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Research article

Traffic safety implementation at local level in line with 2030 Agenda for Sustainable Development: synergies, challenges and enablers

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Abstract: This study explores how traffic safety implementation at local level in line with the 2030 Agenda for Sustainable Development is characterised. By investigating interactions between traffic safety and other sustainability goals (synergies), as well as identifying contradictions between goals and conflicting interests (challenges), the study aims to pinpoint the main enablers for implementing traffic safety as part of sustainability. The emphasis lies on local authorities in Sweden representing a mature traffic safety context when viewed globally. To delve into this issue, interviews were conducted with 37 municipal employees from the city of Gothenburg, encompassing diverse roles that exemplify the significant influence Swedish local authorities wield in shaping traffic safety: as road manager and planner, in maintenance and construction phases, as employer and purchaser, and as influencer of behaviour. The study reveals several synergies between traffic safety and other sustainability goals, as well as contradictions between goals and conflicting interests posing challenges to traffic safety implementation. Main enablers for implementation of traffic safety as part of sustainability at the local level concern, for example, an integrated approach on strategic level where traffic safety could be handled as either a prerequisite (e.g. for active mobility) or a framework condition (e.g. for green cars). The necessity to bridge gaps between strategic and operational levels is also emphasised. Contradicting goals and interests are inevitable and must be managed. The study identifies the traffic strategy and strategic analyses, in the European context referred to as Sustainable Urban Mobility Planning, as a platform for traffic safety implementation as part of sustainability. Such platform highlights implementation areas in common for different target areas. The significance of integrating traffic safety in relevant activities and processes, alongside fostering horizontal collaborations across target areas, becomes apparent when striving to embed traffic safety in a wider sustainability context. While Swedish municipalities may not always recognize traffic safety as part of the sustainability agenda, existing platforms within municipalities serve as a foundation for adopting an integrated approach to traffic safety implementation. However, there is a need for a central coordinating function to ensure robust leadership in integrating traffic safety as a vital component of sustainability.

Keywords: goal integration, local authorities, policy implementation, Safe System Approach, sustainable development, traffic safety, Vision Zero

1 Introduction

The 2030 Agenda for Sustainable Development puts traffic safety as a necessary part of sustainable development. Specifically, traffic safety is addressed within Sustainable Development Goal 3 (SDG 3), Health, wherein SDG 3.6 aims to reduce the number of deaths and injuries from road traffic accidents. The Stockholm Declaration, arising from the UN Ministerial Conference on Road Safety 2020, underlines the importance of starting from the synergies that exist between traffic safety (SDG 3.6) and other SDGs. The importance of strong leadership for traffic safety by public and private actors is also emphasized. The UN General Assembly supports the Stockholm Declaration through Resolution 74/299. Sweden, as some other countries, have greatly reduced the number of deaths and seriously injured in road traffic. This decline has levelled of the last decade though, and an adaptation of traffic safety as part of sustainable development is to be considered a necessity to further advance traffic safety implementation.

In Sweden, *Vision Zero* serves as direction and approach for traffic safety implementation. The adoption of Vision Zero in 1997 shifted the focus from accidents as the main problem to collision violence and the tolerance of the human body as the real cause of deaths and serious injuries. A one-sided focus on the responsibility of the road user was broadened to emphasize the importance of how the system is designed and maintained and that the system designers have a responsibility for creating systems that are forgiving of human errors. Traffic safety implementation on basis of Vision Zero involves a *Safe System Approach* meaning that road users, vehicles and road infrastructure must interact in implementation (Belin et al., 2012; Kristianssen et al., 2018; ITF, 2022).

As direction and approach, Vision Zero and the Safe System Approach, is to be considered as accepted and to a large extent implemented in Sweden. At the national level, traffic safety implementation is carried out systematically in the direction of Vision Zero based on an established model for management by objectives with the Swedish Transport Administration as lead agency. An evaluation shows that the model for management by objectives has been successful in contributing to systematics, knowledge and consensus. However, it has not translated into concrete measures to a sufficient extent to effectively improve each of the performance indicators in the model (Wennberg et al., 2019). Among other things, it is concluded that regional and local initiatives and perspectives needs to be strengthened, as also stated by Thoresson (2018). Analyses of traffic safety trends in Sweden show that the number of fatalities and seriously injured in road traffic accidents has decreased over the years, especially concerning car drivers and passengers. However, major challenges remain regarding the large number of seriously injured cyclists and pedestrians, especially if pedestrian falls are included (STA, 2021).

Traffic safety implementation at the local level is crucial for achieving traffic safety targets in Sweden, particularly as municipalities wield significant control over traffic safety measures in urban areas and play a key role in enhancing the safety of cyclists and pedestrians. Municipalities have the possibilities to improve traffic safety in various roles: as *road managers and planners* through traffic and urban planning, as setter of requirements for *maintenance* of infrastructure and public spaces and for construction phases as well as setter of traffic safety requirements for own vehicles, travel and transport as *employer*, as *procurers* of transport and services affecting traffic safety and as *influencers* of behaviour of citizens and road users. These roles constitute municipalities' *sphere of influence* in terms of traffic safety. Understanding an organisation's sphere of influence in terms of traffic safety is the basis for a systematic work on traffic safety in line with ISO 39001 (Lie & Tingvall, 2022), as well as for reducing the *traffic safety footprint* as part of sustainability practices and reporting (FIA, 2023).

The framing of traffic safety implementation based on Vision Zero has been criticised for disregarding other sustainability goals and for not counteract the automobility norm in society, and to even support and strengthen this norm (van der Meulen, 2022). May et al. (2011) and May et al. (2008) are positive about the ethical approach to deaths and serious injuries in traffic that Vision Zero entails. However, they argue that traffic safety implementation is mainly devoted to *shallow change* entailing minor adjustments and improvements within the existing system, and are calling for a *deep change* involving a transformation of systems where the automobility norm is questioned and broken. They also argue that efforts in traffic safety fail to fully harness the potential for improving safety by

addressing not only the speed of motor vehicles but also considering traffic volumes. Furthermore, the focus of traffic safety implementation in Sweden is on objective and quantifiable traffic safety, and van der Meulen (2022) also calls for perceived traffic safety to be taken into account in order to support cycling. In contrast to these critical researchers, Whitelegg (2020) consider implementation of Vision Zero as a means for a paradigm shift towards more sustainable mobility and an increase in cycling, and thereby makes a distinction between the meaning of the policy itself and the operationalisation of the policy within a certain prevailing norm resulting in certain outcomes. In any case, these researchers advocate for the integration of traffic safety policy with a broader vision for sustainable transportation, encompassing concerns such as public health, climate, and social sustainability.

Relating traffic safety to other societal goals and challenges is what characterises the shift in the field of traffic safety prompted by the Stockholm Declaration and Resolution 74/299, and the expert recommendations that formed the basis for the Stockholm Declaration refer to a *sustainable development goal integration* (STA, 2019). In this way, benefits are taken from synergies that exist between traffic safety and other sustainability goals and sub-optimisation is avoided. However, how such integrated approach can be operationalised needs to be further explored. Guidance on operationalising of safe system approaches in practice, such as ITF (2022), refers to traffic safety being part the sustainable development goals, but with no guidance on how it actually affects traffic safety implementation.

The overall state of research suggests that there are more synergies than conflicts between traffic safety, environmental concerns, and health. However, several previous studies (Elvik et al., 2017; Svensson et al., 2014; Andersson & Vedung, 2007; Jönsson et al., 2017) has reported on contradictions between traffic safety and other interests hindering implementation of measures to improve traffic safety, despite the fact that traffic safety is generally valued highly. Thus, it is relevant to explore how synergies and contradictions between traffic safety and other sustainability goals are manifested and could be handled. Such analysis will be a valuable basis for formulation of systematic traffic safety implementation in line with the 2030 Agenda for Sustainable Development.

Although traffic safety is part of the sustainability agenda, Kristianssen (2022) concludes that most municipalities in Sweden do not see traffic safety as a sustainability issue. Only 23 percent of the municipalities in Kristianssen's study answered that traffic safety is part of the municipalities' work within the 2030 Agenda for Sustainable Development. Nevertheless, many of the municipalities in the study were requesting guidance on how the intentions on traffic safety as a part of sustainability should be put into practice.

