such as heavy traffic, assistants can take further pressure off the driver. They would allow the driver to

communicate with customers and be responsive to some questions, e.g. relating information concerning the journey or connecting lines. However, *Stage Two* also puts further demands on drivers. It requires an increased ability for spontaneous reaction. As the system can only handle highly restricted applications, and as the bus driver is constantly in charge of monitoring it, they will have to intervene on the spot (e.g. when driving through an especially narrow road). The drivers that we interviewed were sceptical about this intermediate stage. They remarked on the challenge of taking complete control of the bus without really being acclimatised to the current situation. The moment the driver needs to recover a feeling for the control units of the vehicle adds significant pressure.

- *Stage Three* – the first stage in which the driver doesn't have to constantly monitor the system – enables them to take care of completely new tasks. From a technological point of view, the driver is still required, since not all roads on the routes might be suited to autonomous driving in *Stage Three,* and a human driver has to be ready to take over if requested by the system. In these situations, which the system can handle on its own, the driver can engage in various ways with the customers. They might even be able to leave their seat and walk around. However, some drivers doubt that they would be capable of trusting the system to the extent that they can take their eyes off the street. Also, there is still the need for human driving in less predictable areas, like cities. This is not only required because of the demand for drivers to immediately take over control of the bus, but also because the system cannot yet communicate with other road users. New rules for human-machine interaction, including standards of empathy, have to be developed for situations like the one in which priority in traffic must be set. Determining who drives first has to be handled as easily as if by hands signs or other means of inter-human communication. However, even regarding this stage, drivers may be sceptical.
- In *Stage Four*, bus drivers would cede their responsibility, at least in predefined situations like BRT or motorway routes. Here, drivers can leave their spots without constantly being ready to take over. Drivers now have even more flexibility to engage in various service activities (see Section 5). Of course, this would require additional qualifications. Also, bus drivers must still be trained drivers, as there will still be situations which the bus can't handle (e.g. city traffic).
- Once *Stage Five* is reached, bus drivers in the literal sense will no longer be needed. Buses might not even have driving seats or steering wheels anymore. However, this doesn't mean that the current drivers will become redundant in their other responsibilities (as outlined in Section 2). Human attendants may still be necessary. In any event, *Stage Five* changes the profession wholly.

4. Why Bother?

Despite the prospect of automatisation and its radical effects on bus drivers which we have just outlined, one could respond in the following way: why bother at all? Of course, technology has an effect on employment. New machines and digitalisation have changed and will continue to change job realities. There is nothing wrong with this. Indeed, technology is partially responsible for some of today's prosperous society. Also, as we have seen throughout history, technology always compensates for the jobs it takes. If bus driving as an occupation is radically altered by autonomous driving, there isn't much need to worry. Even if some may lose their jobs as a consequence of rationalisation, technology ultimately creates more jobs than it takes away. Additionally, one can note that there is a shortage of recruits in the bus industry. This fact ties in with rationalisation neatly. Companies would not have to change their regulations or assist drivers in any way. Instead of interfering with the necessary process of adaption, one should just let things flow.

We call this stance the 'no-change-needed-position'. In the following, we argue that the 'no-change-needed-position' fails, because it relies on un-solid economic foundations and we should be concerned with every single individual, not just aggregate value. Apart from these foundational considerations, even prudential economic reasons should give decision makers a significant incentive to effectively accompany the process.

4.1 Descriptive Uncertainty

Contrary to one of the premises of the 'no-change-needed-position', it is far from certain that a 'full compensation' of jobs that are lost due to autonomous driving will take place. In order to show this, we will briefly survey some theories about employment. Economists' discussions on the relationship between technology and employment have been controversial.

In the past, we witnessed individuals forcefully fighting for their jobs when they were threatened by innovations, the so-called Luddites (cf. Britannica 2018). On the other hand, employment nowadays, in a highly innovated and mechanised age, is not systematically lower than it was before several disruptive innovations. In fact, countries like Germany have recently reached a new optimum in employment numbers, contrary to the believe of mechanisation sceptics (cf.

Stadelmann 2017). Does this mean that automatisation can improve bus drivers' job prospects after all?

Technological process-innovation, e.g. through new machinery, is labour-saving (cf. Vivarelli 2012: 2). In other words, it leads to less demand for employment for the task in question. For bus drivers, this would mean that as soon as buses are fully autonomous (*Stage Five*) they will no longer be necessary in their function as drivers. Even before *Stage Five* automatisation, it might imply that – among other changes – bus drivers would have to take less breaks than they currently have to, so perhaps shifts would last longer and less drivers would be employed.

However, classical economists like David Ricardo have claimed a positive effect of technological innovation on employment levels (cf. Ricardo 1821).[6] How is this possible? In addition to the direct labour-saving effect of technology, there is an indirect effect on employment. Via several mechanisms (e.g. decreases in prices), overall demand and employment rates are supposed to rise when technology increases. This could mean that while companies may lay off drivers due to the increased capacity of a machine, the demand for employees will increase in other areas. This could occur within the same company (a traffic company might require people who monitor self-driving buses) or in a wholly different field (e.g. self-driving buses might get people to work faster, increase overall productivity and lead to the emergence of new firms). Already here it is noticeable that emerging tasks will probably require different levels of skills than former drivers have.

Which of these two effects (the direct or the indirect) dominates is a much-discussed question in economic literature. Crucially, this question cannot be answered a priori. Economic theory has no "clear-cut answer to this" (Vivarelli 2012: 11). Theoretically, either of the effects could overweigh the other. Which one does, is dependent on a number of contingent facts, e.g. the specifics of the industry in question, or the institutional setting. Thus, autonomous buses could either lead to an overall decrease in jobs, to roughly no change at all, or even to an increase in the long run. What remains clear is that we are facing an empirical question.[7]

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6 Note that also views claiming that 'machines take away our jobs' have been widely regarded as committing a "Luddite Fallacy" (cf. Tabarrok 2003).

7 Note that this theoretical indeterminacy does not stop economists from further engaging with the topic. Today, there is still lively debate centred on the crucial question of the net effects on employment. The topic is constantly present in media and academic debate (cf. Brynjolfsson and McAfee 2014).

Investigating this empirical question is beyond the scope of the present paper. It will suffice to note two points here. First, macroeconomic empirical evidence is also ambiguous as to whether innovation has positive or negative effects on employment (cf. Vivarelli 2012: 17–20).[8] An additional insecurity for predictions linked to bus drivers arises from the fact that current technological innovations seem unlike anything before. In any case, empirical evidence can only warrant uncertain predictions about what is actually going to happen to the specific group of bus drivers (cf. Brynjolfsson and McAfee 2014). Second, a general skill bias during innovation processes is visible: workers with lower skills tend to be hit harder by technological innovation (cf. Vivarelli 2012: 32).

However, apart from being complex and inconclusive, going deeply into empirics might not even be necessary for our present purposes. In order to answer whether or not decision makers have to intervene in the process of automatisation, we have to engage in more general ethical considerations.

4.2 Stakeholder Responsibility

Even if we knew that autonomous driving would come with full labour compensation, it is not necessarily an improvement for everyone involved. This is because it is highly doubtable whether the stakeholder group most affected by it, bus drivers, will benefit from potential compensatory effects. Also, the timespan in which affected individuals might benefit from it is essentially uncertain.[9] Lastly, if compensation only means the provision of alternative employment, this neglects current bus drivers' self-conception and ethos. We believe that these grounds justify company decision makers being responsible for assisting bus drivers during the process of automatisation.

During this threat to employment, it is crucial to look after each affected stakeholder.[10] It would be objectionable to simply rely on aggregate effects on the labour market, even if it was positive. After all, individual lives are at stake here. The innovation comes as an external shock to them, altering everything bus drivers are used to. Most can't simply resist this development by

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8 Note that microeconomic evidence points towards a positive link between innovation investment and employment (cf. ibid.).

9 Think of Keynes's famous expression: "In the long-run we are all dead" (Keynes 1923: 80).

10 For a general introduction to stakeholder theory, see the seminal Freeman (2010).

opting for an alternative that preserves their current occupation. As a consequence, it would seem unjust and careless to leave behind some individuals while the overall public benefits from the innovation. It would neglect the concern we should pay for each individual and their way of life. Instead, a reciprocal approach towards the benefits of innovation is societally demanded. This is especially the case since bus drivers play a central role in everyday life and are the employees of often partly publicly owned transport institutions. Part of this reciprocity relation would demand preserving elements of bus drivers' ethos, as this ethos often constitutes essential parts of an individual's life. At this point, one response may be that the preservation of jobs and ethos is not only unnecessary but even has detrimental effects. In fact, if rationalisation is possible, this could lead to more efficient outputs: it may eventually cause lower prices and cheaper access to mobility for the majority of people. Artificial job preservation could hinder these effects. There are two possible rejoinders to this objection. The first is related to the values that have just been outlined. We must concern ourselves with each individual. Autonomous buses will affect bus drivers like no other stakeholder group. Their interests cannot obviously be weighed against those of 'the general public' or some long-term economic goals. Secondly, and more tentatively, bus driving (or at least being a bus attendant) seems an important job to preserve. It is highly questionable whether a complete rationalisation of human employees in a means of transportation that is a deeply social is desirable at all. In situations where people come together as strangers, communication, questions, and sometimes even conflicts emerge naturally. For these, having a human contact person on board – in addition to a driving machine – might be very beneficial indeed.

Given that bus drivers should be helped throughout the process of innovation, who should do this? Intuitively, one might turn to the state and require it to secure lasting employment by structural intervention (akin, say, to the Government Pension Fund of Norway) – as is called for in other instances of structural change too, e.g. in fossil fuel phase-out. It is natural to ascribe some role to politics in this process. However, the extent to which states should interfere is controversial. This is a debate on which we do not take sides in this paper. But then who should act?

Those who bus drivers are most dependent upon bear this responsibility. It is widely accepted that every agent has the responsibility to act in a respectful and supporting way to those on whom they have an influence. Through their actions, companies have huge effects on bus drivers. We

take two major groups of companies to be responsible here due to their major influence on bus drivers' job realities: bus producers and transport institutions. With this influence comes the responsibility not to harm (and even to help) the affected agents. Bus drivers, like all employees, act within the framework of rules set by these institutions. They have entered into a special dependence relationship with their employers: they are, as economists put it, 'specifically invested' and expect job security. To account for this individual devotion, it seems imperative for companies to assist individuals throughout the process of automatisation and facilitate adaption.[11] Securing this requires more than merely providing an occupation: to take into account autonomous human beings in an autonomous future, companies should also consider individual self-conception.

Incidentally, helping bus drivers in the ways highlighted in the next section is especially apt for the actors we claim responsible. Of course, having an obligation implies that one has sufficient capability. This means that we have to ask whether companies can in fact help bus drivers. The answer is that they can. Companies can directly steer the process of adaption by setting regulations and by engaging with the technology. Bus producers design buses, and some might also have other means to facilitate adaption.[12] Before elaborating on these possibilities, we want to briefly point out why it is not only morally required but also beneficial for companies to secure an adequate handling of the innovation.

4.3 Corporate Benefits

While some, for example Daimler, BVG and Deutsche Bahn (cf. Forbes 2016; RBB 2017; NY Times 2017), are already testing the technology, some transport institutions and bus drivers aren't currently preparing for the upcoming development. The excuses often presented for this are short-sighted. Many bus drivers we spoke to do not expect that autonomous buses will be able to replace them in all of their tasks (e.g. difficult situations in city traffic), at least not anytime soon and not in a world of 'mixed traffic' (i.e. traffic containing both autonomous and non-autonomous

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11 Note that there is an ongoing debate on collective responsibility, and whether it is even possible (cf. Smiley 2017). Engaging with this is beyond the scope of this paper. We only want to point out here that, although we point to collective actors, the responsibility ultimately links back to the individuals within them.

12 Here, the state inevitably plays some role in setting the framework for companies' actions (especially regarding decisions on the current regulation for compulsory training).

vehicles). Even if it will not replace bus drivers any time soon, we indicated that it might be coming sooner than expected (see Section 3.2). This alone should suffice in giving both bus drivers and companies compelling reasons to prepare for the process. If automatisation is approaching the mobility market and they are unprepared, they might lose out on this ever-more competitive market.

> A paradigm shift to mobility as a service, along with new entrants, will inevitably force traditional car manufacturers to compete on multiple fronts. Mobility providers (e.g., Didi Kuaidi, Uber, Zipcar), tech giants (e.g., Apple, Google), and emerging OEMs (e.g., BYD, Tesla) increase the complexity of the industry's competitive landscape (Gao et al. 2016: 13).

Technology companies are emerging globally as competitors and mobility is becoming more connected. Just think of Google's development of autonomous cars or of Uber's plans to develop 'robo taxis'. Through these new players, competition can originate from anywhere, potentially. Companies can't afford to be unprepared for this development. The best preparation for the automated future (apart from testing the technology itself) is making the people who will handle the technology aware and ready for it. If drivers cannot deal with the buses they are supposed to navigate soon, this will lead to traffic chaos and inefficiency. As shown in Section 3.1, machines will no drive themselves alone immediately. Throughout the process – and even once stage five is reached – new and different skills will be required from bus drivers.

If companies can make bus drivers ready for this development, they will be in a good position to cope with upcoming challenges. This specific investment can help them to efficiently adopt new technology at every critical juncture. Studies have shown that if one succeeds in preserving and fostering the motivation of one's employees (of which the professional ethos is a crucial part), productivity benefits too (cf. Kühlmann 2008). Thus, apart from the uncertainty connected to the compensatory effects of technological unemployment and the ethical responsibilities which arise, there are also purely profit-oriented reasons (for preserving the current ethos of bus drivers into their future work task) that strongly favour rejecting the 'no-change-needed-position'.

Note that this conclusion in no way claims that the process of technological innovation should be resisted. We do not take a position on whether it is generally welfare-enhancing or not. The point we want to convey in this section is merely that the challenges accompanying

innovation have to be taken and handled seriously. Simply waiting for adaption in a 'laissez-faire' manner will not suffice. What is required is companies' commitment to facilitate the process of adaption – for both responsibility and profit reasons.[13]

5. Road Map

Let us briefly recap what we have detailed so far. Automatisation will have huge effects on bus drivers. It will radically alter their professional ethos, of which responsibility is a crucial element. We have argued that – given the insecurity of compensation and the importance of each individual – companies ought to assist drivers throughout the process. But how can they do this?

In the remainder of this text, we want to outline suggestions on what has to be done to assist the process. Our suggestions focus on the development towards automatisation. In Section 5.1, we will address the necessary measures for preparing for stages *One*, *Two*, *Three* and *Four* of automatisation. Our suggestions are as follows: first, a gradual implementation of assistance technologies, second, the slow introduction of new occupational tasks accompanied by drastically reformed professional training, and third, a bus design that helps strike a balance between concentration on the road and passengers. In Section 5.2, we will give a perspective on bus drivers' role once 'full automatisation' (*Stage Five*) is reached. We will argue that if companies follow the suggestions outlined for the short to medium-term, former bus drivers will be optimally prepared for the point at which they are no longer be able to drive at all. To reach this, a focus on service aspects in their education and a radical reorientation of professional conception is crucial. Taken together, these measures should ensure that many of today's drivers – and especially, today's trainees – remain attractive for their employers, and can retain parts of their professional ethos. Bus producers can implement all of these suggestions in cooperation with local traffic companies: they can design the buses and use (company-owned) training programs, which is already done by Daimler Buses with its OMNIplus program (cf. Daimler 2018).

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13 It might be said that this is a very minimal insignificant point to make – companies have to take stances on developments anyways. If this were widely acknowledged, we would be happy not to stress the issue. However, it seems that not all companies evaluate the eminence of innovation and the responsibilities that come with it in the appropriate manner.

Buses are at the brink of new levels of automatisation. As we have seen, it is unlikely that most will become fully autonomous straight away. Rather, they will gradually incorporate new technologies. As pointed out in Section 3, these stages of automatisation can be distinguished according to the tasks in which the system assists the driver, and which responsibilities the driver still has. Our key claim was that although these gradual developments may help drivers at first, they are also likely to put additional pressure on them. Drivers have to be ready for action instantly, without being accustomed to the given situation. Thus, it is imperative to effectively prepare drivers for these situations. Three steps are necessary to do so.

The first is to introduce these systems carefully. By no means must drivers be taken by surprise by the new technology. It may prove useful to first introduce certain assistant systems and let drivers get used to them. Today, it seems that many buses contain no more modern technology than they did two decades ago. Of course, this is partly due to the fact that new buses are extremely expensive. Therefore, it seems uneconomic to suggest that bus producers develop or that transport institutions buy new buses for each new step of the technology. Rather, both should aim for buses equipped with all kinds of technology (like the 'Future Bus'). Transport institutions should only gradually release technology's potential, and let drivers make use of only some of the technology at first.

Correspondingly, we strongly recommend testing different mobility solutions for autonomous buses in suitable regions of Germany. It is crucial to implement innovation at local levels. Depending on economic and regional particularities, the requirements of introduction and adaption will vary. The different challenges in rural or urban areas will be of great importance. This is especially the case because we do not know in which direction future mobility markets will develop. Experts say it could go either way: traffic could become highly individualised or public transport could prevail (VDV 2015b: 11–12). This is unknown a priori. During this process, it seems helpful to introduce the system on easy terrain first. Motorways and Bus Rapid Transit (BRT) lines, those where *Stage Two* and *Three* systems are likely to be applicable early on, seem the best choice. Due to lower levels of external danger and a lot of uniformity, these situations may be especially suited to getting used to assistant systems.

This careful introduction and local accommodation should ensure that drivers are not overwhelmed. If they were, this would not only lead to discontent on their behalf but to dangerous

situations for traffic as a whole. In order to remove scepticism, drivers could also be granted ample opportunities and incentives to engage with the technology. For example, they should have the chance to take (paid) training for new systems and for learning about their advantages. Such training should contain both security and efficiency measures. Short inductions are already customary in long-distance vehicles. However, drivers are frequently introduced to only the most basic of technical mechanisms. We call for training that is more widespread, with engaging introductions to the technology. Beyond technical measures, bus drivers should also get to know the ecological and safety advantages of the system and its limitations. Furthermore, training should also contain psychological elements. Here, drivers should be able to learn how to deal with stressful situations relating to the system. Companies must account for the feedback drivers provide in these first phases.[14]

The second step is to provide drivers with new tasks. Automatisation creates room for these. At least from *Stage Three* onwards, the driver doesn't have to monitor the street all the time. The time that is now available has a lot of potential. Drivers can engage in various value-adding activities. These might include special services for disabled persons, conversations with regulars, or offering drinks and services. Ultimately, drivers will be able to take up radically altered tasks. Even in *Stage Five*, bus drivers may still be required as service staff. They might become tourist guides or security guards, supervisors or entertainers.[15] Companies should endorse these new tasks and introduce them gradually.

Drivers need to be prepared for upcoming service tasks. Crucially, this has to be done way before *Stage Five* is reached. Overall, we suppose that an increased shift towards the service sector would be helpful. The shift in tasks calls for a radical shift in the training of drivers. Currently, drivers are stuck in an old-fashioned education system that focuses on driving abilities exclusively. This will become less and less necessary. Even before they become completely redundant, drivers' education should focus more on the service aspect. The vocational training 'Fachkraft im Fahrbetrieb' which we mentioned in Section 2 is a step in the right direction. More is necessary, however. Here, instructors should be guided by education in other professions, e.g. in typical service jobs like flight attendants.

Another good starting point is to address in-service training. Traffic companies must provide

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14 This mindful implementation can also facilitate customers' adaption to the technology and therefore ease relations with drivers. In order to do so, the introduction should be accustomed by information campaigns.

15 Note that this is likely to differ for short and long-distance transportation.

suitable further education. Currently, bus drivers have to take five obligatory modules over five years. However, these are sometimes not aimed at their needs. In some companies, drivers have to acquire knowledge that is of no direct use to them at all (e.g. truck driver instructions). As a consequence, the training is often viewed purely as a matter of duty. A driver we interviewed commented that they never really bring anything new. He expressed the desire for more 'extensive training'. Accordingly, transport institutions should aim to make the training innovative and attractive for the bus drivers. Firstly, it must be guaranteed that training relates to bus driving and that it prepares drivers for future challenges. Secondly, and more specifically, these elements can already include service training, psychological courses and additional creative elements.

The third step is to accompany this gradual development at all stages by suitable product design. The bus ought to be constructed in a manner that is helpful for bus drivers. Abandoning old-fashioned construction can contribute greatly to easing the adaption process of both drivers and customers (and, consequently, their relationship). Daimler's 'Future Bus' takes a good step in this direction. It has carefully restructured seating in the back which can help to make use of new digital possibilities. However, more can be done to assist drivers and meet new demands. For example, in the 'Future Bus', the driving seat is left mainly unaltered. If the design of the bus neatly corresponds to the assistance systems which are currently in use and to services which are currently offered, this can help to decrease anxiety and create transparency. This, in turn, would facilitate bus drivers' tasks and the increasing demands connected to semi-automatisation.

How can bus producers design products in such a facilitating way? We only want to give a few examples. One is to include a clear visual strategy, signalling the current driving mode transparently. Such design elements may include light signals on the outside. The interior of the bus must also be considered, e.g. by redesigning furniture elements. For instance, producers could include sliding walls at the back of the driving seat that clearly separate the driver while they have to engage in steering or monitoring but sliding down once they can leave these responsibilities and take care of other tasks. This would create clear signals to passengers as to the activity the driver is currently engaged in and would prevent distraction. At the same time, it would allow for communication as quickly as possible.

In order to decrease the stress, put on drivers, product design could also assist them. It should prepare drivers for situations in which they have to take over the vehicle at a moment's notice. For example, manufacturers could develop simulating accelerators that give drivers the feeling of

how much pressure is currently working on the street and could help them to be ready to intervene. Also, we recommend mobile devices that notify drivers visually and audibly when they have to intervene. These could also contain cameras for the street and front-rear-views, keeping them updated even when they are walking around.

5.2 Final Stop

As has been shown, drivers can engage in various new activities even before full automatisation. But once full automatisation is reached, new questions arise: what should the bus driver's role consist of? Which steps are necessary to prepare drivers for *Stage Five*?

If companies follow all of the steps introduced in the previous subsection, we believe that today's drivers will be optimally prepared for a fully automatised future. Recall that we recommend a gradual shift towards a service occupation rather than one focussed on technical operating. If implemented consistently, this guarantees that *Stage Five* automatisation will be nothing more than the next step on the road to an altered profession that has already adapted to future demands. When concentrating more on the service aspect (especially in bus driver education), drivers cultivate their comparative advantage over machines: a human capacity to decide, handle situations, and provide passengers with what they need. This is where they can retain a crucial part of their professional ethos. Even in situations where the vehicle can handle all of the driving, a bus faces many situations one cannot program, not least as it contains a social hub at its interior. This means that there is room for attendants to make spontaneous, free, and socially beneficial decisions.

We believe that if companies have managed to assist bus drivers thus far, then they are in a good position to deal with future work life. Tasks will be radically altered from previous ones (one might even call drivers 'mobility agents' by then). Indeed, with the skills they have already learned today – punctuality, reliability, social skills – they may be better suited for certain tasks than some professionals used to very narrow (academic) training. Also, demographic changes and the aforementioned recruitment shortage have shortened the process of adaption. Therefore, we do not recommend any specific measures for *Stage Five*. There are two points to note, however. First, this doesn't mean that bus drivers are guaranteed to have a job which they will endorse happily. Recall that Section 4 pointed to significant uncertainty about future developments. Also, usual

demands in the service sector will probably apply by then. In this, there will be challenges for companies but none which we can specifically address right now. Second, it will be necessary to follow the two maxims of this paper when entering *Stage Five*: gradual developments and specific, individual interaction with the stakeholder group.

6. Conclusion

Bus driving is a wide-spread profession in Germany. Most bus drivers work in shifts, get paid little, and face a lot of stress in their every-day lives. This causes some of them to be rather frustrated with their jobs – often, keeping calm and putting up with stressful environments is seen as one of the main challenges. These challenges, however, are also what leads to a core value in the professional ethos shared by the drivers: they are proud of getting individuals safely from A to B every day. This can be tough, but when conducted successfully (as most drivers do) it creates a feeling of meaningful occupation. The innovation of autonomous driving threatens to both undermine and then take away the bus driver's employment. There are many tough, fundamental, and existential looming questions for bus drivers. Several stages towards fully automatised buses lead to a shift in the tasks, drivers have to conduct. During the process, bus drivers' tasks might become even more demanding. Ultimately, however, they are released from their responsibility to transport people safely. This has huge effects on drivers' self-conception and their position in the labour market. We have argued that companies are responsible for helping them throughout this process. Our suggestions build on the gradual endorsement of technology, a reorientation of occupational tasks and education, and product design which is tailored to these processes. If successful, these short-term measures can help preserve central parts of bus drivers' professional ethos while refining it.

The themes we have explored in this paper are, of course, not limited to bus drivers. Many other professions currently face similar issues. Digitalisation and automatisation affect a variety of fields, from traditional manufacturing to law and medicine. It is important to discuss how these developments affect society as a whole. We need to get a firmer grasp of the relationship between humans and machines. The state's role in the process has to be determined: we need to know to what extent it should regulate technology's effect on employment. Besides contemplating on these wide-scope questions, however, a lot can be done immediately. Companies play a crucial role in

the adaption process. They are responsible for facilitating their employees' adaption to technology. Even before philosophical questions are settled, companies can and should have a positive impact on their employees at each crucial juncture. For this, there is no one-size-fits-all or top-down solution. Close examination and individual discourse are the most promising approach to meeting the specific needs of specific stakeholder groups. This approach can be challenging, and it seems impossible to account for all respective opinions. Yet, when conducted carefully and flexibly, we believe it is the right step towards an innovative and professional future.

In this paper, we have tried to cover the specific case of bus drivers. We suppose that somewhat similar results apply for closely related professional groups like taxi and truck drivers. Our hope is that the current approach motivates companies and professional groups in all fields to conduct similar examinations.

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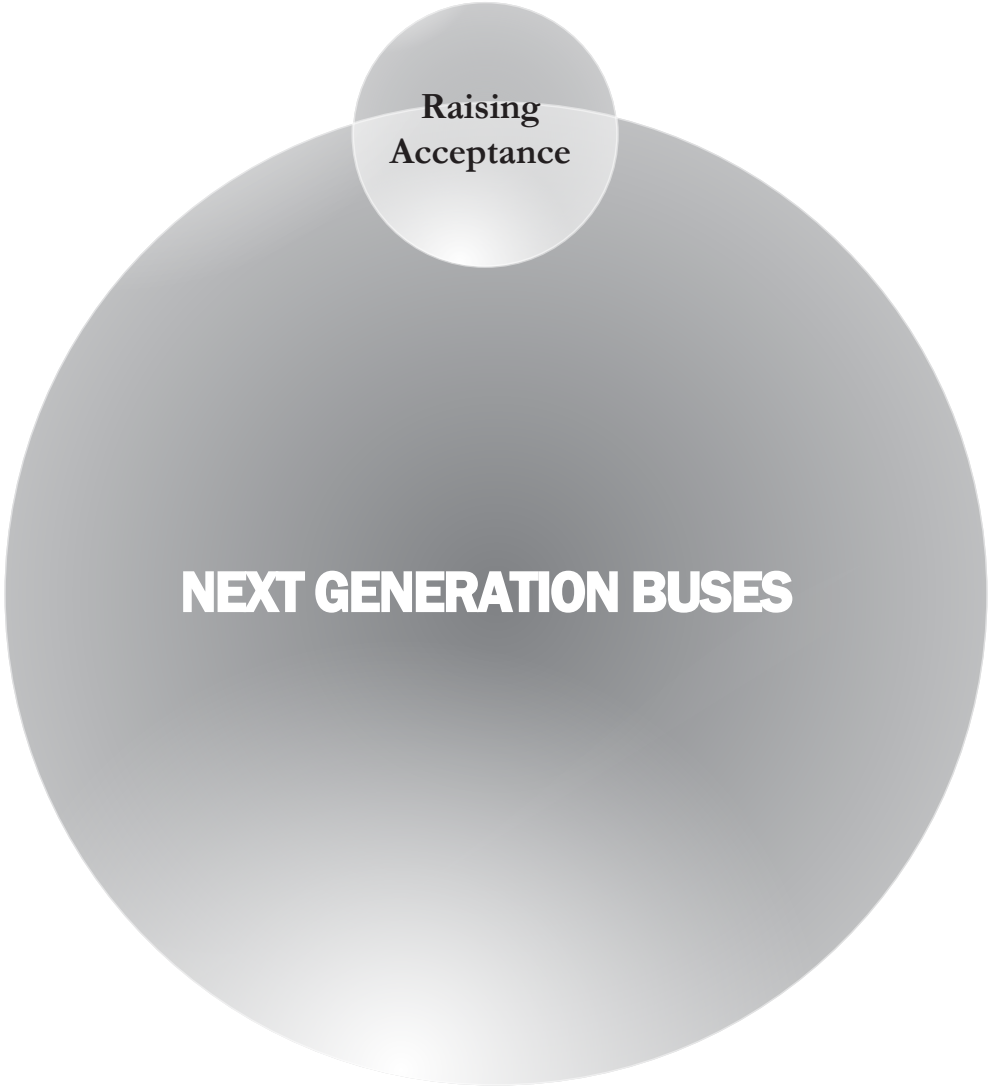
Raising
Acceptance
NEXT GENERATION BUSES

Raising Acceptance

A Stakeholder-Based Communication Strategy for Autonomous Buses

Milena Dehn and Elena Göttert

Keywords
Autonomous Driving, Stakeholder Management, Innovation, Communication

This paper will examine how a stakeholder-based communication strategy (SBCS) can ease the implementation and diffusion of autonomous buses. As autonomous vehicles have the potential to change urban mobility and the role of buses, their successful launch is important for both Daimler Buses and Daimler. Radical innovations bring the necessity to modify the firm-based stakeholder approach and to employ it to a specific, innovation context. Through analysis and by involving stakeholders of innovative projects, our communicative approach secures the 'license to innovate' and raises necessary social acceptance for a successful diffusion. Applying our framework to the introduction of autonomous buses, we will show that a dialogue about autonomous buses should be opened now and involve the affected stakeholders. It is particularly important to transparently inform these stakeholders about the new technology and its implications. Choosing a participatory approach involving the public transport companies, communes, innovative clients and environmental organisations can contribute to establishing the autonomous Daimler Bus as innovative mobility solution.

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1. Introduction

Imagine you are waiting at a bus stop in Bayreuth. At the exact arrival time a bus approaches, stopping right next to you so you can enter comfortably. Inside the bus, you find comfortable seating and standing area. The passengers are people with different ages, careers and cultural background, and the bus is still the most popular traffic means for broader society. That the bus has no driver does not disturb you, it has been that way for some time now. While communicating with the nearest traffic lights and autonomous cars the bus continues its route, estimating the best times to start and stop and effectively using current traffic situation. You lay back and relax, because you feel safe and you know that, in the case of an emergency, the intelligent bus will do its best to save as many lives as possible. You also know that by taking the bus, you are reducing traffic and noise pollution in the city and saving time. Overall, the experience is about more than just arriving at your destination: it is an attitude which you embrace.

This thought experiment could take place only 20 to 30 years ahead from now (cf. Bomarius 2016). Google expects the introduction of the first commercial and fully autonomous 'Google Car' to come before 2020 (cf. Johanning 2015). There is no other field which faces such a profound makeup as mobility is facing right now. This concerns not only the development of electric vehicles, but also of autonomous ones (cf. Land Baden Württemberg 2016). Technically, autonomous vehicles are soon to become reality. But the race to be the first to introduce a marketable autonomous car for series production is about far more than just sensors, algorithms, infrastructure and legal issues. It is about introducing a disruptive innovation that will change the mobility market and the way society uses mobility solutions. By relying on autonomous machines, it also depends on the social acceptance of a new technology.

As our thought experiment shows, the introduction of autonomous vehicles offers great potential for the mobility sector. It could be the answer to the challenges of public mobility. It could make public transport more efficient, comfortable and customisable, while at the same time providing advantages like sustainability, climate protection, decarbonisation[1], security[2], and

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1 According to a new study from the Energy Information Administration, connected and autonomous vehicles could reduce fuel consumption by 44% for private vehicles by 2050 (cf. McMahon 2017).

2 The international Technology and Consulting Society Invensity estimates that autonomous vehicles raise security on the road in the long term (cf. Invensity 2017).

quality of life. Furthermore, buses remain affordable and social and can connect people (cf. Urbantransportgroup 2013).

On the other hand, disruptive innovation comes with a risk for Daimler Buses and public transport companies. Autonomous buses will compete with autonomous taxis and shared cars, which could be more attractive for single users than taking a public bus. Distinct transportation means will grow closer, since an autonomous car can be a private car, a taxi, a bus and shared car all at once. For end-users, buses lose their unique selling point: not having to drive yourself and not having to look for a parking spot. This endangers the existence of buses as a means of public transportation (cf. Die Verkehrsunternehmen VGV 2015). To benefit from the chances of automatisation, it is thus necessary that both the public sector and private manufacturing companies jointly deal with the development and define a strategy to remain important players in this field.

Additionally, clients might perceive the autonomous bus revolution as threatening in a different way: autonomous vehicles are closely connected with the fear of personal autonomy, and there is thus a higher threshold for trust and acceptance of this technology (cf. Vogt 2015). It is at this point that autonomous driving differs from innovations like the electrification of engines: while merely technical innovations need to be investigated for infrastructure and technological path dependencies, the automatisation of buses must primarily be considered as radical in a social and cultural sense (cf. Geels 2004). Launching autonomous buses successfully is therefore about listening to stakeholders and finding answers to their worries, while at the same time convincing them that the new means of transport is reliable, safe and comfortable. It is necessary to create social acceptance to guarantee the 'license to innovate'. Even though technological advancements are still necessary, the social accompaniment of the innovation should therefore be started right away: explicitly, and well in advance.

In the following, we propose a stakeholder-based communication strategy (SBCS) to prepare and accompany innovations. Through analysing and involving stakeholders of innovation projects, this communication approach secures the 'license to innovate' and raises the necessary social acceptance for successful diffusion. Using this theoretical framework, a communicative approach for the introduction of autonomous Daimler Buses is set up.

We will first sketch the existing stakeholder approach and introduce the idea of innovation focused stakeholder accounts (Chapter 2). Afterwards, we will explain why communication is the

key for successfully implementing innovations and prioritise stakeholder groups and communication measures in salience and strategical urgency (Chapter 3). We will then apply our approach to the innovation of autonomous buses: after describing the innovation and its expectable consequences, we will analyse four stakeholder scenarios and the way they change (Chapter 4). We will use this analysis for formulating concrete communication measures for Daimler Buses.

2. Material-Centred Stakeholder Theory

2.1 Theoretical Framework

Stakeholder theory is a "theory of organizational management and ethics" (Phillips et al. 2003: 480). It was introduced by Freeman (1984) and since then has developed and been applied to different business contexts. In the stakeholder's view, a corporation should benefit not only shareholders, but all its major stakeholders. Stakeholders are defined as "any group or individual who can affect or is affected by the achievement of the organisation's objectives" (ibid.). Success can, in this scenario, not be assessed by shareholder value alone, but needs to consider contributions to all stakeholders (cf. Wallace 2003). By considering the interests of all affected people, stakeholder theory involves the ethical evaluation of the ends of an organisation and the appropriateness of the means to reach the ends. On an instrumental reading, it is also closely connected with reaching goals by focusing on strategically relevant groups and their interests (cf. Phillips et al. 2003).

The stakeholder theory was introduced by Freeman as a way of adapting management theory to a changing and more dynamic environment (cf. Freeman 1984: 4 ff.). By focusing on internal and external interests, he wanted to put managers in the position to strategically manage within this new framework instead of reacting to crises (cf. ibid.). Despite this focus on dynamic environments, conventional stakeholder theory focuses mainly on general governance and organisational management. Daimler, for example, uses dialogue with its stakeholders to examine which topics are important to them. Topics that are ranked highly by stakeholders and the firm are defined as 'materialities' and set the frame for the firm-specific CR-strategy (cf. Bürgel and Heger 2014). Stakeholder theory thus ensures responsible governance, which involves and does

not neglect firm-related stakes. Considering Daimler, 'Fuel consumption and CO_2 emissions' was assessed as materiality, and therefore plays a key role in the current sustainability strategy (cf. ibid.: 448 f.).

