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Current social impact assessment practices for transport projects and plans in Chinese cities

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ABSTRACT

The importance of sustainable transport development is being increasingly realised in China. However, the understanding of social sustainability in the transport sector remains inadequate. Transport social impact assessment (SIA) at the local level, especially for small- to medium-sized cities, lacks systematic guidance. As a starting point for improving social sustainability in the transport sector, this research explores transport SIA practices in different-sized Chinese cities. Following a critical review of transport planning and appraisal documents collected from 83 sample cities in mainland China, 5 categories were identified based on the characteristics of their transport SIA practices. It was found that except for a few megacities, transport SIA in Chinese cities is generally weak, compared to developed countries. SIA has received little attention and had limited influence on decision-making in transport planning in China. Current guidance on transport SIA in China is relatively general and ambiguous compared to many developed countries, an established transport SIA framework and indicator set for local governments to refer to are lacking. The disparities in transport SIA among different-sized Chinese cities and different project types are significant. Interviews with Chinese transport practitioners were conducted to further explore the gaps in transport SIA practices and the potential for improvement. Based on the interview analysis, key aspects for improving transport SIA practices in China have been provided.

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Social sustainability; transport appraisal; social impact assessment; mobility; China

1. Introduction

As an important dimension of sustainability, social impacts have received growing attention in recent research. Social sustainability of transport can be understood as the ability of transport systems to support the quality of life of present generations without compromising the mobility needs of future generations (Stefaniec et al. 2021). Many scholars aimed to define social impacts and to identify the connections between transport/mobility and social benefits and burdens, such as social exclusion and wellbeing (Chamseddine and Ait Boubkr 2020). Social impacts in transport studies refer to changes in the transport sector that positively or negatively influence the preferences, wellbeing, behaviour or perception of individuals, groups, social categories and the whole society (Geurs et al. 2009). As an important tool to measure social sustainability, Social Impact Assessment (SIA) refers to the processes of managing social issues related to planned interventions (Vanclay 2003, 2006). Practitioners and researchers have established a set of professional values and understandings of SIA that have been codified in the 'International principles for social impact assessment' (Vanclay 2003) and in a series of core literature (IAIA 2009). SIA as a standalone process helps to make the consideration of social issues in transport infrastructure planning sustainable and equitable (Mottee, 2021). Therefore, it is important to include social impacts in transport sustainability impact assessments (Geurs and van Wee 2004). Transport SIA is the set of procedures through which social impacts are handled in the transport planning and project appraisal process. The discussion on transport social impacts in this research is based on a broad summary of major social themes addressed in the existing transport literature, as listed in Appendix 1, Table A1. This table should not be treated as a checklist of social impacts as the important themes need to be locally defined, and there may be local considerations that a generic listing does not adequately represent (Vanclay 2002). It is important to note that there is often no clear distinction that can be made between social, environmental and economic impacts (Geurs et al., ibid.). For example, air and noise pollution can have both environmental and social impacts; employment can have not only economic impacts as the main source of personal income and social security payments, but also social impacts as a key approach for individuals to improve their quality of life and achieve self-realisation. Moreover, as social themes often intertwine with each other, it is worth noting that the listed themes

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may overlap in concepts. Therefore, Appendix I lists the key subjects which are widely discussed in social sustainability studies, rather than providing a classification of subjects related to social sustainability.

Transport SIA research in developed countries has grown relatively earlier and faster than elsewhere. Thus, plenty of studies can be referred to when launching a new transport project in these countries. For instance, Geurs et al. (2009) reviewed social sustainability within the practice of national transport project appraisal in the Netherlands and the UK, and Mottee (2022) explored the constraints on transport SIA practices through interviews with experts from Sydney (Australia) and Amsterdam (the Netherlands). The limited research on transport SIA in developing countries tends to learn from Western research through reference to their theoretical frameworks and tools (e.g. indicator sets), such as in Chamseddine and Ait Boubkr's (2020) research on social impacts in urban transport planning in Casablanca, Morocco.

Concepts and terms used in the developed country, however, cannot automatically be transferred for use in survey work in a developing country (Becker 2001). Whilst developing countries may experience similar problems to those faced in the developing countries over the last few decades, and solutions for these problems may have already been established in developed countries, considerable adaptation is invariably needed to tailor these solutions to the particular needs and conditions of each developing country to make them transferable (Jacobs and Greaves 2003).