The aim of the study presented in this paper is to examine the characteristics of systematic traffic safety efforts within local authorities that align with the 2030 Agenda for Sustainable Development. Additionally, the study seeks to explore how traffic safety implementation at the local level can be enhanced to leverage the synergies between traffic safety and other SDGs. By investigating positive interrelations between traffic safety and other sustainability goals (*synergies*), as well as identifying contradictions between goals and conflicting interests posing *challenges* to implementation, the study aims to pinpoint main *enablers* for implementing traffic safety at the local level in accordance with the 2030 Agenda for Sustainable Development.

The study centres on traffic safety implementation at the local level, encompassing all possibilities through which municipalities can influence traffic safety. It utilizes the City of Gothenburg in Sweden as a case study representing a mature traffic safety context in global comparison. The main challenge in such mature context is how to advance traffic safety implementation on basis of Vision Zero in relation to other sustainability goals. In all, the project contributes valuable insights into addressing complex societal challenges, with a particular emphasis on integrating traffic safety into sustainability efforts from a local perspective.

2 Method

2.1 Study design

The study is conducted as a case study in the City of Gothenburg, the second largest city in Sweden with 600 000 citizens. The City of Gothenburg is regarded as forerunner when it comes to traffic safety implementation. A systematic traffic safety implementation is carried out on basis on a traffic safety programme and annual follow-ups of the traffic safety

development. Gothenburg as a city is to be considered as rather vehicle-oriented with Volvo and other vehicle and technology developing companies based in the region. At the same time, the city has a well-developed public transport system consisting of tram and bus traffic. The city also prioritises investments in bicycle infrastructure and the promotion of active travel.

Within a selection of processes and activities in the city administration of Gothenburg, the existence of contradictions and synergies between traffic safety and other sustainability goals, and how contradictions are handled, have been explored by interviews with municipal employees. The exploration of synergies and contradictions covers the various possibilities to influence traffic safety that exist as a local authority: as road authority and planner, as setter of requirements for maintenance and construction phases, as employer and purchaser in procurement, and as influencer in relation to citizens.

The study focuses on three of the main processes of the city administration: the *city development process* (land-use and urban planning), the *investment process* (planning and construction of infrastructure) and one of the traffic department's processes concerning the *maintenance and improvement of the function of the city's transport infrastructure*. The processes mainly affect the traffic department and the planning department. Other municipalities in Sweden also have similar processes, although they may be organised and named in different ways. In addition, the study has also covered activities such as communication and behavioural influence, construction phases as well as the city's own and purchased vehicles, travel and transport.

The City of Gothenburg had recently undertaken a traffic safety audit providing a thorough analysis of governing documents, processes and activities, and actors within the city's traffic safety work. The audit report by Wennberg & Evanth (2020) served as basis for the study, not at least for the understanding of the organisational structure and management system of the city in order to design the study properly.

2.2 Interviews in the case study

Interviews were conducted with municipal employees involved in the processes and activities in focus of the study. The interviews were carried out from August 2021 to February 2022. A total of 37 municipal employees were interviewed, see overview in Figure 1. The inclusion of interviewees was done in consultation with the representatives in this study from the City of Gothenburg using the overview of relevant processes and activities as structure and guidance for inclusion.

The purpose of the interviews was to examine how traffic safety is perceived and managed within municipal processes and activities, and to identify contradictions and synergies between traffic safety and other sustainability goals and interests. The interviews also aimed to explore how conflicting goals or interests are managed in practice. The interviewer actively listened to the interviewees' perspectives on traffic safety and the knowledge and approach to the subject.

The interviews were based on a semi-structured interview guide with a number of pre-defined themes that were discussed together with the interviewee. A customized interview guide was created for each group of interviewees. All interview guides are structured by the following themes: (*1*) introduction, (*2*) the role and relevance of traffic safety in the context for the interview, (*3*) traffic safety as a sustainability issue with a focus on synergies and contradicting goals and interests, and (*4*) closure/summary. The questions were adapted for the current context.

The interviews were conducted as individual interviews and mainly via a digital meeting tool with the camera on. The interviews were recorded and transcribed and then analysed with qualitative content analysis. The findings from the interviews are presented in sections 3.1–3.3.

2.3 Workshops to validate findings and identify enablers

In addition to interviews with municipal employees, three workshops were organised in the case municipality in order to elaborate on the synergies, challenges and enablers for of traffic safety implementation in line with sustainable development. To validate the findings, workshops were also organised with other municipalities (two workshops) and with experts/researchers (one workshop). In total, there were six workshops organised. The results from the workshops have mainly contributed to the findings presented in section 3.4.

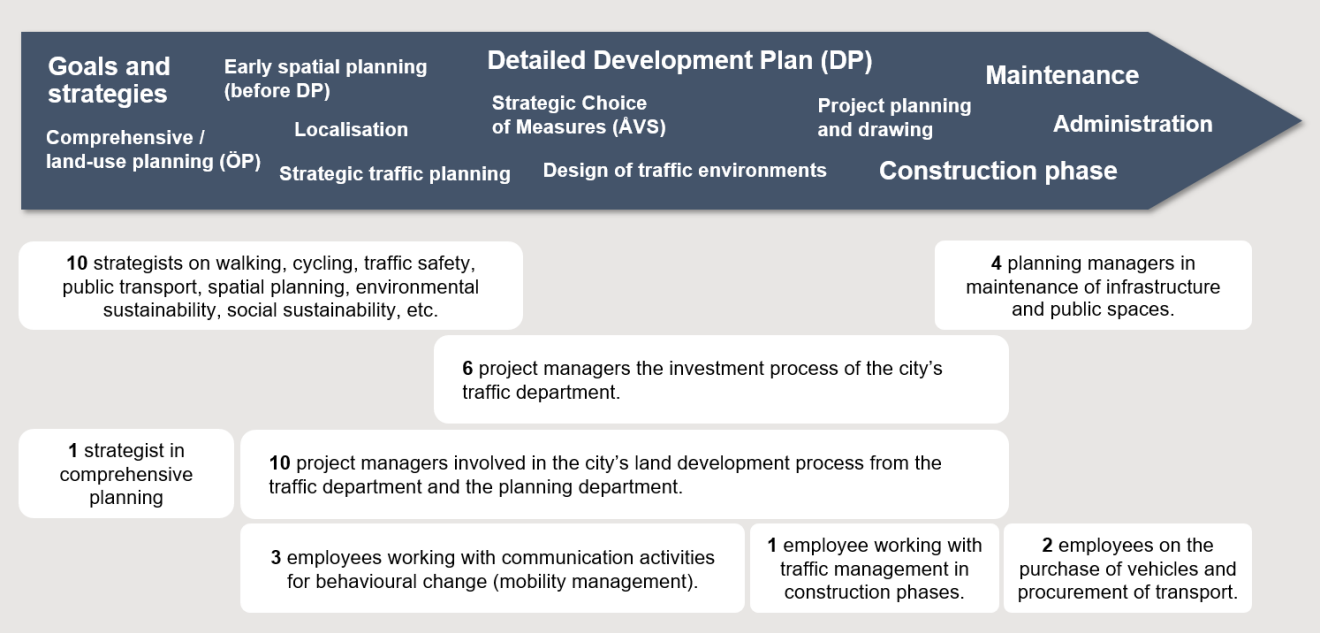

Figure 1 Overview the study of views of in total 37 municipal employees involved in different processes and activities in the city of Gothenburg

2.3.1 Workshops with municipal employees in City of Gothenburg

Workshops were conducted with municipal employees in the City of Gothenburg in order to further explore the characteristics of traffic safety implementation at the local level and to develop strategies for enhancing implementation to leverage the existing synergies between traffic safety and other sustainability goals. The workshops led to the identification of main enablers for implementing traffic safety at the local level in alignment with the sustainability agenda.