However, considering the fast-developing environment in the mobility sector (see Chapter 5.1), it seems valuable to focus even more on the dynamics of stakeholder relations and stakes. This can be done by focusing on specific materialities, their development and the related stakes. Materiality thus stands at the beginning and not at the end of the analysis. Stakeholders are then mapped specifically regarding materiality. The traditional stakeholder concept is thereby turned upside-down: instead of asking stakeholders to define materialities, particular materialities and their development are examined through a stakeholder perspective. This should not replace the traditional stakeholder concept, but can rather supplement it for important materialities, especially if they crucially involve a dynamic component and are not part of daily business.

Innovative undertakings can be seen in this light (cf. Bourne/Walker 2005). The material-based stakeholder concept thus seems a valuable contribution to their success, especially regarding radical innovations that will foreseeably induce criticism and fear. The project can benefit from analysing claims and connected power structures, while the ethical necessity of legitimising changes in the business model can be achieved through appropriate stakeholder communication (cf. Blok et al. 2015).

In the following, we will outline our 'material-based stakeholder approach'.[3] Based on our application, the necessary features of the approach are the applicability of innovation projects (particularly considering the dynamics of the matter), the practical usability from a management perspective, and the possibility to account for legitimate and strategic considerations (cf. Vos and Achterkamp 2006). The stakeholder analysis consists of three steps:

- Defining future scenarios that cover relevant steps of the innovation (see Chapter 2.2)
- Identification of stakeholders and stakes (see Chapter 2.3)
- Categorisation of stakeholders regarding legitimacy, power and their attitude towards the project (see Chapter 2.4)

[3] Even though stakeholder theory is already used to analyse innovations, the focus lies mostly on instrumental applications or one-sided communication strategies (cf. Gould 2012; Troshani and Doolin 2007; Murphy 2014). We will focus on outlining an approach that includes legitimacy as well as strategic considerations.

2.2 Future Scenarios

An innovation is "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations" (Organisation for Economic Co-operation and Development OECD/Eurostat 2007). Innovation explicitly includes the implementation and diffusion stage and thereby differs from pure inventions and R&D activities. It is a project which aims towards a firm's goals of competitiveness and profit (cf. Gatignon 2016). However, if carried out appropriately, it is generally seen to benefit the development of economy and society in a broader sense (cf. Organisation for Economic Co-operation and Development OECD /Eurostat 2007).

Innovative literature traditionally distinguishes three main stages of an innovative process: initiation phase, development phase, and implementation (cf. Vos/Achterkamp 2006). Even though a non-linear and overlapping innovative process seems to better comply with reality, it is indeed helpful to distinguish between specified starting and end points, and crucial decision throughout the process. This allows for a better analysis of related stakes and their development. We therefore propose setting up starting and end-point scenarios which show how the innovation will shape the stakeholder structure in the long term. Additionally, scenarios covering crucial steps of the innovation should be considered. The necessary scenarios can be selected dependent on the aim of the communication strategy and accordingly focus on different stages of the process. Setting up different end scenarios and related process scenarios also makes it possible to highlight key decision gates and their consequences.

2.3 Identification of Stakeholders and Stakes

Stakeholders of an innovation project are the "parties that have an interest in the outcomes, of whatever kind, of that project" (Vos/Achterkamp 2006). For analysing potential stakeholders of innovations, we used the framework and process proposed by Vos and Achterkamp (2006). It gives guidance on how to best identify all the possible stakeholders of an innovation project.

Additionally, we employed a modification of the linkage model by Grunig and Hunt (1984), to ensure that we covered all potential stakeholder groups. Grunig and Hunt distinguish stakeholders with enabling, functional, diffused or normative linkages with the firm (cf. Grunig/Hunt 1984; Rawlins 2006). We transferred this set-up and considered only links directly

connected to the innovation project. 'Enabling linkages' are thus parties that have authority about the project and can enable or disable it. 'Functionally linked stakeholders' structurally contribute toward the innovation, and can be divided into input and output linkages, dependent on whether they deliver resources or are consumers and thus influence the diffusion. 'Diffused linkages' relate to stakeholders who are not closely connected to the project but can be influenced and therefore have a stake. 'Normative linkages' refer to groups that work towards the same goal as the innovation project does.

2.4 Categorisation of Stakeholders

To categorise stakeholders, we modified the stakeholder salience model of Mitchell, Agle and Wood (1997). Our model is not directed towards a descriptive analysis of stakeholders but serves as an action-guiding orientation framework for stakeholders in innovation contexts. Stakeholders and their specific stakes are evaluated according to power, legitimacy and attitude.

- Mitchell et al. define 'power' as a "relationship among social actors in which one social actor, A, can get another social actor, B, to do something that B would not otherwise have done" (Mitchell et al. 1997). In our context, it can be understood as the ability to influence the outcome of the innovation project from within the project team or trough external influence on laws, regulations or public opinion.
- 'Legitimacy' refers to the ethical evaluation of stakeholder claims. Not all claims expressed might require the same consideration from an ethical viewpoint, and some might need consideration from this viewpoint even though they are not articulated through powerful stakeholders. Mitchell et al. define legitimacy as "[a] generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, definitions" (Mitchell et al. 1997). This definition illustrates two important factors: firstly, that the moral evaluation is decisive, and secondly, that it might be based on different schools or societal influences. Companies that embrace corporate responsibility approaches, as Daimler Buses does, therefore explicitly acknowledge the legitimacy of stakeholder claims from "societal stakeholders" (Heger/Bürgel 2013: 1; Bürgel/Heger 2014: 445). Based on Habermas's theory of

communicative action, potential stakeholders have the opportunity to justify their claims in dialogue.[4]

- 'Attitude' is meant to show if the stakeholders have a supportive attitude towards the innovation project. While for whole firms, cooperation counts in general, for innovation projects the specific attitude and outlooks of the project are decisive.

As our approach includes the dynamic development of stakeholder salience through the different scenarios, we have excluded the urgency for stakeholder salience component.[5]

Figure 1 depicts the outlined framework and the possible categories of stakeholders. The classification at the bottom of the graphic defines stakeholders as obtaining power (left side), legitimacy (right side) or both power and legitimacy (in the middle). Stakeholders positioned in the upper part have a positive attitude towards the project, in the middle they are indecisive or indifferent, and in the bottom part they have a negative attitude. The scales are discrete: the exact positioning of a stakeholder within the field powerful and positive attitude does not entail any continuous information about the extent of power and attitude.

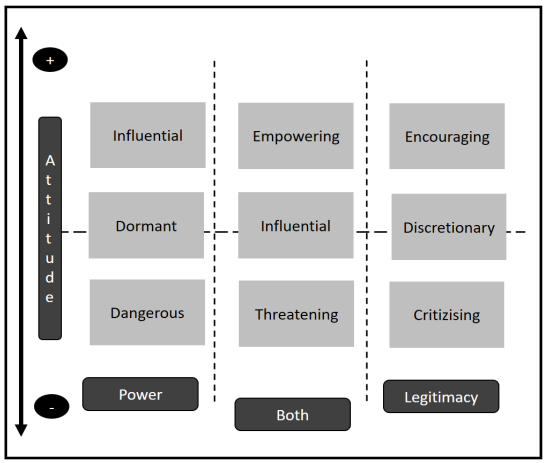

FIGURE 1: SALIENCE CATEGORISATION OF INNOVATION STAKEHOLDER (SOURCE: OWN ILLUSTRATION)

4 This approach will be explained more fully in Chapter 3.1.

5 How urgency needs to be involved in the communication strategy will be discussed in Chapter 3.2.

3. Stakeholder-Based Communication

3.1 Theoretical Basis

Communication is "the transmission of information, ideas, emotions, skills etc. by the use of symbols, words, pictures, figures, graphs" (Berelson/Steiner 1964: 527). Corporate communication is increasingly understood as a process that involves symmetric information exchange and dialogical structures, not only one-sided addressing of interest-groups (cf. Grunig/Repper 1992). Unlike innovation marketing, a communication approach does not only address potential clients but focuses on all the parties that have an interest in the outcome of the project (cf. ibid.). The point is that innovations can have a great impact on the stakeholders and can also cause negative consequences for some groups. Since innovations become reality not only through technical progress but through their diffusion, this demands a good information and communication policy, attending to all stakeholders (cf. Hauschildt/Salomo 2007: 53; Zerfaß 2009).

Our communication strategy has two components: normative and strategic considerations. Firms need to legitimise their innovation activities and optimally achieve the 'license to innovate' by communicating with affected stakeholders, while their goal is the necessary societal acceptance to diffuse the innovation and to make a profit as a company.

The sociologist Schützeichel described communication using four categories: message, information, understanding and adoption/rejection (cf. Schützeichel 2004: 251). A communication process starts with a message, which transfers information only if it is of relevance to the addressee. If it is of relevance, the addressee needs to understand the message, and then as a last challenge accept it, deciding to act upon it in the future (cf. ibid.: 270). One can see that this is a difficult process, where many things can go wrong along. Crucially, good communication is a major task for companies, both internally and externally. It determines the outcome of a project if information is not properly passed along, not understood or not accepted. More precisely, communication does not only depend on the communicator, but on the (unknown) addressee (cf. Heinz/Stahl 2014: 64). That is why communication includes being willing to emphasise the addressee and attempting to understand their point of view (cf. ibid.). Emphasising the addressee is exactly what a stakeholder analysis aims to do, and that is why it is a perfect base for communicative strategies.

Another academic, the philosopher Habermas, provides a concise account of communication which can be easily transferred onto strategic and normative stakeholder management. He differentiates between two ways of communicating, calling them communicative and strategic action (cf. Habermas 1999). Communicative action is used to "mutually coordinate one's actions" (ibid.: 128) and to find consensus in a situation. The purpose of communicative action lies in the coordination of multiple actors, whose individual goals are not hierarchical. Essentially, finding a common, shared hierarchy is the goal of such dialogue.

Strategic action stands in contrast to communicative action. An actor acts strategically if they "choose and calculate means and purpose based on utility expectations" (ibid.: 127) and thereby incorporate the expectations of at least one other determined actor. In short, strategic action aims to achieve personal goals while accounting for other actors, whose actions could endanger the goal (cf. Roloff 2002). Transferring the two ways of communicating onto stakeholder management, one can say that, depending on which way is chosen, different purposes of stakeholder communication can be fulfilled. The goal of the stakeholder dialogue determines the way of communication.

As outlined at the beginning of this chapter, the aim of our proposed stakeholder-based communication strategy is to raise acceptance for innovations through communicating appropriately with all the stakeholders and taking their claims into account. This includes not only strategical considerations, but also legitimisation of innovative activities. Therefore, the communicative approach builds the base of our framework. Ideally, only arguments that both the stakeholder and the management agree to are carried out (cf. ibid.). The goal is to find consensus on how to treat the innovation within the innovation process. Advantages and disadvantages are discussed, to find a common strategy and then successfully and legitimately implement the innovation.

Our stakeholder-based communication strategy lays the groundwork for communicative measures that need to be specified further afterwards. The specification cannot be covered, as very different communication formats are involved. The stakeholder-based communicative strategy therefore focuses on the following three steps:

- Selection of appropriate communication formats (see Chapter 3.2)
- Content selection based on stakeholder analysis (see Chapter 3.3)
- Prioritisation of stakeholders and set-up of timeframe (see Chapter 3.4)

3.2 Format Selection

Different forms of information exchange build the base of communicative interaction with stakeholders. Generally, four distinct forms can be differentiated between: 'inform' (provide information, secure transparency), 'consult' (listen, learn and transfer knowledge from stakeholders), 'dialogue' (exchange opinions, raise common understanding and work on solutions collaboratively) and 'participate' (work together, make decisions collaboratively, involve in projects) (cf. Heger/Bürgel 2013: 129 f.).

To successfully manage stakeholder claims and implement the innovation project, the different forms need to be applied in an appropriate mix. Goals of the information exchange as well as time and cost factors need to be considered. While the stakeholder categorisation that we have applied so far provides a good framework for identifying the salience of stakeholder claims, it seems necessary to categorise stakeholders regarding their situational urgency and choose a communicative format accordingly.[6]

Grunig and Repper provide a comprehensive situational categorisation of stakeholders by segmenting them into publics. While stakeholders generally are influenced by the firm or can influence it, only some become aware or active because of their involvement: these can be described as 'publics' (cf. Grunig/Repper 1992). They will search for information or express criticism, thus identifying them will help a company to address strategically important stakeholders (cf. ibid.) Within their framework, Grunig and Repper stress the strategic side of communication. Since firms normally want to reach specific goals with their communication strategies, it seems valuable to analyse how the publics will react and the claims which will probably become urgent. According to Grunig and Repper, the levels of problem recognition, constraint recognition, and problem involvement influence the way a public will communicate and react. A segmentation according to these characteristics therefore helps to anticipate behaviour and tailor an appropriate communicative strategy.

In categorising stakeholders, we will apply the same segmentation. 'Problem recognition' describes whether individuals perceive a problem in a situation. 'Constraint recognition' captures whether one feels able to influence a situation. If constraint recognition is high, this probably deters individuals from communicating the problem. 'Involvement' describes in which way a

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6 Mitchell et al. (1997) define urgency as time-sensitive claim that is critical to the party that utters it.

person perceives themselves, in terms of being connected to a situation. (cf. ibid.). According to these characteristics, one can distinguish 'non-publics' (no problem involvement), 'latent publics' (low problem recognition), 'aware publics' (high problem recognition, but low involvement or high constraint recognition) and 'active publics' (high involvement and problem recognition and low constraint recognition) (cf. Rawlins 2006).

The categorisation of stakeholders and publics before an innovation becomes reality can only be vague. How the stakeholders react will be influenced by the way the firm chooses to communicate. As the goal is to actively shape the communicative process, however, a foregoing analysis of probable and possible developments can help for choosing an appropriate strategy. The stakeholder categorisation model therefore builds the framework for choosing formats of communication and prioritising the communication efforts. Table 1 illustrates our framework: according to the salience of stakeholders and their status as publics, an appropriate format of communication is selected.

Public			
Stakeholder	Active	Aware	Inactive
Supportive	Participate	Inform	Inform
Empowering	Participate	Dialogue	Inform
Encouraging	Dialogue	Inform	Inform
Dormant	-	Consult	Inform
Influential	-	Consult	Inform
Discretionary	-	Consult	Inform
Dangerous	Consult	Consult	Consult
Threatening	Participate	Dialogue	Consult
Criticising	Dialogue	Consult	Consult

TABLE 1: SELECTION OF COMMUNICATION FORMATS REGARDING THE SALIENCE AND PUBLIC STATUS (OWN CONTENT)

3.3 Content

Apart from choosing an appropriate format, the stakeholder analysis provides a guideline for directing the content of the communication measures. As explained in Chapter 3.1, sympathising with the stakeholder is important for shaping content appropriately. For reaching consensus, it is important to understand claims and their relation to the firm's internal viewpoint. In addition to this, it can help in cases where the communication measures aim at making stakeholders act on the received message. Guiding questions for the content are therefore:

- What is the claim of the stakeholder?
- What are the common interests?
- How can these interests be achieved collaboratively?
- What are the points of disagreement?
- How can/does the firm react to these problems?

3.4 Prioritisation and Timeframe

A separate discussion of each stakeholder, including the appropriate formats and contents to address them, will provide a good overview of when to focus on which stakeholder group. Afterwards, the communication strategy will be summed up in sequences according to the selected scenarios. This transparently shows when to focus on which stakeholder and how to prepare for coming necessities.

4. Stakeholder-Based Communication Strategy for Autonomous Buses

4.1 The Autonomous Bus

The future of mobility is electric, shared, connected, and autonomous (cf. Johanning/Mildner 2015; Daimler 2017a). This is not a new development. Since the industrial revolution, around 1,830 different people have strived to invent technical systems that can take over a human's work, possibly making a process easier, more efficient and safer. One example from history is the introduction of the first electrical elevator. It led to the loss of a job, the lift-boy, and people had to overcome their scepticism of a fully automated system. Today, taking an elevator is an ordinary

part of our lives, and we will now describe how this development may look for the autonomous bus. To describe the degrees of automatisation, five internationally accepted levels have been defined. 'Level 0', 'driver only', offers no driving assistant. 'Level 1' includes assisted driving, consisting in systems that can either take over along – or transverse guiding. An example of this assisted driving is the parking assistant. **'**Level 2' is partially automated. The vehicle can take over driving completely in specific cases, though the driver needs to constantly survey the system and be ready to intervene at any time. One such example is the traffic jam assistant. The Daimler Future Bus is also a 'Level 2' system. 'Level 3' is highly automated. Here, the driver does not need to constantly supervise the system but be ready to take over. This only works on defined routes, and could include taking over driving on the highway, for example. Fully automatised vehicles in 'Level 4' do not require a driver in specific cases. During this time, the driver does not need to be ready to take over. The last step from 'Level 4' to 'Level 5' finally makes a designated driver redundant. This level is called autonomous driving. The vehicle can always drive by itself, in any given situation (cf. Verband der AutomobilindustrieVDA 2015).

Introducing the radical innovation of autonomous buses will have a disruptive force on the public transportation market (cf. Die Verkehrsunternehmen VGV 2015). The innovation is of a special kind: its great opportunities and improvements are difficult to understand at first. Security consideration and existential fears work against this powerful chance to solve mobility problems in an ecological and economic way. According to Scheitenberger, Head of Future Mobility & Cooperations, and Heinz Mobility Solutions, architect at Daimler Buses, the unique nature of the autonomous innovation consists of two parameters. First, we experience a technological development which allows us to efficiently combine different mobility systems. Passengers, operators and digital service developers benefit from a high degree of transparency, which makes it easy to use and optimise the mobility system. Second, autonomous mobility systems will be shared, but at the same time differentiated, providing several transport mode options to individuals according to their preference and budget. This will give a degree of autonomy to broader society that has been, up to now, restricted to people who own a car (cf. Scheitenberger/Heinz 2017).

Coming back to the autonomous bus, it is an innovation that will come. Daimler's former leader of Autonomous Driving expects its introduction in less than 20 years (cited after Doll 2015). Its benefits include safer driving, less accidents, more relaxed driving for the driver, more

homogeneous traffic, less traffic jams, more efficiency overall due to shorter traveling times, less fuel use and interconnectivity (cf. Bundesregierung 2015). Autonomous, shared and emission-free vehicles can be the answer to today's mobility problems, including pollution in cities, climate change, and a lack of parking spots.

Although many advantages of the autonomous bus do exist, there are some difficulties and worries connected to the topic. Potential fears are, for example, that the system can be hacked into and then exploited to cause chaos. As these worries potentially hinder people from trusting autonomous vehicles, they pose a problem for public transport companies. As companies, they must make sure that clients start to trust autonomous buses as a safer method of transportation.

The second uncertainty bus companies face is how societies react to autonomous buses in terms of the mode of transportation they choose. Two scenarios can be seen: first, a 'car-society'. Everyone owns a convenient autonomous car, high performance transportation in urban areas still exist, but weaker lines are repressed. This could have serious implications for car-friendly infrastructure, as door-to-door transportation becomes normal. The second scenario can be the 'triumph' of public transportation. One could think of a graded system, ranging from premium to economy fares, to make public transportation attractive to everyone. Operated with frequent autonomous buses, minibuses, metros and trams would become very attractive, and less people would own a car, and so the situation in cities would improve a great deal (cf. Die Verkehrsunternehmen VGV 2015).

4.2 Future Scenarios

We will proceed by setting up four different scenarios describing the timeline of the innovation of autonomous buses: the current situation (2017), the implementation of partly-automated buses of automation 'Level 3' (2020), the first launch of fully autonomous buses (2027) and the future scenario of established autonomous buses (2035). The last scenario can be regarded as the goal of innovation and should be contrasted with the current situation. As we take benefits of the product to be granted and generally overweigh potential difficulties (see 4.1), our focus will be the analysis of the process scenarios. To cover the innovative process, we have therefore selected two process scenarios that focus on external stakeholders and the introduction and diffusion of the innovation. Figure 2 illustrates these scenarios.

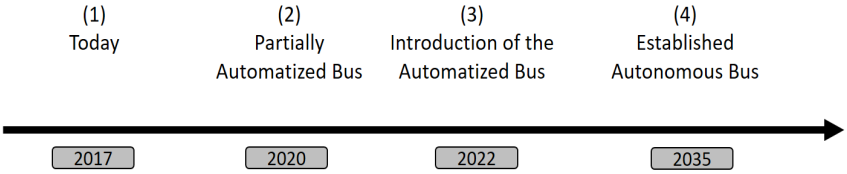

FIGURE 2: SCENARIOS OF THE IMPLEMENTATIONS OF THE AUTONOMOUS BUS (SOURCE: OWN ILLUSTRATION)

4.3 Identification of Stakeholders and Stakes

To outline our approach, we will now introduce exemplary external stakeholders and their stakes. Figure 3 shows which stakeholders we will focus on. As explained in 3.2, the linkage model helps to strategically identify all groups of stakeholders. However, we can only deal with exemplary stakeholders within this paper: covering all groups would exceed our scope. As we will focus on raising acceptance in society, we do not, for example, discuss normative linkage. Analysing the other stakeholder groups in depth seems more important to our goal.

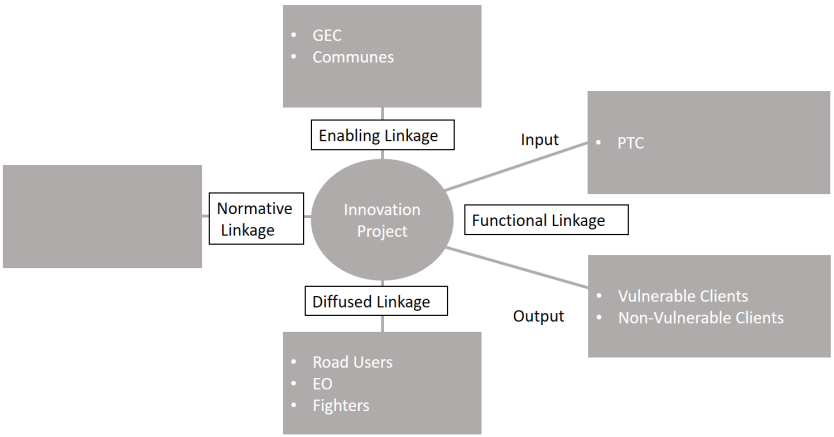

FIGURE 3: SELECTED STAKEHOLDERS OF THE INTRODUCTION OF AUTONOMOUS BUSES (SOURCE: ILLUSTRATION MODIFIED FROM RAWLINS 2006)

An important influence on German legislation is the German Ethics Council (GEC), announced by the President of the German Bundestag. It deliberates ethical implications and solutions in the context of autonomous driving (cf. Deutscher Ethikrat 2017). Representing society and society's moral necessities, it has a great deal of legitimacy. It also has the power to be heard, and influences laws and regulations. In general, the council is cooperative, as it wants to implement autonomous driving in a socially acceptable way (cf. ibid.). The council is an important stakeholder in Daimler Buses, since it has an influence on how the laws in Germany for autonomous driving will be designed.

As public transport is considered as part of the "Daseinsvorsorge" (public service) in Germany, the 'communes' play an important role in public transportation. Based on our welfare state, public transport is seen as a service that needs to be offered by the state. In Germany, this responsibility lies within the communes: based on the general societal understanding of what counts as public service, they define the extant of offers in their commune legally and provide institutions accordingly (cf. Heinrich Böll Stiftung 2016). Changed legislation in Germany, in 2007 and 2015 through the federalist reform, led to drastic changes in the financing of public transportation (cf. Verkehrsclub Deutschland VCD 2015). It is mostly paid through user financing, followed by tariff replacement service paid for by the province. The State of Germany reduced its support for communal public transportation companies, leaving them uncertain about future financing. Studies have shown that in the future, public transport companies will have problems carrying out necessary investment, and thus investing in autonomous buses (cf. Randelhoff 2017). At the same time, costs may be lower in the long term due to the efficiency of autonomous systems and the redundancy of bus drivers. Daimler Buses indirectly depends on the investments of communes in public transport companies, and therefore should consider the legitimate stake of communes as a representative of the need of society to have an affordable, well-functioning public transportation system.

'Public transport companies' (PTC) are part of the users, and act as direct clients. As semi-private companies that are partly subsidised by local communes, they must offer affordable, stable and regular public transport (cf. VCD 2015). At the same time, they have to be profitable businesses. Their goal is to bind clients to their services and offer affordable but viable bus connections. Whether they support autonomous buses depends largely on the support of their own clients and cost structures. Costs will likely rise in the short term through the introduction

of new technology (cf. Litman 2014). However, in the long-term, costs will decline as there will not be the need for bus drivers anymore. In general, they have a lot of power during the introduction of autonomous buses, as they are the gate keepers for the end-users. In the long-term, they will lose influence as autonomous buses become the established standard. Considering a long-term view, even their position in the market might change considerably. As clients, the PTC have a legitimate stake in Daimler Buses to consider.

'Vulnerable clients' are end-users who are traditionally dependent on public transport, including elderly people, children, people with visual or mobility impairments and people otherwise deprived from driving. They are the main target group of public transport services (cf. Bund deutscher Omnibusunternehmer BdO 2017). As they must use autonomous buses once they are implemented, they are largely dependent on Daimler Buses, and have no option for influencing them. This situation might worry them in the beginning, and one cannot necessarily expect cooperation. Indeed, it has been shown that elderly people with a lower socioeconomic status and education level seem to be sceptical about autonomous vehicles (cf. Auer and Schmidt 2018). General technological scepticism or worries about using a wheelchair could be reasons for this. On the other hand, vulnerable clients can benefit from autonomous buses through better bus services becoming available (cf. Bund deutscher Omnibusunternehmer BdO 2017). In the long-term, autonomous cars and not buses may become an option for vulnerable clients, as they also allow for being mobile without driving (cf. Polonetsky/Claypool 2016). However, this depends largely on whether the vulnerability depends on the costs of transportation or the ability to drive. This will shape long-term dependency of vulnerable clients.

'Non-vulnerable clients' use public transport today but are not dependent on it. They also have other mobility options available. They have a huge impact on the introduction of autonomous buses, as they can support and use them or boycott them. As end-users, they will influence the decisions made by the PTCs. In the long-term, they will lose influence as soon as the technology is adopted by the majority. This group probably includes middle-aged people of a higher socio-economic status. One can expect that they are more open to innovation than other groups. Auer and Schmidt show that young, educated men of a higher socioeconomic status are open to autonomous vehicles (cf. Auer and Schmidt 2018). At the same time, this group owns a high percentage of cars in Germany and can, so far, not be considered a target group for the PTC (cf. Plötz et al. 2014; Bund deutscher Omnibusunternehmer BdO 2017).

'Road users' are passively involved in the innovation of autonomous buses. Autonomous buses can improve safety or impede it, depending on its technological standard. It is also possible that safety is improved, but it is felt to decline. The road users therefore have to be considered. It might also be necessary to introduce them to changing traffic and rules for autonomous vehicles (cf. Färber 2015). Although they are sometimes organised, they do not have lot of power to influence the project (cf. Radlobby 2017).

Another lobby group to be examined as example are 'environmental organisations' (EO). In general, they are neutral or cooperative towards autonomous buses. Primarily, they are probably not affected or interested in any particular way, and do not execute power to influence the outcome. As soon as rising traffic becomes an issue due to the comfort of autonomous cars, they will become engaged in fighting this phenomenon (cf. Heuer 2017). As they are established and organised, they have power in this phase. However, they will probably still be supportive towards the autonomous bus, as this vehicle can combine autonomous efficiency and inclusive mobility with ecological efficiency (cf. Byczkowski 2013).

The 'fighters' are not convinced of the benefits of autonomous driving. They stress critical implications, such as the danger of hacking or coding moral decisions.[7] Before and during the introduction of autonomous buses, they will therefore try to organise and fight against the new technology. They do not possess a lot of power, unless they can organise effectively and influence the media and the general public. When autonomous driving becomes more and more accepted, they will lose influence but continue to raise some valid and legitimate worries.

4.4 Categorisation of Stakeholders

Figure 4 depicts the stakeholder categorisation over all four scenarios. For example, the Vulnerable clients first have a positive attitude towards buses. Their claims are legitimate, but they do not have power. They are therefore positioned in the upper right-hand corner. In the third scenario, their attitude changes to negative, and they move down on the graph. In the fourth scenario, the

[7] Chinese students successfully hacked a Tesla Model S in 2014 while driving, opening its doors and turning on its lights (cf. Spiegel 2014). Problems connected with coding moral decisions are stressed by Ganesh (cf. Krempl 2016).

vulnerable clients again have a positive attitude. They lose their vulnerability and gain power. As they now possess legitimacy and power, they move from the right side to the middle of the graph.

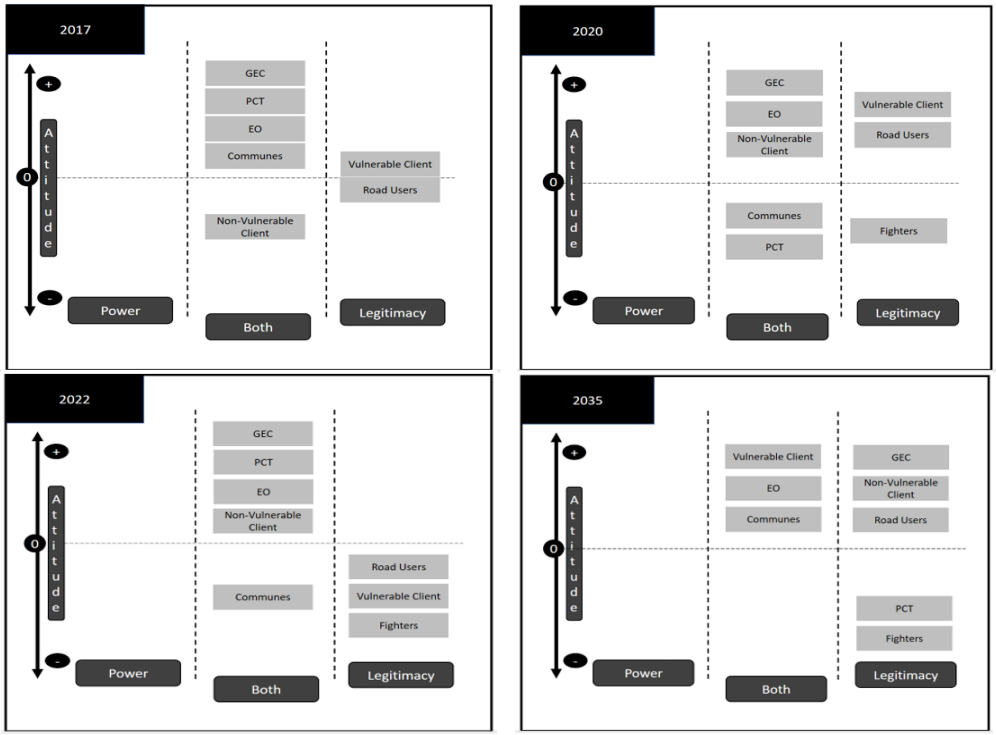

FIGURE 4: CHANGING STAKEHOLDER MAPS FOR THE INTRODUCTION OF AUTONOMOUS BUSES (SOURCE: OWN ILLUSTRATION)

4.5 Format and Content Selection for the Communication Strategy

In tables 2–9, we will discuss the stakeholders and appropriate communication strategies based on the categorisations we have outlined. Formats and content to be chosen are discussed jointly.

German Ethics Council		
Claim	**Common Interest**	**Disagreement**
Only morally acceptable technology implementation.	Socially and ethically acceptable implementation of autonomous driving.	Juridical disputes about responsibility write-ups on the road, and about loss of autonomy to autonomous vehicles.
Today, the GEC is already a relevant stakeholder, although the bus today does not offer any ethical convictions. In June 2017, the GEC held a conference concerning autonomous systems, already pointing the way for German politics in this matter. In phase 2 and 3 it becomes extremely important and powerful since it provides the guidelines for the legislation. In general, the commission as part of the political opinion is positive towards autonomous buses because its early introduction in Germany is good for its economy (cf. Bundesregierung 2015). That is the reason why strategically a cooperative work with the council is useful. Based on the already existent forum "Autonomous Systems – how Machines Change Us", the medium we propose is a participatory approach within which contrasting ethical theories and opinions can be discussed and solutions jointly proposed. Only if the laws in Germany support autonomous buses, can they be introduced. Once the autonomous bus is on the market, the GEC becomes unimportant to Daimler again.		
Stakeholder	**Active**	**Aware**	**Inactive**
Supportive	Participate	Inform|4	Inform
Empowering	Participate|1,2,3	Dialogue	Inform
Encouraging	Dialogue	Inform	Inform
Dormant	-	Consult	Inform
Influential	-	Consult	Inform
Discretionary	-	Consult	Inform
Dangerous	Consult	Consult	Consult
Threatening	Participate	Dialogue	Consult
Criticising	Dialogue	Consult	Consult

TABLE 2: OVERVIEW GERMAN ETHICS COUNCIL (SOURCE: OWN ILLUSTRATION)

Communes		
Claim	**Common Interest**	**Disagreement**
Avoid the implementation of unsafe technology, avoiding high costs, ensuring a well-functioning public transportation system as part of public service.	Implementation of safe technology which does not endanger passengers and is in line with Daimler's Reputation. Benefit of autonomous vehicles for providing efficient and affordable transportation.	Possible disagreement on necessary future investments in autonomous buses.
Communes have a legitimate stake, since they are the main owner of PTC in Germany and an indirect client of Daimler Buses. Additionally, they have legal measures to influence the implementation. They have a mixed attitude towards the project, based on finance and investment issues. Therefore, they should be included early in the project. In phase 1, the awareness of communes will probably not be very high concerning autonomous buses, communes are not as relevant for Daimler Buses yet. But due to their important future role it is recommendable to communicate with them up from this early stage, to raise their awareness about the advantages of autonomous buses. In Phase 2 and 3 communes should be actively included in the project, since they become a threatening factor for the project if they decide not to invest in autonomous buses. In the long, term communes will be convinced by the cost and efficiency advantage of them.		

	Public		
Stakeholder	**Active**	**Aware**	**Inactive**
Supportive	Participate	Inform	Inform
Empowering	Participate	Dialogue	Inform |1,4
Encouraging	Dialogue	Inform	Inform
Dormant	-	Consult	Inform
Influential	-	Consult	Inform
Discretionary	-	Consult	Inform
Dangerous	Consult	Consult|1,4	Consult
Threatening	Participate|2,3	Dialogue	Consult
Criticising	Dialogue	Consult	Consult

TABLE 3: OVERVIEW COMMUNES (SOURCE: OWN ILLUSTRATION)

Public Transport Companies		
Claim	**Common Interest**	**Disagreement**
New buses need to be accepted by end-users. Avoid cost-rise through new technology.	Buses that convince the end-user at a reasonable price. Competition through autonomous cars.	Fair price.
In the first three phases of the innovation the focus should lie on participation. The PTC are powerful, legitimate and can have a positive attitude towards the project if included early in the innovation process. As the PTC are gate keepers in phase 2 and 3, the development of cooperative solutions should be targeted. To create a cooperative atmosphere and initiate participation, it is necessary to stress in which way Daimler Buses and the PTC can face similar problems once individual autonomous vehicles flood the market. Uniting interest is therefore to provide convincing and affordable bus services. Despite that fact, the introduction of partial automatisation (scenario 2) might not be welcomed by the PTC as it entails higher costs. If partial automatisations are communicated to be a necessary step to raise acceptance for the introduction of completely autonomous buses, even during this phase cooperation might be reached. After the introduction of autonomous buses, the tasks and business model of PTC will change. They do not anymore need to provide, and coordinate drivers and other firms might try to directly use this change to push into the market. At the same time, the PTC still face an advantage because they do know the market and might also be able to employ the former bus-drivers for other effective tasks and safe costs. As they are clients, they have a legitimate stake towards Daimler Buses, even though the power of being gate keepers decreases once autonomous buses are established. It seems therefore necessary to consider the situation of the PTC in phase 4 and consultation is necessary.		