Implementation of SIA in China, as a large developing country, should not ignore the complexity of its social problems, as well as the unique historical, structural, cultural and practical backgrounds in its planning system (Tang et al. 2008). For example, the USA and other developed countries tend to experience high levels of social segregation because of car-dominated, dispersed urban patterns (Power 2012). However, Chinese cities present different land use types compared to those of the industrialised countries as, under China's pre-reform regime, society was divided into work units with land allocated not only for business uses, but also for housing and social services for its employees. This resulted in an urban form composed of multifunctional work-unit complexes (Campanella 2008). Although the reform has been changing this urban structure, the mixed-use pattern in Chinese cities is likely to remain predominant due to '*the durability of structures and the gradual nature of transitioning land use institutions*' (Wang 2010, p. 148). Zhang et al. (2019) research on different types of housing in Beijing revealed that segregation level is closely related to housing types and activity spaces. Therefore, Chinese cities experience different levels and types of segregation compared to Western cities, which may result in a different understanding of fair distribution of transport resources (see for example, Li and Liu 2016). Another example relates to how accessibility is understood and measured. While many studies have focused on accessibility to jobs and key urban services, Wang and Zhou (2017) argued that the influence of Chinese culture on access to basic needs should be considered, such as the strong family relationships and the obsession with food freshness. For example, Wang and Lin (2014) argued Chinese obsession with food freshness leads to an emphasis on accessibility to food markets or shops for daily goods.

SIA remains a rather new planning tool for Chinese local authorities (Tang et al. 2008). Zhu and Ru (2008) criticised development plans in China for not including social impacts in their strategic environmental assessment (SEA), and for not referring to any of the methodologies used for SIA. This may relate to the fact that most SEAs were performed by professionals with engineering and science backgrounds, without involving any social scientists (Gao 2004).

Though Chinese scholars are placing increasing emphasis on social impacts in the transport sector, studies of socially sustainable infrastructure projects remain lacking in the Chinese context (Li et al. 2018). According to Zeng et al. (2015), although social issues of specific infrastructure projects (e.g. the Qinghai-Tibet Railway) have been proposed, their generality is questionable. Many researchers have focused on specific social aspects of transport planning in China, for instance, Zhang and Zhao (2021) contributed to understanding the overall picture of urban transport equity, Deng et al. (2016) study emphasised the social inclusion of disadvantaged groups through public transport, and Shen et al. (2016) studied urban rail transit passenger satisfaction. Most of the research focuses on specific cities (see, for example, Lin et al. 2017; Ye 2017; Cao and Hickman 2020) or discusses rural and urban variations considering different socioeconomic conditions (Li et al. 2018; Zhao and Yu 2020).

At the regional level, the number of studies measuring social sustainability in the transport sector in different tiers of cities within a large and complex country is far from adequate (Pojani and Stead 2015). Research in China tends to focus on specific types of transport projects in the most developed areas (such as the capital or economic centre) (Tian et al. 2014), without giving general consideration to the situation in less developed cities. The issue that transport projects are rarely assessed comprehensively for social sustainability is even more severe in smaller cities in developing areas. The local economy in many smaller cities is booming, but social development often lags behind; in some cases economic growth is at the expense of social development (see for example, Bai et al. 2014). The conceptualisation of social sustainability applicable to these cities may be affected by their socioeconomic characteristics, transport systems, built

environment, and other factors. For instance, Martens et al. (2019) suggested that the distribution of opportunities among different social groups depends heavily on the local context. The capacity and capability of different-sized cities in China varies not only by population size, but also economic development level, political ranking, governmental power and innovation ability, etc. Large cities tend to have abundant resources and information, strong innovation capabilities and considerable market size while smaller- cities do not (Yuan et al. 2019). Therefore, a greater understanding of how transport SIA practices and requirements vary between cities of different sizes, with different local priorities and specific social issues is needed.

Most current studies on social impact focus on Chinese megalopolises, second-tier cities have been largely overlooked (Wang et al. 2022), smaller cities even more so. Large developing countries such as China can have considerable imbalances between the economic and social development levels of different places within the country (Shen et al. 2018). Given these imbalances, a one-size-fits-all SIA framework for cities may not be appropriate. While transport problems such as air pollution, noise, injuries and fatalities, congestion, parking shortages, and low mobility for disadvantaged groups are particularly prominent in large Chinese cities (Pucher et al. 2007), they also exist in small and medium-sized Chinese cities (Wan et al. 2013). In China, small- to medium-sized cities account for 75.2% of the country's total population and 56.8% of the Gross domestic product (GDP); these cities are vital in national development. Therefore, it is important to give more focus to small- to medium-sized cities with respect to improving transport SIA.