The following three workshops were organised together with the City of Gothenburg in which municipal employees participated:

- The *first workshop* was organised as part of the city's forum for the strategists at the traffic department on 29 April 2022. The workshop was conducted as a 'vernissage' where the participants discussed and further developed each of the contradicting goals or conflicting interests identified through the interviews and came up with ideas on enablers for traffic safety as part of sustainability. In addition to the project group, 9 strategists participated in the workshop representing 'strategists' in Figure 1.
- The *second workshop* was organised at the city's traffic safety network on 2 June 2022 and focused on two of the enablers: (*1*) strategic approach and management by objectives, and (*2*) bridging gaps between overarching strategies and design on concrete level. These enablers were discussed and further developed in smaller discussion groups. In addition to the project group, 11 persons from the traffic safety network participated in the workshop representing 'strategists' and 'project managers' in Figure 1.
- The *third workshop* aimed at identifying in which stages/contexts traffic safety is affected and in what way and was carried out 18 October 2022. The workshop also touched on which areas where the municipality is currently weak/strong in traffic safety consideration and how the municipality can be better at working for increased traffic safety in the weak parts. The workshop contributed with information on where and how traffic safety can be integrated in processes and activities in a local authority. In addition to the project group, eight persons from the traffic department and the planning department participated representing 'strategists' and 'project managers' in Figure 1.

2.3.2 External validation workshops

To validate the results obtained from mapping synergies and contradictions within the case municipality with other municipalities, a *validation workshop* was conducted on 18 March 2022. Eight

municipal employees from six Swedish municipalities participated (mainly 'traffic safety strategists' involved in a 'traffic safety network' organised by the Swedish Association of Local Authorities and Regions) as well as seven employees from the national traffic safety unit at the Swedish Transport Administration. Results from the interviews were presented with a focus on the contradictions and synergies between traffic safety and other goals or interests that were identified. The workshop was structured around two main discussion points: (*1*) whether the participants recognized the contradictions/synergies or if we had missed anything relevant, and (*2*) how the working methods in municipalities are affected by viewing traffic safety as part of sustainability.

Furthermore, a workshop was held with experts / researchers on 23 May 2022, where the participants discussed the identified enablers for traffic safety as part of sustainability. In total, 15 persons participated in the workshop of which eight were researchers, five were employees at the Swedish Transport Administration, and two were municipal employees from the City of Gothenburg.

The enablers were also discussed in a workshop with the *municipalities* who had previously participated in the initial validation workshop. This workshop was held on 9 November 2022. Prior to the workshop, participants were provided with a draft report for discussion during the meeting. Additionally, participants contributed examples from their municipalities, aiming to illustrate the practical implications of the identified enablers.

3 Results

The results from the interviews exploring traffic safety implementation in relation to other sustainability goals, using the City of Gothenburg in Sweden as a case, are presented below. Several *synergies* were identified among goals enabling that facilitate traffic safety implementation, as well as contradictions between goals and conflicting interests that present *challenges* to implementation. Furthermore, the section presents main *enablers* for the implementation of traffic safety on local levels in line with the 2030 Agenda for Sustainable Development.

3.1 Synergies—interactions between traffic safety and other aspects of sustainability

The fact that traffic safety is a sustainability issue by being part of the 2030 Agenda for Sustainable Development is relatively new and quite unknown to most interviewees in this study, except for the interviewees from the traffic department responsible for traffic safety implementation. While most interviewees may not be aware of traffic safety being considered a part of sustainability, traffic safety is generally perceived as integral to the city's objectives of fostering sustainability within both urban infrastructure and transportation systems. For example, traffic safety is included in the city's comprehensive (land-use) plan. Traffic safety is also integrated into the goals and strategic priorities outlined in the city's traffic strategy (an equivalent to the Sustainable Urban Mobility Plan) and in yearly follow-ups of the traffic strategy, as well as in governing documents pertaining to cycling, walking, and other implementation areas.

In general, the interviewees emphasise the positive synergies between traffic safety and other sustainability goals. Traffic safety implementation is seen to contribute to the achievement of goals in several other target areas, and vice versa. For example, most interviewees mention that *reducing car traffic speeds* enables progress towards various sustainability goals. Traffic safety measures aimed at reducing speeds also contribute to making driving less attractive:

'*If we will have dense cities and an increased urban life, then it is speed that is the overall solution. The speed is the enabler to create this.*' (project manager in the investment process).

The interviewees generally mention that road users also have to perceive traffic environments as safe in order to walk and cycle more. Traffic safety is widely considered as a *prerequisite for promoting active mobility* by the interviewed municipal employees:

'*Our desire to influence behaviour... one of the obstacles is perceived safety. Perceived safety and actual safety become a prerequisite for the behavioural change that we want to achieve.*' (employee in communication activities for behavioural change / mobility management)

'*If you want more people to walk and cycle, you have to feel safe. If letting my children out, I should not be afraid of they getting killed or injured.*' (project

manager in the land development process from the traffic department).

Increased walking and cycling are linked to a *living city* according to the interviewed municipal employees, which is also often discussed in relation to lower speeds of car traffic. A city that is safe for vulnerable road users is also considered as a more *inclusive city*, not least for children, older people and other groups that depend on walking and cycling for their mobility:

'*There are synergies with social perspectives. Improving traffic safety through more pedestrian-friendly pace and urban spaces enable a more inclusive city for both older people and children, but also from an accessibility perspective for people with functional limitations.* ' (strategist at the traffic department).

Furthermore, the city is setting traffic safety requirements when *purchasing vehicles* as well as on *employees' travel in the service* which also have positive environmental effects. For example, demands on driver support system for speed compliance contributes to lower fuel consumption and lower emissions of greenhouse gases. The environmental and traffic safety requirements on the municipality's vehicles contribute to safer and in other ways more sustainable vehicles on the roads:

'*Because we have such a large fleet of vehicles, we actually contribute to more environmental-friendly and safer vehicles on the second-hand market.*' (employee in purchase of vehicles).

Overall, the interviewees express the opinion that there are clear connections between traffic safety and all perspectives of sustainability: ecological, social, and economic sustainability. The following quotation from one of the interviewees constitutes a summary:

'*There is a connection to economic sustainability. There are large societal costs associated with people being injured and killed in traffic. Socially, traffic safety is linked to perceived safety. Objective and subjective traffic safety often go hand in hand, not always, but quite often. Ecologically, if you have a safe traffic environment, it will enable sustainable mobility.*' (project manager in the land development process from the traffic department).

3.2 Challenges—contradictions between goals and conflicting interests

In addition to clear synergies between traffic safety and other sustainability goals, the interviews also reveal contradictions between goals to some extent. Primarily, the ambition to *increase cycling*, as a public health goal, is perceived to conflict with traffic safety targets:

'*In the long term, accidents may level off or decrease. But initially you can say that if cycling increases, accidents will increase. But we also need this transition, so we have a better transport system that takes care of pedestrians and cyclists in a better way.*' (strategist at the traffic department).

Especially the intentions to increase *bicycle helmet use* recurs in the study as an issue where contradictions are experienced. Several interviewees believe that active encouragement of bicycle helmet use can be in conflict with the ambition to increase cycling as it sends signals that cycling is dangerous:

'*We have chosen not to actually talk about helmet use in connection with cycling because it can have a more deterrent effect in encouraging cycling.* [...] *If we say "we require you to wear a helmet" people will think "it is dangerous to cycle".*' (employee in communication activities for behavioural change / mobility management).

Even though contradictions between goals are reported, many interviewees at the same time emphasise that there are common interests between target areas to a large extent. For example, several of the performance indicators for the city's bicycle program and traffic safety program are actually shared, implying that it is the same type of measures that contributes to both increased and safer cycling. Bridging contradictions between target areas calls for a focus on the indicators that are common, which is expressed by two of the interviewees as follows:

'*It is about which indicators you have for traffic safety. We also have indicators to measure what we are doing to improve traffic safety* [performance indicators]. *Not only actual accidents.*' (strategist at the traffic department)

'*I believe in finding indicators that are in common* [for target areas]. *Such indicators will help us managing the city administration and to see whether we are heading in the right direction.*' (strategist at the traffic department).

Additionally, conflicting goals have also emerged regarding the transition to a *fossil-free vehicle fleet* within the municipality. While opting for smaller cars when procuring vehicles for the city's fleet is generally advantageous for environmental reasons, there is often a practical need to consider slightly larger vehicles (ones that also meet high safety standards) from a traffic safety standpoint. Consideration of both environmental and traffic safety requirements is handled as follows by the unit responsible for the city's vehicle fleet:

'*In order to meet traffic safety requirements, we have switched to a slightly larger car than before. So, the home care services drive bigger cars than they really need.*' (employee in purchase of vehicles).