Public			
Stakeholder	**Active**	**Aware**	**Inactive**
Supportive	Participate	Inform	Inform
Empowering	Participate | 1,3	Dialogue	Inform
Encouraging	Dialogue	Inform	Inform
Dormant	- -	Consult	Inform
Influential	-	Consult	Inform
Discretionary	-	Consult	Inform
Dangerous	Consult	Consult	Consult
Threatening	Participate | 2	Dialogue	Consult
Criticising	Dialogue	Consult | 4	Consult

TABLE 4: OVERVIEW PUBLIC TRANSPORT COMPANIES (SOURCE: OWN ILLUSTRATION)

Vulnerable Clients		
Claim	**Common Interest**	**Disagreement**
Avoid the implementation of unsafe technology. Frequent bus connections. No price-rise.	Implementation of safe technology which does not endanger passengers and is in line with Daimler's Reputation. Benefits of autonomous vehicles for providing bus connections, e.g. frequent connections.	High threshold to accept unknown technology.
Vulnerable clients have a legitimate stake towards Daimler Buses because they depend on a well-functioning public transportation system. From the beginning on they should therefore be informed. Vulnerable clients will probably support phase 2 as they will benefit from increasing safety and smoother service. As dormant aware stakeholders, they are one target group to be informed; even though they lack specific power, socially legitimate support of phase 2 might be important in promoting the project. It is therefore important to inform the stakeholders about the benefits to them. Nonetheless, their scepticism about completely autonomous buses can be robust (see 5.3). To legitimise the innovation for the whole society and to raise general acceptance, it is necessary to include such voices in a dialogue and to discuss possible solutions (phase 3). In phase 4 vulnerable clients might lose their vulnerability in some cases: widespread autonomous cars might be an alternative option for them which was not open to them before. Given the generally positive aspects of autonomous buses, e.g. more frequent connections, they probably develop a positive attitude towards autonomous buses once prior worries are overcome. Dialogue therefore seems important to acknowledge their power as clients, listen to open problems and keep them as promoters of autonomous buses. Clients who could theoretically drive but do not possess the financial means to use own vehicles stay a vulnerable client group: the need to provide better buses at prices which still enable affordable public transport therefore needs to be considered further.		

	Public		
Stakeholder	**Active**	**Aware**	**Inactive**
Supportive	Participate	Inform	Inform
Empowering	Participate	Dialogue|4	Inform
Encouraging	Dialogue	Inform|2	Inform
Dormant	-	Consult	Inform
Influential	-	Consult	Inform
Discretionary	-	Consult	Inform|1
Dangerous	Consult	Consult	Consult
Threatening	Participate	Dialogue	Consult
Criticising	Dialogue|3	Consult	Consult

TABLE 5: OVERVIEW VULNERABLE CLIENTS (SOURCE: OWN ILLUSTRATION)

Non-Vulnerable Clients		
Claim	**Common Interest**	**Disagreement**
Avoid the implementation of unsafe technology.	Implementation of safe technology which does not endanger passengers and is in line with Daimler's Reputation. Comfortable and flexible driving experience.	High threshold to accept unknown technology.
Today, the non-vulnerable clients do not depend on public transportation. They are powerful in an economic sense as they might accept or boycott the bus and its innovations and will thereby influence the PTC. As one can expect that they are more open to innovation than other groups, they become an especially important target group in phases 2 to 3. However, technology critics that have enough financial means to choose their mean of transport might also form a part of that group. The acceptance of the non-vulnerable clients is therefore decisive. Even if they appear only as aware and indecisive public, it should be tried to involve them in the diffusion process through actively informing and consulting them. This might move some of the stakeholders to empowering stakeholders who can be actively involved in promoting the innovation. Threatening clients should on the other hand be given the opportunity to participate in the set-up of solutions. In phase 2 and 3 Daimler Buses can use the power of this group by including them into the process: participation is the keyword. In phase 4 non-vulnerable clients are probably mostly supportive but inactive. A continuous information provision seems indispensable to value them and keep them as clients.		

Public Stakeholder	Active	Aware	Inactive
Supportive	Participate	Inform	Inform
Empowering	Participate | 2,3	Dialogue	Inform | 4
Encouraging	Dialogue	Inform	Inform
Dormant	-	Consult	Inform
Influential	-	Consult | 3	Inform | 1
Discretionary	-	Consult	Inform
Dangerous	Consult	Consult	Consult
Threatening	Participate | 3	Dialogue	Consult
Criticising	Dialogue	Consult	Consult

TABLE 6: OVERVIEW NON-VULNERABLE CLIENTS (SOURCE: OWN ILLUSTRATION)

Claim	Common Interest	Disagreement
Avoid the implementation of unsafe technology. Felt safety must not decrease.	Safe public transport that does not endanger other road users.	High threshold to accept unknown technology.

Road users remain a legitimate but neither powerful nor active stakeholder throughout the four faces. In phase 1 they are probably neutral and in phase 4 in general positive minded towards the buses. Phase 2 will passively be supported as it increases safety in the general perception. As phase 3 might decrease the felt safety firstly, especially as traffic rules might change, the road users will probably first have a negative outlook on the innovation. Out of normative reasons it is important to constantly inform the road users about the status of the innovation. Daimler Buses can even take responsibility by involving them in trainings on changed traffic rules and changing conditions. To demonstrate that Daimler Buses takes worries seriously, it seems valid to explicitly consult road users in phase 3.

	Public		
Stakeholder	**Active**	**Aware**	**Inactive**
Supportive	Participate	Inform	Inform
Empowering	Participate	Dialogue	Inform
Encouraging	Dialogue	Inform	Inform | 2,4
Dormant	-	Consult	Inform
Influential	-	Consult	Inform
Discretionary	-	Consult	Inform | 1
Dangerous	Consult	Consult	Consult
Threatening	Participate	Dialogue	Consult
Criticising	Dialogue	Consult	Consult | 3

TABLE 7: OVERVIEW ROAD USERS (SOURCE: OWN ILLUSTRATION)

Environmental Organisation		
Claim	**Common Interest**	**Disagreement**
Increase ecological efficiency without rebound.	Ecological benefits of public transport and autonomous driving.	Doubts about the sustainability of innovations.

EO generally have high power as they are already organised and specialised on voicing issues of public interest. They are critical regarding autonomous vehicles in general and would rather support autonomous public transport. However, in phase 1 and 2 they are probably rather inactive on the issue. Even in phase 3 they might only be aware but probably not involved enough. This might change in phase 4 if autonomous vehicles are common in general and raise the traffic flows. In this phase, EO will start to promote public transport as an alternative. It seems therefore crucial to try and engage them even before, particularly in phase 3. This can be reached by informing them properly from the beginning on and trying to engage them actively in phase 3. To build the base for the participation, the common interest of promoting autonomous public transport needs to be communicated.

	Public		
Stakeholder	**Active**	**Aware**	**Inactive**
Supportive	Participate	Inform	Inform
Empowering	Participate | 4	Dialogue | 3	Inform | 1,2
Encouraging	Dialogue	Inform	Inform
Dormant	-	Consult	Inform
Influential	-	Consult	Inform
Discretionary	-	Consult	Inform
Dangerous	Consult	Consult	Consult
Threatening	Participate	Dialogue	Consult
Criticising	Dialogue	Consult	Consult

TABLE 8: OVERVIEW ENVIRONMENTAL ORGANISATION
(SOURCE: OWN ILLUSTRATION)

Fighters		
Claim	**Common Interest**	**Disagreement**
Stop the implementation of unsafe and morally questionable technology.	Close security gaps.	Very critical outlook on new technologies.

In phases 2 to 4, fighters are criticising stakeholders. As phase 2 does not directly pose a problem to enemies of autonomous machines, fighters will probably not be active but already aware. Consulting them in this phase will help Daimler Buses to understand the arguments and develop according strategies. In phase 3, when the activity of fighters as well as public perception is the highest, it seems valid to involve them in dialogues. By listening to each other, Daimler can take fears into account and maybe contribute to some understanding and acceptance. Furthermore, critical feedback is an important tool for Daimler to evaluate their own work. In phase 4 fighters probably tend to become less active but may still utter critique. Consulting them further takes worries seriously and can help Daimler Buses to improve the security of their technology even further.

	Public		
Stakeholder	**Active**	**Aware**	**Inactive**
Supportive	Participate	Inform	Inform
Empowering	Participate	Dialogue	Inform
Encouraging	Dialogue	Inform	Inform
Dormant	-	Consult	Inform
Influential	-	Consult	Inform
Discretionary	-	Consult	Inform
Dangerous	Consult	Consult	Consult
Threatening	Participate	Dialogue	Consult
Criticising	Dialogue|3	Consult|2,4	Consult

TABLE 9: OVERVIEW FIGHTERS (SOURCE: OWN ILLUSTRATION)

4.6 Prioritisation and Timeframe

The communicative strategy is now summed up in the four scenarios we have selected. Graphic 5 illustrates the sequences.

The focus group of 'phase 1' is the PTC group. A participatory forum with the PTC, holding regular meetings, seems a good basis for innovative communication. Firstly, a mutual strategy and communicative approach should be worked out. Additionally, from the beginning, a discussion of phase 4 and the future situation of PTC and drivers is necessary. Apart from this, Daimler Buses should start to work out and publish information material for clients and road users. They need to be informed about the ongoing incremental automatisation, and the material should shed light on the final target. It seems reasonable to mainly outline benefits of total automatisation at this stage. The information should also explicitly target EO.

In 'phase 2', the participatory forum with PTC will continue. Additionally, non-vulnerable clients should be included and participate in the forum. The idea is to get them on board during phase 2, to have them participate and promote the innovation even in phase 3. It seems important to include communes in the participatory forum at this stage. After the PTC have worked out their strategies during the first phase, the communes need to contribute their legal and financial perspectives. Phase 2 seems a good moment to put the topic on the agenda and to engage jointly in the planning of future cities' public transport. It also seems necessary to target further political decision makers and commissions during this early stage. Since they will influence the new laws that define the use of autonomous technology, a participatory approach with the GEC is indispensable, in order to assure a responsible, efficient and innovative use of this technology in the future. Additionally, it seems reasonable to start consulting exemplary vulnerable clients now. It could be useful to focus on interest groups: for people with visual impairments, or school children using the bus regularly. Apart from this, information campaigns need to continue. Together with partly automatised buses, more and more discussion about future possibilities will arise. This provides the forum for informing about dangers and security measures. One focus should be on taking EO onboard in promoting the autonomous bus. In public debate, it will probably also become possible to identify potential fighters. This chance should be used to consult them, even before the autonomous bus is finally implemented.

Finally, when the buses really enter the streets in 'phase 3', even inactive or aware members of the public might become active. Participatory options and dialogue platforms should therefore be in place already. Identified and consulted fighters and vulnerable clients, as well as promoters like EO and optimistic clients, can be invited to dialogue on this topic. This exchange should build a platform for further and authentic communication: to tackle fears and advantages and to work on mutual solutions. In general, Daimler Buses should signal its readiness to listen to dialogue on the innovation. In phase 3, it is necessary to tailor specific informative opportunities for clients and road users. They should have access to detailed information on the new technology and the codes used. This material needs to be available for technology enthusiasts, but also in simple language. The opportunity to visit Daimler's production sites and be provided with an introduction to the new technology would, for example, be a gesture of transparency. Additionally, clients need to have access to testing opportunities and contact persons for questions (cf. Auer and Schmidt 2018). Road users in general can be included by providing material and trainings on changing traffic behaviour and rules, including them in consulting approaches.

In 'phase 4', it is necessary to stay in contact with the PTC and work on mutual strategies with the EO. The platforms for this exchange will already be in place from the previous phases. Apart from this, Daimler Buses' usual stakeholder platforms will take over again.

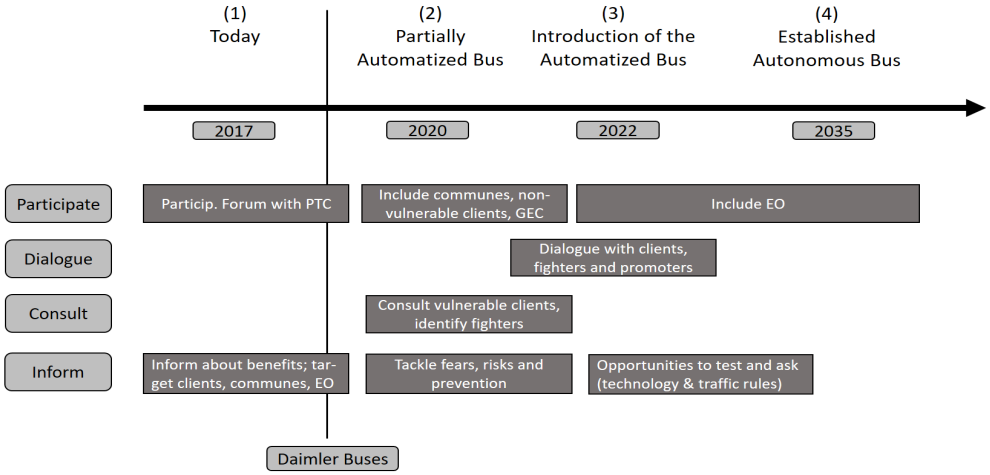

FIGURE 5: SEQUENTIAL COMMUNICATION STRATEGY

5. Conclusion and Horizon

Human beings are travellers. From using horses 12.000 years ago to inventing the steam machine in the 16th century and using the first automobile with an internal combustion engine in 1888, transport innovation has shaped our societies. Motorised automobiles gave people the opportunity to travel comfortably, autonomously and in a self-defined manner (cf. Daimler 2017b). On the other hand, they have brought problems like air pollution, climate gas emission, noise pollution, traffic jams and a lack of space in cities.

The bus already is a good answer to these problems, and can be used as an efficient, connected and sustainable way. Autonomous driving systems can combine all these features, making an autonomous bus a very attractive mean of transportation. However, social and political acceptance must be raised before this scenario can occur.

So far, Daimler Buses has taken considerable steps towards being one of the first companies to successfully launch an autonomous bus for use in public. The Daimler Future Bus is ready to be used on bus rapid transit lines and compromises efficient, sustainable driving with a comfortable and spectacular design. In this light, it can be said that Daimler Buses currently hit the border between automatisation levels 2 and 3. The Future Bus could already manage many situations on its own. However, due to technicalities, legal restrictions and social acceptance, this is not yet implementable without an attentive driver. At the end of March 2014, the United Nations (UN) revised the Vienna Convention On Road Traffic (cf. Wissenschaftliche Dienste Deutscher Bundestag 2016). Now, systems that influence the guiding of a vehicle are permissible, so long as the guiding can be taken over at any time by a driver. This change came into practice on April 23rd, 2016. First steps towards legalising autonomous traffic on the road have thus been taken. Nonetheless, more regulatory issues need to be tackled: intelligent connection and communication between vehicles, data-security and privacy and liability questions. Keeping the fast technology development and its advantages in mind, the necessary technology and according legal steps are certain to come soon.

To support Daimler Buses in its way of implementing such a radical innovation, we propose a stakeholder based communicative approach, tailored for innovation processes. By involving all the stakeholders, we aim to raise social acceptance and to generate the 'license to innovate'. Applying our framework to the introduction of autonomous buses, we showed that is important

to engage in a dialogue now. By working together with communes and PTC and by getting innovative clients as well as EO on board, the advantages of the project can be sincerely communicated and established within society. However, our approach also involves listening to the stakeholders and taking their worries serious. Only if accompanied by authentic communicating can a socially beneficial and acceptable innovation be reached.

We therefore end with one of the most famous quotes of innovation history: when Henry Ford started the assembly line production of cars in 1913, laying the cornerstone of making automobility accessible to everyone (cf. Daimler 2017b), he stated: "If I had asked people what they wanted, they would have said faster horses." (cited after Bender 2018). This quote has held true, in that radical innovations need courageous pioneers to bring about progress and to introduce new ideas. Considering the 'license to innovate', listening to the people and their claims is essential.

While pushing forward technologically in the sector of autonomous buses, it therefore seems valid to engage and communicate with stakeholders. We hope that this baseline motivates Daimler Buses to become the pioneer in successfully launching the autonomous bus, thereby responding to current mobility challenges.

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NEXT GENERATION BUSES

Next Stop:
Materiality Analysis

Next Stop: Materiality Analysis

Supporting Daimler Buses on its Way Towards a Bus-Specific Corporate Responsibility Strategy

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Keywords

Corporate Responsibility, Stakeholder, Materiality Analysis, Buses

The stakeholder approach is an essential aspect of Corporate Responsibility (CR) theory. Daimler AG adopts this approach by performing a materiality analysis, which serves as the basis of its CR strategy. Daimler Buses is currently trying to develop a bus-specific CR strategy that does not conflict with Daimler's overall strategy. However, Daimler Buses has not yet determined its CR strategy by including its stakeholder's opinions through an independent materiality analysis. This paper puts forward two arguments in favour of Daimler Buses conducting their own materiality analysis as a basis of a bus-specific CR strategy. The conceptual argument is that, due to particularities of stakeholders and the 'bus' product, only their own materiality analysis can lead to bus-specific materialities. The market-oriented argument says that Daimler Buses requires its own materiality analysis to form a CR strategy that can keep up with those of its competitors. Finally, we will make proposals for how Daimler Buses can implement their own materiality analysis, both in the short and long term.

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1. Introduction

People want to be included in decisions that affect them. This can be seen in almost all contexts of social life — whether it is school officials ignoring pupils' opinions of a new building project, or the German Football Association forgetting to listen to the wishes of club supporters concerning the half-time show. In each of these cases, the ignored groups have the potential to not only verbally express their disappointment, but to take action which might damage the organisation. Thus, if an organisation makes a decision affecting possibly powerful groups, it would be dangerous not to take into account the opinions of these groups. The same is true for Daimler Buses. R.E. Freeman made similar observations and applied them to the business context in his well-known stakeholder theory. For him, businesses need to interact with stakeholders, i.e. people or groups affected by or affecting the actions of the business, in order to do well in the long run. This stakeholder approach is adopted by nearly all large corporations today. A major element of it is to perform a materiality analysis in which the interests of the company's stakeholders are matched to corporate interests, in order to shape the company's corporate responsibility (CR) concept and strategy. It will be the main point of this paper that Daimler's bus division, Daimler Buses, requires its own materiality analysis.

The first step of this paper will be to give an overview of how the focus of corporate social responsibility (CSR) has shifted towards a stakeholder approach, both in theory and in practice (chapters 2.1 and 2.2). This stakeholder approach forms the theoretical basis of our argument. We will then consider normative and instrumental reasons for adopting the stakeholder approach (Chapter 2.3). Subsequently, we will review how stakeholder-oriented CR is practiced at Daimler AG, which is important because the areas of focus Daimler AG determined in its 2016 Sustainability Report are also used for determining the CR strategy of its business division of Daimler Buses (Chapter 2.4). Afterwards, we will examine the CR strategy of Daimler Buses. We will analyse how it relates to that of its parent company, and whether stakeholders are included in determining it (Chapter 2.5). In Chapter 3, we will argue that adopting the materialities determined by Daimler AG in cooperation with its stakeholders is not sufficient for a bus-specific CR strategy. After listing and rebutting possible arguments for the opposite position (Chapter 3.1), we will bring forward two main arguments supporting their own materiality analysis. First, due to particularities regarding stakeholders and the 'bus' product, only their own materiality analysis can

lead to bus-specific materialities (Chapter 3.2). Second, Daimler Buses needs its own materiality analysis to secure its leading role in terms of CR on a bus market where competitors have already developed specified CR strategies in cooperation with their stakeholders (Chapter 3.3). These two arguments will lead to the final conclusion, that Daimler Buses needs their own materiality analysis. In the fourth and last chapter, we will propose short term (Chapter 4.1) and long term (Chapter 4.2) measures for how Daimler Buses can achieve the conclusion proposed by us.

2. Daimler (Buses) and the Stakeholder Approach to Corporate Responsibility

2.1 The Evolution of the Corporate (Social) Responsibility Concept

The content of this paper fits into the theoretical framework of corporate (social) responsibility (C[S]R). The following historical overview of CSR is intended to illuminate what this theoretical framework is and how the stakeholder theory, which is the basis of our argument for a Daimler Buses materiality analysis, has become the prevalent CSR theory.

The 'chameleon-concept' is a metaphor that authors Jean-Pascal Gond and Jeremy Moon employ to characterise the concept of 'corporate social responsibility (CSR)', emphasising the major changes the concept has undergone in recent years (cf. Gond and Moon 2012: 1). The evolution of the concept becomes particularly vivid if one reviews how the definition of CSR has changed over the years. According to Gond and Moon, in 1953 Howard R. Bowen defined CSR as referring to the obligations of businesspeople to pursue policies, make decisions and follow the lines of action which are desirable in terms of the objectives and values of our society (cf. ibid.: 6). According to Bowen, the social concern of managers for their communities is essential. Seventeen years later Milton Friedman famously argued that "[t]here is one and only one social responsibility of business – to use its resources and engage in activities designed to increase its profits […]" (Friedman 1970). Friedman emphasises the responsibility of a businessperson towards the shareholders of their company. Hence, the focus of CSR theory shifted from a focus on how corporations can create value for society through actions that go beyond business decisions (philanthropic concerns) to CSR recommending profit maximisation as the best way of 'serving society'. Where is CSR today? The most current definition is offered by Basu and Palazzoy: "We can define CSR as the process by which managers within an organisation think

about and discuss relationships with stakeholders as well as their roles in relation to the common good […]" (Gond/Moon 2012: 7). Apparently, the trend has shifted again, this time towards the so-called 'stakeholder approach'.

Edward R. Freeman, known as the founder of the stakeholder theory, defines stakeholders as groups and individuals who would benefit from or be harmed by corporate actions, and whose rights would be violated or respected by them. Stakeholders would have the right to make claims to the corporation on these grounds (cf. Freeman 1984: 41). Stakeholders are therefore people or groups of people who are entitled to special consideration from the company that affects them. As stakeholders of specific importance, or 'primary' stakeholders, Freeman views suppliers, customers, employees, owners/stockholders, the local community, as well as the company's management in its role as an agent for these groups (cf. ibid.: 42).

What a stakeholder approach to CSR demands is that "[t]he interests of key stakeholders [are] integrated into the very purpose of the firm, and stakeholder relationships must be managed in a coherent and strategic fashion" (Freeman/McVea 2015: 12). In practical terms, this means that a company's key strategy should be shaped by the interests of its stakeholders. If a corporation adopts this approach, this would mean that it first identifies which stakeholder relations are crucial for the firm (which individuals or other organisations are most affected by corporate actions) and then include them in determining the corporate strategy.

In the following section, we will review whether corporations today adopt this approach and, if so, how it is done, before analysing how stakeholders are included into the corporate CSR strategy of Daimler Buses.

2.2 The Stakeholder Approach in Today's Corporate Practice

In order to see whether the stakeholder approach has arrived in today's business practices, it is useful to consider the 'Corporate Responsibility Index' (CRI) and the standards of the 'Global Reporting Initiative' (GRI). The CRI analyses how well corporations in Germany fare in their CSR practices, focussing on whether CSR governance is implemented in the concerned firm, which CSR actions are taken and how effective these CSR practices are (cf. CRI 2015: 15). Based on its findings, the 2015 CRI Report issues eight recommendations for a firm to enact in order to have an effective CSR strategy. The report says that the companies with the most successful CSR

practices showed an excess concern for their stakeholder groups (cf. ibid.: 20), which is why the first and most fundamental recommendation the report entails is that a firm willing to develop a good CSR strategy should enter into a dialogue with its stakeholders.

The Global Reporting Initiative (GRI) sets the standards for CSR/sustainability reporting, not only in Germany but also worldwide. Just as in the 2015 CRI report, stakeholder inclusiveness was included as the first principle for a successful CSR practice: "When making decisions about the content of its report, the organisation is to consider the reasonable expectations and interests of stakeholders" (GRI 2016: 8). Since many multinational corporations (among others the Daimler AG) base their CSR strategies and reports on the concept proposed by the 2016 'GRI Sustainability Reporting Standards', this shows that the stakeholder approach has become an integral part of today's CSR reporting.

In addition to the 2015 CRI report, the GRI standards demand that that a well-rounded CSR report should be sensitive to the company's materialities. Materialities are defined as topics important enough as to be reported on (cf. ibid.: 10). Material topics are identified based on the following two dimensions:

1. The significance of the organisation's economic, environmental, and social impacts.
2. Their substantive influence on the assessments and decisions of stakeholders.

If a topic scores highly enough in both of these categories, it counts as 'material' and the company's CSR concept should address it. According to the GRI standards, whether a topic counts as significant under '1' is determined by expert communities (cf. ibid.: 10). Daimler, for instance, has established such expert communities inside the corporation's CR governance structures, the Corporate Sustainability Board (CSB) and the Corporate Sustainability Office (CSO), which evaluate different impacts as 'material' from the perspective of the company (cf. Heger/Bürgel 2013: 6). In this paper, we will adopt this approach as a way of obeying the first GRI principle for materiality above, and thus view materialities as topics which are considered essential by the corporate side and by the stakeholders.

By stressing that a firm should determine its materialities in cooperation with its stakeholders, the GRI standards define the way in which a company should include its stakeholders into determining its basic corporate strategy (as it was demanded by Edward Freeman, the founder of the stakeholder theory), by conducting a materiality analysis. In such an analysis, stakeholders are asked to give their opinions on the importance of certain CR issues. The outcome of such an

analysis includes areas that are recognised as important by a firm's management (or in the case of Daimler: the Corporate Sustainability Board [CSB] and the Corporate Sustainability Office [CSO]) and the stakeholders at the same time. This outcome is supposed to shape CSR strategy and the profile of the corporation. For example, a corporation that produces buses would be expected to have environmental pollution as one of its materialities. In a materiality analysis, the relevant stakeholders reassure the company in the importance of this materiality. If this is the case, the materiality 'lowering environmental pollution' is tackled by the company becomes an integral part of the company's CSR strategy and reports.

The graph below (see Figure 1) illustrates how materialities can be visualised. The x-axis determines the significance of socioeconomic and environmental impact on the business, while the y-axis depicts the significance a certain topic has for stakeholder interests. The dots represent different CR-issues, while the dots on the upper right are the materialities that should be tackled and reported on in order to stay true to the company's influence on its environment and the interests of its key stakeholders.

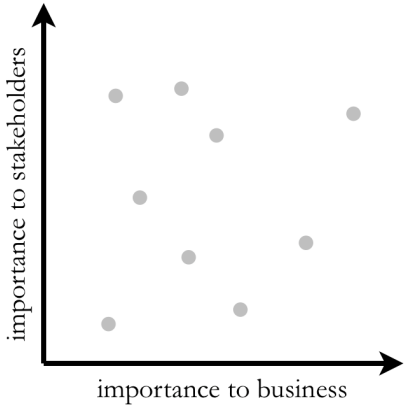

FIGURE 1: THE TWO AXES DEPICT THE TWO ASPECTS THAT HAVE TO BE ANALYSED WHEN DETERMINING MATERIALITIES (OWN ILLUSTRATION)

Altogether, what can be learned from reviewing the CRI and the GRI report is that the stakeholder approach has become an integral (if not the primary element) of CSR strategies that are developed in corporations worldwide today. Furthermore, the GRI report explicitly reveals the 'best practice' for stakeholder inclusiveness, namely incorporating their opinions into the very core of a company's (CSR) strategy by allowing them to 'co-determine' the company's materialities in a materiality analysis. This allows us to draw the conclusion that whichever approach Daimler AG and its business division Daimler Buses adopt to shape their CSR strategies and CSR activities in the future, it will have to take the interests of their stakeholders into account to a large extent, ideally through a materiality analysis.

2.3 Reasons for a Corporate Stakeholder Approach

In the previous section, we explained that the stakeholder approach has become the 'state of the art theory' in current CSR concepts. In order to show why companies like Daimler Buses *should* adopt this approach, we will review two arguments in favour of it. The first will be a 'normative' argument, explaining why companies have a duty to adopt the stakeholder approach. The second will be an 'instrumental' argument, emphasising that stakeholder orientation has beneficial effects on a firm's financial performance.

In 'The Moral Basis of Stakeholder Theory', Kevin Gibson depicts a normative argument in favour of stakeholder-oriented management and for corporations to explicitly consider their stakeholder's interests. The argument is based on Immanuel Kant's demand for how agents ought to treat each other. According to Kant, moral agents ought not to treat each other as means to achieve an end, but as 'ends in themselves'. Disregarding this maxim by employing moral agents as means would be equal to devaluing their moral worth, which is equally possessed by all moral agents. Moral agents would have the duty to abstain from such behaviour (cf. Gibson 2000: 248).

In terms of stakeholder-oriented management, this argument implies that both the stakeholders and the corporation can be viewed as moral agents. The actions of the corporations affect the stakeholders. Freeman puts it clearly when he says that "stakeholder groups […] [have] a right not to be treated as a means to some end" (Freeman 2002: 39). This can be interpreted as a call for companies to show genuine concern for the needs and interests of their stakeholders (for example, by conducting a materiality analysis) if they wish to behave morally.

Another argument in favour of a consideration of stakeholder interests by corporations is that a corporation should treat its stakeholders in a certain way (e.g. considering their interests) for instrumental reasons, for example, in order to improve the financial performance of the corporation. Gibson calls this the "instrumental stakeholder approach" (Gibson 2000: 247). An example of an argument in favour of an instrumentally motivated stakeholder approach is given by Freeman and McVea, who present the stakeholder approach as an essential component of a corporation's 'survival on the market' (cf. Freeman/McVea 2001)

The authors identify the stakeholder approach as a strategic management approach. Strategic management is defined as future-oriented in the sense that it tries to predict future developments on the market and tries to influence the future market by directing some specific course. In directing the course of the market, the corporations would have to be in support of their stakeholders, since "in the long run they can make active responses" (ibid.: 14). Therefore, the authors conclude that "understanding stakeholder relationships is, at least, a matter of achieving the organisation's objectives which is in turn a matter of survival" (ibid.: 14). This argument is intuitively plausible. Only corporations that can respond to the interests of stakeholder groups like customers can be successful in the long run.

Note that this approach seems to contradict Freeman's normative argument against using stakeholders as means to an end. Gibson, however, refers to the reconciliation thesis, which claims that morally and financially beneficial behaviour might simply coincide. Showing genuine concern for the interests of stakeholders is morally desirable, and at the same time it improves the company's balance sheet (cf. Gibson 2000: 246 f.). However, corporations should not *merely* act for instrumental reasons if they wish to behave morally and responsibly (which is the aim of CSR). This argument, if correct, does not entail an obligation to a stakeholder approach. It rather offers a good reason for adopting it.

Empirical support for the instrumental and intuition-based argument that stakeholder orientation enhances the company's success in terms of financial performance is provided by Shawn L. Berman in his paper 'Does Stakeholder Orientation Matter? The Relationship between Stakeholder Management Models and Firm Financial Performance'. In a 1999 study, Berman tested whether incorporating the interests of stakeholders influenced the financial performance, defined as "Return on Assets" (Berman 1999: 496), of companies, and whether singular indicators representing the corporation's strategy could be influenced positively by stakeholder engagement

(these were defined as cost efficiency, selling intensity, capital intensity and capital expenditures) in a sample of 81 corporations. Berman defined key stakeholder relationships that the corporations either payed attention to or disregarded as employees, natural environment, diversity, customers/product safety and community (cf. ibid.: 489 f.).

The study lasted six years and had two major findings. Firstly, it showed that considering the interests of employees and showing an increased care for product safety (which is here seen as equal to showing excess interest in the stakeholder group consumers) was positively correlated with the corporation's overall financial success (cf. Berman 1999: 498). Hence, stakeholder commitment in these two areas proved very likely to enhance the corporation's balance sheet. Secondly, the study revealed that a stakeholder commitment in one of the key relationships defined above was positively correlated with one of the variables which define corporate success: cost efficiency, selling intensity, capital expenditures, capital intensity (cf. ibid.: 501). For instance, the variable cost efficiency had significantly better values in corporations that paid attention to the key stakeholder relationship product safety.

Altogether, Berman showed the existence of a positive correlation between concern for stakeholder interests and a corporation's success. In this, he backed Friedman's and McVea's instrumental argument in favour of a stakeholder orientation, because his paper supports the claim that corporations should adopt the stakeholder approach as a means of financial success.

The previous sections have shown that, first, contemporary CSR theory and practice are shaped by the stakeholder approach. Second, according to the GRI standards, stakeholder inclusion is best practiced by including stakeholders into a materiality analysis in order to let them influence fundamental corporate CSR strategy. Third, a normative obligation of a stakeholder approach shows that there are good instrumental reasons for adopting it. Having completed the theoretical groundwork of the paper, the next step will be to analyse how CSR is practiced at Daimler AG and Daimler Buses, and whether the appropriate approach of stakeholder inclusiveness we have defined is adopted. Although the main focus of this paper is the CSR strategy of Daimler Buses, the fact that the current strategy has a strong connection to the sustainability strategy of its parent company makes it necessary to consider Daimler AG strategy first.

It is worth addressing a conceptual issue here: Daimler's basic understanding of sustainability and CSR. The company's key concept under CSR concepts and activities, as well as basic corporate aims (e.g. legal and ethical standards, emission reduction), is sustainability. The Daimler AG describes sustainability as "a basic principle of our corporate strategy and a benchmark for our business success" (Daimler 2016c: 8), defining it as "responsible corporate behaviour that leads to long-term business success and strives to achieve harmony with society and the environment" (ibid.: 8). Accordingly, the basic report which describes the areas in which the company exerts responsibility, as well as the company's strategy for the future, is called Sustainability Report. The latest version was published in 2016. The report shows that the sustainability strategy is part of the basic corporate strategy (cf. ibid.: 9). Furthermore, it is explicitly stated that the overall sustainability strategy is developed in cooperation with the corporation's stakeholders (cf. ibid.: 8).

In terms of Daimler's understanding of CSR, Daimler AG does not employ the "classical" notion of 'Corporate Social Responsibility', but rather the notion 'Corporate Responsibility' (CR), in order to reflect a more diverse set of responsibilities which the company is concerned with, including, among others, "product responsibility", "ethical responsibility", "legal responsibility", and "social responsibility" (ibid.: 3). From now on in this paper, the abbreviation CR will be used to refer to the overall practice of corporate responsibility at Daimler AG and Daimler Buses.

The relation between sustainability and responsibility is that sustainability is the more basic and broader concept that encompasses the topic of responsibility and topics related to strategic management, for example the strategic actions the company as a whole will take in the future. Risk management is subsumed as a sustainability topic because identifying diverse risks for the corporation and tackling them ensures the long-term existence of the company.

After having addressed this conceptual issue, let us now look at how the Daimler Group has incorporated the stakeholder approach into their sustainability report. In line with Freeman's definition mentioned above, the 'Daimler Sustainability Report 2016' reveals that the corporation defines stakeholders as "all parties and organizations that impose legal, financial, operational or ethical requirements on Daimler AG" (ibid.: 13) and lists "employees, customers, shareholders, and investors, as well as our suppliers" (ibid.) as the corporation's primary stakeholders. The report explicitly mentions that the sustainability strategy of the Daimler AG, which is going to

shape the future of mobility, will be tailored explicitly to benefit the corporation's stakeholders (cf. ibid.: 2), which is a straightforward confirmation that Daimler AG has adopted a stakeholder approach to integrating their interests into their corporate strategy.

In terms of the practical aspects of stakeholder inclusiveness, the stakeholder approach for Daimler AG can be deemed exemplary, as it fulfils and even exceeds the requirements of the GRI standards, which serve as a benchmark in today's sustainability reporting.

It fulfils them because stakeholders are included into the materiality analysis in order to determine and legitimise the company's corporate sustainability strategy, and its CR focus as the GRI standards suggest (cf. Heger/Bürgel 2013: 7). The approach exceeds requirements, because Daimler AG, on top of the materiality analysis, includes primary stakeholders in the so-called stakeholder dialogue, enabling a face-to-face interaction between stakeholders and the company. These two measures, the materiality analysis and the sustainability dialogue will be further examined in the following sections.