This paper aims to understand how social impacts are addressed in the practices of transport planning and project appraisal at the city level in China, and to analyse the drivers and limitations of existing transportation appraisal systems in different-sized cities. The rest of this paper is laid out as follows: Section 2 briefly introduces the research background. Section 3 outlines the methodologies used. Sections 4-5 present our main findings. Section 6 discusses the results and proposes suggestions for improving transport SIA in Chinese cities of different sizes. Section 7 presents our key conclusions.

2. Research background

Transport planning and appraisal in China is the responsibility of many different departments, at both the local and national levels. According to Pan (2012), at the national level, the administration function for urban public transport belongs to the Ministry of Transport, and the National Development and Reform Commission takes charge of the planning of intercity railway and metro lines, while the Ministry of Railway is responsible for construction and management of intercity rail, all agencies work closely with the Ministry of Housing and Urban-Rural Construction.

At the local level, the division of responsibility is more complicated and varies between cities. For most cities, the Development and Reform Commission is in charge of compiling feasibility study reports and social stability risk assessment (SSRA[1]) reports; the Transportation Bureau or Municipal Transportation Commission is responsible for compiling social impact assessment reports; the Ecology and Environmental Bureau is in charge of producing environmental impact assessment reports; and the Natural Resources and Planning Bureau takes charge of other relevant technical reports of transport projects (Dimitriou and Gakenheimer 2011). Local government departments conduct transport impact assessment according to instructions provided by the Ministry of Transport of the People's Republic of China (MOT).

SIA is mainly subsumed under environmental impact assessment (EIA). Some other transport appraisal processes, such as feasibility studies and SSRA, also involve analysis of social issues. However, the Law of P. R. China on Environmental Impact Appraisal (Ministry of Ecology and Environment 2003) and other laws have not clearly stated how social impacts are to be formally and separately addressed in an EIA; at the local level, there is also a lack of a statutory framework and administrative procedures to fully integrate EIA with national environmental protection policies and environmental management laws (Tang et al. 2008).

The impact assessment requirements for transport projects are integrated into the pre-existing land development management process, which is characterised as '*one proposal and two permits*' (Lin and Yang 2019, p. 69). The 'one proposal' refers to the proposal of the potential project location, and the 'two permits' represent the land development permit (allows the land to be used for the proposed purpose) and the planning permit (approves the detailed project design) (State Council 2007). After receiving the land development permit from the government, the developer commissions a qualified planning consultant to compile the required impact assessment reports. The developer can only continue to apply for the planning permit and start the construction work if the EIA and feasibility study reports pass review. Usually, the relevant local governmental departments, the planning/traffic consultant, the land developer, and scholars jointly form a review committee to evaluate the impact assessment report. Either the local Natural Resources and Planning Bureaus or the Transport Department (determined by the municipal government) is

responsible for managing the transport impact assessment process.

The 'Technical Standards of Traffic Impact Analysis of Construction Projects' (Ministry of Housing and Urban-Rural Development 2010) sets out the requirements for when an impact assessment is needed. These include high traffic volume construction projects and large complex multi-modal schemes such as highway-railway passenger and freight terminals, public transport hubs, and large social parking lots.

Transport EIA is generally divided into three stages, including an investigation and work programme formulation phase, an analysis and predictive evaluation phase, and an EIA report preparation phase (Ministry of Environmental Protection 2016). The 'Technical Guideline for Environmental Impact Assessment of Construction Project' (ibid) stipulates the required contents of the EIA report, and requires the adoption of public opinions to be summarised in the EIA conclusion.

3. Methodology

This paper combines two approaches to assess current transport SIA practices in Chinese cities: a document analysis of transport planning and appraisal reports from a selection of Chinese cities, and a series of semi-structured interviews with transport professionals working in China.