Contradictions also arise in the requirements for *employees' travel in the service*. While the travel policy stipulates that traffic safety for such work-related travel is an occupational health issue, with the employer (the city of Gothenburg) responsible for ensuring employee safety, it primarily emphasizes modal choices based on environmental reasons. However, it remains unclear how modal choices should be approached from a traffic safety perspective. Regarding safety, the travel policy mandates compliance with the law when driving in the service and requires the use of a bicycle helmet when cycling, as well as studded tires on bicycles in winter conditions.

Overall, the interviews convey the perception that the synergies between traffic safety and other sustainability goals by far outweigh the contradictions. Traffic safety interacts well with other sustainability goals on an overall level. The true challenge lies in translating goals and strategic priorities into action. In the midst of stark trade-offs during concrete planning, design, and maintenance processes, where competing interests vie for attention, intentions may become obscured. This is where traffic safety risks being side-lined to accommodate other priorities.

Various conflicting interests in traffic and urban planning have been revealed throughout the study. Despite the fact that traffic safety is generally highly valued, conflicting interests inevitably arise that have to be dealt with in the daily work of municipal traffic and urban planning. The interviews with municipal employees identify four main categories of conflicting interests which are summarised below:

- **Spatial conflicts**—when there is not enough space to ensure traffic safety implementation for various reasons. For example, a great deal of space is still dedicated to car traffic despite societal ambitions to invest in walking, cycling and public transport, and space conflicts are therefore also largely a result of political priorities. Spaces during the construction phase are also limited, especially for pedestrians and cyclists. Intense developmental pressures within the city, coupled with ambitious targets for urban expansion, often result in the clearance of public land to facilitate economic viability in projects. In addition, narrow street sections may also be deliberately chosen as a response to the prevailing planning ideal in 'urban street design' (see also below).
- **Conflicts with views on 'urban street design' and aesthetics**—when there are barriers to traffic safety implementation due to traffic safety measures being in conflict with what is considered as 'good' urban street design in the planning community. According to the interviewees, different planning ideals can be expressed in terms of how a street section should be designed. For example, narrow street sections correspond to views on 'urbanity' in the planning community, while the traffic community tend to prefer wider streets section in order to give space for each one of the travel modes. Traffic islands and other traffic-related design elements as well as and roundabouts are also measures considered to be in conflict with preferences within 'urban street design' for causing 'wobbly street sections' (varying street width along a street).
- **Accessibility conflicts**—when there are conflicts between traffic safety and accessibility in terms of travel times and capacity. Implementation of physical traffic safety measures (for example speed bumps) may have negative influence on the accessibility of car traffic, public transport and emergency traffic. For an attractive public transport, it is important to maintain a high average speed to minimize travel times. Several interviewees also believe that roundabouts, that could be beneficial for traffic safety reasons, are not chosen because they are often less suitable for bus traffic.
- **Conflicts with perceived safety**—when traffic safety in objective terms is considered to be in conflict with how the safety situation is perceived by the road user. The interviewed municipal employees mean that objective and subjective safety can be both in conflict and in harmony. Pedestrian tunnels are questioned by several

interviewees for perceived safety reasons, while some emphasise that pedestrian tunnels are justified and desired by citizens for the same reasons, not least to ensure children's safe mobility. Furthermore, different views on separation versus integration of road user groups emerge in the interviews. For example, whether bike lanes placed in the street (and not separately) contributes to a safe situation for cyclists and pedestrians in both objective and subjective terms.

Conflicting interests are also interacting and reinforcing each other. For example, conflicts between pedestrians and cyclists can arise when vulnerable road users are not given enough space in the streets, which could be considered as a spatial conflict, as expressed below:

'*The width of pedestrian routes is often reduced in reality and pedestrians are squeezed together with cyclists. This is often perceived unsafe, even though we know that collision accidents between pedestrians and cyclists are rare.*' (strategist at the traffic department).

The interviewees also highlight how conflicting interests are handled in practice. The city has guidelines for planning, design and maintenance in the so-called technical handbook. However, it remains unclear how deviations from the guidelines are documented and addressed. Additionally, some interviewees report inconsistent considerations of traffic safety based on individual discretion, along with inadequate review procedures. Deviations are also attributed to a lack of understanding of traffic safety among municipal employees, as reported by some interviewees. They argue that a fundamental understanding of traffic safety is necessary to comprehend the rationale behind the guidelines and the implications of deviations.

Furthermore, several interviewees describe gaps between the overarching goals and strategic priorities in the governing documents and the actual planning, design and maintenance of traffic environments. In the interviews with strategists, there was discussion about the potential absence of 'intermediate steps' in terms of systematic planning at the network or area level. Two of the interviewees express this as follows:

'*I see that we have a gap between the strategic documents and a lack of a "middle level" that could help us and explain what we should do in different areas. I think we need to work on the interpretation of what strategic document means in reality*.' (strategist at the traffic department)

'*I do not think our technical handbook supports such things. We need to have a package of "these are solutions we want to see on this type of street" or "it is this priority that applies and it is designed in a certain way".*' (strategist at the traffic department).

3.3 Other views on traffic safety imposing challenges for implementation

Even though most interviewees are aware that the traffic safety targets mean reducing number of fatalities and seriously injured in road traffic, the interviews reveal different perspectives on traffic safety, both in narrower and wider sense. Some of these perspectives may impose challenges to traffic safety implementation.

The safety concerns of cyclists and pedestrians (in that order) are the primary focus of the interviews. However, the discussions predominantly centre around *collision accidents* involving motor vehicles, particularly among urban planners. Strategists at the traffic department and planning managers in maintenance also underscore the challenges associated with the high incidence of *single accidents* among cyclists and pedestrians. By overlooking single accidents, the interviewed municipal employees fail to obtain a comprehensive understanding of traffic safety.

The majority of interviewees emphasize the safety concerns regarding *children*, whereas only a few mentions *older people* or *people with disabilities*. Several interviewees assert that traffic safety is adequately addressed when considering the perspective of children or prioritizing travel modes such as public transport, cycling, and walking in traffic and urban planning. One of the interviewees express this as follows:

'*Pedestrians and cyclists are the highest priority in all our projects. Then we have public transport, business transport, and finally cars. We must ensure that pedestrians and cyclists are prioritized and can make their way safely, smoothly and quickly. With such prioritization, you get traffic safety for free.*' (project manager in the investment process).

It should be noted that such perceptions do not necessarily have to be completely true. Children have far more local everyday life compared to the adult population, and their mobility and safety concerns are at the local level. Some interviewees note that the focus of the city's traffic planning efforts has shifted over

the years—from local area initiatives to prioritizing commuter cycling routes.

A recurring theme in the interviews is the desire for a wider perspective on traffic safety which also involves *perceived safety*. The general belief among the interviewees is that a focus on ensuring that no one is killed or seriously injured in traffic is not enough; if traffic environments are not perceived as safe, no one want to use these environments. Not at least cyclists' perceptions of traffic safety are considered as important when encouraging increased cycling:

'*It is much safer to bicycle nowadays than 20–30 years ago. The experience though is that it is more dangerous.* [...] *It is something that we have to work on; it is an obstacle to get people on the bike if they are afraid that an accident will happen.*' (employee in communication activities for behavioural change / mobility management).

Furthermore, there is a prevailing belief among the interviewed municipal employees that traffic safety is a *fundamental requirement* always given due attention. This mindset could be interpreted as a risk of taking traffic safety for granted:

'*My reaction* [to the invite for the interview] *was that I have nothing to say about traffic safety. From my perspective, traffic safety is so self-evident that I do not think of it as a particular goal or area. It is something that has been around for so long. It is definitely a part of the overall picture; it is there in the background and is not pronounced.*' (strategist in comprehensive planning).

As a fundamental requirement, interviewees commonly assert that traffic safety is frequently invoked as a rationale for implementing measures. Additionally, traffic safety is often cited as a *means* to achieve other objectives, despite the fact that there are various approaches to achieving traffic safety. For instance, safety concerns are cited as reasons for installing fences and reducing pedestrian and cyclist crossings over tramway tracks and streets in the city, when the primary benefit lies in enhancing the capacity and accessibility of public transport.