The Materiality Analysis

The materiality analysis is a survey with the aim to determine and prioritise the most important fields of action in a firm's CR management (i.e. its sustainability strategy). The online survey, which is carried out every two years, is described in the Daimler Sustainability Report 2016 as follows:

> The target groups are not preselected in advance. For more than one month, all interested parties can take part in the survey on our Website at www.daimler.com, and name and evaluate topics that are important to them. In our assessment of the results, we give special consideration to the great significance of our primary stakeholder groups (shareholders and investors, customers, suppliers, and employees) as well as to non-governmental organizations. (Daimler 2016c: 4)

Heger and Bürgel explain that once the economic, ecological and social fields the stakeholders are particularly concerned about are collected, they are compared to the fields which Daimler AG views as particularly important (which are determined independently). As explained in Chapter

2.2, there are specific CR governance structures inside of the corporation whose responsibility it is to determine topics the corporation deems as particularly relevant. The intersection of fields prioritised by the stakeholders and those prioritised by the company determines the materialities of Daimler AG (cf. Heger/Bürgel 2013: 10).

The Sustainability Report of 2016 mentions what the result of the materiality analysis was used for: "The materiality analysis shows us the areas to which we have to pay particular attention. As a result, we further intensified our sustainability management activities in 2016, focusing particularly on the key topics of the materiality analysis" (Daimler 2016c: 4). The graph (see Figure 2), taken from the Sustainability Report (ibid.: 5), shows some of the primary materialities that were determined. Issues like reducing CO2 emissions, developing innovative technologies and customer satisfaction were among the primary materialities.

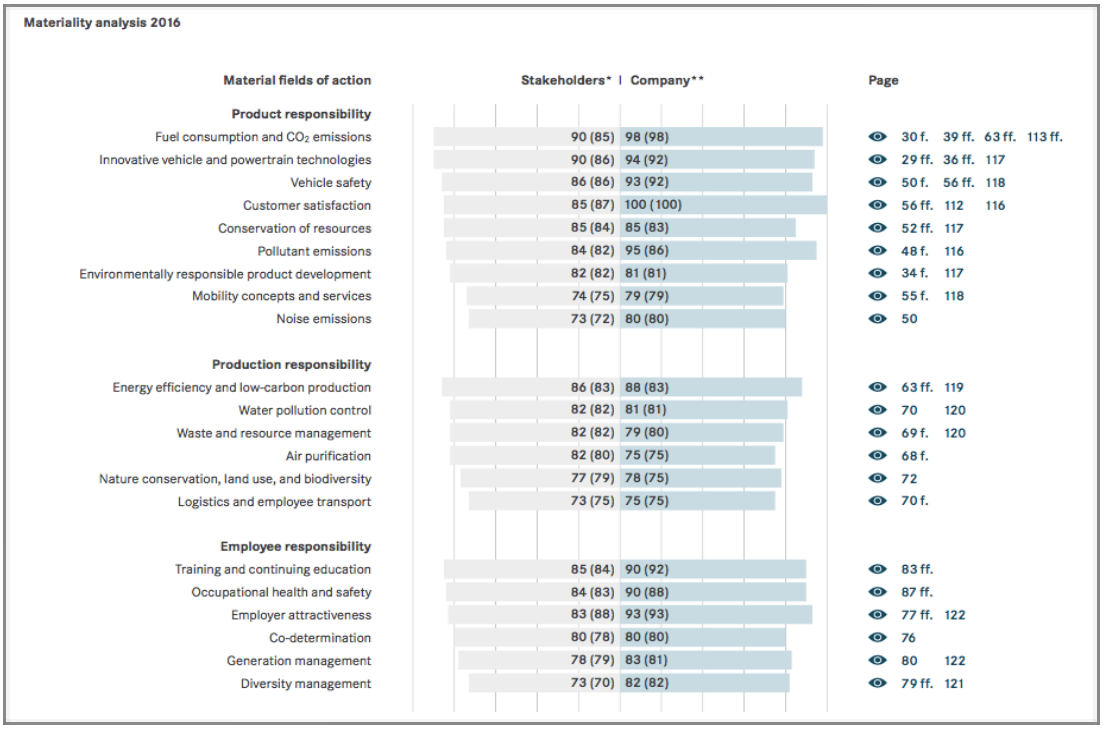

FIGURE 2: OUTCOME OF THE 2015 MATERIALITY ANALYSIS (CF. DAIMLER 2016C: 4)

The stakeholder inclusiveness of Daimler AG does not end with the materiality analysis with the company's stakeholders. Daimler AG goes a step further by setting up the so-called 'Sustainability Dialogue', which focuses on the particular inclusiveness of primary stakeholders.

The Sustainability Dialogue

Daimler AG explains the Sustainability Dialogue as follows: "[it] has been held annually in Stuttgart since 2008, brings various stakeholder groups together with representatives of our Board of Management and the executive management. The main element of the dialog is the sharing of ideas in a variety of themed workshop" (ibid.: 14).

Heger and Bürgel show that the Sustainability Dialogue is more specific than the materiality analysis in certain aspects. It includes only specific stakeholders from the private sector, politics, science, labour unions, suppliers, NGOs and citizens from Daimler locations (cf. Heger/Bürgel 2013: 2). Furthermore, the interaction between stakeholders and the firm is direct in contrast to the materiality analysis, and certain topics and future trends/challenges that are discussed in specific workshops (cf. ibid.: 4). Heger and Bürgel explain that the specialised divisions of Daimler take up the suggestions made by the stakeholders during the workshops during the dialogue and report on improvement of the problems the stakeholders recognise after the dialogue (cf. ibid.).

Altogether, the relationship with its stakeholders the Daimler AG constantly works on is exemplary. Not only does the company fulfil Freeman's requirement that "[t]he interests of key stakeholders [are] integrated into the very purpose of the firm, and stakeholder relationships must be managed in a coherent and strategic fashion" (Freeman/McVea 2001: 9), but it does this by entirely implementing the standards proposed by the GRI, which are the most-respected ones in today's CSR reporting, as it undertakes a materiality analysis to shape its sustainability strategy as the GRI suggests (see Chapter 2.2). Thanks to these practices, Daimler AG fares well in terms of its stakeholder inclusiveness in comparison to other companies in Germany. The 'Corporate Sustainability Barometer' is a survey that compares the sustainability management of Germany's biggest companies. The survey identifies the number of companies that practice intense and regular stakeholder inclusiveness as having dropped for most stakeholder relationships (cf. Schaltegger 2012: 11). Recalling the various, regular activities Daimler AG carries out in order to include its stakeholders into its strategic CR management, the conclusion is close that Daimler AG is among the frontrunner companies in terms of stakeholder inclusiveness in Germany.

2.5 Sustainability and CR at DaimlerBuses

Above, we have sketched out the basic understanding of sustainability and CR of the Daimler AG, as well as its exemplary practice of stakeholder inclusiveness in shaping the corporate sustainability and CR strategy. We will now analyse the CR governance at Daimler Buses, which is the business division of the Daimler AG responsible for the company's production of buses for local and long-distance traffic. Subsequently, we will look at the sustainability and CR concept Daimler Buses adopts, paying particular attention to how it relates to the concept of its parent company. Finally, we will review whether stakeholders are included in determining the corporate sustainability and responsibility strategies of Daimler Buses.

CR Governance at Daimler Buses

In terms of CR governance, the Daimler Bus Board, which is the primary management board of the company's bus division, determines the overall sustainability strategy of Daimler Buses. The authority responsible for coordinating this overall sustainability strategy among all the company's business areas is called the 'CSR Bus Board', and totals seventeen employees. One of these employees is responsible for the company's CR activities exclusively, while the other employees work in various divisions of Daimler Buses. The board furthermore functions as an interface to the 'Corporate Sustainability Office' (CSO), which is the main corporate responsibility governance authority of the Daimler AG. The CSO supervises the sustainability and CR approach of all the divisions of the company (of which Daimler Buses is one). It also allows the various divisions of Daimler AG to exert influence on the overall sustainability strategy that Daimler AG adopts. Altogether, examining the sustainability of governance at Daimler Buses, which is illustrated in the image below (cf. Daimler Buses 2017), one notices a strong interconnectedness with the sustainability governance authorities of Daimler AG (see Figure 3).

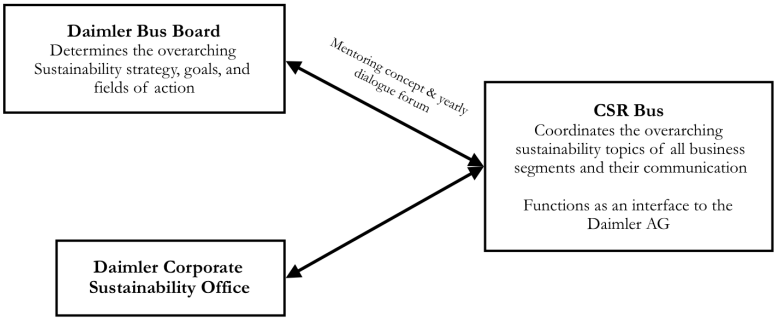

FIGURE 3: CR GOVERNANCE STRUCTURE OF DAIMLER BUSES AND THEIR CONNECTION TO CR GOVERNANCE OF DAIMLER AG (OWN ILLUSTRATION)

CR Today: The Daimler Buses Responsibility Concept

When it comes to CR strategy, Daimler Buses identifies six areas of responsibility which are of primary importance to the business division (cf. EvoBus 2017): The first area of focus is 'employee responsibility', meaning that Daimler Buses aims to foster diversity and equality among its employees, and wants to allow them to have a healthy work-life balance. Second, 'product responsibility' indicates that Daimler Buses sees itself as responsible for creating products that benefit their customers, adhere to high safety standards, and are environmentally friendly. Third, 'production responsibility' means that the firm's operations, in particular when it comes to manufacturing buses, should be as environmentally friendly as possible. Fourth, Daimler Buses wants to be a 'responsible business partner', meaning that it strives for trustworthy and durable partnerships. Fifth, Daimler Buses focuses on 'social responsibility', with the company committed to take up responsibility for the wellbeing of the local communities in which it operates worldwide. The sixth and final dimension of sustainability at Daimler Buses is 'ethical responsibility', meaning that Daimler Buses wants to uphold ethical values such as fairness, honesty, openness and the promotion of human rights in its business activities.

The company has implemented CR activities in these responsibility areas. For instance, in social responsibility, the "Schenk ein Lächeln" project has shown the company's concern for local communities. In this project, employees donated gifts to low-income families (cf. Daimler 2015). However, over the course of this paper, we will not consider the CR activities of Daimler in

further detail, as our focus is the basic sustainability and CR concept that the company adopts on which the CR activities are then based on.

CR Tomorrow: The Daimler Buses Sustainability Concept

Daimler Buses is currently working on a 'Sustainability Roadmap 2030', which encompasses the main actions the company wants to undertake in the future in order to secure their long-term success on the market. The roadmap identifies four main areas of action (cf. Daimler Buses 2017):

1. Mobility in the future, which encompasses subtopics like digitisation, autonomous driving and sustainable public transport.
2. Production & environment, which encompasses subtopics like resource- and energy efficiency.
3. Employees & society, which encompasses subtopics like employee satisfaction, diversity and commitment to the community.
4. Partnership & integrity, which encompasses subtopics like customer satisfaction and integrity.

Two Remarks About Current and Future CR Concepts of Daimler Buses

Altogether, two things are striking about the responsibility concept and sustainability topics at Daimler Buses. First, it is worth noting that there is a significant conceptual overlap between the CR and sustainability concepts of Daimler AG and Daimler Buses. For instance, in terms of the corporate responsibility concept, the responsibility categories of Daimler Buses (cf. EvoBus 2017), which were defined in the subchapter 'The Daimler Buses Responsibility Concept', are the same ones as in the Daimler AG 'Sustainability Report' (cf. Daimler 2016c: 3). However, the fact that Daimler Buses sets and prioritises its own sustainability topics for the future (see: CR Tomorrow: The Sustainability Concept of Daimler Buses) indicates that Daimler Buses is working on an overall CR concept that is more bus specific than that of Daimler AG.

Secondly, it is worth mentioning that Daimler Buses does not determine its CR concept and sustainability topics in cooperation with its stakeholders by conducting a materiality analysis, which can be seen as the best way to include the opinions of stakeholders into corporate CR strategies according to the Global Reporting Initiative (see Chapter 2). Thus, the sustainability roadmap 2030 entails topics which Daimler Buses primarily considers important to its stakeholders. Having in mind the arguments in favour of stakeholder-oriented corporate strategies (see chapter 2.3), this hardly seems sufficient.

Stakeholder Inclusiveness at Daimler Buses

As was emphasised in Chapter 2.2, a well-rounded CR strategy should be developed in cooperation with the company's stakeholders by including them in the process of determining the company's materialities. Since Daimler Buses does not conduct a materiality analysis in order to determine the company's sustainability topics and CR strategy (e.g. the 'Sustainability Roadmap 2030'), the conclusion that could be drawn is that Daimler Buses simply disregards the essential materiality principle. However, this conclusion would be rash.

One has to keep in mind that Daimler Buses is a business division of the Daimler AG. As we have seen above in the section 'Two Remarks about the Sustainability and CR concepts of Daimler Buses', Daimler Buses mostly has the same sustainability topics and its CR strategy from the Daimler AG Sustainability Report, which in turn is shaped by conducting a materiality analysis (cf. Daimler 2016c: 4). Thus, lacking a materiality analysis for determining the corporate sustainability topics and CR strategy can be justified by the thesis that adopting the sustainability topics and CR strategy of Daimler AG fulfils the demand for stakeholder inclusiveness, as the stakeholders of Daimler Buses are part of the materiality analysis which Daimler AG conducts. The stakeholders of Daimler Buses are thus able to influence the sustainability strategy of the Daimler AG as a whole, and that of Daimler Buses, since it is based on the former. This thesis, which we call the 'legitimacy thesis', is illustrated in the following image (Figure 4):

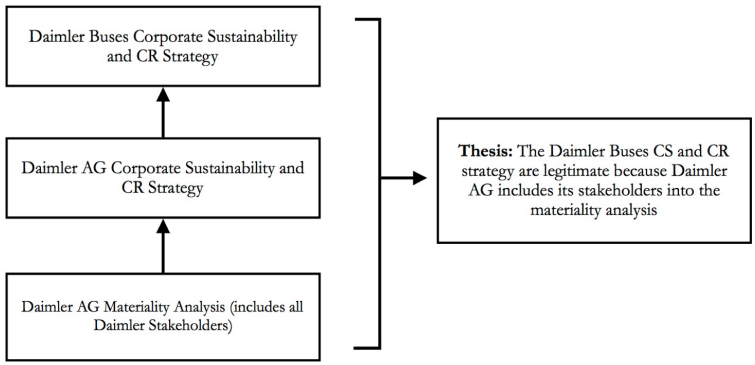

FIGURE 4: THE LEGITIMACY THESIS (OWN ILLUSTRATION)

To see whether the above thesis is tenable, or whether more than Daimler's materialities is required for the basis of Daimler Buses' CR strategy, we have to analyse the following:

- How are Daimler Buses' stakeholders included into the materiality analysis of the Daimler AG?
- Are the materiality categories that the stakeholders are questioned about (as these are determined by Daimler AG beforehand) essential to Daimler Buses?
- Is the current outcome of the materiality analysis appropriate to determine a bus-specific CR strategy for Daimler Buses in the future? (conceptual argument in Chapter 3.2)
- Will having a similar CR concept to Daimler AG (as it is the case today) place the company as the CR frontrunner of the bus division, staying true to the company's vision "Daimler Buses. Best Buses"? (market-oriented argument in Chapter 3.3)

A particular sense of urgency for analysing whether Daimler Buses should have the same sustainability topics and CR strategy as suggested in the Sustainability Report 2016 while ensuring an appropriate stakeholder inclusiveness is created by the fact that, in the future, Daimler Buses will develop a CR strategy specifically suited to the bus division (see 'Two Remarks about the current and future CR concepts of Daimler Buses'). In order for the CR division of Daimler Buses to know whether the materialities (and thus the central sustainability and CR topics) from the Sustainability Report are suitable for its CR strategy, the above questions need to be addressed.

Our main argument is that Daimler Buses cannot rely on the Daimler AG materiality analysis and thus the sustainability and CR focus of its parent company, because Daimler Buses has special stakeholder relationships and competitors that already have stakeholder-oriented CR strategies distinct from their parent groups. We argue that, for these reasons, Daimler Buses should carry out its own materiality analysis.

3. The Need for a Bus-Specific Materiality Analysis

3.1 Does Daimler Buses Require its Own Materiality Analysis?

We have seen that performing a materiality analysis is an essential basis for a well-rounded CR strategy. We have also seen that Daimler, of which Daimler Buses is a division, follows this approach by conducting a materiality analysis every two years. It is now our aim to argue that Daim-

ler Buses still requires its own materiality analysis. At first, this might appear counterintuitive because the 'natural starting point' for Daimler Buses would be to simply stick to the materialities[1] that resulted from Daimler's analysis. You could therefore say that Daimler Buses does *not* require its own materiality analysis, and that sticking to Daimler's materialities is enough. We will now present hypothetical arguments which could support this view. However, as we will see in the coming sections, these arguments cannot support the claim that Daimler's materialities are a sufficient basis for a bus-specific CR strategy. This leads us to arguing as to why it is that Daimler Buses requires its own materiality analysis.

Adopting Daimler's Materialities — Pragmatic Advantages

Two arguments can be put forward in favour of Daimler Buses adopting Daimler's materialities. The first is of a pragmatic nature. As mentioned, the CR panel of Daimler Buses (called 'CSR Bus') consists of seventeen people, with one person coordinating CR topics, and the remaining sixteen implementing them in the different parts of the business, e.g. in Human Resources, Mobility Solutions or Research & Development. Consequently, it seems impossible for them to realise a materiality analysis similar to the one performed by Daimler. Simply adopting the results from Daimler's materiality analysis would enable Daimler Buses to profit from all the resources that Daimler's Corporate Sustainability Office puts into the materiality analyses. Pragmatically, it seems to make sense to simply use Daimler's materialities.

However, this pragmatic aspect is only relevant for questions of implementing a materiality analysis. It is not relevant for arguing why it would be wise for Daimler Buses to do so in the first place. In the following, we will focus on the latter argument. For now, we will ignore the question of implementation and return to it in the last section of this paper. Even ignoring the pragmatics, there are other possible arguments for Daimler Buses taking over Daimler's results.

Adopting Daimler's Materialities — Profiting from Daimler's CR Image

Firstly, if Daimler Buses adopts Daimler's materialities, they will adopt the basis of a CR strategy that has proven to produce a positive image. Daimler can be called a pioneer when it comes to

[1] As mentioned earlier, 'materiality' here describes certain CR issues that are relevant both to a company and its stakeholders. This is to be distinguished from a 'materiality category', which is a category of several CR issues that are part of a materiality analysis.

CR — academics and consumers seem to perceive it this way. On the academic side, this is indicated by the 'Good Company Ranking' conducted by Kirchhoff Consult (2016). Here, experts rank the 30 largest German DAX corporations in terms of sustainability performance in the categories employees, environment, society and financial integrity. Daimler was ranked first. Consumers have a similar perception. This can be seen in the 'Global CSR RepTrak' published by the Boston-based Reputation Institute (2016). 240,000 people in 15 countries (cf. Strauss 2016) were asked how they would rank the world's largest corporations in terms of CR. Daimler came sixth. Therefore, if Daimler Buses adopts Daimler's materialities, they might be able to profit from Daimler's CR reputation.

One needs to keep in mind that it is equally possible for Daimler Buses to be negatively impacted due to its close CR links with its parent company. Just as easily as you can jump on Daimler's train of success, you can get pulled into scandals linked to them. Of course, this does not imply a complete CR separation from Daimler, which is neither possible nor wanted by Daimler Buses. Still, it gives reason to give the CR strategy a more independent, bus-specific twist, so that that people rather connect it with Daimler Buses than all of Daimler AG.

Adopting Daimler's Materialities — Overlaps in Stakeholder and Materiality Categories

The main point in conducting a materiality analysis is to focus the CR strategy on stakeholder's opinions. This bearing on stakeholders is already given by Daimler Buses' inheritance of the materialities from Daimler's analysis. If the aim is to have a stakeholder-oriented CR strategy, taking over Daimler's materialities is sufficient. However, the aim is not to regard the opinions of any stakeholders, but the opinions of specific Daimler Buses stakeholders. Even this aim, it could be argued, is fulfilled by adopting the materialities that resulted from Daimler's analysis. Who counts as a stakeholder of Daimler Buses automatically counts as a stakeholder of Daimler. As Daimler openly addresses its surveys to all possible stakeholders, there is certainly the possibility of Daimler Buses' stakeholders voicing their opinions. The results of Daimler's analysis might thus partly reflect what Daimler Buses stakeholders see as major CR issues.

Another aspect speaking in favour of adopting Daimler's materialities is that the materiality categories of Daimler's analysis all represent CR issues that could be relevant to Daimler Buses as well. Daimler's current materiality analysis conducted by WeSustain (2017) includes six main categories:

1. 'Anchoring' sustainability refers to CR matters being incorporated into the corporate strategy and taking into account stakeholder opinions. This is relevant for Daimler Buses, as they are currently reshaping their CR strategy for the years to come. External stakeholders also find this important.
2. 'Sustainable Vehicles' addresses ecological issues for the vehicles, such as CO2 emissions and energy efficiency. This category is material both for any manufacturer of CO2 emitting vehicles (Daimler Buses) and their stakeholders given the public uproar surrounding the 'Diesel Scandal' (cf. Reuters 2017).
3. 'Sustainable Mobility Solutions' relates to finding new and sustainable ways of mobility. To come up with such sustainable mobility solutions is an integral part of Daimler Buses' business strategy (cf. Daimler 2017: 15). This topic also matters for their stakeholders, as users of public transport are interested in receiving the same or better transportation services without suffering from the negative, ecological side-effects of current public transport.
4. 'Responsible Digitisation and Trust' concerns networked vehicles, autonomous driving and employee-related matters. Again, this is relevant to Daimler Buses having created the first partly-autonomous bus, the 'Future Bus' (cf. Daimler 2016b). As stakeholders will be heavily affected by this disruptive innovation, they might also see this issue as essential for Daimler Buses.
5. 'Responsible Action' is about integrity, compliance and human rights. This category is germane to any enterprise and their stakeholders. It is even more so in Daimler Buses case, as they manufacture buses in less economically developed countries, like India.
6. 'Social Commitment' focusses on (supra-)regional commitment for social topics. This seems pertinent to Daimler Buses, when looking at activities like employees visiting schools close to their Turkish production site in order to convey the pleasure of reading (cf. Daimler Buses 2016). Social commitment is a common expectation for stakeholders nowadays, and those of Daimler Buses are probably no exception.

We see that all of the categories are (or are at least likely to be) relevant for Daimler Buses and their stakeholders. Thus, Daimler's materiality analysis applies to Daimler Buses in both of the relevant respects: the addressees (stakeholders) and in the topics that are surveyed (materiality categories).

The result we have just obtained is not surprising, as it is exactly the purpose of Daimler's materiality analysis to cover all of its branches to receive all-encompassing feedback. Its purpose of universal scope is, however, also the weakness of Daimler's materiality analysis. A mixture of opinions from different branches are received, and by design, ignore the distinctive features of these branches. A bus driver will care about different CR issues to a truck driver. An individual car purchaser will care about different CR issues to municipal transport services buying a fleet of buses.

Therefore, the legitimacy thesis from Chapter 2.5 is correct only if Daimler Buses simply wants a CR strategy that has some level of stakeholder inclusiveness. If, however, Daimler Buses aims to construct a genuinely bus-specific CR strategy, simply sticking to Daimler's materialities is not enough. In the following, we will present two main arguments for this. The 'conceptual argument' will further elaborate the problem that was just touched upon, namely that sticking to Daimler's materialities ignores particularities for Daimler Buses stakeholders and the 'bus' product. To further support the need for their own materiality analysis, the 'market-oriented argument' will state that Daimler Buses requires its own materiality analysis in order to form a CR strategy that can keep up with its competitors' CR strategies.

3.2 Particularities Regarding Stakeholders and the 'Bus' Product – the Conceptual Argument

The conceptual argument can be sketched out in the following way: In Chapter 2.5, we mentioned that Daimler Buses wants a CR strategy that, while being consistent with Daimler's overall strategy, contains bus-specific elements. As argued in Chapter 2.2, performing a materiality analysis is an essential basis for any well-rounded CR strategy. You have to find material for CR issues together with your stakeholders. If the CR strategy for Daimler Buses is supposed to contain bus-specific elements, this consequently has to be reflected in some bus-specific materialities. How do you obtain these? The main point we want to make in this chapter is that only their own materiality analysis can lead to bus-specific materialities, and therefore to a CR strategy with a bus-specific twist, as desired by Daimler Buses.

Why is it the case that only their own materiality analysis will lead to bus-specific materialities? In the following, we will support this claim in three steps. We will again explain why Daimler's

overall materiality analysis cannot possibly be enough to produce bus-specific materialities. We will specify what exactly we mean by their 'own' materiality analysis, i.e. what could be different from Daimler's. We will then show why this own materiality analysis is likely to produce different, bus-specific results.

Achieving Bus-Specific Materialities — an Incorrect Way

Why is it the case that only their own materiality analysis can lead to bus-specific materialities? The only meaningful alternative that might function as a basis for Daimler Buses' CR strategy is Daimler's overall materiality analysis. It should have become clear that this cannot possibly lead to bus-specific materialities.

Daimler has five divisions: Mercedes-Benz Cars, Daimler Trucks, Mercedes-Benz Vans, Daimler Buses and Daimler Financial Services. With a revenue of approximately €4 billion and 17,899 employees in 2016 (which amounts to only 6.57% of all Daimler-employees), Daimler Buses is the second smallest of these five (cf. Daimler 2016a: 3). By looking at one stakeholder group, say the employees, you get an idea of how small the proportion is that Daimler Buses stakeholders make up. If all of Daimler's stakeholders now participated in the materiality analysis, Daimler Buses stakeholders would be able to voice their opinions. But given their small share, what would occur is the 'dilution effect'. The relation to Daimler Buses is given, but it is diluted by including all of Daimler's stakeholders. This would not be problematic if all these stakeholders cared about the same CR issues that Daimler Buses do. But as we will see below, this is very likely not the case. There are differences in the CR issues relevant to Daimler Buses and other branches of Daimler.

Apart from this, the premise that all of Daimler's stakeholders participate in the materiality analysis in practice is not even remotely true. In a survey from 2015, around 700 answers were received (cf. Daimler 2016c: 4). Compared to the total of 272,579 employees (cf. Daimler 2016a: 3), this is astonishingly low. Many of these answers would not have related specifically to Daimler Buses, and it seems less likely that Daimler Buses stakeholders will take part in such a general materiality analysis. Stakeholders might not identify themselves with the parent company, Daimler AG, but rather with certain brands that belong to the different branches. In Daimler Buses, stakeholders have a strong bond with EvoBus and one of its brands, Setra. Therefore, they would rather participate in a materiality analysis related to these brands than in one related to the Daimler

group as a whole. Similarly, there are other instances in which political participation has shown to decrease with the size of the object that participation is required in. For example, while German voter turnout in the European election has been below 50% throughout the last twenty years, the turnout in the German national elections has constantly been above 70% since 1949 (cf. Statista 2018a; Statista 2018b). Just as Germans seem to see themselves more as German than as European (cf. YouGov 2016), Daimler Buses stakeholders are likely to feel more attached to Daimler Buses than to Daimler.

This makes it even less likely for Daimler's general materiality analysis to lead to bus-specific materialities, and stresses that only their own materiality analysis can deliver this. But what is such a materiality analysis supposed to look like?

Their Own Materiality Analysis

To answer this question, you need to think about who will participate in the analysis, and which CR issues will be surveyed. Daimler Buses' own materiality analysis would only and explicitly be addressed to Daimler Buses stakeholders. For the sake of such a survey, it makes sense to adopt Daimler's broad definition of who counts as a stakeholder. According to this definition, Daimler Buses stakeholders are "all parties and organizations that impose legal, financial, operational or ethical requirements" (Daimler 2016c: 13) on Daimler Buses. Such a broad definition allows you to receive many answers to the survey. Which stakeholder group's answers are then seen as most important can be decided by stakeholder weighting.

Concerning the CR issues surveyed, we have already seen in Chapter 3.1 that all the materiality categories of Daimler's analysis are also relevant to Daimler Buses. Thus, these could form a good basis for their own materiality analysis. However, although all these categories are also relevant to Daimler Buses, they do not contain all CR issues relevant to Daimler Buses. It is possible that in the selection of material CR issues (see step (1) of the materiality analysis in Chapter 4.2), Daimler Buses would come up with a different list to Daimler. One difference might be the CR topic of 'urbanisation'.

If you look at Daimler's materiality analysis from 2017 (see Chapter 3.1), you will find four future trends: climate change, sustainable mobility concepts, digitisation and autonomous driving. One major future trend for buses that is not explicitly mentioned is urbanisation. Urbanisation is the phenomenon of people increasingly moving from rural to urban areas. It is especially seen in

places like Latin America (cf. Atlantic Council 2014) or India (cf. Padam and Singh 2001: 3), both of which Daimler Buses sells its products to (cf. Daimler 2017: 6). Increasing urbanisation, together with an (over-)use of private transport, leads to congested and polluted cities (cf. Padam and Singh 2001: 5). More and better public transport seems to be the solution, and especially buses, as they often can be used without relying on pre-existing infrastructure. Daimler Buses is thus likely to be impacted by urbanisation and certainly has to see this as a materiality, which they of course (at least implicitly) already do (cf. EvoBus 2017). However, putting urbanisation at the core of one's (CR) strategy could be even more legitimised by explicitly asking stakeholders for their opinion in an own materiality analysis (as it is done by MAN, see Chapter 3.3).

To conclude, Daimler Buses own materiality analysis would address only their stakeholders and likely differ in the CR issues that are part of the survey. One example we gave for this is urbanisation. However, this does not constitute the main difference between Daimler's general and Daimler Buses' own materiality analysis. This main difference lies elsewhere — which leads us directly to the third part of our argument. The main difference lies in what results the own materiality analysis is likely to produce. Those results would then reflect the distinctive features of Daimler Buses in CR. In other words: only this materiality analysis can lead to bus-specific materialities. This is due to particularities with Daimler Buses stakeholders and the 'bus' product.

Particularities of Daimler Buses Stakeholders

What is so pertinent to Daimler Buses stakeholders? Where is the difference to Daimler's general stakeholders? Daimler, in its sustainability report of 2016, divides its stakeholders into more important (primary) and less important (secondary). This is based on "the extent to which a person or group is affected by our company's decisions or can, in turn, affect these decisions" (Daimler 2016c: 13). Primary stakeholders are employees, customers, shareholders, investors and suppliers. Primary stakeholder's responses enter the results of the materiality analysis with a higher weighting. In this way, stakeholder groups that are few in number and yet of high importance are able to be appropriately represented in the weighted results. Secondary stakeholders are analysts, professional associations, trade unions, media, scientists, politicians, municipalities, residents, and neighbours of the locations. There are at least two differences regarding these categories when it comes to Daimler Buses' stakeholders.

The first difference refers to their division into primary and secondary stakeholders. The relation between employees, customers, shareholders, investors and suppliers on the one hand and Daimler Buses on the other is the same as with Daimler in general. Thus, all these are primary stakeholders for Daimler Buses. There is just one primary stakeholder group of Daimler Buses, which is only an implicit part of Daimler's secondary group 'trade union' — this is the 'bus drivers'. Why are bus drivers primary for Daimler Buses?

Firstly, they are heavily affected by Daimler Buses decisions. Although they do not buy the buses, they are the ones who influence by any change in the bus. These may be incremental changes, like a different driving seat design, but also disruptive ones, like a partly autonomous bus. The latter has the potential to completely change the profession of bus drivers (cf. Mattheis et al. 2019), and it is not too far away in the future. In 2016, Daimler Buses presented its partly autonomous Future Bus and tested it on a 20 km long Bus Rapid Transit track in Amsterdam (cf. Daimler 2016b). Given this 'threat' to bus drivers, it becomes even clearer how strongly bus drivers are affected by Daimler Buses' decisions.

Secondly, bus drivers have the potential to affect Daimler Buses' decisions. It is possible for them to organise themselves in a trade union and have enough power to put pressure on Daimler Buses. More importantly, they are the 'faces' of buses, which leads to them having a significant impact on the image of buses in general. As a consequence, bus drivers are a primary stakeholder group[2], which implies that their answers in a materiality analysis should receive a higher weight in the results. As we will see below, this is likely to lead to materialities that differ from Daimler's.

The second difference in stakeholder categories concerns the category 'customers'. 73,3% of Daimler's sales are made up of the branch 'Mercedes-Benz Cars' (cf. Daimler 2016a: 3), which means that the majority of Daimler's customers are individuals. However, it is not individuals who buy buses. Rather, buses are bought by tourism companies and public transportation firms. The fact that buses are mainly used in public transportation is closely linked to the distinctive features of the 'bus' product.

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2 Although bus drivers might be assigned to the group of trade unions, given their special status it might even make sense to create their own category.

Particularities of the 'Bus' Product

What distinguishes the bus from the other vehicles, such as the cars, trucks and vans that Daimler manufactures? First of all, buses are often not bought in single units but as whole fleets. At the same time, buses usually have a lifespan of nine years, while cars only are used for about six years (cf. Bundesministerium der Finanzen 2000: 4). As such, bus fleets are used for public transport, and the bus fleet will shape cityscapes for a long time. In the urban use of buses, we have also seen that buses are an important means of efficiently managing urbanisation.

Another important peculiarity of buses relates to the number of people that are transported at once. Imagine how packed buses are when, for example, school starts on a regular day in the week. In these cases, every seat is occupied and the areas in which you can stand are so crowded that you have to squeeze yourself into the bus. Depending on the size, around 100 people will be inside the bus at once. Compare this to a car which can carry about 4 to 7 people at a time, all seated and secured by seat belts. It immediately becomes obvious that this leads to an immense responsibility for bus drivers and the security features of buses.

In conclusion, Daimler Buses shows particularities both in the stakeholder categories and the product that is sold. These particularities affect the results of Daimler Buses materiality analysis and will likely differ from Daimler's ones. Their own materiality analysis will lead to bus-specific materialities. There are at least three CR issues for which this might be the case.

How their own Materiality Analysis Produces Bus-Specific Materialities

A look at the results of Daimler's 2015 materiality analysis reveals the first two CR issues with less importance for Daimler than for Daimler Buses and their stakeholders. As Daimler Buses differs from other branches in the product it sells, these CR issues are, unsurprisingly, part of 'product responsibility'. Here, both noise emissions and mobility concepts and services are the least material issues (cf. Daimler 2016c: 5)[3]. However, both are likely to be more material for Daimler Buses. We have seen that buses are bought as whole fleets by public transportation services and will influence cityscapes for a long time. Thus, Daimler Buses and its stakeholders will care more about reducing noise emissions, in order to ensure a convenient urban life. In contrast, in the case

[3] On a scale from 0 to 100, both have materiality ratings of around 73. As all issues received ratings between 65 and 93, 73 is a comparatively low score.

of cars, primary stakeholders such as consumers might enjoy driving a loud vehicle. Also, mobility concepts and services are likely to be more material for Daimler Buses. As explained earlier, urbanisation, with all its problems of congestion and pollution, is a major issue for bus manufacturers. Again, the difference in the primary stakeholder group of consumers might become relevant. Public transportation services are those who have to solve problems caused by urbanisation, by relying on more efficient mobility concepts. Private purchasers of cars or vans usually care less about such societal problems, which they individually only have a limited impact on. Above this, changes to the car itself are not able to reduce traffic congestion.