3.1 Document analysis

The analysis included online information collected from sample cities selected from all 21 provinces, 5 autonomous regions, and 4 direct-controlled municipalities in mainland China, as well as national guidance from the departments involved in the transport planning process. The sample cities are listed in Appendix 2, Table A2. According to the State Council (2014), cities with a resident population of below 50,000 are classified as small-sized cities while cities with a resident population of between 50,000 and 100,000 are classified as medium-sized cities. In order to better understand transport SIA practices in cities of different sizes, this research selects one large city, one medium-sized city and one small-sized city from each province/autonomous region. Priorities are given to capital cities when selecting sample large-sized cities. These cities are the political centre and often the economic centre of each province, thus transport planning in capital cities tends to better reflect provincial laws and regulations. The official websites of capital cities generally include clearer and more complete instructions and documentation than lower-level cities. As there is no large-sized city in Xizang, and no medium-sized city in Qinghai, corresponding types of sample city was not selected from these two provinces.

The selection of transport projects takes both document availability and manageability into consideration. Documents from at least one local transport plan, public transport project, and road construction project were selected from each sample city for inclusion in the analysis. Additional project types, such as pedestrian and cycling projects, were included where available. Reviewed documents were published within the time frame from August 2017 to August 2023. For each city, the latest project for each project type was selected, and priority was given to projects with more relevant documents available or specific document types (i.e. EIA and social stability risk assessment) included.

Given the different divisions of work in practices in different cities, all the departments mentioned in the previous section as being involved in the transport planning process were searched to prevent any possible omission. Where limited documentation was available from a city government's website, as was the case for some sample cities, the relevant departments were contacted for information. We also contacted a range of other stakeholders and agencies to collect additional documents, including the Urban Planning and Design Institute and the Municipal Engineering Design and Research Institute. Data on socio-economic characteristics of the cities from the 2017–2021 China City Statistical Yearbook and China Transportation Statistical Yearbook was used to identify potential explanatory factors for differences in transport SIA practices.

The documents reviewed included transport plans and project appraisals, official guidelines, project publicity and news, and personal communications with public servants. A discourse approach was applied to the selected documents using discursive coding to extract contents (including indicators, introductory text, narrative descriptions, etc.) relevant to social and distributive impacts (see Appendix 1, Table A1) in transport planning and appraisal. We paid attention to the primacy and emphasis within the documents to identify important aspects of transport SIA in China.

The analysis of the documents starts from an inductive approach which summarised the types of transport SIA characteristics from the first-round review of documents collected from capital cities. A deductive coding is then used for analysing the documents collected from small- to medium-sized cities based on the categorisation drawn from the inductive analysis. An additional inductive-deductive iteration of all documents was conducted to establish the final categorisation and to avoid possible omissions. The categorisation ended when each group showed significant similarities in two or more criteria. The categorisation starts from SIA-relevant content available via online official channels (i.e. documents and information published by the local governments). Cities with

limited available transport SIA documents are classified as Type I. The next step classified cities with no clearly established SIA processes or regulations, who merely provide a general discussion on social conditions and potential social benefits, as Type II. For the remaining cities, we then assessed what types of transport projects include SIA. Cities with a narrow range of project types that include SIA are grouped as Type III. Typically for Type III cities systematic SIA were only found for rail transit network projects, road construction projects, and large-scale public transport projects. Cities where transport SIA was included in a wide range of transport projects including smaller-scale interventions, such as cycling, taxi, and car-hailing projects, are further divided based on the types of social impacts covered in transport documents. Cities with transport SIA that involve only social impacts that are listed in the national guidance and are related to local development (e.g. accessibility, migration and displacement, cultural and historical impacts) are classified as Type IV, while transport SIA in Type V cities covers the widest range of social impacts, some of which are rarely mentioned in other types of cities, such as equity and social inclusion. Figure 1 charts the logic flow used to categorise the sample cities.

3.2 Interviews with transport professionals

To further explore transport SIA practices in small- to medium-sized cities with limited published SIA documents, interviews with Chinese transport practitioners, including national and local public servants, transport consultants, and scholars with knowledge and experience relevant to transport social impact assessment (SIA) were conducted. The research has been granted ethical approval by University College London. Nineteen transport practitioners from 13 different cities in China were interviewed (see Appendix 3, Table A3). By the 19th interview no new information was emerging; it was considered that saturation had been reached. All the interviews were conducted between July 2021 and July 2022.