Some interviewees raise criticism regarding the focus of traffic safety implementation aligning with the prevailing norm of automobility. For instance, the separation between road user groups has prioritized the speed of motorized traffic over traffic safety:

'*Vision Zero may have gotten a bit of a bad rap in the "planning community" based on the fact that it is about median barriers on roads. It is things that somehow all the time have made the car able to increase the speed, and it is also a contradiction to sustainable mobility. We have implemented Vision Zero in a way that meant more and more separation and that the car actually becomes more and more competitive.*' (strategist at the traffic department).

The interviews reveal different approaches to traffic safety implementation. On one hand, traffic safety is seen as a matter of orderliness with a focus on separating vulnerable road users from motorised traffic and teaching road users to obey rules. On the other hand, there is a focus on a living city with an including and forgiving traffic environment. This corresponds to the discussion above on conflicting interests due to different planning ideals:

'*Slow down then. After all, there are several ways to achieve Vision Zero. One is to drive 70 km/h right through and then have a fence around the route. The second is to reduce speeds to 40 or 30 km/h.*' (project manager in the land development process from the planning department).

3.4 Enablers for the implementation of traffic safety at local level in line with Agenda 2030 for Sustainable Development

Enablers for traffic safety implementation at the local level, in alignment with the 2030 Agenda for Sustainable Development, have been identified by the authors through the mapping of synergies and contradictions in municipal processes and activities. These enablers have subsequently been refined and elaborated upon in the workshops with municipal employees from the case municipality and also validated in the external validation workshops with other municipalities. The enablers concern the four main areas presented below.

3.4.1 Integrated approach on strategic level

Traffic safety implementation in line with the 2030 Agenda for Sustainable Development implies an integrated approach starting in the synergies with other sustainability goals. Interactions between target areas are facilitated by *recognising and visualising these synergies*, according to the interviewees and workshop participants. Synergies mentioned in the interviews

were elaborated by the authors into main categories of synergies, see Figure 2. This overview was considered as useful by the municipalities participating in the external validation workshops.

A starting point in the synergies means that traffic safety implementation at the local level involves a focus on improving traffic safety for *pedestrians and cyclists*. By focusing on pedestrians and cyclists, traffic safety is considered as a *prerequisite* for a modal shift where people walk and cycle more. The implementation also needs to be based on the whole picture of the injuries among pedestrians and cyclists. Thus, adaptation of strategies to prevent single accidents (including pedestrian falls) is highly relevant enhancing the importance of maintenance of traffic environments the year around. Furthermore, implementation needs to address collision accidents where *safe speeds* of motorised traffic are an important implementation area for traffic safety as well as being an enabler for several other sustainability goals. However, peoples' perceptions of traffic environments also depend on, for example, the amount and composition of traffic and the characteristics of the street space. Traffic safety implementation could therefore also be aimed at reducing *traffic volumes*, which also may contribute to increased traffic safety in both objective and subjective terms.

Nevertheless, contradicting goals are inevitable and must be managed. One relevant approach is therefore to focus on the *performance indicators* (implementation areas) shared among target areas. This was mentioned by the interviewees, and was also considered as highly relevant by the participants in the workshops. Performance indicators reflect the desired conditions for a target area, and are often overlapping for traffic safety implementation and the promotion of cycling at the local level. Speed compliance, safe crossings for pedestrians and cyclists, and quality of maintenance of walkways and cycle paths are examples of performance indicators relevant for both target areas.

Traffic safety implementation at the local level is carried out systematically towards traffic safety targets based on management by objectives with the municipality as lead agency. This is largely the case in the City of Gothenburg, which is in focus for this study, as well as in several other municipalities in Sweden. The traffic safety targets themselves are not altered by the fact that traffic safety is integrated into sustainability. However, follow-ups of traffic safety trends are to be analysed and interpreted in relation to the trend of other target areas.

An integrated approach is enabled by a *shared platform* for the strategic level of implementation. At the local level, such platforms are, for example, the traffic strategy in the municipality (an equivalent in Sweden to the Sustainable Urban Mobility Plan) which was considered as a relevant platform for each one of the participating municipalities in the workshops. Sustainability practice and reporting may also be a context in which traffic safety is a relevant part.

In addition to being considered as a *prerequisite*, traffic safety could in some respects also be regarded as a *framework condition* for other sustainability goals, for example, when establishing requirements for vehicles within the municipality as in the City of Gothenburg.

3.4.2 Integration of traffic safety in processes and activities

Traffic safety implementation is not an isolated activity, especially not when considering traffic safety as a part of sustainability. This insight derives from the interviews and workshops in the case municipality, and is also shared by the municipalities in the external validation workshops. Traffic safety has to be integrated in the relevant processes and activities of the organisation, in the municipality's working methods and routines, together with other sustainability issues. By integrating traffic safety into the regular management system and processes, interactions with other goals and interests are enabled.

The starting point for such integration is a municipality's possibilities to influence traffic safety, which may also be referred to as the municipality's *sphere of influence* in terms of traffic safety. The possibilities to influence traffic safety as presented in Figure 3 were discussed in the workshops. Initially, the role 'Road authority / Planner' was only written as 'Road authority', but were changed according to input from the workshop participants.

3.4.3 Bridging gaps between strategic and operational levels

As shown in the interview study, there is often a gap between goals or priorities in governing documents (strategic level) and the actual planning, design and maintenance of the city's traffic system and environments (operational level). Intermediate steps

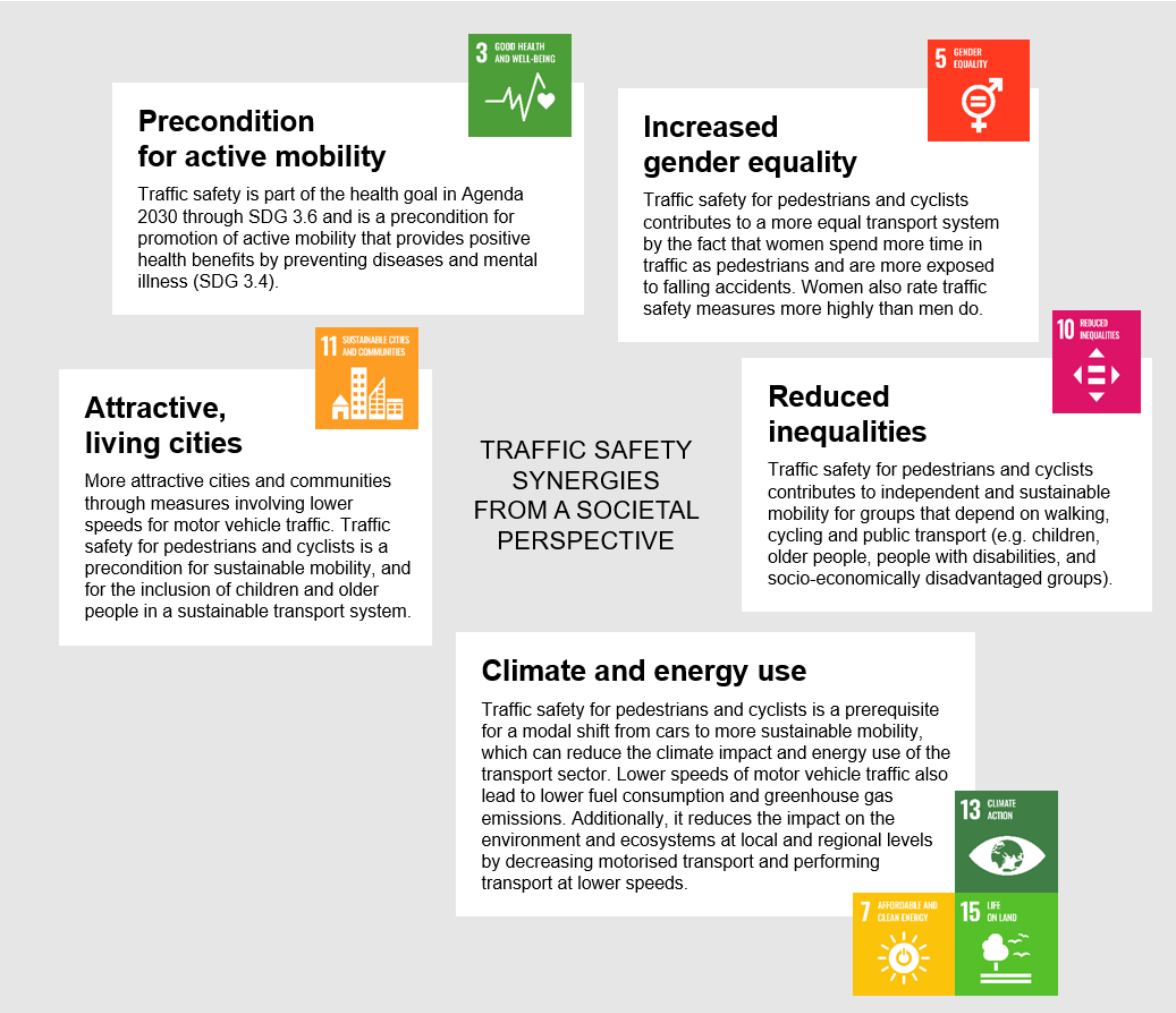

Figure 2 Overview of synergies between traffic safety and other sustainability goals (SDGs)