The third relevant CR issue can be found in Daimler's 2017 materiality analysis: 'autonomous driving'. Although no results for this are available at the time of writing, one could put forward an argument for why this is more material for Daimler Buses and its stakeholders than for Daimler in general. This is related to the particularities of the bus driver and of the bus itself. It has already been mentioned that the introduction of a (partly) autonomous bus may change the whole profession of bus drivers. If an autonomous car is introduced, however, none of Daimler's primary stakeholders are as heavily affected. One might argue that the profession of taxi driver will become obsolete. However, they are not as important for Daimler as bus drivers are for Daimler Buses. Buses are exclusively driven by bus drivers, while most car drivers are ordinary individuals. These, you might argue, see autonomous driving not as a serious issue to deal with, but rather as an innovation that will make driving a lot more comfortable. With respect to the particularities of the bus, it has been explained that many more people are transported in buses. This results in a larger responsibility for bus producers in case of technical failures in the autonomous driving technology.

All in all, we have now seen three CR issues which are likely to be relevant for Daimler Buses and its stakeholders, but not necessarily for Daimler as a whole. Together with the earlier explanations in this sub-chapter, we have supported the claim that only their own materiality analysis can lead to bus-specific materialities. As a materiality analysis is an essential component of a CR strategy, and only their own materiality analysis can deliver the materialities that are required for a more bus-specific CR strategy of Daimler Buses, we end with the conclusion: Daimler Buses needs to conduct their own materiality analysis. This completes the conceptual argument. In the following chapter, we want to support our conclusion by a market-oriented argument.

3.3 Learning from Best Practices – the Market-Oriented Argument

True to their own "Daimler Buses. Best Buses." vision, Daimler Buses claims to lead the bus market in terms of innovative mobility solutions, product safety and environmental footprint (cf. Daimler AG 2018). In the first section of this paper, we pointed out that CR has become one of the defining features of a firm's business activities. Moreover, we saw that stakeholder theory is today's most widely accepted theoretical approach to how companies can take responsibility for society and the environment in which they operate. Evidently, if Daimler Buses really takes its aspirations of being the undisputed market leader in the bus industry seriously, then the company's CR strategy cannot fall short of these expectations. This means that Daimler Buses must be at the forefront (setting industry standards) with regard to its CR strategy. However, the question arises of whether this is really the case. Finding an appropriate answer to this question will be the primary aim of this section. In doing so, we will focus on analysing how Daimler Buses competitors incorporate stakeholders into their CR strategy and whether they work with the concept of a materiality analysis.

The evaluation of Daimler Buses' competitive environment will proceed as follows: first, we will briefly recapitulate the CR status-quo at Daimler Buses. Then, we will argue that when it comes to stakeholder inclusion and the usage of materiality analyses some of Daimler Buses competitors such as MAN and Scania have developed more detailed CR strategies, with a clearer focus. This will be followed by working out what advantages these competitors might have over Daimler Buses. Finally, we will make the case for a bus-specific materiality analysis being necessary for Daimler Buses, in order to keep up with the competition.

Recalling 'CR at Daimler Buses'

We will start this analysis with a brief restatement of the most central CR features at Daimler Buses.[4] The company publicly communicates CR-related topics under the headlines 'sustainability' or 'responsibility'. It further differentiates the concept of sustainability into six different focal areas, reflected in its concrete business activities (cf. EvoBus 2017). These are employee responsibility, product responsibility, production responsibility, responsible business partner, social responsibility and ethical responsibility. This categorisation gives an overview of what the company

[4] For a more thorough review of the CR practices and CR governance at Daimler Buses, see Chapter 2.5.

imagines when talking about sustainability or CR. Further, it gives an insight into which topics could possibly become material within the Daimler Buses division. Derivable (although not spelt-out) CR issues of relevance to the company are diversity and equality, product safety, customer satisfaction, environmental protection, integrity, honesty and trustworthiness, human rights, innovative strength, and social responsibility. We can see that the six fields in which sustainability is reflected in the business activities of Daimler Buses derive a range of CR issues which could become material for the company. They are, however, neither made explicit nor are they developed or prioritised in any way, for example as the result of stakeholder interaction.

Moreover, it can be concluded that Daimler Buses is stakeholder-oriented in its CR practice, as they state that they want to "[…] be profitable only while acting in the interests of our stakeholders, including employees, customers and society […] partners and suppliers." (EvoBus 2017). This also shows that Daimler Buses has identified employees, customers, society, business partners and suppliers as stakeholder groups for which they take responsibility in the six areas mentioned. However, beyond these aspects there is no further specific information available about CR at Daimler Buses. While the annual sustainability report of Daimler AG gives far more detailed insights (both in quality and quantity) into CR at the Daimler Group as a whole, it is not possible to distinguish between CR practices at Daimler's different business divisions.

Based on all the information available (public and internal information about CR strategy and CR governance at the company), one can conclude that Daimler Buses, even though it has regular mechanisms for engaging in dialogue with its stakeholders, does not yet do so explicitly in the form of an annual sustainability dialogue within the division. Furthermore, Daimler Buses does not make use of the concept of a materiality analysis in order to prioritise key issues to both the company and its stakeholders. As a consequence, the CR strategy of Daimler Buses remains vaguer as it has (at least when it comes to what has been externally communicated) neither identified key stakeholders nor key topics (merely responsibility categories) which can form the basis of a specific, bus-oriented CR strategy.

The question arises of how similar companies, which are also active in the market for buses, handle the two crucial aspects of materiality analysis and stakeholder inclusion. We will thus contrast CR at Daimler Buses with CR at MAN and Scania. They both have Volkswagen AG as their mutual parent company, which suggests that they have a similar relationship with Volkswagen AG as Daimler Buses has with Daimler AG. Consequently, this similarity makes

them well-suited for such a comparison. However, one needs to keep in mind that Daimler Buses is significantly smaller than both MAN and Scania, which produce, besides buses, trucks and engines. Also, Daimler Buses is only a business division of Daimler AG, while MAN and Scania are both their own companies. In the 2016 financial year, Daimler Buses employed 17,899 people and had total sales of 4.18 billion Euros (cf. Daimler 2016a), while Scania employed 46,243 people and had a revenue of 10.96 billion Euros (cf. Scania 2017). MAN had 53,824 employees and created a revenue of 13.6 billion Euros (cf. MAN SE 2017a). These differences in sheer size should not, however, stop us from drawing reasonable conclusions based on the following analysis. The reason this is possible is that the aspects of CR we analyse and compare are not so much rooted in quantitative differences as they are qualitative differences between the companies. This means that what applies to MAN or Scania can and should also apply to Daimler Buses — of course, allowing for some adjustments due to the varying firm sizes and different organisational structures.

CR at MAN: A More Focused CR-Profile

Let us begin by taking a closer look at the CR strategy of the MAN Group. A detailed insight can be gained from both their website as well as their annual "MAN GRI Report — Corporate Responsibility at MAN". Since 2010, CR has been integrated into MAN's corporate strategy and in 2014 they developed the realigned "CR strategy 2020+" (cf. MAN SE 2017b: 5-10). The new strategy shifts focus to stakeholders' expectations and orientates itself at global challenges that have material significance for MAN's business activities (cf. ibid.). Hence, *CR* means for MAN "(…) understanding global challenges and recognising the opportunities and risks with regard not only to sustainable development, but also to commercial success." (MAN SE 2017c). This shows that the CR strategy of MAN is built in line with trends such as globalisation, population growth, urbanisation and climate change. It further rests on the four cornerstones of "integration", "people", "production" and "products", each of which consists of four concrete fields of action for the company. At the heart of the CR strategy of MAN is a materiality analysis from 2014 that the company plans to update in 2017 (cf. MAN SE 2017b: 8). The aim of MAN's materiality analysis is to identify key issues that are relevant to the company's stakeholders, as well as to its own business objectives. This list of top-priority topics that MAN needs to address within its CR ac-

tivities was developed in a multi-stage process. First, the "MAN CR Steering Committee" discussed and ranked twelve global challenges in terms of the risks and the opportunities they may pose for the company. Second, MAN conducted an open online stakeholder survey with over 1700 participants including stakeholder groups such as employees, NGOs, investors, business partners and customers to supplement the internal analysis. According to MAN this "(…) led to the definition of six material challenges as the basis of the MAN CR strategy (…)" (ibid.: 9). These challenges are: "climate change", "resource scarcity", "urbanisation", "health", "environmental pollution" and "diversity & equal opportunities".

MAN conducted two additional separate materiality analyses for the business divisions MAN Latin America and MAN Diesel & Turbo in order to account for regional differences as well as differences across business divisions. They found, besides a general similarity, that "(…) regionally relevant issues such as access to water, biodiversity, and population growth were ranked higher (…)" (ibid.). MAN then made use of this valuable information in order to come up with very specific and local CR activities (cf. ibid.).

MAN shows a strong stakeholder orientation in its CR practice, which is expressed by making use of its stakeholders' opinions in order to create a materiality analysis, which in turn is foundational for the company's CR strategy. MAN's approach can thus be seen as a best practice in terms of materiality analysis and stakeholder inclusion.

If one looks at the annual sustainability report for Scania, a Swedish manufacturer of commercial vehicles, published in accordance with the standards of the Global Reporting Initiative (GRI), one sees that MAN is not the only bus manufacturer that makes explicit recourse to a materiality matrix in order to prioritise sustainability issues and to develop a CR strategy with a clear focus. What Daimler Buses and Scania have in common is that both companies market their CR activities under the slogan of "sustainability". Besides this, we have found that Scania's CR strategy has a clearer focus when compared with the CR status-quo at Daimler Buses. We believe that this comes from Scania making extensive use of materiality analyses and stakeholder interactions in order to develop their CR strategy, as Scania acknowledges that "(…) understanding our stakeholders' views of the material considerations allows Scania to focus on the areas that matter" (Scania AB 2017a: 12). Scania values the concept of materiality analysis as it generates information concerning the expectations of stakeholders (cf. ibid.). Scania uses this information to improve its business activities and processes, particularly during its shift towards

sustainable transport solutions (cf. Scania AB 2017b). Scania thus conducts a materiality analysis on a yearly basis. In an online survey, internal stakeholders such as employees (but also a rich variety of external stakeholders such as customers, suppliers, political decision makers/regulators, NGOs, capital providers, students can labour unionists) can participate (cf. ibid.)

Scania's definition of sustainability has three materiality matrices, each for one of their three overarching sustainability categories: "sustainable transport", "responsible business" and "long-term business value" (ibid.). Stakeholders are asked to prioritise a total of 28 issues spread over three categories in terms of how relevant they are to Scania's long-term performance. When stakeholders had to identify the most important six out of the 28 issues they named, "investment in research and development", "customer satisfaction", "connectivity", "energy efficiency" and "electrification" had the highest priority. What is particularly positive is that Scania actively makes use of the results of the stakeholder surveys, in that the highlighted issues are then addressed with special importance. This is reflected on their website as well as in their sustainability report. The company even plans to extend the current materiality analysis over the next year (cf. Scania AB 2017b). Specifically, they want to further broaden the range of stakeholders which they include in their survey. Moreover, Scania wants to introduce a continuous stakeholder dialogue instead of an annual survey for an even more direct feedback from its stakeholders (cf. ibid.).

Learning from the Competition

What can we conclude from this brief analysis of Daimler Buses competitors? First, we need to acknowledge that the analysis of MAN and Scania is, of course, not comprehensive in terms of the status quo in all the bus industry. With MAN and Scania, we chose companies that have particularly well-developed CR strategies, which will obviously not be the case for all of Daimler Buses' competitors. In this sense, we believe that MAN and Scania can be seen from Daimler Buses perspective as best-practices for the inclusion of both stakeholders and materialities in a content-oriented CR strategy. Second, what this analysis however shows that there are other notable players in the bus market that have already developed their own materiality matrices, taking into account stakeholder expectations of the company's operations. Third, these companies use — as has been particularly visible with MAN — the results of the materiality analysis for the development of very specific CR strategies that focus on particular stakeholders and topics that are exceptionally important.

What does this mean for Daimler Buses' future business prospects? As argued in Section 2.3 of our paper, a well-developed CR strategy can be a decisive competitive advantage. As a consequence, this could mean that if Daimler Buses does not start to make up the leeway, which it evidently has, this could have negative implications for the company's financial performance in the long-term. This means that, apart from any moral deliberations about whether Daimler Buses is actually *obliged* to increase its stakeholder inclusion, there are also good reasons for the company to start doing so on a purely instrumental level. That is why we are convinced that — while acknowledging that Daimler Buses needs neither its own CR reporting nor a fully-developed CR strategy that is as detailed as that of MAN or Scania due to its smaller size — it needs to start engaging more with its stakeholders by developing its own materiality matrix.

This is particularly true for Daimler Buses, as it needs to direct its (in comparison to MAN and Scania, more limited) CR resources to the issues which are more important for the company's continuing prosperity in the coming years: its materialities. This means that Daimler Buses should make use of the materiality analysis as one important CR instrument, not in spite of its smaller size but because of it. For this reason, we will sketch out how a future pathway for the company could look.

4. Next Steps for Daimler Buses: Roadmap

4.1 The Short Term: the Wheres, Hows and Whats of Getting Started

Up to this point, we have argued that it is reasonable or even necessary for Daimler Buses to increase its stakeholder engagement and develop its own materiality analysis. Now it is time to turn over to the more pragmatic part of our paper. We deem this necessary, as even if one accepts the arguments that we have made up to this point, there might be some scepticism regarding whether it is even possible for Daimler Buses to come up with their own materiality analysis. Hence, the following two sections will be devoted to explaining how their own, bus-specific materiality analysis could be implemented at Daimler Buses. We want to tackle this issue from a practical perspective by giving some general guidance for the implementation process.

We will approach this task by differentiating between two different time horizons. For the short term, which will be in this section (see Chapter 4.1), we are going to make some concrete

proposals on how to deal with the issue at hand pragmatically, and in a resource-efficient way. This means that we will explain how Daimler Buses can approximate their own stakeholder survey and materiality matrix by making recourse to the company's available resources without actually having to perform an analysis. In Section 4.2, we propose that in the long-term Daimler Buses needs to conduct its own materiality analysis. In order to support this endeavour, we will show six steps for developing a materiality analysis and outline how much there is for Daimler Buses left to do.

Approximating Their Own Materiality Analysis

We have pointed out that Daimler Buses needs its own materiality analysis in order to create a bus-specific CR strategy that reflects all the particularities that distinguish Daimler Buses from the other business divisions of the Daimler Group. Doing so will generate useful learning that can be used for sharpening the company's CR profile. For example, this will help in understanding what bus drivers — as we have shown, a primary stakeholder group for a bus manufacturer — expect from the company. This information will then give Daimler Buses the opportunity to adapt and sharpen its CR strategy accordingly. Thus, even in the short term, it is clear that Daimler Buses will profit from being aware of its materialities.

However, we acknowledge that a proper materiality analysis is a complex and thus expensive undertaking. Our study into the state of affairs within the CR division at Daimler Buses, especially in terms of governance and available resources, has shown that the division's capabilities are limited at the moment. We do not believe that Daimler Buses should aim for coming up with a fully sophisticated CR strategy based on their own materiality analysis in the near future. For the moment, this is not too problematic as Daimler Buses can draw on the knowledge and resources of the Daimler Group. It can make use of already-existing materiality analyses. However, this materiality analysis may only be an approximation of the materialities of Daimler Buses and thus not sufficient in the long-term, as we have argued earlier in this paper. Still, it makes a good starting point for further action. Even though Daimler Buses wants to set its own priorities with its CR strategy, the company also needs to preserve a common core with CR at the Daimler AG. This means that both companies need to share the same 'DNA' in this respect. Whatever Daimler Buses does in terms of differentiating themselves with their CR strategy, the company needs to ensure a general congruence with the overarching CR strategy given by Daimler AG.

It is important to note that the limitations above do not excuse Daimler Buses from becoming more specific and distinct in its CR strategy. We have seen that a sharpened CR strategy can be achieved through CR priority-setting, resulting from a materiality analysis. Now, the most pressing question for Daimler Buses is: how can it find out about its materialities without having to conduct a fully encompassing materiality analysis on its own? Therefore, the company needs to figure out which of the pre-existing CR resources and stakeholder communication tools it has recourse to in this process. This will prove to be the most cost-efficient and fastest way of finding out more about stakeholders' expectations. Consequently, Daimler Buses needs to engage in a learning process which will show the issues which matter most to the company and its stakeholders, in order to understand the issues which could become material.

Taking the 'Roadmap Sustainability 2030' as a Starting Point

Firstly, let us take a closer look at the issues of particular importance to Daimler Buses. When analysing the six dimensions according to which sustainability is understood and represented at Daimler Buses, we have already pointed out that there seem to be implicit potential materialities deducible from the company's current CR strategy. For instance, we referred to diversity and equality, product safety, customer satisfaction, environmental protection, integrity, honesty and trustworthiness, human rights, innovational strength, and social responsibility as apparent CR issues for Daimler Buses. Another starting point is the recently developed 'Roadmap Sustainability 2030', which illustrates core sustainability issues that the company sees as having an impact on its future development (cf. Daimler Buses 2017). Earlier in this paper, we pointed out that this roadmap represents what the company determines important for its long-term success. Hence, drawing on the roadmap we can add issues (such as autonomous driving or resource efficiency) to this list. As a result, we are able to create a list of issues that could become material to the company. However, it is important to note that these issues are not materialities in the 'theoretical' sense yet. For the listed issues to become 'real' materialities, they also need to be considered important to stakeholders. While Daimler Buses already utilises various formal and informal channels over which it collects information about stakeholders' views, this information can further be validated by conducting a stakeholder survey.

Secondly, it seems obvious that the next step in finding out whether the issues worked out by Daimler Buses within the 'Roadmap Sustainability 2030' are really material must be to include

stakeholder opinions. As the goal for a short-term realisation of our proposal it is to approximate a materiality analysis, this inclusion of stakeholders' voices needs not to have the form of an empirical stakeholder study. For the purpose of learning something about what the unique materialities of Daimler Buses are, it may be enough to include the opinion of some selected decisive, i.e. primary and qualitatively representative stakeholders and stakeholder groups.

Thirdly, in order to reach out to these stakeholders it is reasonable to rely on existing channels of stakeholder communication which are already implemented and used by Daimler Buses. From internal information provided by Daimler Buses, we learned that the company has established a variety of communication channels to connect with specific stakeholder groups. However, it has not yet established a full survey that addresses all the stakeholders. With this limitation in mind, Daimler Buses could use its marketing division's existing customer survey, for instance. This survey is conducted on a regular basis, and it will be relatively easy to integrate a few sustainability related questions into it. In doing so, the company could learn something about how its customers, which are one primary stakeholder group, assess and view certain CR issues.

However, what is the concrete benefit of doing this? Earlier, we pointed out that the Daimler Buses customers are mostly other companies or public transportation providers, unlike private consumers, as is the case with Mercedes-Benz cars. We see that what 'customers' are varies across Daimler's different business divisions. Therefore, it is important for Daimler Buses to make use of additional modes of reaching out to *its* customer base and letting them contribute to determining material issues for the company. This makes clear why it can be so valuable for Daimler Buses to reach out to its own stakeholders and create its own materiality analysis.

The Next Step: Adapting Daimler Buses' CR Strategy

By gathering stakeholder feedback on the importance of certain, pre-selected CR issues, Daimler Buses can get to know which of these issues are really material. But how can this knowledge now be fruitfully applied by the company to improve its CR strategy?

Let us suppose that by following the above-mentioned steps, Daimler Buses was successful in creating a first overview of what its materialities are. Knowing this, Daimler Buses can then start realigning its CR strategy by giving priority to those issues which are particularly important to its primary stakeholders. For example, we can assume that it turned out that one of the issues of high importance across different stakeholder groups was 'time optimisation'. Daimler Buses

could then use this information to shape its CR strategy. For instance, the company could adapt its previous responsibility categorisation in a way that reflects 'time optimisation'. This would also help to bring CR activities in closer alignment with stakeholder expectations.

The information gathered also allows the company to specifically target different stakeholder groups in its CR communication. Whether it is via its own website, during a customer event or when providing training for bus drivers, Daimler Buses can then more convincingly engage in dialogue with each of its stakeholder groups. This is because Daimler Buses has the ability to always address the CR topics that are most important to each stakeholder group. What sounds particularly promising is that this will result in better stakeholder relationships for Daimler Buses. This in turn means that its business activities will be more broadly and firmly legitimised through stakeholder inclusion.

4.2 The Long Term: Performing Their Own Materiality Analysis

Though utopian in the short term, for conceptual (see Chapter 3.2) and competitive (see Chapter 3.3) reasons, Daimler Buses has to perform its own materiality analysis in the long term. But what exactly is required for this? In this final chapter, we would like to support Daimler Buses in this endeavour by sketching out six steps that are integral to a successful materiality analysis. When applicable, we will comment on how far Daimler Buses is already along some of the steps, which challenges might occur, and how these could be tackled. The process can be broken down into a materiality analysis of six steps (see Figure 5):

1. Prepare: Define purpose, scope, stakeholders and surveyed CR issues.
2. Ask: Let businesses and stakeholders prioritise a selected list of CR issues.
3. Evaluate: Score the importance of CR issues and determine materialities.
4. Communicate: Communicate the results internally and externally.
5. Implement: Implement the results into different areas of the business.
6. Improve: Improve the process by drawing on your experiences and feedback.

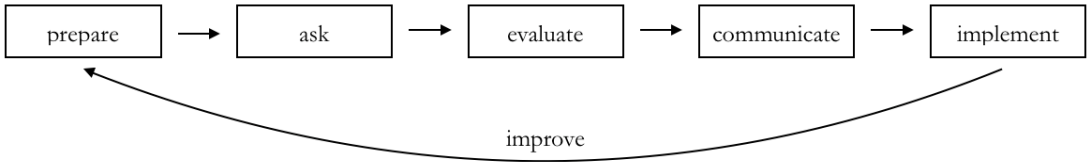

FIGURE 5: SIX STEPS OF PERFORMING A MATERIALITY ANALYSIS (OWN ILLUSTRATION)

There are two striking aspects in these six steps. Firstly, the process is not only about the materiality analysis itself, but also about what happens to the results. We will explain below that this is required for the business to actually profit from conducting the analysis. Thus, one does not only prepare, conduct and evaluate the analysis — the communication and implementation of the results are required as well. Secondly, the process does not end with the implementation of results but is a dynamic process which has to be improved and then repeated in order to adapt to changes in the industry. How frequent this adaptation has to be depends on how steady or dynamic the industry is (cf. KPMG 2014: 16). We will now explain each of these six steps in more detail. Some of the ideas are based on guidelines by the Antea (2017) and KPMG (2014) consultancies.

(1) Prepare

The first step, taken before conducting the materiality analysis, is to prepare it. There are three sub-steps: define purpose and scope of the analysis; determine, categorise and rank stakeholders; determine and categorise potentially relevant CR issues.

Only few businesses are pure Kantians. Therefore, the foremost reason for performing a materiality analysis is rarely to act on a duty of including stakeholders. In reality, businesses pursue certain aims or purposes: they adopt an instrumental instead of a normative approach (see Chapter 2.3). Resources are ultimately spent on a materiality analysis which the managers have to justify to their shareholders. It is thus the first task to define the purpose or aims of the materiality analysis. These aims can differ from one business to another. A common purpose is to improve the risk management (cf. KPMG 2014: 7) by identifying new risks from CR issues. Businesses ordinarily strive for a greater acceptance by stakeholders, or merely want to keep up with their competitors (see Chapter 3.3). Other aims might be to refine the CR (or even the whole business) strategy, identify future trends and areas of improvement in CR activities (cf. ibid.: 7). It is essential to

notes that the choice of aims has direct impact on which action you will take in steps 4 (communicate) and 5 (implement). One might even go so far as to take only the first three steps, having included and therefore possibly satisfied the stakeholders. However, as will be explained in 4 and 5, most of the key advantages of a materiality analysis can only be gained if you engage in all six steps.

The remaining steps for preparing a materiality analysis are a little more technical. Firstly, one has to define the scope of the analysis, answering questions such as: which stakeholders will take part in the survey? Which (geographical/organisational) parts of my business does the analysis apply to? Who do I communicate the results to (cf. ibid.: 7)? Daimler adopts a very broad approach by opening the survey to all possible stakeholders and applying it to all parts of the corporation. In contrast, MAN (see Chapter 3.3) performs different analyses in different regions of the business. It is advisable for Daimler Buses to focus on certain regions, as this eases communication and raises the motivation of participation given that stakeholders rather identify themselves with certain regions they work in.

Next, you have to decide who your stakeholders are, and which CR issues might be relevant to your business or the stakeholders. We have already touched on these questions in 3.2, but we will go into more detail here. One task is to determine, categorise and rank stakeholders. First you have to define what counts as a stakeholder, for which there are many different definitions available. As mentioned in 3.2, it makes sense to adopt a broad definition as Daimler has, so that you receive as much feedback from the target region as possible. Consequently, stakeholders can be determined and categorised by checking which people or groups impose requirements on the business. Not all of these stakeholders have an equally legitimate or urgent stake in the business. That is why they also have to be ranked in importance by dividing them into primary and secondary groups. This can be done by applying Daimler's way of testing how much stakeholders are affected by or can affect the company's decisions (see Chapter 3.2). In order for the results of the analysis to reflect this difference in importance, it is necessary to choose a certain factor that puts greater weight on responses from primary stakeholders. We know that Daimler Buses has already concluded this task of stakeholder identification, categorisation and prioritisation, which significantly shortens the 'to do list' for conducting a materiality analysis.

The final part of preparing the materiality analysis is to determine and categorise potentially relevant CR issues. For determining these issues, a list of CR topics that represent possible

opportunities and risks to the business can be put together. Ideally, not only internal but also external stakeholders will participate in this process (cf. ibid.: 8). With such a list, it is necessary to cluster them into categories which have similar levels of abstraction and match it to the terminology already used in the business (cf. ibid.). In Chapter 3.2, we have already gone through the different categories that Daimler includes in its materiality analysis and concluded that all of these categories fit Daimler Buses too, only lacking 'urbanisation'. The list of CR issues from Daimler consequently forms a solid basis for a Daimler Buses list. Alternatively, Daimler Buses has come up with a list of relevant CR issues called 'Roadmap Sustainability 2030' (cf. Daimler Buses 2017). It is possible that there was a pre-selection of CR issues that existed before the roadmap, which could also be used as a basis for a materiality analysis.

(2) Ask

Once the list of CR-issues is created, everything for conducting a survey for the materiality analysis is ready. Here, the aim is to filter material CR issues: issues that are both a priority to the business and the stakeholders. The list of CR issues can be used to let businesses and stakeholders prioritise certain issues on a numerical scale (cf. Antea 2017). Concerning the importance to the business, prioritisation has to be based on an assessment of economic, social and environmental impacts that each CR issue has or might have (cf. KPMG 2014: 9). It is useful to have a team from different parts of the company decide on this importance, as it can thereby be best grasped in terms of impact on the different areas of the business a certain issue has. That team then ranks the importance of the different issues on the numerical scale that was chosen before. In Daimler Buses' case, the 'Roadmap Sustainability 2030' mentioned earlier presents exactly the issues that are a priority to the business. The only thing missing for a proper materiality analysis is the ranking on a numerical scale, including CR topics that are less relevant to Daimler Buses.

Prioritisation by stakeholders is done by conducting a formal survey, in which each stakeholder can participate by rating the importance of certain CR issues from the previously compiled list on the numerical scale. A major challenge at this stage is to ensure representative feedback. If Daimler openly addresses its survey to all possible stakeholders and only 700 people respond, the results do not remotely represent what is important to Daimler's stakeholders. Although the chance of obtaining a higher participation rate in an own materiality analysis by Daimler Buses is likely to be higher than in Daimler's case (see Chapter 3.2), it is unrealistic to

receive responses from all stakeholder groups. However, this has to be the aim of feedback from the primary stakeholder groups. How can this be achieved? The following tips might give a good idea: inform your (primary) stakeholders early and express the fact that you appreciate their participation. Stress how valuable their input is and be transparent about how their answers will be integrated into the business strategy (cf. Antea 2017). Do not merely send out e-mails but communicate across a variety of different channels, such as displaying the materiality analysis on your front web page, posting regular reminders on Facebook, etc. Keep the survey short and simple, so that no one is put off by a long a survey with technical terms only experts are capable of understanding. Continue to advertise the materiality analysis of different channels and thereby remind (cf. ibid.) the stakeholders of their contribution's importance. Of course, all this will mean even more resources being used on the materiality analysis. But once you decided to perform a materiality analysis, it makes sense to do it properly.

(3) Evaluate

Conducting the analysis leaves one with numerical feedback from both the business and stakeholders. The next step is to evaluate this feedback. Most importantly, one has to evaluate the feedback obtained from stakeholder responses to the survey. One task is to average their responses while regarding the weighting factor that was determined in step 1. One can also gain interesting insights by looking for similarities among stakeholders or differentiating results for each stakeholder group (cf. ibid.). On the business side, there is usually a team of experts from the business who decide on one ranking for each CR issue. No average is thus required here. The usual way to illustrate the (average) results is to plot them in a graph with two axes: importance to business (x) and importance to stakeholders (y) (see Figure 1). For each CR issue, one point can be entered. This graph allows for a good overview of which topics are relevant to the parties. If, for example, human rights are seen as important by stakeholders but not by the company, this presents a potential risk for the company and gives a reason for taking this issue more into account.

Finally, as it is the aim of the analysis to determine materialities, one has to define which results are required for a topic to count as material (cf. KPMG 2014: 9). One could, for example, have a numerical scale from 1 to 100 and say that a material topic is one, for which both parties gave a score of at least 85.

(4) Communicate

The plotted results and the determined materialities are content that can easily be communicated both internally and externally. It is advisable to take this step, as it is the easiest and fastest way to reap profits from the materiality analysis.

Internally, one should first show the results to senior management (cf. ibid.: 10), so that they can sign off what is determined the company's materialities. At Daimler Buses, further coordination within the Daimler Group will be required. By doing this, Daimler Buses can also make sure that, although the analysis led to some bus-specific materialities (see Chapter 3.2), adopting and acting upon these materialities will not conflict with Daimler's overall CR strategy. One can also improve risk management if it is extended by insights from the materiality analysis. The example of human rights above would be an issue that has to be included into the risk management. Lastly, the whole company should be informed of the results of the analysis e.g. via the intranet. This allows for sensitising the company to material issues and can set the basis of ideally creating a company-mindset aligned on the materialities.

External communication of the materiality analysis and its results usually happens in sustainability or CR-reports. However, as a sophisticated CR strategy does not seem necessary for Daimler Buses, neither does a full CR report. Alternative, existing ways of communicating the results include the company brochure, website and company presentations. There are many possible advantages of external communication: one can not only legitimise CR activities but also signal that one cares about stakeholder's opinions and thereby increase their level of satisfaction and acceptance of the company. This in turn leads to a lower risk of primary stakeholders withdrawing their support or even boycotting the business. Showing inclusion of stakeholders in determining the (CR) focus can also lead to a better reputation and therefore to a competitive advantage.

(5) Implement

After successful communication, all that remains is to implement the results of the analysis into the company. Similarly, to step 4, the action taken here depends on what the aims, but this action again is something the company can profit from. However, these profits are harder to gain, as implementation is a more time-consuming and complex process than mere communication.

The first (and probably the easiest) possibility is making the determined materialities the heart

of the CR strategy. Ideally, it does not stop here: materialities can also be made an integral part of the whole strategy. For this, the results should not only be presented to senior management (see step 4) but also recommended action should be based on the results (cf. ibid.: 10). Such an alignment of the whole corporate strategy on issues of sustainability (or CR) is quite common in large corporations. Take as an example the daughter company of 'Rheinisch-Westfälisches Elektrizitätswerk' (RWE), Innogy, which entered the stock market in 2016 and has the production and distribution of renewable energy at its core (cf. innogy 2017). Daimler Buses adopts a similar approach by making the clear CR issue of producing sustainable mobility solutions the key element of the corporate strategy. If the materialities that were co-determined by the stakeholders form the core of the strategy, this will raise stakeholder satisfaction even more, as they would feel their opinions have a real impact on the overall focus of the company.

(6) Improve

This final step might be self-explanatory, but it does not reduce its significance. During the first five steps, the company will realise possible room for improvement. For example, they might find out that the earlier prioritisation of CR issues was inefficient, as it included too many people in decision-making and could have been done with fewer people while still covering all the relevant areas of the company. On the other hand, there will be large amounts of feedback from external stakeholders. Here, it will be clear how stakeholders perceived the survey design. They might rate whether the survey had an appropriate length, whether the handling of the survey was intuitive, or whether they felt that certain CR topics were missing. It is important to gather both this internal experience and the external feedback, and to use this information for improvements once it is time for the next materiality analysis.

Six Instead of Three

Higher stakeholder satisfaction, a more positive reputation, a competitive advantage, lowering risks — all of these are possible profits to gain if the six steps above are followed. Ultimately, it is for each company to decide on its own how many resources should be spent on the process connected to a materiality analysis and which aims to pursue. We still are confident in having presented plausible reasons for Daimler Buses not only to use the first three steps, but all six.

5. Conclusion

Our paper has developed its argument from the abstract, theoretical aspects around CR in general to the more concrete and practical aspects of one specific CR instrument: the materiality analysis. Both the abstract and the concrete aspects we developed and discussed in close connection to the status quo in terms of CR at Daimler Buses. After having ended our paper with concrete proposals on how Daimler Buses should handle the implementation of an own materiality analysis, it is now time to look at the bigger picture again.

Recalling our previous train of thought, we started by arguing that Daimler Buses needs to perform its own materiality analysis for the purpose of developing a bus-specific, more streamlined CR strategy that can account for Daimler Buses' particularities. We began our argument by contextualising the following discussion as we gave a brief, general insight into the evolution of the multifaceted concept of CR. Then, we introduced stakeholder theory as today's predominant view on how companies can and should take over responsibility for the impact their operations have on society. In the tradition of stakeholder theory, we pointed out why firms are morally obliged to incorporate stakeholders' views into their own CR strategy. This moral obligation was supplemented by showing that firms will also profit financially from integrating stakeholder demands into their own business activities.

The next logical step was for us to analyse how CR is practiced both at the Daimler Group as a whole and at Daimler Buses specifically. We found that while Daimler AG has been a pioneer of CR, the principle of stakeholder inclusion is unfortunately not visibly implemented at Daimler Buses yet. With Daimler Buses wanting to develop and communicate its own, more differentiable CR strategy in the future, we proposed that the best way to do so would be through their own materiality analysis. However, in the conceptual argument we stressed that the pre-existing materiality analysis of the Daimler Group is not sufficient to cater for the special requirements that Daimler Buses has in finding out its distinct materialities. Secondly, in the market-oriented argument, by looking at what competing bus manufacturers such as MAN and Scania are doing in terms of CR, we noticed that both have already developed quite specific CR strategies by relying on their own materiality analyses. While MAN and Scania are not fully comparable with Daimler Buses, we believe that they set an example which can inspire Daimler Buses in further developing its own CR strategy.

After having presented our argument for why Daimler Buses needs to carry out its own

materiality analysis, we turned to the more practical side of our discussion and looked into how Daimler Buses could accomplish this aim. In the short term, Daimler Buses can draw not only on the pre-existing materiality analysis of the Daimler AG as a blueprint but on its newly created 'Roadmap Sustainability 2030' to find the issues that matter most to the company. Engaging with stakeholders will then further help Daimler Buses in finding out what these stakeholders expect from the company. As a result, an initial list of issues that are material can be compiled which can then be used for a possible realignment of the CR strategy. In the long term, Daimler Buses needs to perform its own materiality analysis, and we assembled six steps which will facilitate this task. The guideline encompasses ideas on how to design a materiality survey, how to effectively reach out to different stakeholder groups, and how to make the most of the results obtained from the analysis.

Overall, we provided Daimler Buses with an analysis and assessment of their CR activities through the lens of Philosophy & Economics. Our careful deliberations and proposals are inherently forward looking and are aimed at provoking thought about what to do next within the Daimler Buses CR division. We believe that by taking up some of our ideas, Daimler Buses can become even more true to its own, ambitious vision: "Daimler Buses. Best Buses.".