Participants were identified using their job synopsis published online, or through referral from their colleagues, and were then recruited via email or other contact details provided by their referee. The participants were interviewed as part of a larger project on transport SIA. These interviews were conducted either in-person or through video calls via Microsoft Teams, and each interview lasted 30 to 60 minutes. For the public servants, the questions revolved around (1) how the current SIA process works and divisions of duty; (2) the insufficiencies in local SIA practice; and (3) the relationships and gaps between the SIA practice of the national government and that of local governments, as well as between cities of different sizes. For the consultants, questions focused on the limitations and difficulties they face when conducting transport SIA. The scholars were asked about the gaps between SIA theory and practice, and the role of academic research in improving current SIA practice. Interviews were recorded, and later transcribed and analysed in Mandarin by Author 1. The coding of these interviews was checked by Author 3.

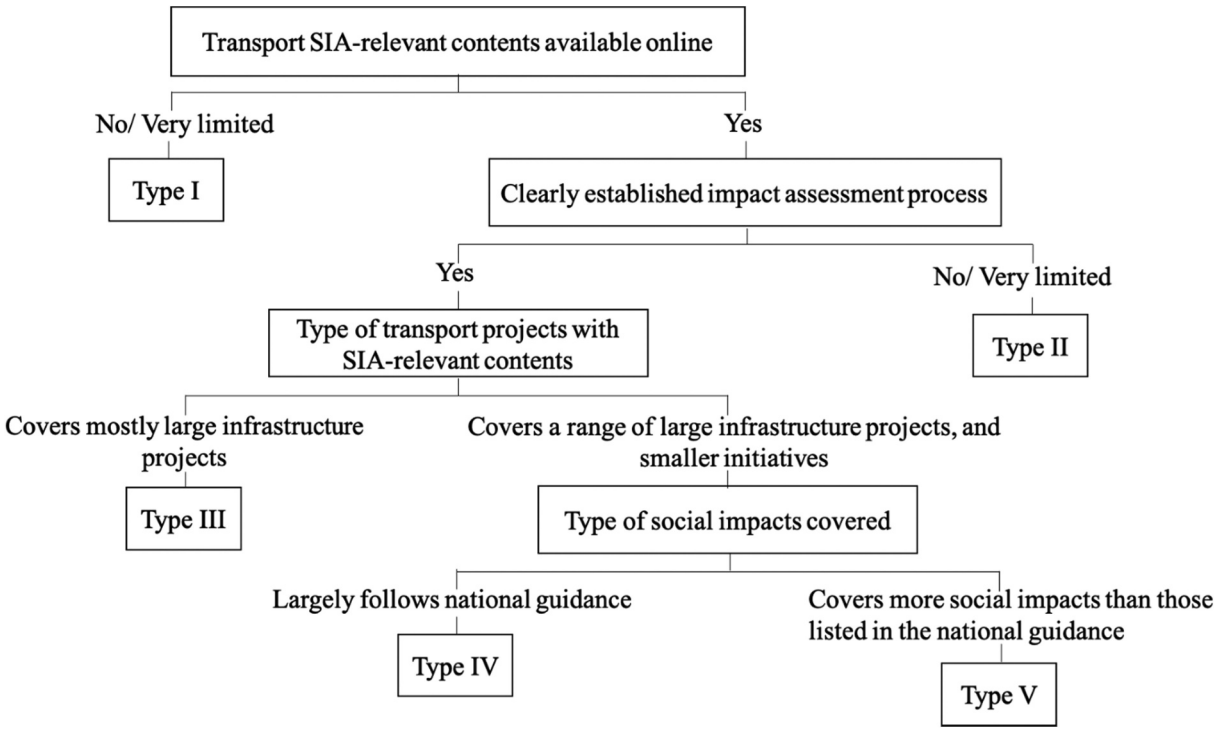

Figure 1. Categorisation of sample cities.

An iterative deductive-inductive approach was used to analyse the interview data. The deductive coding used a set of a priori category codes drawn from the critical review and document analysis. Starting with multiple readings of the interview transcripts, sections of text corresponding to the categories were highlighted and coded, then collated. The inductive approach started with open-minded readings of the collated coded texts to achieve an understanding going beyond the initial categorisation. Additional codes were applied to aid the identification and interpretation of similarities and differences in participants' views. Two deductive-inductive iterations were conducted. The diversity of opinions was then compared referring to the practitioners' roles, city type, and other factors.