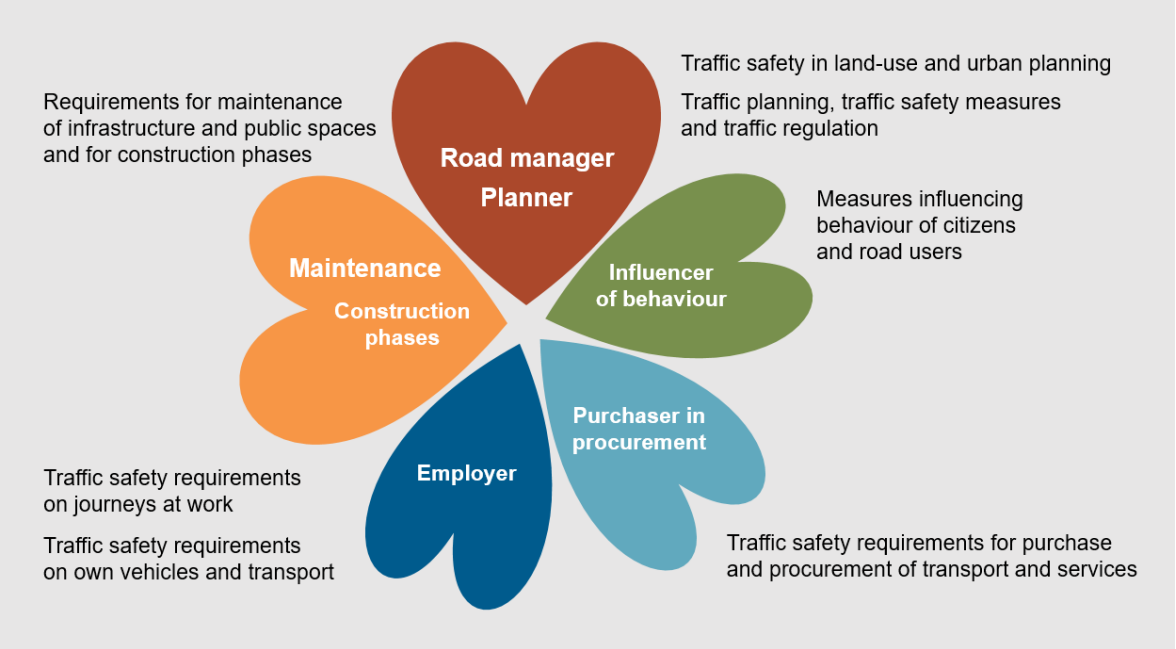

Figure 3 Overview of a Swedish municipality's possibilities to influence traffic safety (sphere of influence)

to support planning, design, and maintenance, such as systematic approaches at network or area level, are generally lacking. Such intermediated steps were discussed in the workshops as an enabler to handle and manage conflicting interests. For instance, conducting traffic network analyses for different road user groups can serve as a foundation for establishing such systematic approaches. These analyses inform priorities in traffic and urban planning, as well as guide maintenance efforts for the traffic environments. In other words, such analyses facilitate determining 'where to do what'.

3.4.4 Knowledge building and dialogue

The importance of knowledge building and dialogue for advancing traffic safety implementation is emphasised by several interviewees, an opinion shared by the workshop participants. Basic understanding of traffic safety among municipal employees and decision-makers is crucial for traffic safety implementation in general as well as in relation with other sustainability goals. Understanding the sphere of influence in terms of traffic safety is also a prerequisite for individual employees to seek knowledge, support and dialogue.

Furthermore, in order to be able to integrate traffic safety into relevant processes and activities in the municipality, cooperation is necessary with the departments or units concerned. The importance of establishing horizonal collaborations across targets areas (both internally and externally) is evident when traffic safety is to be integrated into a broader sustainability context.

4 Discussion

4.1 Exploring traffic safety implementation as part of sustainability at the local level

The trajectory of traffic safety in Sweden has seen notable improvements over the years, particularly in reducing the number of fatalities and serious injuries in road traffic. Nonetheless, significant challenges persist, particularly concerning the high number of seriously injured cyclists and pedestrians. Single accidents among cyclists and pedestrian falls constitute a substantial portion, accounting for 80%–90% of serious injuries, highlighting areas where targeted interventions are crucial. Municipalities' efforts to improve traffic safety at the local level are therefore crucial. The importance of strengthening *local and regional initiatives* and perspectives is also highlighted by Thoresson (2018) and Wennberg et al. (2019) as a critical factor for achieving goals for traffic safety in Sweden.

In Sweden, Vision Zero has served as a direction and approach for traffic safety implementation since 1997 and meant a shift in the view of responsibility for traffic safety. A one-sided focus on the responsibility of the road user was broadened to emphasise the importance of the responsibility of the system designers. Traffic safety implementation on basis of Vision Zero involves a Safe System Approach meaning that road users, vehicles and road infrastructure must interact in implementation. As direction and approach, Vision Zero and the Safe System Approach is to be considered as accepted and to a large extent implemented in Sweden. The next shift in traffic safety implementation is prompted by the Stockholm Declaration, arising from the UN Ministerial Conference on Road Safety 2020, and involves integration of traffic safety with other sustainability goals in the 2030 Agenda for Sustainable Development. However, how such *sustainable development goal integration approach* can be operationalised needs to be further explored, not at least for traffic safety implementation by municipalities at the local level.

The study presented in this paper explores how traffic safety implementation in line with the 2030 Agenda for Sustainable Development is characterised. The focus is on local authorities in Sweden representing a mature traffic safety context in global comparison. The main challenge in such mature context is how to advance traffic safety implementation on basis of Vision Zero in relation to other sustainability goals. The study encompasses the various roles that Swedish local authorities hold in influencing traffic safety: as road manager and planner, as setter of requirements for maintenance and construction phases, as employer and purchaser in procurement, and as influencer in relation to citizens. In other words, the focus of the study has been on the whole *sphere of influence* in terms of traffic safety at the local level. Municipalities wield their most significant influence on traffic safety through their role as road managers and planners. Consequently, this study places substantial emphasis on traffic and urban planning, along with the maintenance of traffic environments. While other roles are addressed, they are discussed more succinctly.

Interviews with in total 37 municipal employees at the city of Gothenburg were carried out in the study representing the various roles in traffic safety implementation at the local level. The interviews revealed several *synergies* between traffic safety and other sustainability goals, as well as contradictions between goals and conflicting interests that present *challenges* to traffic safety implementation. The main *enablers* for implementation of traffic safety on the local level in line with the 2030 Agenda for Sustainable Development were elaborated by the authors on basis of the interview study and workshops with municipal employees and experts in the field.

The results presented in this paper originate from one case municipality in Sweden. Through the external validation workshops, it was possible to also discuss and further elaborate the identified synergies, challenges and enables with six other Swedish municipalities as well as with several experts/researchers in the field. These municipalities largely confirmed what emerged through the interviews in the case municipality, indicating that the results presented in this paper are likely relevant for other Swedish municipalities as well. Municipalities in other countries may also make use of the results even though traffic safety implementation may be organised in different ways. At least in a European context, there are similarities when it comes to the roles of local authorities and cities in traffic safety implementation and the challenges and opportunities a sustainable development goal integration approach involves. The relevance for local authorities in other countries are to be further explored though.