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The Ergon of the Bus

NEXT GENERATION BUSES

The Ergon of the Bus

An Aristotelian View of the Future of the Bus

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Keywords
Future of Mobility, Public Transportation, Aristotle, Ergon, Bus

This paper examines the future and nature of the bus from an Aristotelian perspective. Based on the description of key future developments in the mobility market, we anticipate that the substantial changes approaching the market will require a rethinking of the bus as a means of transportation. To rethink the bus, we draw from Aristotelean philosophy by outlining the Aristotle's Ergon argument and its criticism, as well as the notion of excellence and theory of the 'Golden Mean'. We will first define the bus in its current form, capturing all its relevant conditions. However, this is not satisfactory in fully determining the relevance and nature of a bus. In applying the Ergon argument, we exhibit the buses specific functions, leading to a its Ergon: flexibility and public space. To fulfil his Ergon, the bus must bring these two specifics to excellence. Following this argument, four cases of how the bus can practically excel in these two specifics and fulfil its Ergon are presented. Lastly, we will state implications and guidelines for EvoBus GmbH to optimally react to possible future scenarios.

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1. *Introduction: The Future of Transportation*

In times of rapidly changing technological frameworks, the transport market faces a fundamental question: how will the future of mobility look? We see that methods of transportation are changing. More and more new and innovative technologies are being developed and put into use. Traveling time is continuously being reduced and commuting from one place to another is becoming easier than ever. Considering these developments, we need to ask ourselves what role the bus will inhabit and how its conception will have to change to keep up with future scenarios. Contemporary problems of transportation are time, comfort, sustainability, flexibility, individuality, and safety. Because the future is something we can anticipate but not foresee, we attempt to give a broad overview of the mobility trends which are emerging today and a prediction of how transportation markets might look in the future. We will focus on urban[1] and long-distance transportation.

Urban means of transportation are moving away from conventional combustion engines and towards renewable technologies (cf. McKinsey & Company et al. 2016: 15), employing artificial intelligence, e.g. for autonomous driving (ibid.: 18). This connects vehicles, infrastructure and other smart devices. In addition, more and more car sharing systems are being offered (e.g. car2go, BlaBlaCar), shaping the trend of cars becoming increasingly shared goods, as opposed to being an individual means of transport (ibid.: 16). Autonomous driving will intensify this trend by letting even privately-owned cars service themselves to customers at unused times and offer a cheap alternative to taxis (cf. Teslarati 2017).

An innovative development concerning long-distance travel on land is the Hyperloop. It is a means of transport thought to connect cities via a vacuumed tube in which a pod travels, capable of carrying more than 20 passengers. Target travel velocity is around 1,000 km/h, meaning that a city located 500 km away can be reached within half an hour. Due to longer travel times, long distance travel by neither bus nor car will *ceteris paribus* be attractive (Hyperloop-one 2018).

We can see through these two brief illustrations – which can be expected in the near future – that there will be new and attractive ways of transportation which will redefine how we commute between places. Both developments will take place in areas where the bus is a competitive choice

[1] By 'urban', we refer to transportation within and around cities.

today. However, as described, substantial changes are to be expected in these areas, which will redefine how we use and perceive transportation. We therefore need to ask ourselves which role the bus will play in the future. At this point, it is vital to emphasise that these are just anticipations based on current developments, and that there will be even more innovations to come, but also some time for adaptation.

We do not argue that the bus will be defeated in this transformation process. On the contrary: we define the very nature, the essence of the bus, residing in its specific function, and state that once the specific function of the bus is found, it can be brought to excellence. Thus, by fulfilling the specific function of the bus well, it will become a good bus: one which will have a competitive stance in the prospective mobility market. To the very contemporary question concerning the nature of the bus, we will apply thoughts that date back to antiquity: Aristotle's Nicomachean Ethics (NE).

In order to identify the specific function of the bus, we will begin with Aristotle's Ergon argument (commonly known as the function argument) in Chapter 2. We will also explain the notion of excellence, and theory of the Golden Mean. Aristotle uses the Ergon argument to identify the function and the good of human beings. By doing so, he additionally demarcates human beings from other living organisms. This sets the foundation for applying the Ergon argument to the bus. Chapter 3 sets up a status-quo definition of the bus. This definition will be our point of comparison for the Ergon definition of the bus. We find that the latter is more satisfactory than the former. In Chapter 4, we will transfer Aristotle's Ergon argument to the bus in order to fuel contemporary discussion about the central aspect of the bus and give Aristotle's thoughts new application. We will argue that the Ergon of the Bus is flexible public space and that bringing its Ergon to excellence through various forms of innovation and design will place the bus in a more competitive position. In Chapter 5, we will take the Ergon argument as groundwork for displaying practical thoughts on how EvoBus GmbH (EvoBus) can improve the bus through specific changes surrounding the Ergon. We will discuss four different cases, shedding light on the Ergon in different ways. We will support our thoughts by comparing the bus to other means of transportation and show how the buses location among them might change when focus is placed on the Ergon of the Bus. Chapter 6 is dedicated to briefly summarising our insights, their implications, and to present some general guidelines for EvoBus.

2. Theoretical Background: Aristotle's Theory of the Ergon

2.1 The Ergon Argument

In the first book of NE, Aristotle develops the Ergon argument, also referred to as the function argument. Aristotle devotes NE to the search for human good, or *eudaemonia* (cf. May 2010: 1). He starts by asking what the ultimate goal of human beings is: what is the highest good human beings should aim for in their actions? (cf. Pakaluk 2005: 80) Aristotle uses the word 'good' to denote an ultimate end or goal. Human good is something which is final and always desirable (cf. May 2010: 7).

> What, then is the good of each action or craft? Surely it is that for the sake of which the other things are done; in medicine this is health, in generalship victory, in house-building a house, in another case something else, but in every action and decision it is the end, since it is for the sake of the end that everyone does the other actions (Aristotele 2007: I.7 1097a18-22).

He believes that the final human good is eudaemonia. It can neither be pleasure, honour, reason, nor virtue, as those all are chosen for the sake of promoting eudaemonia. We choose eudaemonia because of itself and never because of something else (cf. Gomez-Lobo 1989: 172; Aristotele 2007: I.7 1097a37-b22). It can be understood as 'happiness' or 'flourishing' (cf. May 2010: 1).

To give a clearer account of human good, eudaemonia, Aristotle proposes to determine a human's Ergon. Ergon can be translated as 'function' or 'characteristic work'. With the Ergon argument, Aristotle defines his view of human eudaemonia (cf. May 2010: 5).

> For just as the good, i.e. [doing] well, for a flautist, a sculptor, and every craftsman, and, in general, for whatever has a function and [characteristic] action, seems to depend on its function, the same seems to be true for a human being, if a human being has some function (Aristotele 2007: I.7 1097b25-29).

Aristotle states that craftsmen each have an Ergon (e.g. the Ergon of a flute player is to play the flute (cf. May 2010: 6)) and therefore human beings also have an Ergon (cf. Aristotele 2007: I.7 1097b30-32). He adds that body parts (e.g. eye, foot, hand) each have an Ergon, and thus a human being must

also have an Ergon (ibid.: 1097b32-24). The good in each craftsmen or bodily object resides in its specific function. Human good can therefore be accomplished through a human's specific function.

Upon establishing that human beings have a function, Aristotle states that the Ergon of humans can be identified if it is discovered what is unique to human beings (cf. May 2010: 9). He begins his search for the specific function of human beings by considering "life of nutrition and growth" (cf. Aristotele 2007: I.7 1097b36-1098a4). This characteristic is also shared with plants and animals and therefore cannot be specific to humans. In considering "life of perception", Aristotle finds that this function is still shared with every animal and cannot serve as the specific function of humans (cf. ibid.). He reaches the conclusion that an "active life of the element that has a rational principle" is the function specific to humans (cf. ibid.). What is meant is that only humans are capable of rational thought. The specific function of the human is therefore rational activity of the soul, and for the good or virtuous human to perform this activity well. This is the human Ergon (cf. Gomez-Lobo 1989: 173; Pakaluk 2005: 75).

2.2 Notion of Excellence

Upon establishing the specific function of human beings to be "an active life of the element that has a rational principle" (cf. Aristotele 2007: I.7 1097b36-1098a4), Aristotle proceeds in sketching out the good of this function. Eudaemonia consists of performing the Ergon well. If, as Aristotle states, the Ergon of human beings is rational activity, human eudaemonia consists of the best and teleiotatos rational activity. Teleiotatos here can be translated as 'most perfect', 'most complete' or 'most final' (cf. May 2005: 10). Eudaemonia therefore is excellent rational activity. In general, the characteristic work or function of something can be seen as the sake for which it exists. Its good can therefore be seen in achieving its work, or in doing this well. "Only a good thing of a kind achieves its function well […] and through […] having the relevant virtues […] something is a good thing of its kind" (cf. Pakaluk 2005: 75). The notion of Ergon itself is descriptive and therefore neutral (cf. Gomez-Lobo 1989: 175). It simply refers to a function inhabited by an object or being. A being can exercise its Ergon, but the mere possession of an Ergon does not make it good. To distinguish between goodness and badness, excellence or virtue needs to be added to the Ergon for the argument to receive evaluative strength (cf. Gomez-Lobo 1989: 175).

To illustrate his argument, Aristotle draws an analogy with a lyre player. The specific function

(the Ergon) of the lyre player is to play the lyre, and the specific function of the good lyre player is to play the lyre well (ibid.). The Ergon of both lyre players is identical. Both performances, whether good or bad, are identical in the sense that they are performances of the same activity. Obviously, they aren't strictly identical. The difference resides in the fact that one of the lyre players performs their Ergon well.

> In order to distinguish between an unqualified performer and a good performer of an Ergon, eminence in respect to excellence has to be added to the specification of the Ergon (ibid.: 176).

We see that there is no Ergon that is peculiar to the good of something, but that upon establishing what the Ergon of something is, an evaluative judgment of what counts as a good Ergon of that thing must be passed (ibid.: 175). The notion of excellence can thus be summed up as distinguishing the simple fulfilment of an object or being's Ergon from the well or excellent fulfilment of the Ergon.

2.3 The Golden Mean

In adding excellence in his Ergon argument, Aristotle brings in virtue. In book two of NE, Aristotle analyses the concept of virtue. We will briefly mention parts of the concept relevant to our purposes here. In speaking of virtues, Aristotle refers to those of character. Virtues are acquired by first having activated them, similarly, to acquiring crafts. We can become a flutist by playing the flute, or we can become just by performing actions that are just (cf. Aristotele 2007: II.1 1103a15-1103b). Aristotle further concludes that virtues are states that do the best actions concerning pleasures and pains, and that vices are opposite states (cf. Aristotele 2007: II.3 1104b29-30 and II.5 1106a13-15).

> […] (E)very virtue causes its possessor to be in a good state and to perform their functions well. The virtue of eyes for instance, makes the eyes and their function excellent, because it makes us see well […]. […] The virtue of a human being will likewise be the state that makes a human being good and makes him perform his function well (Aristotele 2007: II.6 1106a17-24).

Aristotle continues by explaining that the ideal state is an intermediate between excess and deficiency. With the term intermediate, he refers to equidistance from each extremity. According to Aristotle, virtue is a mean as it aims at what is intermediate, whereas excess and deficiency are vices (ibid.: 1106a27-1106b35). Concerning its essence and the account stating that which it is, virtue is a mean, but it is an extremity concerning the best condition and a good result (ibid.: 1107a7-10).

Aristotle mentions the example of fear or cowardice and confidence or recklessness, both extremes of which bravery or courage is the mean (cf. Aristotele 2007: II.7 1107b1-4). We therefore find the Golden Mean is a desirable middle between two extremes or vices. It is hard to find the intermediate of two extremes, and therefore hard to be excellent (cf. Aristotele 2007: II.9 1109a25-26).

2.4 Criticism

Aristotle's function argument has been criticised on many levels. One of the main points raised is Aristotle's supposition that human beings have a function (cf. Pakaluk 2005: 75). He states that since craftsmen and body parts each have a function, human beings have a function (cf. Aristotele 2007: I.7 1097b28-33). Though in literature his line of argumentation is considered rather weak (cf. May 2010: 7), we regard it as irrelevant to our purposes. We intend to convey this argumentation to the bus as a 'tool' of transportation, and tools are not targeted by this criticism. This in turn supports the intuitive view that objects have a function.

Furthermore, it has been criticised that while rational activity is specific and unique to humans, mere distinctiveness cannot serve as a guide to retrieving the function of something: it can be seen as arbitrary. There are many characteristics which are distinctive to us (e.g. laughing or murdering for amusements sake (cf. Angier 2010: 62)) but which it would be absurd to see these as parts of a human's function. In response, Pakaluk interprets Aristotle as having stated that a function of something has to pertain to what is common to *all* members (cf. Pakaluk 2005: 78). (Hence, as murder for amusement's sake is a function of only *some* humans, it cannot count as a human's Ergon.) The criticism can indirectly be applied to the bus. By stating that mere distinctiveness cannot serve as a guide to retrieving the function of something, the possibility of running into danger in choosing an arbitrary function of the bus would be too great. Here, we

also determine that the distinctive function of the bus must be applicable to all buses, therefore rendering the criticism irrelevant.

Often, it is argued that Aristotle is unclear on which excellent rational activity he refers to in his conclusion of the function argument, as in NE three different rational activities are discussed (cf. May 2010: 11). This criticism applies to our case in the sense that we cannot be sure in what way the Ergon manifests itself in the bus. However, we can soften the criticism by limiting the Ergon's scope to some features which survive in a market situation. Relevant features in a market situation consider different dimensions of cost, competition and adaptation by costumers.

A similar but differently targeted criticism doubts that what is unique to humans matters to human eudaemonia (ibid.: 9). Respectively it is doubtful that what is unique to the bus matters to its excellence. However, as we explained in the first section, the bus faces and will face competition in all relevant areas. This competition means that the bus must provide customers with either better or unique features to promote a more attractive customer experience. Otherwise, such a proposed feature would have to be omitted to retrench costs. It is in line with Aristotle that most features unique to the bus improve it, and hence approach its excellence.

A final criticism also resolves itself. It is stated that a life involving reason is not distinctive to human beings because gods, which Aristotle believed in, also share this function. As in the more elaborate version, attention is drawn to 'action': this argument becomes void, as only human beings can act (cf. Pakaluk 2005: 77). Here, we can see that it does not apply to our evaluation of the Ergon of the bus, as it concerns human beings and their function. We therefore come to the conclusion that none of the criticism is substantially relevant to our endeavour of constructing the Ergon of the bus.

3. What Is the Bus?

3.1 Status-Quo Definition of the Bus

An important question our paper aims to answer is: what is the bus? This may seem superfluous, because people are, without a doubt, able to judge whether something is a bus or not. If this is the case, a conventional and intuitive definition with necessary conditions must exist in people's heads. Even though this definition is obvious to nearly everyone, it is still important to describe

it, in order to understand what is meant when we talk about the bus. At this point, it is important to state that we are focusing on a notion of the bus as a mobility concept for public use and excluding buses which are for private use.

The following sets up a necessary condition for something to be a bus, which we would most certainly all agree upon. We will call this our status-quo definition. It disassembles the current state of the bus into a certain set of features without focusing on possible future omissions and additions. In this necessary condition, all of the following have to be fulfilled (if bus, then x.):

1. Means of transportation
2. Large motor vehicle
3. Drives on roads
4. Scheduled route
5. Publicly available for a fare
6. Interior of more than eight seats

Furthermore, one could think of many, but only overly sufficient (If x, then bus) conditions (e.g. if something has the number plate AB CD 1234, it is a bus; if something is called Citaro, it is a bus) that by themselves are not useful for our purposes. Therefore, we can conclude our status-quo definition at this point. Moreover, we can think of many technical peculiarities with respect to the bus (e.g. certain arrangement of engine components, specifically designed chassis, wheels, windscreen, etc.), but this would miss the point of providing an intuitive clarification of what is normally understood when we talk about a bus.

We will now proceed to evaluate our status-quo definition. As we evaluate the ability of being intuitively correct to many, it is reasonable to compare it with definitions from common dictionaries:

1. Merriam-Webster states that a bus is "a large motor vehicle designed to carry passengers usually along a fixed route according to a schedule" (Merriam-webster 2018).
2. According to the Oxford English Dictionary, a bus is "a large public vehicle carrying passengers by road, running on a fixed route and typically requiring the payment of a fare" (CNTV 2010).

We can see that according to our status-quo definition it succeeds in capturing what in general qualifies something as a bus and only a bus.

3.2 Why This Definition is Insufficient for Our Purpose

We think that, while the status-quo definition successfully captures current understanding of the bus, it will not capture future understandings of the bus. Neither does it give guidelines for future innovation. This becomes apparent for three reasons.

The first is shown by the proposed Transit Elevated Bus, which redefines the classical buses' condition 'driving on roads' as it straddles above-road traffic carrying more than a thousand passengers (cf. ibid.). Secondly, fully autonomous and digitally-connected buses such as the Olli Bus redefine the schedule condition by providing services on demand and moving in an ecosystem of other buses. The Olli Bus is an urban, electric, self-driving and 3D-printed vehicle produced by Local Motors, Inc. that can carry up to 8 passengers (cf. Meetolli 2018). A third reason is the EvoBus Future Bus concept, which shows that in addition to the first two reasons, the bus interior can be used to mimic the openness and atmosphere of a natural environment (Daimler 2018a).

We think that these examples fundamentally weaken the status-quo definition, because they cannot be captured by it. We therefore need to define the bus in a different way. This definition should capture not only current physical and non-physical components of the bus, but the overarching motivation behind the bus, its very nature or specific function. Only a new understanding will allow for change and innovation in the aforementioned manner.

4. The Nature of the Bus

4.1 The Ergon of the Bus

Identifying the Ergon of the bus consists of ascertaining its specific function. As Aristotle identified the "active life of the element that has a rational principle" (cf. N.E. I.7 1097b36-1098a4) as the unique and essential human function, we can now apply this method to the bus. A justification for this method by analogy is shown in the following:

As we have already sketched out, to identify the Ergon of the human, Aristotle starts with an overall category (life) and discriminates further on the basis of 'perception' and 'rationality'. The latter is only shared in humans, and accordingly it is the human's Ergon. Analogously, we first need to set an overall category that is exhausted by the bus and all its possible competitors. Unless

this is the case, our resulting definition would not be useful. Then, stage-by-stage we will exclude other means of transportation on the basis of certain respective criteria until we are left with a function unique to the bus. For this to be the buses Ergon, it needs to be both essential and unique to the bus.

The overall category of this investigation is 'means of transportation'. To start out, we examined the function 'transportation from A to B'. This is a function inherent to all means of transport, not solely to the bus. It can therefore not be chosen as a decisive function. Next, we discriminate means of transport on the basis of their 'place of transport'. Although there are buses capable of moving through water, their essential place of transportation is land as opposed to air or water. However, cars, trucks, trains, bicycles, motorbikes and many other vehicles share this feature. The next stage discriminates all those means of transport on the basis of their 'flexibility with respect to schedules and routes'. Clearly, rail vehicles always have physically fixed routes rendering them inflexible, while cars and motorbikes generally do not. Buses also do not have physically fixed routes, although most commonly they move on a constant and pre-set route but allow flexibility. As this feature is shared by many other means of transportation, we must continue in our analysis. We proceed by discriminating on the basis of 'public space'. Most car routes are determined by the respective owner. The same holds true for motorbikes and trucks. The bus is different in this respect, as it is public. Firstly, multiple people can pay a fare and take the bus: it is not owned by any passenger and therefore publicly available. Secondly, as opposed to taxis and shared cars, the bus is spacious. It has not only more seats than any other road vehicle, but in most cases offers wholesome areas for public interaction. The bus is a public space, unlike cars and taxis.

So far, we have identified the specific function of the bus as 'a certain kind of transportation which is unique in that it combines spacious and public transport that takes place on pre-set but not physically fixed roads on land, hereby rendering it flexible'. But which of these components are essential to the bus? It is obvious that no component alone can suffice as essential to the bus. Furthermore, there are components that are merely self-evident facts or features of the bus, such as the fact that it moves on land. Through these features alone, it cannot achieve its excellence. It can achieve its excellence only through 'functions': those components capable of being fulfilled by the bus well or badly. To fully comprehend our conclusion on the function of the bus, it is vital to understand this distinction. In terms of the bus, functions that it can fulfil well or poorly

are public space and flexibility. Therefore, we see public space and flexible transportation as the buses Ergon. We will call it 'flexible public space' for short.

4.2 Excellence of the Ergon

As we have established, the Ergon of the bus is flexible public space and the bus is something that fulfils this Ergon. A good bus is one that performs its Ergon well. We will now consider whether the bus in its current version fulfils its Ergon well, and if not, how the bus needs to adapt in order to be considered an excellent bus.

The bus is a flexible vehicle, in that it could potentially change its routes and destinations seamlessly with the great road infrastructure available to it. However, it is currently bound to schedules with bus stops and pre-set routes. This system works reliably and efficiently when there are only limited possibilities for communication between the bus and its passengers. However, there are nowadays various possibilities and more efficient systems available. We therefore state that the aspect of flexibility is not yet performed well by the current bus. The aspect of public space is given through the availability of service to the public. One way of evaluating this is to look at the atmosphere in the current bus. It reflects the fact that the bus is a means of transportation but does not yet seem inviting or a reflection of the public it serves. Thus, we state that the public aspect is not yet performed well either. Considering both central aspects of the buses function (flexibility and public space), we see that the bus in its current version does not fulfil its function in an excellent manner, and that there is therefore room for improvement.

In order to reach the excellence of the Ergon, the specific function of the bus needs to be fulfilled well: this means that flexibility and public space need to be fulfilled well, brought to excellence. Here, we refer to Aristotle's conception of the Golden Mean. As stated earlier, he claims that the mean between two extremes must be found. This also applies to the bus. In enhancing the functions of flexibility and public space, we must be careful not to produce any externalities by simply maximising the function, for example. Too much flexibility or public space could be at the expenses of employees or the environment, hereby producing an unwanted externality. Flexibility could be interpreted as bus lines operating day and night, regardless of demand. This would lead to an unnecessary use of valuable energy resources and present a burden on employees in the form of late-nights and general increases in shifts. If public space is

interpreted as a more spacious interior, the bus could become too large to drive on regular roads or could face safety issues when more passengers are able to fit in the bus while at the same time less seating is offered. However, too little would lead to inefficiencies, as the bus does not fulfil its potential. We therefore aim to focus on what is intermediate and find the mean of both functions. In doing so, we can bring the bus to excellence.

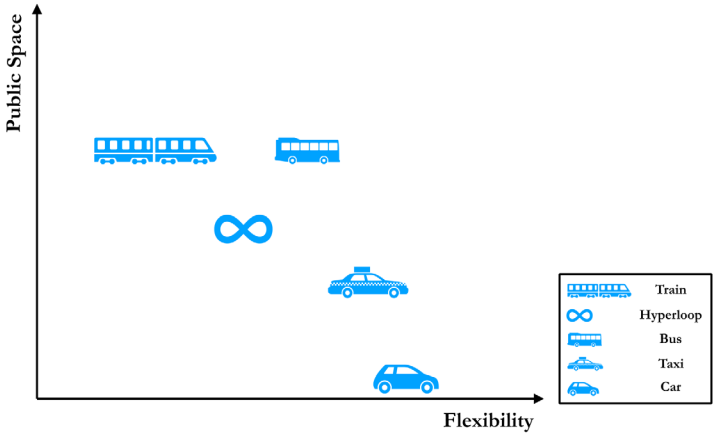

FIGURE 1: STATUS QUO ASSESSMENT OF COMMON MOBILITY CONCEPTS (OWN ILLUSTRATION)

Here, we see a diagram pinpointing certain positions of current common mobility concepts on land. The horizontal axis indicates the degree to which the function of flexibility of a means of transportation has been brought to excellence. At this point, we will define flexibility as an attribute which includes predetermination in routing, schedules and availability. The vertical axis indicates the degree to which the function of being a public space as a means of transportation has been brought to excellence. We define public space not only in respect to including accessibility to the public, but notions of public demands and benefits as well. At this point, it is important to mention that, according to our model, an infinite positive movement along one axis would represent an infinitely excellent means of transportation. Excellence, however, refers to an end-state of a certain quality and therefore cannot be continuously increased. A certain interpretation of this diagram solves our problem: first, the axes represent only an approach to the excellence, and second, this excellence is not something we presume to be fixed to a level. In any case, both axes

do not plainly represent more flexibility and more public space, but a better flexibility and a better public space.

This diagram depicts the current state of the bus (flexibility, public space). To put bus performance into perspective, we consider the functions of flexibility and public space applied to other means of transport. We do not state that these means of transport have the same Ergon as the bus but use the diagram simply as a means of comparison. We can easily see in this status quo estimation that the car, as a private and unbound vehicle, shows great flexibility and very limited public accessibility. The bus seems to be fairly flexible and quite publicly available, contrasting the position of the car. We will use this diagram as a reference point for visualising possible shifts in parameters when analysing practical cases. The cases are ideas focused on the Ergon of the Bus.

With the diagram, we also intend to show that the bus will become more competitive by implementing our different cases. Within the cases, we see that an increase in flexibility or public space often leads to the bus getting closer to its excellence and thereby better fulfilling its function. We note that an increase in flexibility is intuitively more desirable (for single passengers) than an increase in public space. The more customers use a good, the more likely rivalry between them is. However, public transportation receives its justification through sustainability and efficiency. Hence, an increase of public space can as well be regarded as being good.

4.3 Cases in Perspective

We have now seen that the Ergon of the bus is flexible public space, and that a bus, in order to be excellent, must fulfil this Ergon well (in accordance with Aristotle's concept of the Golden Mean). As shown in Figure 1, the bus has not yet brought its Ergon to excellence. In the following chapter, we want to see how shifts of innovation towards flexibility and public space change the position of the bus within the diagram. It is important to keep in mind that the Ergon flexible public space can be expressed in many different ways. Respecting these, we continue by presenting several examples of how the bus can fulfil its Ergon well.

Some of the adjustments and features we suggest here can already be implemented with today's technologies, like autonomous driving. Others will have increasing relevance with emerging developments. Furthermore, with the following cases we are not arguing for

disregarding market dynamics, cost-benefit-analyses or the adaptive needs of customers. Nevertheless, it could be that unintended consequences arise by shifting the focus to the Ergon solely, which optimally manifest themselves positively within the market. A positive manifestation could be a reshaping of the perception of the product bus and an increased usage of public transportation. An increase in flexibility could lead to more efficiency, which in turn will decrease overall emissions and the time spent commuting. Furthermore, people using the product could become inspired by the new focus on its public function, as they feel appreciated in their time and money spent and thus potentially become happier and more productive in their workspaces. Negative manifestations could be that new features are accepted poorly and decrease its overall value, resulting in lost investment.

5. From Theory to Practice: Implications

5.1 Representing the Public

The Ergon of the bus, flexible public space, reflects the interests of people who use it. By focusing on the public aspect of the bus, we intend to view the bus as a 'hub' for people. Besides commuting from A to B, the bus can serve as a source of inspiration for its users.

We believe it would be beneficial to listen to communities, making it possible for them to contribute to the face and identity of the bus. The bus should not try to fixate on a specific conception of inspiration or communication, but ought to reflect the people's wants, ideas and thoughts in the most flexible way possible. The bus could become a platform where people can write their ideas and display their creations on its displays. This can be implemented by transparent displays located on the outer shell and on the inner side of the bus, reflecting the processes and inspirations inside. Of course, they can be used for pragmatic and commercial purposes, displaying travel data and advertisements, but they can also be an area for artwork, thoughts, lyric or pictures created by customers. These creations can be submitted through an application found on smartphones and tablets or through an interface provided by the bus itself. In order to anticipate possible abuse of this opportunity for expression, there ought to be a filtering system of some sort to prohibit explicit content. Moreover, displays need to be cleaned and secured

against theft or destruction. The basic inspiration behind this is that the bus currently drives through the city without much of an identity. We argue that this can easily be changed by focusing on the public aspect of the Ergon.

The diagram shows a strong shift from the bus's current state (flexibility, public space) to an improved fulfilment of its public function (flexibility, public space +++). This is justified by the heavy focus on public representation in this case.

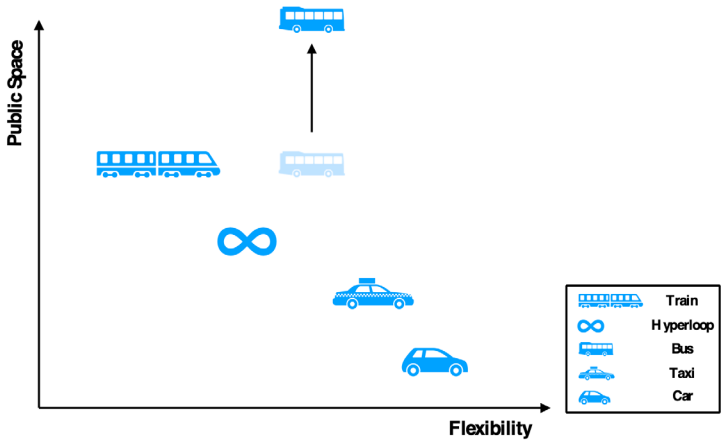

FIGURE 2: REPRESENTING THE PUBLIC
(OWN ILLUSTRATION)

5.2 Improving the Public Space

A further idea through which we believe the bus can excel at fulfilling its Ergon heads in a similar direction. In looking at the bus's Ergon as flexible public space, we notice that the aspect of space has not been rethought yet. Space is substantial in respect to being public space, which ought to be as beneficial as possible to the people who experience it. This sheds a new light on the Ergon, as the space is for the public and hence it should be beneficial.

> "Most of the people feel small in a big gothic church and unsafe in a dark alley at night. Architectural spaces have certain atmospheres which influence the

> emotional state of a person; the interaction between environment and its occupant" (Paul de Vries 2009).

We argue that the bus should focus on these aspects as well. Interior designers ought to focus on the emotion a room creates in order to generate an interesting place to meet and a good atmosphere to live in. This can be further enhanced by alternative offerings, such as coffee lounges or themed seating, which embed communal values.

Bringing its Ergon to excellence means that the constructor needs to create the bus well. Thus, if focusing on community and public values, the designer needs to aim to create a relaxing, welcoming and efficient atmosphere in accordance with the needs of the people. Therefore, the bus has to expand its limits and make room for more efficient and welcoming special concepts, reflecting the needs of the community. In city buses, for example, this could be implemented by reflecting more forestial scenes, compensating for the lack of nature in big cities. Moreover, one could implement spaces where people can get in touch with each other, enjoying the everyday commute in a lounge, where coffee and similar beverages are served. In this case, the bus can be seen as a forum.

At this point, we want to acknowledge the advances EvoBus's Future Bus concept has to offer. Its implemented concept portrays an interior design reflecting forestial aspects and nature-inspired scenes. Furthermore, the Future Bus creates an inviting and futuristic interior, which has been positively embraced (cf. Daimler 2018a). An even simpler implication of the aforementioned idea would be to adapt features from luxury car innovation currently in production, such as the S-Class. One could incorporate the use of the 'Energizing Comfort Functions' in the bus (cf. Daimler 2018b). For example, during the morning during rush hour, a vibrant but calming colour and a refreshing scent could be chosen. At night-time, perhaps a blue would suit the needs of customers, subtly decreasing stress and potential anger levels. Also, a poll for choosing among preselected colours and maybe even scents could be implemented, to collectively seek an optimal solution.

In the diagram, we notice a positive movement of the bus along the public space parameter due to the focus on an improved public space. However, by including poll options and versatility of the space, a slight increase in flexibility is also represented (flexibility +, public space ++).

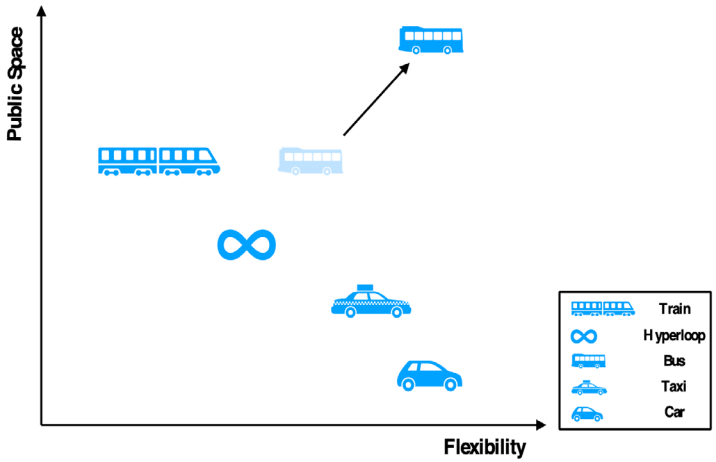

FIGURE 3: IMPROVING THE PUBLIC SPACE
(OWN ILLUSTRATION)

5.3 Increasing Flexibility

This idea attempts to merge the aspects of public space and flexibility of the bus by trying to increase utility of the Ergon in a technical sense. Technical is here understood as being not directly observable but virtually increasing the efficiency of the service.

Imagine a situation in which the bus still travels along its fixed route but does not have fixed bus stops. Consider for this example a city in which there are different bus lines, which have a pre-set route and assigned streets to pass through, but no fixed bus stops. We propose that people could use an application on their smartphones to communicate with the bus system. The application requires entering a destination and collects location data for the pick-up. Because it might be difficult to collect each individual on each spot, an algorithm calculates the best location for pick-up for most of the people and directs them to the location. Then, the application displays pick-up times, travel duration and, once near the destination, the drop-off location with routing to your preferred destination. With this system, it could be possible to flexibly and efficiently assign pick-up and drop-off locations, while also incorporating a collective sense, because of the consensus built by the algorithm. Furthermore, concepts concerning data protection must be

developed. It needs to be proven in field studies that this concept promises an increase of efficiency, but it shows an innovative way of disregarding the old structures that the bus is currently limited to.

To further extend the idea, one could imagine a new kind of transition solution of bus lines which doesn't require bus stops. This is a more advanced technological effort but could reshape the scope of flexibility for the bus. Through the connectivity of bus and customer, it could be made possible to redesign an autonomous bus as having two ports on each end. It would then connect various bus lines on the go and have customers transit bus lines while they are moving. Similar ideas can be found in the TED Talk "What a driverless world could look like" by Wanis Kabbaj (cf. TED 2016).

Considering the diagram, we can observe a substantial shift towards more flexibility. This is due to the new-found flexibility of the service. A slight increase along the public space axis is also described, justified as the public has a key role in reaching the desired outcome of the service (flexibility +++, public space +).

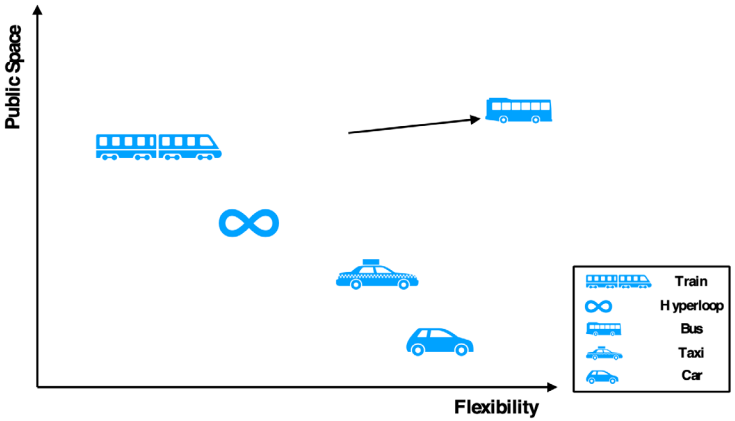

FIGURE 4: INCREASING FLEXIBILITY
(OWN ILLUSTRATION)

This last idea focuses on flexibility and adaptation to public demands, which can be met by considering a modular design. It does not limit the final identity a bus can have, due to ever-evolving innovation in special concepts. It incorporates both notions efficiently, but nevertheless will need a greater reconstruction of the bus.

The idea is that buses can serve as modules which can be booked and customised by cities. It is possible to create standard modules suited for rush hours, not offering much seating area, modules that are designed for handicapped individuals and elderly people, or modules that offer a sort of lounge with comfortable seating. On demand, these modules can be easily swapped and changed, and are thus open for future innovation as well.