4. Document analysis on SIA in Chinese cities

Through the document review, it can be found that social impact assessment is currently not an established part of transport plan and project appraisal in China. The national government has not provided any law or regulation for defining social impacts, let alone how to address them. Recently, the 'Appraisal Indicator System Building National Strength in Transportation' issued by the Ministry of Transport (2022) provides a general reference for local governments regarding the social themes that need to be considered in transport planning, which includes safety and convenience. Safety mainly covers life safety, emergency support, and controllability. Convenience refers to transportation supply capacity and quality, which aims at improving the accessibility, travel convenience, equitable distribution of transportation services, and people's satisfaction rate. However, this guideline failed to specify the types of transport projects and the stage in the planning process in which these indicators should be applied.

Across the 83 cities reviewed, transport SIA practices were grouped into five main types, as presented in Appendix 2. Figure 2 presents a quantified summary of the classification of sample cities. It can be found that while half of the large cities lie in Type IV and Type V with relatively well-established transport SIA, most of the small- to medium-sized cities belong to Type I and Type II which show limited transport SIA practices. The main features of these five groups are discussed below. The similarities and differences between transport SIA practices in these five types of cities are then summarised in Table 1 at the end of this section.

4.1 Type I: cities with limited public-available evidence of appraisal

Type I cities include 3 large cities, 11 medium cities, and 18 small cities. Most of the small-sized cities sampled fall into this category. Medium and large-sized cities categorised as Type I are mainly located in the western or central part of China, where the economic development and infrastructure are generally backward. For these cities, a very limited number of officially published transport appraisal documents can be found on the governments' websites, most of which are EIA reports for large-scale construction projects, such as major highways. The local governments neither publish an introduction to the planning process and the job across different agencies, nor provide transport appraisal reports for most of the transport projects. The opportunities for the public to get appraisal information from the local government are also weak, as few relevant planning and appraisal documents were published. Government departments in some Type I cities even failed to publish valid

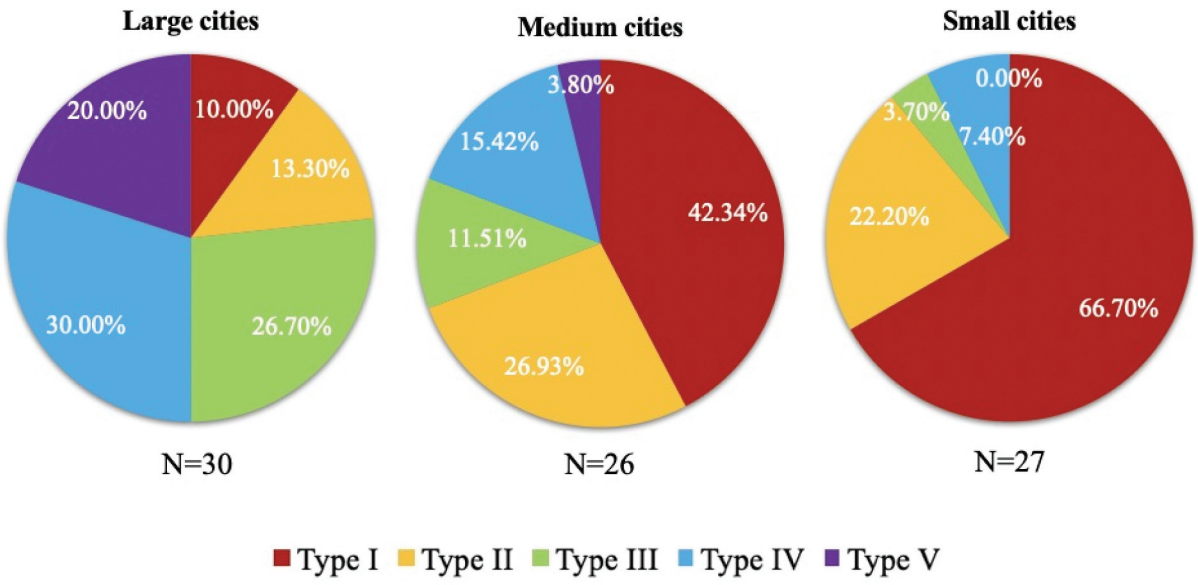

Figure 2. Summary of sample cities classification.

Table 1. Similarities and differences of transport SIA in reviewed cities.