4.2 Views on traffic safety as part of sustainability in Swedish municipalities

According to a prior study conducted by Kristianssen (2022), the majority of municipalities in Sweden do not perceive traffic safety as an integral component of sustainability efforts aligned with the 2030 Agenda for Sustainable Development. Additionally, the inclusion of traffic safety within the sustainability agenda was largely unknown to most municipal employees interviewed in the study discussed in this paper. Despite the lack of awareness of traffic safety being part of sustainability, traffic safety is nevertheless recognized as a fundamental part of the city's goals and strategies for establishing sustainable urban environments and transport system. In other words, traffic safety is to a large extent treated in relation to other sustainability issues in the case city, even though traffic safety may not be handled in the context of the 2030 Agenda for Sustainable Development. The latter is often managed in an environmental department in Swedish municipalities, and not in traffic and transport related contexts.

The interviewed municipal employees generally emphasise the positive synergies between traffic safety and other sustainability goals. The importance of safety (perceived and objective) to encourage walking and cycling is often mentioned, and traffic safety is seen as a *prerequisite for active mobility* and for a shift from motorised traffic to more sustainable modes of transport.

Traffic safety is inherently linked to social sustainability, as it intersects with gender equality and the reduction of inequalities. The interviews underscore the role of traffic safety in fostering *liveable and inclusive cities*, with a particular focus on vulnerable groups such as children, older people, and those reliant on walking or cycling for mobility. The importance to recognise preconditions and perceptions of children and older people is discussed, but at the same time traffic safety is rarely integrated in social impact analyses or similar. In all, these are synergies related to the municipality's role as *road manager and planner*.

Conversely, municipal employees also express scepticism about the feasibility of simultaneously promoting increased cycling while reducing the number of road traffic fatalities and injuries. Specifically, the topic of *bicycle helmets* sparked discussion, highlighting a prevailing belief that initiatives to encourage helmet use among cyclists could potentially hinder efforts to promote cycling by signalling that cycling is dangerous. Scepticism towards efforts for bicycle helmet use is also found in a previous study among Swedish municipalities and regions in which respondents argue that other issues are more important to improve safety of cyclists, not at least infrastructure and maintenance of the infrastructure (Wennberg et al., 2022). Such argumentations in relation to the bicycle helmet is also highlighted by Andersson & Vedung (2007), and mainly concern the role as *influencer* in relation to citizens.

The perceived contradiction between *increased cycling* and *safe cycling* is also focused in a recent analysis of traffic safety policy in Sweden, in

which van der Meulen (2022) emphasises that cycling is often portrayed as dangerous and that a focus on bicycle helmet use shifts the responsibility for road safety onto the cyclists themselves. However, it should be pointed out that Vision Zero entail a clear ambition to move from a one-sided focus on the responsibility of individual road users, to also focusing on the responsibility of system designers. For pedestrians and cyclists, the system designer's responsibility is even more important, as emphasised by one of the policy documents analysed by van der Meulen (STA, 2018). Traffic safety implementation on basis of Vision Zero could instead be seen as a facilitator of cycling, as argued by Whitelegg (2020), referring to Vision Zero as a means for a paradigm shift towards more sustainable mobility and an increase in cycling.

Contradicting goals have also emerged regarding the transition to a fossil-free vehicle fleet and in the context of employees' travel at service, i.e. in the municipality's role as setter of requirements as *employer* and *purchaser* in procurement. For instance, when procuring vehicles for the city's fleet, there is often a balance between environmental and traffic safety considerations. Typically, smaller cars offer environmental benefits, whereas slightly larger ones may provide greater safety. In response, the city treats traffic safety as a *framework condition*, ensuring that only 'green cars' meeting the city's safety standards are procured and utilized.

4.3 Challenges and enablers for traffic safety implementation at the local level

Whether goals are opposed to each other or not depend on how the goals are operationalised and handled in actual implementation. On an overall level, there is perceived to be an agreement between traffic safety and other sustainability goals, but depending on how the traffic safety goals are operationalised and managed in practice, the outcome can either be in harmony with or opposite to other goals. In other words, contradictions are in the solutions when traffic safety may encounter various conflicting interests. The study highlights several conflicting interests for traffic safety implementation such as *spatial conflicts* and *accessibility conflicts* with car traffic, public transport and emergency traffic, conflicts with *views on 'urban street design' and aesthetics*, and traffic safety being either in harmony or opposite to *perceived safety*. These conflicting interests are in line with previous studies (Elvik et al., 2017; Svensson et al., 2014; Andersson & Vedung, 2007; Jönsson et al., 2017) and mainly concern the municipality's role as *road manager and planner*.

The study highlights factors that facilitate the integration of traffic safety into local sustainability efforts. These include adopting an integrated strategic approach where traffic safety is regarded as either a *prerequisite* (e.g. for promoting active mobility) or a *framework condition* (e.g. for selecting green cars) in alignment with other objectives. The necessity to bridge gaps between strategic and operational levels is also emphasised. It is clear that contradicting goals and interests are inevitable and must be managed. The study identifies the municipal traffic strategy, in the European context referred to as *Sustainable Urban Mobility Planning* (*SUMP*), as key platform for traffic safety implementation as part of sustainability. Such platform highlights implementation areas (and thereby the related performance indicators) in common for different target areas. For example, speed compliance, safe crossings for pedestrians and cyclists, and quality of maintenance of walkways and cycle paths are relevant areas for both reducing deaths/injuries in road traffic and encouraging increased cycling. Traffic strategic analyses on net level are also a key to a systematic prioritisation on more detailed levels. Examples of such analyses are found in planning handbooks in Australia (Corben, 2020) and Sweden (STA, 2022).

The study emphasises the importance of integrating traffic safety in relevant activities and processes on basis of the roles (sphere of influence) municipalities hold in influencing traffic safety: as road manager and planner, as setter of requirements for maintenance and construction phases, as employers and purchaser in procurement, and as influencer in relation to citizens. Addressing complex societal challenges, particularly sustainable development, which encompasses traffic safety, significantly impacts management. Karlsson et al. (2019) argue that sustainability aspects need to be integrated into the internal management systems of both public and private organisations and for a shift towards horizontal management of *processes*. The importance of establishing *horizonal collaborations across targets* areas is evident when traffic safety is to be integrated into a broader sustainability context. Furthermore, basic understanding of traffic safety among municipal employees and decision makers is crucial for traffic safety implementation in general as well as part of

sustainability. The importance of roles, responsibilities and procedures for traffic safety in a municipality is also emphasised by Nævestad & Milch (2023).

The importance of strong leadership for traffic safety by public and private actors is emphasised by Stockholm Declaration and the UN Resolution 74/299. Generally, municipalities must prioritize traffic safety on their overall agenda. Implementation in relation to the 2030 Agenda for Sustainable Development is often handled by an environmental department or similar at the municipality. Traffic safety implementation, as well as implementation of other sustainability goals, affects many departments of a municipality, and a central coordinative function is crucial.

4.4 Traffic safety in a wider sustainability context towards an integrated approach

Previous research has criticised the framing of traffic safety implementation solely based on Vision Zero, advocating instead for the integration of traffic safety policy with a broader vision for sustainable transportation. This broader perspective encompasses concerns such as public health, climate, and social sustainability. While van der Meulen (2022) expresses a desire to widening traffic safety implementation in order to facilitate efforts to increase cycling, researches such as May et al. (2011) and May et al. (2008) argue that such widening is *necessary* in countries with low accident rates in order to handle remaining challenges with the large number of seriously injured cyclists and pedestrians as well as other complex challenges in society. Relating traffic safety to other societal goals and challenges is also what characterises the shift in traffic safety implementation prompted by the Stockholm Declaration and UN Resolution 74/299. The study presented in this paper explores how such *sustainable development goal integration* should be put into practice with a focus on the local level.

It can be debated whether it is traffic safety implementation itself that needs to be widened and transformed, or whether it is simply more a matter of coordination and collaboration between target areas. May et al. (2011) and May et al. (2008) argue that traffic safety implementation is mainly devoted to *shallow change* entailing minor adjustments and improvements within the existing system, and are calling for a *deep change* involving a transformation of systems where the automobility norm is questioned and broken. Shallow change may be fruitful by, for example, making use of the positive synergies between traffic safety and other sustainability goals, while deep change means that contradictions between goals and conflicting interests must be dealt with. They also argue that efforts in traffic safety fail to fully harness the potential for improving safety by addressing not only the *speed* of motor vehicles but also considering *traffic volumes*. The need for handling contradicting goals and conflicting interest is most evident in the municipality's role as *road manager and planner* and as *influencer* in relation to citizens.