With this idea, EvoBus could tap into a new market by expanding it to business demands. This could redraw long-distance travel, where business trips can include team building and productive activities due to the better usage of longer traveling times. There, modules can be custom-made for businesses, or created to offer dining areas, lounges, sleeping options, presentation rooms and others. To make this concept even more appealing, the idea from case 5.3, connecting autonomous driving buses with each other, can be incorporated. This would effectively create a more flexible and customisable alternative to trains. Even though this sub-case focuses on businesses and thus would undermine the notion of public space for our Ergon argument, it still holds for public transportation. Adaptation of public demands and increasing flexibility by easily changing the shape of a bus fits perfectly into the argumentation of creating the bus according to its Ergon.

The movement on the diagram is shown as an increase in both flexibility and public space parameters. The case greatly increases the versatility of the bus by implementing modular designs, resulting in an increase in flexibility. The bus enjoys a similar increase in public space, as the modules can be fitted perfectly to public demand (flexibility ++, public space ++).

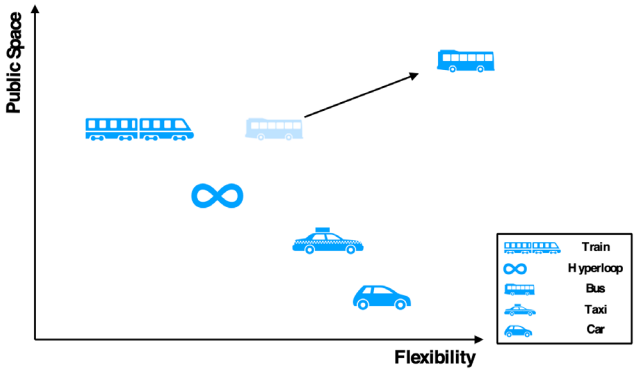

FIGURE 5: MODULAR DESIGN
(OWN ILLUSTRATION)

6. Conclusion and Guidelines for EvoBus

The mobility market is constantly transforming and finding new ways of bringing people from A to B. Most means of transportation will shift into different and new areas of service, rendering the bus a debatable choice.

We have raised the question of why to choose the bus, and upon sketching Aristotle's theory of the Ergon, constructed a status-quo definition of the bus. Here, we have shown that a fixation on necessary and sufficient conditions limits the notion of the bus and does not prepare it for future changes and rethinking processes. We found that the status-quo definition is not sufficient for our purpose and therefore identified the buses specific function or Ergon by applying Aristotle's Ergon argument. We concluded that its specific function resides in flexible public space, which is not shared by other means of transportation. This allows for the bus to keep its distinctive identity, but at the same time offers the opportunity to excel in its intended nature. Simultaneously, it has the freedom to innovate in other areas as well but centring on the Ergon and bringing it to excellence will make for a good bus.

Furthermore, in order to inspire EvoBus's innovative direction for the Ergon of the bus, we have sketched out four different cases. We have concentrated on different aspects of the Ergon and tried to rethink ways the bus can fulfil its function well. We have focused on the public aspect

and the flexibility parameter and marked possible positive effects on the parameters on a mobility diagram. With these cases, we have tried to bring the bus to excellence in terms of the Golden Mean. However, it is extremely difficult to strictly define what the Golden Mean of the bus is. This we will leave for others to examine.

With our results in mind, EvoBus does not necessarily need to reinvent the bus, but rather rethink the way it fulfils its societal function and services. This will create a good bus, which ultimately means that EvoBus will stay on top of the game as a premium world-wide bus provider.

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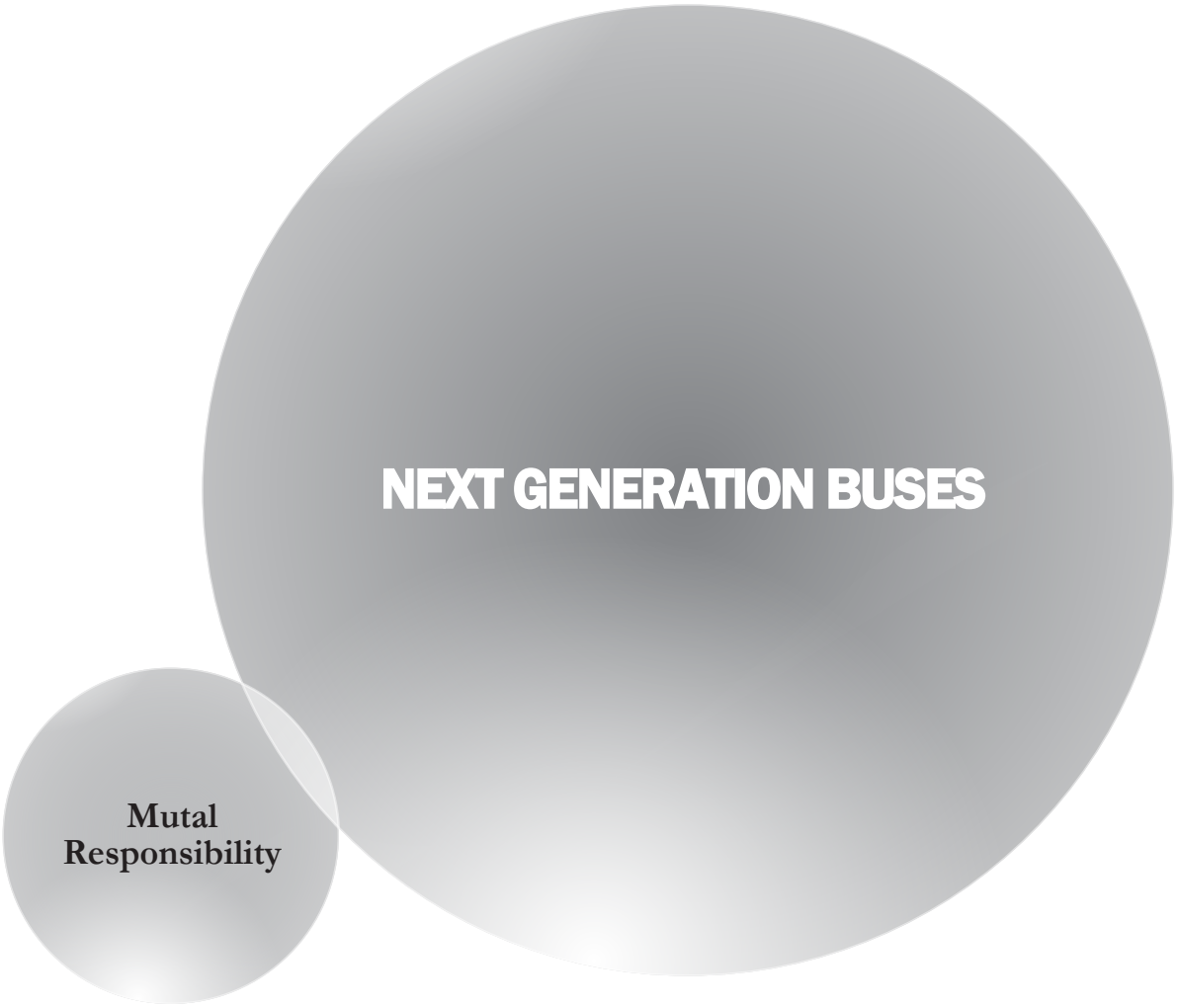
NEXT GENERATION BUSES
Mutal
Responsibility

Mutual Responsibility

Responsibility for and of Employees

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Keywords
Mutual Responsibility, Reciprocity, Autonomy, Principal-Agent-Theory, Sustainable Leadership

The aim of this article is to show that the understanding of responsibility needs to switch from a simplistic one-way concept to a more complex structure. Today, employees are regarded as the most important stakeholder group in a company. In order to enable innovation from within, employees have to be given more autonomy, so that new ideas and proposals for sustainable improvement can emerge. As autonomy always comes with responsibility, structures and hierarchies have to be reconsidered in order to organise innovative settings. Within the concept of New Institutional Economics, we will argue that employees are not just agents, but that they also inherit the role of principals. We will point out the superiority of the concept of Mutual Responsibility through arguments regarding motivation, quality and legitimacy, as well as specific implications concerning responsibility for Daimler's Leadership 2020 campaign and how it helps to identify important aspects in establishing an error management culture at Daimler Buses.

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1. *Introduction*

Karl Müller, aged 43, has been working at EvoBus GmbH for 22 years. Asked about his daily work life and environment, he states: "No matter how much I try to change work routines – that could be approved – nothing is changing".

Karl's biggest "irritations" are demotivated colleagues, a lack of honesty and cooperation in teamwork. Generally, he feels exhausted by these deficiencies. What he wishes for to improve his (personal) situation are incentives that honour a vivid error culture through team-focused projects. For him, this implies an honest and open communication about and around errors that might occur, and the safeguard that his own job is not in danger if errors are addressed directly. Karl also mentions another thing: for years, he has been thinking about a way to design customer processing in a more efficient and unbureaucratic way. Finally, he realised that a small modification (just two steps of the process) could make his life so much easier.

If his team leader listened to him, he could present his ideas! But Karl intuitively feels that there is generally no way for him to gain real attention from any of the principals. They are only concerned with bigger topics, in order to boost their own careers. Karl even fears his team leader could declare Karl's ideas his own. Therefore, Karl would like to report about his mistrust of his team leader but lacks the possibility to really pass feedback on (anonymously).

Anyway, Karl is discouraged: the team has been led by the same principal for over seven years, and things seem to be cast in stone. Nevertheless, Karl can imagine a better working environment: a communicative team and dynamic working spirit, where vindications become superfluous. When asked what he needs specifically, Karl claims: 'First, mutual acknowledgement between colleagues and principles, transparency that consists of real time feedback but also information about working processes, and a new approach to dealing with errors: to establish a new error management culture and to enforce innovate ideas that might come along with a trial and error path.'

Karl thinks that this could motivate employees again and awaken a more entrepreneurial spirit. Of course, security and stability should be guaranteed through innovation and change processes at any time. At the Daimler Company, this is highly valued in all associates. On the other hand, he recognises the huge challenge that comes along with changing basic structures and enforcing occupational safety and continuity for all the team members. Also, overall impersonal

and objective dealing with all kinds of subjects, and the possibility to ask for support when solving problems or implementing innovative ideas, are important for him. Karl has heard of innovation labs and future task forces. He can imagine such tools being used to realise his ideas for EvoBus GmbH. While Karl has described his visions and needs for the future, his mood has changed: from a negative attitude to a mindset concerning future goals that seem possible.

"If only the working environment at Daimler would change." Karl feels oppressed in his role. Every task is still defined by his boss – some are not efficient or useful at all. Even Dieter Zetsche, CEO of Daimler, has recently stated:

> If you give precise instructions, the best you can hope for is what you expect. If you give the team more freedom, ideas may arise and go much, much further (Daimler AG 2018g).

Karl hopes that this will be the new spirit at Daimler very soon. It's time for a change.[28]

As technologies, consumers' desires and values change, economic agents like companies, organisations, managers and employees face different challenges in the struggle to stay or to become leaders in their field of practice. Human capital seems to be the motor of innovation, and thus the basis for future prospects in the world of digitalisation and globalisation (cf. Anger 2007: 1 f.). But how can human capital reveal its full potential? The answer is autonomy and liberty. In order for human capital to unfold, the autonomy for it to develop has to be provided throughout all hierarchical levels. Since autonomy and responsibility are two sides of the same coin, more autonomy for a single employee imposes, at the same time, responsibility for decisions, actions and omissions to employers and employees in a new dimension. As the example of Karl demonstrates, the lack of autonomy and liberty is not usually hard to identify, and in this way, demands to fill the void can be formulated. Finding a new way of handling shifting autonomy and deploying responsibility is the hardest part of enabling innovation and change. It will become clear that traditional concepts of (as we will call it) one-way responsibility do not meet the requirements of organisations that foster innovation. A new concept of responsibility is needed. In this paper,

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[28] This story is fictitious and based on the follow-up workshop #ThankGoditsMonday at Daimler Buses in Stuttgart on the 16th December 2016. At the beginning of the workshop, employees designed a picture of 'the classical Daimler employee'. This story was created based on their results.

we will show that this new kind of responsibility, Mutual Responsibility, is reciprocal, dynamic and self-directed. To increase the understanding of this new concept, we will outline its foundations.

2. Methodological Approach

In the first part of this article, we will take a closer look at the notion of responsibility. It is used in various situations and applied to different kinds of things, such as individual people, organisations or governments. In the following chapter, we will show how responsibility has evolved from a simplistic one-way into a more complex and reciprocal concept. First, we will take a closer look at the historical background of responsibility, and how it developed from a term affiliated with religion and demerit into a more differentiating and future-oriented concept from the development of science, technology and industry over centuries. We will point out that organisations can be considered moral agents, as they are bearers of 'systemic responsibility'. In the second part of the following chapter, the difference between individual personal responsibility and 'system responsibility' will be spelled out. Furthermore, we will provide a first general definition of Mutual Responsibility, and indicate current trends towards our concept among vehicle manufacturers.

On the foundation of this, we will analyse the concept of responsibility in an economic setting, from a microeconomic point of view. Classical economic theory has defined economic relations solely through contracts – contracts that define the exact liabilities on both sides of the contractual agreement, which are supposed to be rational and complete.[29] Intuitively, one would judge this a rather naive, short-sighted and reactionary point of view: exceptions or human interaction are simply omitted, nothing other than the strict fulfilment of precisely-defined instructions of the agreement is permitted. Many companies are based on complex hierarchical systems and contracts of employment, and have hundreds of pages for scheduling any single occupation precisely. First, we will outline the theoretical model on which such company structures currently rely. Then, we will widen the above-mentioned theoretical and one-sided interpretation of an economic relation to a more realistic and complex understanding of relations

[29] Completeness within contractual language indicates a coverage to all expectations and unexpected situations or circumstances. This is an idealistic vision of a contract and therefore serves only as a model (version).

by adding Mutual Responsibility.

Then, we will show why the concept of Mutual Responsibility is not only normatively desirable, but also superior to other concepts of employer-employee-relationship. We will show this via motivational, quality and legitimacy arguments. This tripartite is necessary, because superiority in only one or two aspects cannot indicate superiority on the whole. Each aspect is necessary, but only jointly are they sufficient. For example, one can easily imagine a firm with highly motivated employees and a legitimate product, but if the produced product is of low quality, the firm will not play a role in the top segment.

As we outlined the theoretical foundation of our concept of Mutual Responsibility and explained its superiority in terms of motivation, quality and legitimacy in economic relations and actions will now turn to its adaption in reality. For this purpose, we will call upon Daimler's initiative of cultural change, 'Leadership 2020'. We will take a closer look at the three game-changers of leadership role/development, feedback and the decision-making process, and draw conclusions with our concept of Mutual Responsibility. Furthermore, we will give an overview of the EvoBus Theme Day: Quality and Error Management Culture, which took place in July 2017 in Mannheim. Our concept of Mutual Responsibility explains why the stated shortcomings reflect upon an error rate, which still leaves room for improvement and optimisation and helps to identify necessary aspects of advancement. We will close with a summary and an outlook for our concept of Mutual Responsibility.

3. From One-Way to Mutual Responsibility

3.1 Historical Evolution of Responsibility

The notion 'responsibility' has existed since the second half of the 15th century, where it was used to justify things that already happened in front of God or court (cf. Heidbrink 2011: 188). Hence, the traditional view of 'responsibility' implies some kind of illegitimacy and demerit, which has to be taken account of in front of a higher instance that decides on a suitable punishment (cf. ibid.: 189). This is what we call a 'one-way' perception, where there seems to be a clearly separable and single operation direction of responsibility: a person takes responsibility for one specific object, act or issue, and has to report and justify their doings in front of another. As we will spell out in

Chapter 4, the person responsible can be described as the agent, and the instance that demands accountability takes the role of the principal in a classical principal-agent problem in New Institutional Economics.

To ascribe responsibility to a person, certain criteria of accountability of an action have to be fulfilled. Aristotle mentioned freedom, intentionality and causality as conditions for a person to be made accountable for their actions (cf. ibid.: 189). Freedom, in the form of freedom of action and freedom of will, are normative predicates of responsibility, which means a person ought to be free in will and in action in order to be held responsible. Not only an action but the according person is evaluated, to estimate the proper level of responsibility and the fitting punishment (cf. ibid.: 189). 'Moral responsibility' can be defined as the following: if an individual's thought and decision-making process are independent from external influence or coercion, they can have a 'moral point of view', and hence be considered a carrier of moral responsibility (cf. Goodpaster and Matthews 1982).

John Stuart Mill expanded the concept of 'responsibility' by adding to the applicable field of performed actions the idea of being responsible for unintended consequences, and of being responsible for omissions, since a person cannot only harm others by their deeds but also by not taking action (cf. Mill 1969: 18). His understanding of 'responsibility' for an action, its unintended consequences, omissions and resulting punishment therefore rests on the condition of having caused harm to others. From the development of science, technology and industry, the process of individual action and resulting harm become more and more complex, such that consequences cannot be explicitly assigned to certain individuals anymore (cf. Jonas 1979: 26). This led to collectivisation and juridification of responsibility, since functional differentiation and the division of labour detached accountability from individuals and transferred it to higher process chains and abstract juridical entities, such as firms and institutions (cf. Heidbrink 2011: 190).

This opens up the question of whether firms themselves can be considered moral agents, or if they rather are aggregates of individuals that embody collective responsibility (cf. Moriarty 2016). Kenneth E. Goodpaster and John B. Matthews, Jr. (1982: 132) argue that an organisation can in a sense have a conscience "for its members can make the corporation[30] act as a morally

[30] For our purpose, there is no distinction between corporation, firm or organisation necessary: these terms can and should be treated as synonyms.

responsible person would." They stress that organisations are subject to moral responsibility since they are affected and affect their environment (cf. ibid.: 138), which fits with Mill's notion of responsibility as the ability to cause harm to others.

Furthermore, Goodpaster and Matthews (cf. ibid.: 133, 139) clarify that when speaking of a firm as a moral person, they do not mean 'person' in a literal sense but rather that certain aspects that define responsibility of an actual moral agent – such as being held accountable for something, having the responsibility to follow external laws and norms and following a decision-making process independently defined by its managers and internal rules and values – can be attributed to an organisation. When looking at the size, power and scale of organisations today, it is not so much the question of whether they should use their moral power, but rather how they can use it in the best possible way (cf. ibid.: 139 f.). This question seems to be normatively and therefore morally loaded. Large organisations are controlled by managers, single women and men, but the morality of a firm is more than the sum of its components, since several moral agents do not make a moral whole without having something structuring the complex system (cf. ibid. 1982: 140; Bühl 1989: 26). From this, it follows that the morality of a firm is slightly something different to the aggregated morality of its individuals. Therefore, firms are moral agents which embody a collective responsibility structured by the organisation.

While organisations can be legally and morally liable, the concept of accountability is reserved for personal agents (cf. Heidbrink 2011: 195). According to the criteria mentioned above, the accountability of a subject depends on its freedom, intentionality and causality. An organisation might have their own logic and internal laws that structure processes within it, but it is individuals that define these logical systems and set these laws so that freedom of will and freedom of action trace back to these individuals. We can say that Volkswagen and other vehicle manufacturers acted morally objectionably when collating in the cover up of the amount of exhaust gases (cf. ZEIT ONLINE 2017), but those actually accountable for this affair are individual, personal agents who either voluntarily chose to act in a morally condemnable way and/or who set up a system that incentivises morally condemnable actions, and/or who recognised those incentives and played along with them instead of pointing this moral hazard out.

This restricts the idea of organisations as moral agents to what is called 'system responsibility', which includes the self-reproduction and inherent dynamism of social processes (cf. Heidbrink 2011: 195 f.). According to Walter L. Bühl (cf. 1998: 27 f.) 'system responsibility' obliges to

determine and identify the architecture, coding and future trends of a system and to base all of them on moral judgement. He claims that, in a globalised world, action takes place in the framework of institutions where the basic conditions for responsibility of action are expressed in a system theoretical way (cf. ibid.: 15). Within a system, an agent's actions are oriented on formalised and customised rules, and on concrete, individual settings. Hence, the internal and external aspects of responsibility have to converge in the long run, in order for the individual to bond themselves to the (former) external rules and principles (cf. ibid.: 15).

3.2 Mutual Responsibility

Since a system is formed and defined by subjective individuals as well as norms and rules that are objective within that system, its responsibility dimension includes more criteria than those of a person. 'System responsibility' differs from personal responsibilities in the aspects that the first includes (cf. Heidbrink 2011: 196):

- Possible risks, like consequences of system processes that are usually characterised by uncertainty
- Mill's conception of responsibility for an action and for an omission is expanded upon by the responsibility for design, including surrounding conditions and promotion of business culture
- The seniority of contextual governance, aiming at cooperative coordination between external interests and self-governance of organisations

Responsibility for design as part of 'system responsibility' can be considered a responsibility for control based on long-term considerations, which include adaption and progress, control and governance. These long-term goals are the preservation of the organisation's structure and innovation at the same time, reached through more autonomy for operational units within an organisation and better environmental orientation (cf. Bühl 1998). The main task of management is to obtain potential variety by directing, coordinating and integrating numerous and diverse activities, visions, aspirations and potential within a system (cf. ibid.: 101).

It can be concluded that innovation and therefore also the future sustainability of an organisation also depend on its associates' capabilities, potentials and commitment, next to the skill of its management and leadership principles (cf. Robinson and Smith 2014: 1). Morally acceptable management within 'system responsibility' does not only rely on according rules and ideas, but also needs associates that enable and enrich this management with their own values and

integrity such that they can bond with those (at first) external laws. When the management entrusts an employee with a task, by accepting that task and the responsibility that comes with it, the employee trusts the management's capabilities to be used and invested in the best possible and most sustainable way – by devolving responsibility on its associate, the management itself becomes responsible and there is no longer a clearly separable and single operation direction of responsibility.

Responsibility becomes a more organic concept, that is triggered by an act, object or issue and then scattered among numerous affected people, and the environment in general. Those responsibility relations do not only have to be directed one way, but are usually reciprocal and self-directed – this is what we call Mutual Responsibility. In the following chapter, we will explain and sharpen this definition further within New Institutional Economics, and point out the superiority of Mutual Responsibility with the aid of three arguments concerning normativity, quality and legitimacy in an economic context.

Our concept of Mutual Responsibility is already partly in practice with some of the leading vehicle manufactures. In his famous article on Internal Entrepreneurship, Rolf Wunderer (cf. 2009: 32) names Audi and Daimler as pioneers who formulated principles that aim at the empowerment of what he calls 'internal entrepreneurship' – a concept that is based on shared responsibility and engagement above all. Wunderer's idea of 'shared responsibility' can be understood similarly to our concept of Mutual Responsibility, since it is also directed towards the idea that employees are not only entrusted with tasks by their employers, but that they become entrepreneurs themselves: the trust at stake is not just one-way, but reciprocal. In order to reach this reciprocal level, Audi encouraged their factory workers to define 'internal entrepreneurship' under the slogan of 'employees as entrepreneurs'. They concluded that they are those who know their working environments best, and therefore are on hand to improve the production process in terms of surplus production or shortages of production parts – like an enterprise of factory workers within Audi (cf. ibid.: 34). Daimler, on the other hand, defines value-oriented leadership through entrepreneurial reason and action within its growth strategy. The engagement of employees including qualification, satisfaction and commitment is the focus of Daimler's value-oriented leadership (cf. ibid.: 33 f.).

There is a striking trend towards the higher involvement of employees in entrepreneurial business, but when enacting Mutual Responsibility it does not suffice to simply expand the

responsibility dimension of one participant in a system, but the dimensions of the others should be revised as well as the implications of 'system responsibility'.

4. Employees: Both Agents and Principals

4.1 Mutual Relation Between Employer and Employee?

"If you want something done right, do it yourself" (Sappington 1991: 1). This general piece of advice seems very appropriate when it comes to decisions and actions individuals can handle within their personal scope of action. Unfortunately, this scope of direct personal interference is limited – mainly by time, personal and organisational capability, power and financial or technical resources (cf. Erlei et al. 2016: 71). Considering these restrictions, individual economic subjects are forced to delegate certain tasks to other economic subjects, in order to reach complex objectives (cf. ibid.: 72).

To fully develop our concept of Mutual Responsibility and describe its implications, it is essential to reflect upon the theoretical foundation of the above-described relationship between economic agents. For the sake of thematic clearance, we will focus on the relationship between two participants: an employer (commonly interpreted as the principal) and the corresponding employee (commonly interpreted as the principal's agent) (cf. Hochhold/Rudolph 2011: 134). Two typical examples for a model of such an economic relationship are the corporate management (agent) and the corporation's shareholders (principal), as well as the subordinated employee (agent) and their supervisor (principal) (cf. Holmstrom/Milgrom 1991: 25).

Recalling our concept of Mutual Responsibility, we will argue that employees are not only to be interpreted as mere agents but also as principals. Therefore, we will first analyse the common modelling of a principal-agent relation introduced by New Institutional Economics. We will then emphasise that this standard concept is primarily concerned with an asymmetrical, hierarchical interpretation of an employer-employee relationship (cf. Erlei et al. 2016: 65). On this basis, we will continue to outline the interpretation of a mutual relation between employer and employee and work out the material and immaterial advantage when considering such a mutual relation from a microeconomic perspective.

Building the core part of the principal-agent model, the Principal-Agent Theory, also called the Agency Theory, assumes that any complex economic (trans)action requires a relationship between two economic subjects (cf. Sappington 1991: 64). Therefore, a principal – the employer – delegates certain tasks to their agent – the employee. Within this relationship, both parties (principal and agent) are assumed to be self-interested utility-maximisers who act rationally, in terms of an individual point of view (cf. Erlei et al. 2016: 71). This implies that both parties maximise their utility according to their individual sets of knowledge, beliefs and values. Therefore, the interests of principal and agent must not necessarily be equivalent. In fact, if both parties are assumed to be self-interested utility-maximisers, most commonly their interests within the economic relation will differ significantly (cf. Hill/Jones 1992: 132). Because of this disparity in interests, opportunistic behaviour within the economic relationship is likely to occur. To coordinate the economic relationship between principal and agent, contracts are designed to define the converse liabilities on both sides (e.g. such as accurate payments for compensation or the specific description of the agent's duties within the contract) (cf. Erlei et al. 2016: 71).

Up to this point, costs for drafting the contract such as selecting an adequate applicant and costs for the contract's implantation like monetary compensation of the employee arise – but only under the assumption of complete contracts. However, this assumption is considered short-sighted. Indeed, the incompleteness of contracts is exactly why the principal-agent problem arises: Agency Theory strictly denies that any contractual agreement – no matter how detailed it may have been – can guarantee completeness and therefore ensure complete rationality solely by this contract. In fact, any contract is considered incomplete to some extent (cf. Hart/Moore 1988: 758 f.).

Nevertheless, due to various personal restrictions and the complex dimensions of economic goals, the principal is forced to outsource certain tasks to an agent. For the principal, it is therefore rational to employ an agent with appropriate, specific skills to fulfil the relevant task in the best feasible way. Most commonly, the principal will therefore prefer to recruit employees who are especially adequate and therefore specifically invested (e.g. in form of qualification, knowledge or resources). Most commonly though, the principal does not know of the agent's qualifications and characteristics in advance (cf. Oliveira et al. 2017: 623).

At this point, the principal is confronted with a cost-intense selection process. Therefore, it is inevitable to screen potential employees according to the relevant qualifications of the specific assignment. This will help to determine the eligibility of the applicant in certain aspects. However, some agency risk remains part of the transaction, because of potentially hidden characteristics and intentions. The same counts for the agent's standpoint, considering the conflict of interests that arises when managers intentionally misdirect resources according to individual benefit and thereby preventing the best overall allocation (cf. Erlei et al. 2016: 149). The agent faces the risk of hold-up attempts after entering the contract, especially if they dispose highly specialised qualifications or investment which are precisely fitted to this specific task (cf. Laffont/Martimort 2009: 3).

In fact, it is commonly assumed that the agent is specifically invested and hence also in an advantageous position regarding information about their delegated task. The agent is potentially able to use their advantageous position in terms of knowledge ('hidden information') to increase or reduce the benefit (economic outcome) of their principal (cf. Pratt/Zeckhauser 1991).

To enforce the contract, it is therefore essential for the principal to monitor the agent's actions after contractual agreement. On the other hand, the agent might try to approach the principal by trying to reduce distrust through signalling their credibility towards the principal. In the same way, the principal can signal to their agent that their firm-specific investments will be used in an efficient and sustainable way (cf. Whitener et al. 1998: 514). The principal may not be an expert on any specific topic but have more knowledge of the organisation and its position in the institutional environment. It can therefore be concluded that both parties – principal and agent – mutually must consider hidden information within the principal-agent relation. At this point, high transactional costs arise due to necessary decision controls (cf. Erlei et al. 2016: 89).

To illustrate this reciprocal asymmetry within the relation of knowledge of powertrains, the following constellation between the head of product development and research (who is directly subordinated to the management board) in a car operating company and an employed engineer within the same department can be called upon. Suppose the engineer is highly specialised in powertrain mechanics for electronic cars, while the head of product development is not. The latter is assigned with a more general, coordinating task: they must conduce constant cooperation and fluent communication between the different sections within their department and decide on the dispersion of resources. While they are frequently informed about the main challenges which arise in every single section of the department, the engineer specialised in powertrains does not know

about the precise struggles outside of their own specific framework. The latter might also be not informed about strategic management decisions that are finalised by the board of management, whereas the head of the department will be incorporated in such decision-making.

For the engineer, it is therefore difficult to judge whether the head of department defalcates parts of the resources, or whether the principal's decisions are accurate according to the company's goals. On the other hand, the head of department – based on their poor knowledge of powertrains and time restrictions – may not be able to evaluate whether the engineer is developing and testing the powertrain technology according to security standards and in an efficient way, or whether they might systematically contort testing results. Moreover, they will not be able to judge whether the agent is acting accordingly to the stipulated tasks or passionately exceeding their tasks by using additionally time resources to improve technical details to the overall quality of the powertrain. Furthermore, the head of the department is not able to observe the engineer's intentions. Could they be willing to leave the company? Do they reveal business secrets to competitors?

Both parties – head of department and engineer – do not possess the whole set of information. The principal enjoys an advantage of knowledge within the overall organisational context and the strategic management decisions of the company, whereas the agent is in an advantageous position in terms of knowledge within the development of powertrains for electric cars. Neither of them has access to the complete knowledge within such a complex organisational constellation. Therefore, both parties are mutually concerned with the underlying principle of bounded rationality for two reasons:

- Contracts are incomplete and therefore irrational arrangements that cannot cover all the situations that might arise from the complexity of the contractual subject.
- Principal and agent are both self-interested utility-maximisers and will act according to their individual welfare maximisation. This opportunistic (egoistic) though rational behaviour (consisting of hidden characteristics, hidden intentions, hidden information, hidden actions), is not limited to the scope of action within the contractual framework, but potentially leads to a violation of the contract.

Due to the incompleteness of contracts and the mutual assumption of opportunistic behaviour between two or more economic actors (consisting of hidden characteristics, hidden intentions, hidden information, hidden actions, etc.) within complex contracts high transactional costs arise

when it comes to their enforcement. Mutual Responsibility is a way to exceed this contractual problem, which is mainly a problem of trust. To complete this chapter, the following definition (based upon the microeconomic reflections above within the 'employer – employee' relationship) intends to briefly summarise what we will call Mutual Responsibility.

Mutual Responsibility can be developed between two or more (economic) actors (for example, an employer and employee) if, and only if, both parties have equally agreed on being part of such a reciprocal and dynamic relation. Within this relation, the term responsibility is directed to the personal engagement of both contractual parties. This implies that the concept of Mutual Responsibility is not only directed and fixed to an economic link or pre-set and pre-defined aims and intentions of the economic relation, but responsibility is also self-directed in terms of self-reliance in accordance with their own conscience and the shared purpose of their cooperation.

Therefore, Mutual Responsibility is defined by reciprocally-directed behaviour patterns (in the form of trust, honesty, integrity, good conscience) within in the economic relationship. Concrete manifestations are reflected by the entrepreneurial behaviour of employees, employers who define their core leadership values according to the values of the 'honourable merchant', or the establishment of an honest and open, non-hierarchical feedback culture.

Microeconomic consequences of this reciprocal understanding are that classical concepts of detailed contracts become gratuitous if Mutual Responsibility can be developed and established in an economic relationship. To be more precise – and this brings us to the most important microeconomic argument of Mutual Responsibility - transactional costs will be significantly reduced (e.g. in the form of contractual design and control and enforcement of the contractual agreement), and reputation funds can be established over time by mutually contributing to the relationship.

As we will outline in the following chapter, further arguments of motivation, quality and legitimacy support the favourable concept of Mutual Responsibility between employer and employee.

In the following, we will show why the concept of Mutual Responsibility is not only normatively desirable, but also why it is superior to other concepts of employer-employee-relationships. Therefore, we will argue via motivational, quality and legitimacy arguments.

5. *The Superiority of the Concept of Mutual Responsibility*

5.1 Motivational Argument

We will start by showing why the implementation of a Mutual Responsibility leads to highly motivated employees. To properly understand the concept of motivation, we will first take a look at the definition of motivation. Even though motivation is what brings people to do something, there are many different opinions on how exactly this works.

First, it is necessary to understand that every human action is motivated in some way. In modern economics, it is generally assumed that the background of any action is rational choice (cf. Sugden 1991: 751 f.). However, there are different accounts of what a rational choice is, as there are different accounts of rationality (cf. ibid.).

According to the 'Kantian notion' of rationality, the making of choices and hence the planning of actions is motivated by rationality. A person only decides on an action if it is prescribed by some principle, which the chooser can conceive and will to be a universal law (cf. ibid.: 755 f.). A necessary condition to reason in this way is for any deciding agent to conceive themselves autonomously, which means believing in their ability to make free decisions (cf. ibid.: 755).

Another possible account is the "instrumental conception of rationality" (ibid.: 752), which claims actions are motivated by desires and never by reason alone. It is built upon the reasoning of David Hume, who claimed that "[r]eason is, and ought only to be the slave of the passions" (Hume 2012). To motivate someone, it is necessary to appeal to their feelings (cf. Sugden 1991: 753), because "reason alone can never be a motive to any action" (Hume 2012).

Even though these theories seem contrary to one another, both entail some truth and should be recognised as important to the formation of choices. Therefore, in the following we will try to appeal to both aspects – those that motivate somebody's interests, passions and creativity, and those that motivate the rational drive for job security and physical integrity.

Now that we have discussed the general concept of motivation, we will focus on motivation for work. For a long time, the most important thing in the field of leadership was to ensure that employees function properly: one did not attempt to find out how to motivate them in the best way. However, in the 1960s this changed to perceiving employees as complete humans with

complex needs (cf. Kühlmann 2008: 56 f.). Hence, how to best satisfy those needs differs for every individual. Today, we know that much of this is true, but it is still possible to motivate people to do the best work that they can do. To understand employee needs, it is necessary to first understand their individual positions, what motivates them and how they become frustrated. Only if an organisation can satisfy its employees' basic desires will they be able to perform at their very best (cf. ibid.: 72) and thus their corporation will give the best possible result.

According to classical theory, there is a network of four conditions that influence work (cf. ibid.: 57 f.):

- Personal will: this means desires, interests, wishes - everything an individual assumes to be precious and worth striving for.
- Personal ability: knowledge, skill and experience.
- Social allowance: the rules of society which restrain how individuals behave inside a society without having to fear sanctions.
- Situational empowerment: how the current situation encourages or restrains certain actions. Important components in this are the type of work, the devices worked with, the pressure of time and the social environment.

From this, it follows that work is finally determined by a function of will, ability, allowance and empowerment.

$$action\ of\ work\ =\ f(will, ability, allowance, empowerment)$$

Therefore, if one of the determents is zero, the action of work will also be zero (cf. ibid.: 58).

Theories of Motivation

As we have seen, the action of work is determined by four different conditions. Therefore, the question is, how it is possible to motivate employees to be more willing or learn additional skills? How can the conditions be influenced?