Transport SIA characteristics		Type I cities	Type II cities	Type III cities	Type IV cities	Type V cities
Type of social impacts covered	Accessibility to basic needs	✓	✓	✓	✓	✓
	Accessibility to education and employment		✓	✓	✓	✓
	Demographic change (i.e. Migration and displacement)	✓	✓	✓	✓	✓
	Social stability	✓	✓	✓	✓	✓
	Safety and security	✓	✓	✓	✓	✓
	Sense of identity, place and culture (i.e. Cultural and historical impact)	✓	✓	✓	✓	✓
	Equity				✓	✓
	Empowerment and participation	✓	✓	✓	✓	✓
	Quality of life: travel experience		✓	✓	✓	✓
	Quality of life: satisfaction rate			✓	✓	✓
	Quality of life: other				✓	✓
Level of detail		Low	Relatively low	Relatively high	Relatively low	High
Indicator types		Descriptive information	Descriptive information with a few quantitative indicators	Mix of quantitative & qualitative indicators	Mainly quantitative indicators	Mix of quantitative & qualitative indicators
Consistency with the national guidance		Meets the minimum requirements	Relatively high consistency	High consistency with stress on local priorities	High consistency but with differences across project types	Goes beyond national requirements and instructions

consultation channels for the general public, such as Tongren (Guizhou).

Type I cities show limited evidence of having a formal and systematic transport SIA process, and little information on social impacts was found in EIA and other supporting documents. Take the Lhasa rail transit EIA (Lhasa Municipal Development and Reform Commission 2022) as an example, social impacts were included as a part of EIA outcomes, including brief descriptions of accessibility; public transport layout; population migration; demolition resettlement; safety and security; and cultural and historical impact. These descriptions merely present possible benefits the proposed project brings to the local area, without providing specific data or evidence to support the assumptions. Transport SIA in Type I cities seems to be adopted as a justification for already-made project decisions.

4.2 Type II: cities with less well-established SIA on large-scale construction projects

Type II cities include 4 large cities, 7 medium cities, and 6 small cities. For these cities, a policy specifying the transport project types that require an impact assessment is published; this includes projects which are considered to have significant influence on urban transportation, as well as construction projects of certain scales, such as air/railway/highway passenger and cargo terminals, logistics centres, bus parking lots, social parking lots, petrol stations, large-scale public transport hubs, and rail transport facilities. For these projects, transport impact assessment is required at three stages: the Regulatory Detailed Planning stage, the initiation of projects and permission of the planning for use of land stage, and the engineering construction permission stage. However, local governments in Type II cities failed to provide any instruction on addressing social impacts specifically.

The government agencies of Type II cities do not directly preserve or publish social appraisal reports for transport projects in most cases, but provide information on companies which compile and hold the relevant documents. The companies involved vary by project, and a number of the companies identified do not have a clear and official channel for requesting information from them. Guiyang is a typical example; according to the information provided by Guiyang Development and Reform Committee, the comprehensive public transportation hub of the Guiyang Southwest business service cluster project is being appraised by Guiyang Transportation Investment Development Group Co. Ltd., while Guiyang Urban Construction Investment Group Co. Ltd. is in charge of the West Beijing Road construction project. Only some of these developing companies and consultancies provided effective contact details, and were willing to offer relevant documents to the general public on demand.

For most of Type II cities, SIA-relevant contents were involved for Local Transport Plans and road/rail transit construction projects, while impact assessment

documents for public transport planning and operation were difficult to find. Through the documents reviewed, appraisal outcomes relevant to social issues were generally mentioned in EIA reports and SSRA reports. The social themes included in transport SIA in Type II cities are similar to those for Type I cities, but with the inclusion of quantitative indicators and a greater level of detail. Large infrastructure projects in Type II provinces are better appraised with respect to social impacts. Take Xianbei Avenue in Xianyang (Shaanxi) project as an example, accessibility, transport mode share, impacts on culturally and historically sensitive areas, and public participation tend to be quantified and gain a higher weight than other social impacts. This may be because of the stress on these impacts in the national guidance, as well as the data availability to quantify them. However, transport SIA in Type II cities rarely identified any potential negative social impact and preparing mitigation measure. Therefore, it may be usually applied to facilitate smooth and timely implementation of development project which has already been decided (Tang et al. 2008).

4.3 Type III: cities with many clear SIA cases but lacking consistencies among transport projects

Type III cities include 8 large cities, 3 medium cities and 1 small cities. For these cities, precise project planning and construction process instructions were published, but official instructions or explanations relating to social impacts were difficult to find. A series of transport appraisal documents have been published through unofficial sources, such as consulting or construction companies, yet the formality of these reports is not ensured by the local government. Even for the same type of transport projects within the same city, SIA was included in only some projects. The emphasis on social impact within transport planning and appraisal also varies between Type III cities. This may be due to the different development situations in these areas. Type III cities cover a wide range of different economic, geographical, socio-demographic and developmental conditions, making, it difficult to draw conclusions about the factors influencing SIA practice in these cities as a group.