The municipal employees in this study also highlighted the prevailing automobility norm in societal planning, noting that a significant portion of urban space is still allocated to motorized traffic. Also, accessibility of public transport is to be regarded as part of the planning norm in Swedish municipalities and may pose conflicts with accessibility and safety concerns of pedestrians and cyclists. Some interviewees believe that Vision Zero has historically been operationalised in favour of the prevailing automobility norm with a focus on separation between road user groups resulting in maintained or increased speeds of motorised traffic. Recurring in the interviews is the desire for *safe speeds* of motorised traffic, which is emphasised as an important implementation area for traffic safety as well as being an enabler for other sustainability goals. Positive synergies related to 30 km/h in cities are also highlighted by Yannis & Michelaraki (2024). It should also be pointed out that both the mentioned critical researchers and the interviewed municipal are mainly focussing on pedestrians and cyclists' interactions with motorised traffic (collision accidents) and tend to neglect the large number of single accidents among pedestrians and cyclists.

It is clear that the *context* of operationalisation of a policy is relevant. Implementation is carried out within a context in relation to prevailing norms where some issues and perspectives will dominate, while other will be less prioritised. Vision Zero as a policy involves an ethical approach putting collision violence and tolerance of the human body as starting point for the design of the transport system. The policy itself does not emphasise any particular prioritisation of transport modes or road user groups. Traffic safety implementation, however, involves prioritisation between efforts, and depending on which efforts are implemented, benefits and consequences accrue different transport modes and road user groups. Whether Vision Zero contributes to the automobility

norm, depends on the operationalisation of the policy in actual implementation. For example, Svensson et al. (2014) distinguish between the *dominant mobility perspective* in transport planning in Sweden, which prioritises higher speed limits with regard to travel times, commuting opportunities, regional development and growth, and the *traffic safety perspective*, which supports lower speed limits. When Vision Zero is applied within the mobility paradigm, measures responding with this paradigm will be more likely to be implemented. Whitelegg (2020) refers to Vision Zero as means for a paradigm shift towards more sustainable mobility and increase in cycling, and thereby makes a distinction between the meaning of the policy itself and the operationalisation of the policy within a certain prevailing norm.

Another concern for traffic safety implementation in Sweden is raised on its focus on objective and quantifiable traffic safety, and van der Meulen (2022) also calls for perceived traffic safety to be taken into account in order to support cycling. The study presented in this paper also highlights an aspiration for a broader perspective on traffic safety encompassing *perceived safety* as well. It is obvious that the municipal employees interviewed in the study, along with the mentioned researchers, draw a clear distinction between objective and subjective safety. However, studies indicate that elements in the traffic environment perceived as safe by pedestrians and cyclists are often the same factors that contribute to improved traffic safety objectively (Wennberg, 2011). It could be argued that such an agreement between objective and perceived safety implies that a wider perspective on traffic safety in this sense does not really change much in actual implementation.

Road traffic fatalities have decreased over the years in Sweden, and the number of fatalities is low in comparison with other countries as well as in relation with other threats and risks. A recent comprehensive study by Reitan (2023) on the implementation of Vision Zero in Sweden, raises the question on how Sweden can continue advancing traffic safety implementation when there is no longer the same 'sense of urgency' as before. Traffic safety is generally described as a prioritised issue in the case city presented in this paper, while at the same time there is a prevailing belief among the municipal employees that traffic safety is a *fundamental requirement* always given due attention. This mindset could be interpreted as a risk of taking traffic safety for granted. Reitan (2023) argues for a downplaying of the quantitative argumentation and instead focus on the contribution of traffic safety to other purposes. Similar to the critical research calling for a deep change in traffic safety implementation, Reitan also argues for the necessity to question the current situation where the transport system is dominated by motorised vehicles moving at high speed and causing other problems as well, such as physical inactivity, air pollution, and congestion.

The practical implications of such research findings concern prioritisations in traffic safety implementation, at any level (local, regional, national). In the context of the Stockholm Declaration and the UN Resolution 74/299, there are an argumentation with strong focus on the integration of traffic safety *into* the sustainability agenda. However, there appears to be a lack of corresponding reasoning regarding how it affects traffic safety being part of the sustainability agenda. In the systematics and prioritisations in traffic safety implementation, the synergies are the starting point and the potential conflicts are to be recognised and handled. In other words, the perspective on traffic safety as a component of sustainability should influence decisions about whom to collaborate with across different target areas.

5 Conclusions

This study explores how traffic safety implementation in line with the 2030 Agenda for Sustainable Development is characterised. The focus is on local authorities in Sweden representing a mature traffic safety context in global comparison. The main challenge in such mature context is how to advance traffic safety implementation on basis of Vision Zero in relation to other sustainability goals—in the Stockholm Declaration and the UN Resolution 74/299 referred to as a *sustainable development goal integration approach*.

The study reveals several synergies between traffic safety and other sustainability goals, as well as contradictions between goals and conflicting interests posing challenges to traffic safety implementation. In conclusion, there is high level of agreement between traffic safety and other sustainability goals on an overall level. However, depending on how the traffic safety goals are operationalised and managed in practice, the outcome can either be in harmony with or opposite to other goals, i.e. contradictions between goals or conflicting interests are in the solutions.

The study also points out main enablers for implementation of traffic safety as part of sustainability at the local level. These enablers concern, for example, an integrated approach on strategic level where traffic safety could be handled as either a prerequisite or a framework condition in relation to other goals. The necessity to bridge gaps between strategic and operational levels is also found highly relevant. It is clear that contradicting goals and interests are inevitable and must be managed. The study concludes that the municipal traffic strategy, in the European context referred to as Sustainable Urban Mobility Planning (SUMP), is a key platform for traffic safety implementation as part of sustainability. Such platform highlights implementation areas, and thereby the performance indicators, in common for different target areas. Traffic strategic analyses on net level are a key to a systematic prioritisation on more detailed levels.

Another conclusion concerns the importance of integrating traffic safety in relevant activities and processes on basis of the roles (sphere of influence) municipalities hold in influencing traffic safety: as road manager and planner, as setter of requirements for maintenance and construction phases, as employer and purchaser in procurement, and as influencer in relation to citizens. The importance of establishing horizontal collaborations across targets areas is evident when traffic safety is to be integrated into a broader sustainability context. Furthermore, it is concluded that basic understanding of traffic safety among municipal employees and decision makers is crucial for traffic safety implementation in general as well as part of sustainability.

While Swedish municipalities may not be fully aware of traffic safety's inclusion in the 2030 Agenda for Sustainable Development, there are existing local platforms and collaborations that serve as a foundation for integrating traffic safety initiatives. However, it is concluded that there is a pressing need for a central coordinating function to ensure robust leadership in integrating traffic safety as a vital component of sustainability. At all levels, there is a need for further elaborations on how being part of the sustainability agenda affects traffic safety implementation, not at least in terms of addressing the synergies and the contradicting goals and conflicting interests, as it affects the systematics and prioritisations in implementation.

CRediT contribution statement

Hanna Wennberg: Conceptualization, Funding acquisition, Investigation, Methodology, Writing—original draft, Writing—review & editing. **Olivia Dahlholm:** Investigation, Writing—original draft, Writing—review & editing.

Declaration of competing interests

At the moment of the manuscript submission Hanna Wennberg was affiliated as an external expert at the Department of Technology and Society, Faculty of Engineering, LTH, Lund University, which is the official publisher of the *Traffic Safety Research* journal. To ensure unbiased review process, the submission was handled by an editor not affiliated with Lund University, who also declares no other conflicts of interests with the authors.

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The research presented in this paper is also published in a report in Swedish in February 2023, see Wennberg & Dahlholm (2022a). Recommendations for Swedish municipalities are summarised in a 'popular version' of the report with guidance on the enablers for the implementation of traffic safety on local levels in line with the 2030 Agenda for Sustainable Development, see Wennberg & Dahlholm (2022b). The results have also been used to develop a traffic safety audit scheme for local authorities in Sweden, Trafiksäkerhetslyftet (SKR, 2023).

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