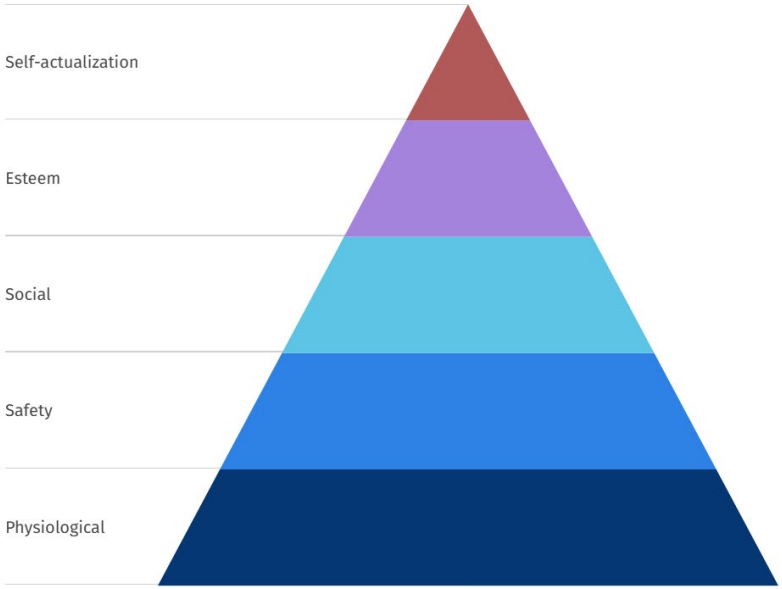

FIGURE 1: MASLOW'S 'HIERARCHY OF NEEDS'
(OWN ILLUSTRATION ACCORDING TO ROBBINS 1991: 193 F.)

One of the most famous motivational theories is Abraham Maslow's 'Hierarchy of Needs' (cf. Robbins 1991: 193 f.). He argues that human actions arise from the desire to fulfil needs (cf. Almquist 2016: 48). These needs are of different complexities, while they are often interpreted in a way that, in order to reach the next level, one first must fulfil the lower level (cf. Kühlmann 2008: 70). Therefore, to motivate someone, it is necessary to understand where that person stands and to focus on the satisfaction of needs at or above that level (cf. Robbins 1991: 193 f.).

Even though this theory is influential and is famous amongst studies of motivation (cf. Almquist 2016: 48), one can argue that the necessity to fulfil lower needs to be able to reach higher ones is not always a given. As Eric Almquist, John Senior and Nicolas Bloch argue, for example "rock climbers achieve self-actualization in unroped ascents of thousands of feet, ignoring basic safety considerations" (ibid.). They modify Maslow's theory, describing 30 'elements of value' that influence human decisions (cf. ibid.: 49). Almquist et al.'s theory was originally designed to show

the values that are important for customers to decide which product t to buy (cf. ibid.: 48). However, this does not mean that the factors cannot be applied to other situations – like employees deciding on the firm they want to work for or motivating themselves for a specific task.

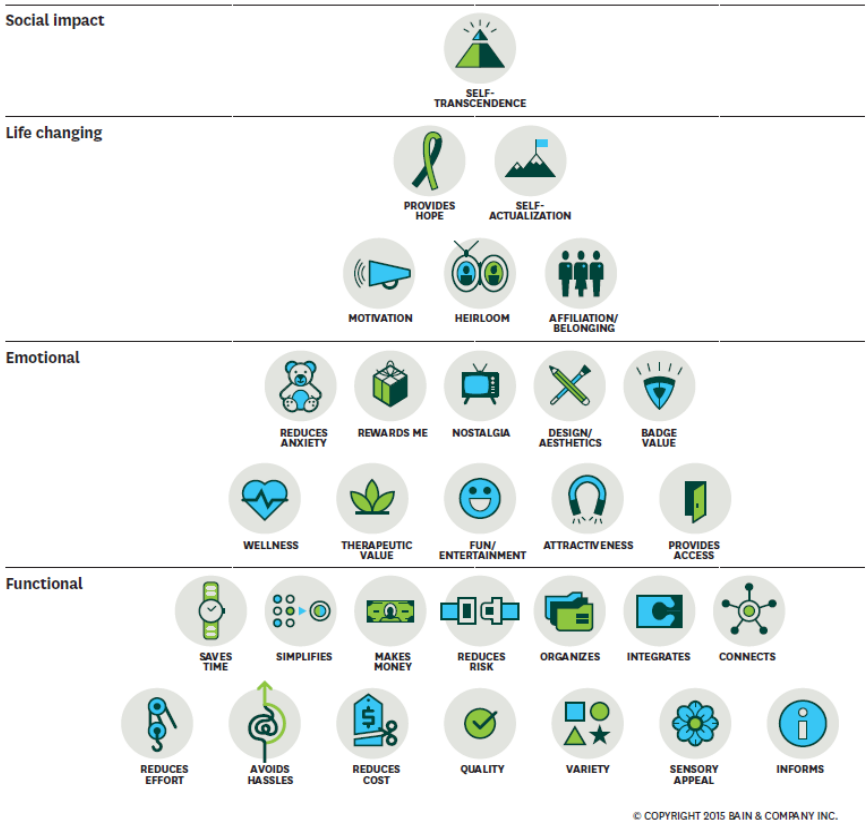

FIGURE 2: MODIFIED HIERARCHY OF NEEDS (CF. IBID.: 51)

When comparing figures 1 and 2, it is obvious that both are similar, though Figure 2 is more complex. Still, this complexity is useful for understanding the many factors that play a role in decision-making. As Almquist et al. show, it is unnecessary to score highly in all factors, but on those that are important to the agent. Also, basic factors like 'quality' might be low on the pyramid

but affect customer's decisions more than any other factor (cf. ibid.: 50). Therefore, in the next chapter we will focus on the influence the concept of Mutual Responsibility has on quality.

For now, our attention is on the motivation of workers. They too strive for superior goals in the categories 'Life changing' and 'Social impact'. To satisfy these, a firm must give its employees tasks that appeal to values that fall under these categories, like self-actualisation or belonging. This is what can be achieved under Mutual Responsibility. As we have already defined, this concept focuses on engagement and reciprocal understanding, which gives employees the ability to decide autonomously. However, as was already pointed out, there are many theories about motivation. A concept that focuses more clearly on motivation of work is the 'motivation hygiene theory' by Frederick Herzberg (cf. Miner 2005: 61). He argues that there are factors which encourage job satisfaction, as well as other factors that lead to job dissatisfaction.

Job satisfaction is enhanced through "outgrowth of achievement, recognition (verbal), the work itself (challenging), responsibility, and advancement (promotion)" (ibid.: 63). When these factors are satisfied, the basic needs related to personal growth and self-actualisation are satisfied too. However, there are also factors which lead to job dissatisfaction, which are determined by the environment in which the work is performed, for example the company's policy or administrational practices. These factors can restrain an employee's motivation, which means that firms must take care of a good environment or hygiene to motivate their workers best (cf. ibid.: 63).

To implement his theory, Herzberg proposes eight ways to design work in such a way as to not only increase work satisfaction, but motivation:

- Direct feedback on performance
- Contact with those who use the product of one's work
- Direct communication with those working on the same task, regardless of hierarchic constraints
- Possibilities of meaningful learning
- Being able to schedule one's work independently
- Freedom in carrying out a task
- Providing mini-budgets that make employees directly responsible for costs
- Maintaining individual accountability of results (cf. ibid.: 66).

Studies show that tasks enriched in this way result in higher work satisfaction, as well as better performance. These superior results occur in productivity, cost saving, absenteeism and a lower rate of personnel turnover (cf. Kühlmann 2008: 82).

The question is, which motivator is the most important, and does this fit with the Mutual Responsibility notion? As a study with more than 8,000 employees among others from Germany, Israel and the UK shows, employees believe interesting work to be the most important motivator (cf. Harpaz 1990: 75). Mutual Responsibility does not only enhance motivation of work, but also factors into the attractiveness of an employer. A firm that provides not only safe but interesting work has much to offer potential employees, thereby gaining the power to only employ those with the highest qualifications.

In order to not only not dissatisfy, but satisfy one's employees, there are several factors which play a role. Among the most important is the possibility to create something autonomously, thereby enjoying work. Of course, this will vary from person to person, but in general independence and self-reliant decisions (decisions that conform with the concept of Mutual Responsibility) enhance work performance, as the employee is given the chance to be responsible for themselves and responsible for the product, and hence the firm (cf. Kühlmann 2008: 75).

Practical Implications

After assessing these different theories, what can we learn from them? Even though every theory sheds light on different aspects of motivation and results in different instructions, there are some common points. They all argue for some kind of autonomy with employees, as well as for the possibility to cross hierarchical levels and deal with each other in a way of mutual understanding and responsibility. This responsibility should be taken not only by the firm, but also by the employees, as they identify with their work and have the freedom to decide independently, thereby taking responsibility for their actions.

5.2 Quality Argument

Now that we have worked out how employee motivation can be raised by implementing the concept of Mutual Responsibility, we should look at the product. If highly-motivated workers produce a product of low quality, customers will not buy this and therefore the outcomes would be

undesirable for a firm (cf. Almquist et al. 2016: 59). Therefore, in the following we will argue that Mutual Responsibility also increases the quality of a product. First, we will show that there is a close relationship between employees' motivation and commitment, which leads to higher quality, through superior error-management. Then, we will argue for a higher permeability of innovations that finally result in more importance in the future. As Daimler Buses and the whole Daimler Company already produce the highest quality products, there are not many ways to perform better. There are already short ways between workplaces, the materials are of good quality, and the workers are trained perfectly (author unknown, year unknown). However, Mutual Responsibility can still increase the quality of the products.

Psychological studies show that there is an empirical relationship between commitment and self-leadership (cf. Andreßen 2008: 228). According to a study by Panja Andreßen, motivational variables have a significant effect on dependent variable commitment (cf. ibid.: 229). As we have shown in the last chapter, there is a relationship between self-leadership and commitment, a finding that is also proven by Andreßen's study. It is concluded that there is a relationship between self-leadership, motivation and success (cf. ibid.). This shows that the quality of a product will improve if the workers are able to take responsibility for what they do. Therefore, the theory of Mutual Responsibility is superior to the classical one-way responsibility.

For example, in error management, higher motivation plays an important role. Motivated workers are willing to spend more time remedying mistakes and will take responsibility for mistakes they have made. This way, mistakes in the production of a bus will no longer reached the last station of production, where the rectification is a long and complicated process, but can be taken care of earlier, thereby needing less time to be corrected.[31] Mutual Responsibility is not only useful for the present but plays a role in future competitiveness. Employees will rather use the possibility of proposing their own suggestions if they know that these will be appreciated and realised.

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[31] Here, we refer to the workshop EvoBus held in July 2017, dealing with the culture of error management within the production. Further references will follow in Chapter 5.2.

After legitimising the concept of Mutual Responsibility from a pragmatic point of view, we will show that this concept is not only practically superior, but morally more advanced than a classical relationship between a worker and his firm. As the most recognised ethical schools of thought are those of consequentialist and deontological (rules-based) reasoning, we will show the superiority of Mutual Responsibility here.

First, we will show the legitimacy of Mutual Responsibility for a classical business ethics understanding, according to Adam Smith. As the concept promotes reciprocity, it is legitimated in his understanding, which focuses on the consequences of actions. According to his account of morality, there are two guidelines for normative action: rules and virtues. Rules result from reactions to some actions and are generally stricter and more rigorous than virtues. Virtue, however, means not only following some rules or laws, but is an inherent attitude (cf. Smith 1822: 165 f.). Here, the agent tries to behave in the way an impartial observer would. This means one tries to adopt the feelings one would have if one had no individual interests pulling one's feelings in one direction or the other. In this way, a truly just society could come into play, as people would start to behave in a way that brings a benefit to all (cf. Fleischacker 2017).

How does this fit Mutual Responsibility? It is not a great leap from being an impartial spectator to our complex understanding of responsibility. Here, everybody is given the same responsibility, everybody is equal and relations between each other are reciprocal. The trust the employer gives to the employee by giving them a task which they could not perform. As well as trust, the employee gives this to their employer by doing what they believe to be best. A situation in which everybody would be given the same amount of responsibility (the state of complete Mutual Responsibility) is exactly what would be reached if everybody conceived and behaved as an impartial observer. So, by acting mutually responsibly, one would acknowledge everybody in the same way.

According to a Kantian understanding of morality, Mutual Responsibility is approved. We have already established that for Kant, autonomy is necessary in order to make rational decisions. The most important Kantian rule, not only for forming imperatives of how one should behave but for life within a society, is that people are always ends to themselves. It is morally wrong to treat them only as a possible means to an end (cf. Kant 2016). On the contrary, one should treat

people with respect and in a way that recognises their autonomy, thereby allowing them to make personal decisions.

In the context of work relations, this is what we will aim for with the concept of Mutual Responsibility. It means that workers take and can take responsibility for their actions and tasks, that they can and have to make decisions autonomously and in a self-determined manner. The most important task of a firm is enabling its employees to take responsibility, because only if the workers can take responsibility will they ultimately identify with their work and try to fulfil their given tasks in the best way possible.

Mutual Responsibility also works in the opposite direction: a manager who should always take responsibility for everything, no matter whether they played any role in the current problem or could even influence it in any way, is also only a mean. Their role is to take responsibility. By giving up some of this, they would only be held responsible for things they are responsible for, which would also lead to less frustration.

After we have shown the theoretical foundations of Mutual Responsibility, we will adapt the concept and apply it to Daimler's working ethics.

6. Adaption of Mutual Responsibility

6.1 The Idea and Concept Behind 'Leadership 2020'

"What has made us prosperous so far, could lead us the wrong way tomorrow" (Daimler AG 2018b). Daimler is currently reinventing its business model as a vehicle manufacturer and striving to transform into a future role of mobility provider (cf. Daimler AG 2018c). As new markets and new products are expected to arise, Daimler wants to widen its key business. Daimler has therefore identified digitalisation and globalisation as its main challenges, but also opportunities: these factors are expected to cause a rapid change in products, customer expectations and the work environment (cf. Daimler AG 2018j). Therefore, Daimler is focusing on project-based teamwork, mobility of employees and employers, and the digitalisation of services (the way information is

communicated within the Daimler company will change) (cf. Daimler AG 2017b). This implies significant changes to the requirements of employers and employees.

Therefore, in January 2016, the Daimler Group set up a new initiative to actively promote different measures for developing a fundamental cultural change across the whole operating company. Entitled 'Leadership 2020', this cultural change focuses on measures mainly concerned with human resource development and decision-finding processes, as well as management structures (e.g. hierarchies) and working methods (cf. Daimler AG 2018c). Within the creation, upsetting and implementation of 'game changing' ideas and processes, great care has been and is taken to actively involving not only executive staff and high-level leaders, but to particularly integrate the associates and staff into the process. Therefore, the initiative Leadership 2020 claims that all concepts are being generated within a participative, international and intergenerational structured process. More than 200 employers and employees of the Daimler Group from all hierarchical levels are directly involved into this process, displaying a wide range of ages and nationalities (cf. Daimler AG 2018g). The group is structured into eight agile working task forces, and each task force is concerned with one specific package of measures: Leadership Role & Leadership Development and Feedback Culture and Performance Management, Best Fit – Daimler Development Path, Digital Transformation, Swarm Organisation, Decision Making and Incubator (cf. Daimler AG 2018d).

To give the task forces firepower – to enable them to implement and convert new measures – every team is directly enforced by a board director. The overall pursuit of Leadership 2020 is to boost the working culture of Daimler into a sustainable format that must follow the idea of a quicker, better and more flexible company culture. The targeted purpose of the program can be summarised by four general goals:

- Obtain elevated level positions in all fields (e.g. granting only first-class products)
- Set new standards in technology and innovation (e.g. achieving worldwide growth and a leading role in)
- Delight and enthuse employees continuously (e.g. through change in organisational management)
- Establish a community (working) culture (e.g. through digitalised tools) (cf. Daimler AG 2018f)

To adapt our concept of Mutual Responsibility to Daimler's Leadership 2020 program, we will focus on three of the eight game-changers designed during the Leadership 2020 summit in Frankfurt in May 2017: Leadership Role & Leadership Development, Feedback Culture and Decision Making. (cf. Daimler AG 2018g)

Leadership Role & Leadership Development and Feedback Culture

Leadership is the key to cultural change. With Leadership 2020, Daimler has defined eight new leadership principles which seek to represent Daimler's idea of sustainable leadership behaviour and attitude: Purpose, Agility, Empowerment, Driven-to-win, Pioneering Spirit, Learning, Co-Creation, and Customer Orientation (cf. Daimler AG 2017c). Through the Game Changer Leadership Role & Leadership Development, it is planned to encourage and cultivate more teamwork and collaboration, and to create new developmental paths (cf. Daimler AG 2017b).

To turn over these goals and systems, new tools – such as direct feedback reports from colleagues and team members and leaders – are directly included into the people development processes. Easy feedback tools implemented 'bottom-up', will be available in Autumn 2017. Therefore, Daimler has developed an app called 'Echo', that can be used by management and employees to give feedback based on specific categories (cf. Daimler AG 2018g). Daimler takes exceptional care that hierarchies or leadership roles do not influence user performance, as feedback can also be sent anonymously. As support and a practical tool for the implementation of the game changer 'Feedback Culture', the app supplies Daimler and its employees with direct, immediate, digital acknowledgement and evaluations. Feedback cannot only be sent, but actively demanded by team members.

Another focus is led through Leadership Development: leadership responsibilities and positions are regularly reviewed and processed to help cross-functional positioning. Furthermore, the international movement of team members is simplified (cf. Daimler AG 2017a). To set incentives towards the conversion of new leadership style and to enforce teamwork, leadership roles are temporarily bounded, and refunds are team-oriented. Daimler has also set up pilot programs to foster collective intelligence (cf. Daimler AG 2018e).

Daimler is aware of the fact that a new leadership culture takes time to evolve and requires a fundamental rethinking of employer and employee relations and tasks. This is where the concept of Mutual Responsibility comes into play. As we have seen, it helps to form a new idea of

leadership, of leading in a way that enables both the employer and the employee to give their best. By giving responsibility to employees, they can improve structures and their own work as they identify with their produced product. There are many concrete ways to promote employees to take more responsibility, as well as for managers to let go of some of their responsibility. In a podcast series by UCLA Anderson, leaders from some of the world's most important firms talked about their styles of leadership (cf. Feinberg 2011).

Eric Schmidt, Executive Chairman of Google, has some principles for how to best run a firm (cf. Schmidt 2016). He says the most important thing is to inspire people. This means not only to present properly functioning and interesting products, but especially to be interested in the firm's employees (cf. ibid.). To achieve this, Google implemented the "70/20/10 rule" (Battelle 2005): "The correct organization […] [is] 70 percent of your company working on normal, traditional things, 20 percent working on adjacent businesses and 10 percent working on other. Things which were very high risk, that might work out and might not" (Schmidt 2016). This does not mean that 10 percent of Google's employees can do whatever they want while 70 percent have a strict work plan, but that every employee can pursue new ideas, technologies and simply be creative. This rule is so important to Google that they employ people to enforce it (cf. Battelle 2005). This is where some of their most famous products, like Google Chrome and Google Maps, originated (cf. Schmidt 2016).

The 70/20/10 rule implements the concept of Mutual Responsibility in a perfect way, because employees entrust their firm to manage their time wisely, understanding the big picture and where their work is needed 70 percent of the time. For the other 30 percent of the time, trust is given back to the employees. They alone are responsible for the work they do, but the firm trusts them to employ their time in the best possible way: not to waste their time aimlessly, but to pursue creative, useful ideas that enhance the productivity of the firm in the long run.

Another basic strategy at Google is to empower leadership, especially the bottoms of leadership, who should be empowered by their management. As Schmidt puts it: "Let's face it: programmers want to program, they don't want to do their laundry. So, we make it easy for them to do both" (Schmidt 2008). This shows the confidence and trust Google puts in its employees, giving them the possibility and responsibility to try their own ideas and see how far they get (cf. Schmidt 2016). They push for new products and ideas every week, not by making plans their employees have to follow, but by forcing them to be creative themselves (cf. ibid.). At this point,

the differentiation is the vision of the product and the ability to implement this vision. An employee who is really invested into a certain product or idea can lead in this section, because they know the strategy. They see which parts are the most important, because they really understand the idea. To be a good leader, it is important to know where you are going (cf. Campion 2016).

Another important part of leading is making decisions. However, as Andy Campion, CFO of Nike says, this does not necessarily mean that leadership requires deciders (cf. ibid.). Leaders often have to find a balance between two conflicting goals, "trying to optimize against both [contradicting] objectives" (ibid.). Therefore, in the following we will look at Daimler's game-changer 'Decision Making', where a more organic and quicker way of deciding is implemented.

Decision Making

Daimler, a company with more than 280,000 employees, is currently shaped by a hermetically-structured hierarchy. Decisions must be passed on to higher levels in the hierarchy to be validated, even though they could easily be taken at low levels. This leads distorted presentation, a loss of information, and even bogs down related processes: decisions are delayed and complicated (cf. Weinzerl 2016).

Therefore, Daimler focuses on creating a new business culture which reduces decision processes. The overall goal is to set up a culture of trust. Approval processes will be limited to a maximum of two approval levels, with the goal of becoming faster and limiting bureaucracy (cf. author unknown 2016). Throughout this process, Daimler expects to be able to focus on important strategic decisions. Additionally, some areas and projects are supposed to function without a leadership hierarchy, ensuring even more flexibility and celerity in decision processes (cf. Daimler AG 2018e). The goal for 2020 is to have approximately 20 percent of the company working in agile structures (cf. Weinzerl 2016).

This measure is also implemented for awareness of new business models and markets changing rapidly, due to the fact that innovative ideas and answers to this transformation process can be found more easily through agile structures. The long-range vision of Daimler is to entirely abolish hierarchical structures (cf. Daimler AG 2018d).

Indeed, the implementation of a new leadership culture takes time to evolve and is mainly shaped by the mind-sets of employers and employees – something Daimler is aware of. This

development is accelerated by digitalised tools and digital collaboration possibilities. Daimler schedules standardised systems and creates platforms that enable a better connection and cross linkage within teams and global project groups. Positive effects, such as learning from colleagues and better and faster communication of ideas between different project groups, are seen as an answer to the digital practices that are developing around the world, and as valuable possibilities of digitalisation (cf. Weinzerl 2016).

Here, Mutual Responsibility provides a useful framework. The new responsibility gives employees the courage to introduce new ideas of how to change structures in a more efficient way, while eventuating a change in the employees themselves. The only way to educate them to think for themselves, thereby making them more efficient and enabling them to fully embrace their work, is teaching them how to take responsibility. Everybody knows that a game of basketball or soccer cannot be won with a single player, even if this player is the best in the world. To win a game or even a championship, a team is necessary. Of course, in this team everybody has their position, and in this position, they know best. German goalkeeper Manuel Neuer knows that he plays a defensive role in the game, and not that of an attacker. Even though a captain is necessary, all the members of a team form an organic and hierarchy-free whole.

In short, equality between employees is of great importance. People feel empowered when treated with respect, which often means that people are willing to accept other difficulties if they are treated fairly and can share the profits when the company does well (cf. Goodpaster and Matthews 1982: 187). For instance, Praemandatum, a German firm which deals with data security, is structured completely democratically, where employees decide with a vote who will take a leading position. Here, every member of the firm is paid the same amount (per hour), no matter which position they are in. How many hours an individual works is decided by them alone (cf. Praemandatum 2013). This obviously results in a lower salary for some team members. However, they are willing to accept this because they know they can influence the general direction of the firm, and count on its support should they ever be in a situation where they need it (cf. ibid.).

Nonetheless, joint decisions can only work if every member of the team has the same aim. Again, looking at sports, one of the most successful teams is the New Zealand's rugby team, the 'All Blacks', who win 84 percent of their games (cf. Tödtmann 2017). Why is this team so successful? It is made up of many deciders, working together. To remind themselves of their common goal, they have an impressive ritual: the traditional Maori 'Haka', which they dance

before every game (cf. ibid.). Fast decisions can only be made if they do not have to be debated through many hierarchies. This means that employees must also decide autonomously to do their jobs well (cf. ibid.).

6.2 Error Management Culture

The three-pointed silver star is the symbol of the Daimler Group. It is associated with reliability, elegance and quality (cf. author unknown, year unknown). As a global company, the Daimler Group distinguishes five fields of business activity: Mercedes-Benz Cars, Daimler Trucks, Mercedes-Benz Vans, Daimler Buses and Daimler Financial Services (cf. Daimler AG 2018a: 3). EvoBus GmbH is the biggest European subsidiary company of Daimler AG, part of the operation field Daimler Buses and the leading omnibus manufacturer worldwide (cf. EvoBus GmbH 2017). In order to keep this leading position, EvoBus strives for innovation, future-oriented enhancement and the further improvement of existing practices.

Daimler Buses differs from the other Daimler divisions in terms of the bus being a highly complex product, which involves a multitude of manual labour practices and a high scope of audits and follow-ups. On June 22nd 2017, the EvoBus Theme Day: Quality and Error Management Culture took place in Mannheim, Germany. Representatives of management, foremen and workers in bus production attended this theme day, which was split into talks and workshops. The foremen of the production departments of EvoBus initiated this event and within the cooperation between the Philosophy & Economics Programme of the University of Bayreuth and Daimler Buses, we were invited to join. The following information is based on this event. We will outline the reasons which triggered this theme day, as well as the problems that were mentioned (5.2.1). Furthermore, we will present the results of this day, embodied in guiding principles. Referring to our definition of Mutual Responsibility, we will point out that adequate error management is subject to it and enriches the results with our concept.

High Error Rate and Shortcomings

Dr. Marcus Nicolai, head of production at Daimler Buses, and Dr. Ronny Barthel, head of quality control at EvoBus in Mannheim, opened the theme day and addressed the circumstances leading to this event. It was stated that the foremen approached the management to organise this theme

day because they feel responsible for quality and for pointing out shortcomings, as well as for seeking solutions and improvement. The foremen noticed some current deficiencies within the bus production, namely that, on average, one single bus exhibits 120 errors. This high error rate implies that 30 hours are usually spent on auditing one bus, and an additional workload of 30 hours is needed to fix the errors.

One of the reasons for such a high number of errors occurs at the production stage of quality control is that defects are often noticed at an earlier stage, but then they are only reported to a higher instance or to the next production step. Instead of taking on the task of rectifying the deficiency when spotting it, the error is simply reported or looked over because it is not part of the current production step, and a final quality check will follow anyway. This behaviour partly originates in the lack of training, a lack of competence, and partly in the absence of motivation to act, because one does not feel responsible for it.

In both cases, the management and the foremen aim to eliminate obstacles to more efficient error management. This is because deficiencies cost additional time (on average, two and a half days). With this time in working hours, it also means supplementary costs for production, and in the worst case, could even lead to a loss of customers if the quality turns out to be unsatisfactory. To reduce the likelihood of this tripartite of costs to occur, a new error management culture (according to the idea "everyone does what they can – not just what they must to do" is to be implemented. The aim is not to sanction mistakes, but to sanction their concealment.

Before the guiding principles for this new error management culture were compiled, the attending foremen and workers collected the specific causes for the average of 120 errors per bus, as well as the current handling of mistakes in workshops. The lack of motivation to act when an error occurs was mentioned. These irregularities are not only affiliated with the personalities and the integrity of the individuals but linked to current circumstances in the working environment.

For example, it was pointed out that production steps are not linked and integrated in the best possible way, so that different levels of distress caused by the errors occur at different stages of production. Furthermore, the shift system leads to the fact that the causal agent usually is not called upon to fix their mistake, but it is to the next one who does so. This is also because the clocking rarely permits proper time to look for mistakes at other production steps, rather than a quality check at the end. Moreover, different reporting systems occur as obstacles for a proper flow of information. Another interesting aspect was mentioned, which is that errors also appear

due to habit because of overload through under-load – meaning that workers are so used to specific and routine tasks, and they become blind to other aspects that are not part of their clearly-defined assignment.

During a conversation with one of EvoBus's Q-Gatekeepers[32], it came up that the scope of work at the different steps of bus production used to be greater than it is now. The production cells where work was not separated by single production steps but clustered according to competences needed to fabricate set building components or even the final product – in this case the bus[33] – were replaced by a clocked and specialised division of labour, organised in group work. This led to more anonymity, and it became harder to find the person responsible for an error. Individual responsibility declined. Previous to this change, tools and machinery from other productions steps were available at the production cells. But now, due to limited working space and a more condensed field of operation, these tools are not at stations where they are not usually needed. Autonomous corrections by motivated and skilled workers at the single production steps are thus no longer possible.

A clocked and classified (and therefore more specialised) division of labour might be the answer to new technology and more complex electronic equipment, but it also curtails individual space and initiatives. While at the production cells one could see what everyone was working on, now the process has become more sterile – the joy of work has declined, and highly-motivated workers are trapped inside a rigid structure.

Guiding Principles and Application of Mutual Responsibility

At the end of this theme day, the guiding principles compiled for a new error management culture were presented. The aim was to reach a more solution-oriented handling of errors, where it is not the goal to find the responsible person of a specific error but to identify the circumstances that allowed the error to occur, and how to avoid it in the future:

- I know the quality criteria and I will obey them.
- I do not communicate errors anonymously.
- I treat errors objectively and in a solution-oriented way.

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32 Workers who inspect the buses and check for quality.

33 For more information on production cells, see: cf. Landau 2007.

- I am responsible for open interaction.
- I take care of the proper training of all my co-workers.
- My error focus is an essential part of my guideline communication.
- I take proactive action in sustainable error rectification.

The attendees agreed on widespread communication of this event's happenings and results, so that they can be spread on to other colleagues. After all, cultural change has to work as a whole, and must be carried out by everyone involved in and affected by it. An open atmosphere across hierarchical levels within the production and within EvoBus will be required for this new error management culture to develop. Either the current hierarchy structures can be entrusted with this task, or they should be reconsidered. Finally, efficiency only goes along with quality, and if the product changes, its challenges and organisational measures might have to be adapted.

With our concept of Mutual Responsibility, we aim to trigger the pending reconsideration of the employer-employee relationship, and with this the outstanding change of hierarchies and organisational structures for a sustainable work environment. When working at the production site of EvoBus, both parties – the management and workers or foremen – mutually agreed on working together in the process of creating safe and high-quality buses. Errors occurring in the production process incorporate impediments to reaching this goal in the most efficient way. Hence, it is upon both sides to take responsibility and action to eliminate these obstacles. At EvoBus, the foremen reached out to the management in pursuit of a theme day on error management, met backing and support, and in this way the first step towards a mutual error culture was taken.

The multitude and diversity of the possible causes for errors emphasises our point: that the employer-employee relation and the relations between employees are reciprocal. For the first kind of relationship, it is striking that workers are supposed to be motivated for their task, while it is in management's interest create a motivating and encouraging environment for its associates. In this way, they are able to live up to their potential. This is because EvoBus, as an organisation, is subject to the system of responsibility, thus having to coordinate potential, aspirations and the specific investments of its employees in the best possible way. For an employee to dwell on missing encouraging surroundings and to use it as an excuse for a lack of contribution, they are called upon to take initiative to point it out and to seek for help. This shows how Mutual Responsibility is reciprocal – not only is EvoBus responsible for its employees, but associates are

also responsible for the success of EvoBus – and develops its own dynamics.

At the EvoBus theme day, the associates pointed out that there is, in fact, room for improvement concerning the motivation to handle errors. However, simply noticing that motivation is missing and stating that all associates should embody it cannot bring this motivation about alone. Rather, employees should be seen as complete humans with complex needs and values. The shortcomings mentioned, such as work becoming less joyful due to the different and more specified organisation of tasks, seems to be a very tight clocking and a strict division of labour which obstructs work, other than what the production step is supposed to do, conflates with the values of Almquist et al. (cf. 2016: 51) such as integration, variety and fun/entertainment. Thus, blocking motivation is located at a higher value level and therefore set aside if other important values of lower levels are not met. EvoBus management should therefore consider whether they can meet these desires for a higher variety of tasks and greater freedom in the organisation of work stages in a clocked and precisely planned production process.

For employees, not just precisely following their instructions but also showing initiative and engagement means that they must be given the space to do so. The motivation to specifically invest beyond what is demanded is brought about by self-actualisation, thus depending on the autonomy of the employee to make certain decisions for themselves. It might be useful to see if the 70/20/10 strategy by Google could also implemented in some way to the production process at EvoBus. With this, workers could use some of their given time for the originally-assigned task, another portion could be used to fix errors or to contact someone who knows how to, and there would also be the possibility of working in other fields of interest connected to the main goal of constructing safe and high-quality buses.

For the second kind of relationship, it is important that individuals do not take advantage of the anonymity of the clocked and divided production process. If one becomes aware of an error, this should not be dismissed due to the fact that other production steps and a quality check will follow, and it would not be known at what point the error was spotted first. This is because the earlier a mistake is spotted, the sooner it can be fixed, and the more likely it is that the reasons for it are identified. With this, bus production becomes more efficient and by determining error causes properly, they can be overcome permanently. One could also support the causal agent by approaching them in a more direct way and as quickly as possible, raising awareness of the defect and helping them improve their skills and work.

It could also be the case that the person working at the quality check might somehow miss the error, because they did not receive the same training or pay attention to the same features as the first person. In this case, the mutual goal of creating a secure and high-quality bus would be failed by everyone involved in the process. Everyone must therefore act upon the responsibility to reach their mutual goal – a responsibility towards others and towards oneself. Furthermore, management comes back into play for providing an environment that enables the development of such reciprocal relations.

By the interrelations between employees and management, it can be concluded that Mutual Responsibility is reciprocal, develops its own dynamics, and is self-directed. If the management of EvoBus wants its associates to take on more initiative and responsibility, it must provide appropriate room to do so. As Kant remarked: in order to be responsible, one first of all has to be autonomous (cf. Kant 2016). Autonomy and scope for development are also the basis of a sustainable and future-oriented company. Business is changing and depends more and more on human capital. To foster innovation, this human capital needs to be empowered and work as a network. In this network, everybody depends on and empowers each other, as well as themselves – everyone has taken on the task of Mutual Responsibility.

7. Wrap-Up

In this article, we have examined the relationship between employer and employee, which led us to introduce a new concept of responsibility to be lived in companies. First, we worked out the old understanding of responsibility, a one-way concept with clear direction of operation. However, this concept cannot fit current challenges, as we showed in Chapter 2. Looking at classical Principal Agent Theory, we concluded that the employer-employee relation is too complex to be fully described through contracts, that there is always some amount of trust which plays a role in this relationship. This is where Mutual Responsibility becomes necessary: for the employer, it means not to hold every aspect of responsibility themselves, but also to give some tasks that require responsibility to employees, thereby giving them the possibility to act autonomously and to decide rationally. Mutual Responsibility is not only useful for the top-down implementation of responsibility, but for two people on the same level, or for an employee to realise that a task

exceeds their capabilities. Mutual Responsibility, and the relationships it involves, can be compared to a spider web: the more links it has, and the more often the thread is taken back and forth, the stronger it becomes.

After having established this new concept, we showed that it is superior to the old conception in at least three aspects: it leads to more motivation, because one is always responsible for the tasks one actually deals with, leading everybody to make decisions independently; it results in the higher quality of a product, as there is a relation between motivation and quality, leading to more attention towards the product; it is highly legitimated from a philosophical background, not only because it acknowledges every individual as an end in themselves, but also because it is built on an understanding of reciprocity.

Finally, we have shown how Daimler Buses can implement Mutual Responsibility into the existing structure of the firm. For instance, it fits perfectly with some of the game-changers that were introduced in the campaign of Leadership 2020. With this program, the Daimler Company tried to implement a new role of leadership. Mutual Responsibility can provide a good foundation to build the more specific game-changers upon. But also in another, more pragmatic field, the implementation of Mutual Responsibility was shown to be helpful: in error management, responsibilities can no longer be transferred to other instances, but the individuals take responsibility for their actions.

Karl, the after-sales man, forecast that a concept of Mutual Responsibility would motivate employees and awaken entrepreneurial thinking. Our dynamic and organic concept of responsibilities opens up doors that seemed sealed before. Through its adaptability and interactivity between agents that can be embodied in single persons, groups or whole organisations, Mutual Responsibility embodies the fitting reverse side to the coin that displays autonomy on top. Thus, Mutual Responsibility can be the tool for providing innovation and autonomy, leading to the bright future Daimler and Karl, the after-salesman, wanted.

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