Rail transit network projects in Type III cities tend to have the most complete and detailed SIA compared to other kinds of transport projects. Take the Yinchuan rail transit network project as an example, the planning document report analysed social impacts including accessibility to basic needs and key services, local residents' travel quality, public transport mode share, safety issues, impact on local history and culture, and coordination with land-use and urban development. These impacts were largely analysed through quantitative methods. However, there are weaknesses in the SIA for rail transit projects. For example, accessibility impact analysis was largely based on the connectivity of proposed networks, with no supporting data on people's travel behaviour, and equity was only briefly mentioned.

Compared to rail transit planning, SIA indicators in other kinds of transport projects were fewer and cruder (although this may be because all the relevant appraisal documents were not found). For small- to medium-sized Type III cities without rail transit projects, transport projects included a systematic public consultation process, for which appraisal documents were published officially online, however, we were unable to analyse these documents as once the consultation finished, they were taken down. From those reports which were still available, it was found that though planning documents for transport projects present a generally comprehensive consideration of social issues, only a few social issues were then analysed through quantitative indicators in the impact assessment process. As an example, Bus Rapid Transit programme in Suqian (Jiangsu) listed several social issues and provided simple quantitative indicators for measuring them. For instance, the mortality of accidents caused by buses for assessing safety, the proportion of buses with air conditioning for measuring comfort level, and passenger satisfaction rate for measuring travel experience.

Similar to the earlier types of cities, transport SIA in type III cities acts merely as a supporting section of EIA, SSRA or feasibility assessment to justify established decisions, and takes place at the early stage of project planning. Public participation is a one-off targeted publicity campaign organised by the government bureaucracy. Limited evidence shows that public concerns about potential social impacts have been reflected and mitigated in the planning process.

4.4 Type IV: cities where SIA follows national guidance with adjustment to the local situation

Type IV cities include 9 large cities, 4 medium cities, and 2 small cities. Compared to Type I and II cities, separate SIAs were conducted for not only local transport plans and construction projects, but also some other types of projects. Though an established definition of social impacts was not given by local governments in Type IV cities, except for social themes listed in the national and provincial guidance, transport appraisal covers wider social themes and more detailed processes, taking into account local development statuses and priorities. SIA was mainly conducted at the beginning of the planning process to raise appropriate measures to mitigate negative impacts and enhance positive impacts. Type IV cities also published brief introductions to methodology and data

resources for measuring social impacts to support the validity of the appraisal outcome. For instance, the SSRA for Taxi-hailing Services Management in Liaocheng (Shandong) conducted questionnaire surveys and workshops with relevant stakeholders, including taxi drivers, ride-hailing drivers, transport professionals, and the general public, in order to analyse their adaptability, concerns and suggestions. Based on the appraisal outcome, 12 possible risks were identified, such as ride-hailing drivers being limited to local citizenship, and the legalisation of online ride-hailing services. As one of the mitigation measures, a group of municipal public servants from relevant departments would work on introducing supporting transition policies.

Local authorities in China have been provided with a certain degree of autonomy in explaining the national social appraisal guidance based on their own local priorities, and Type IV cities tend to compile their own appraisal guidance documents and include more social issues than required by the national government. Transport SIA mainly cover accessibility, distribution of public transport service, migration and displacement, safety and security, cultural and historical impacts, and satisfaction of stakeholders. To address the local priorities, Type IV cities establish a formal public participant process for most of the transport projects at the early stage of planning. For some large-scale projects, public participation is also involved at the construction stage, and external experts are invited to review the appraisal reports. The importance of mitigating negative social impacts is highlighted in the local guidance. Transport SIA in these cities includes more approaches for data collection, such as surveys and interviews, and clarifies the time frame. The assessment of social impacts is based on a combination of quantitative and qualitative data.

4.5 Type V: cities with advanced SIA processes and criterion

Type V cities include 6 large cities and 1 medium city. Among all the Chinese cities reviewed, Type Five cities have the best practice in transport SIA. These cities have plenty of cases (EIA reports or appraisal reports with social appraisal contents for transport projects) available online, and the planning process is clearly published by the local government. The planning process for transport projects and the documents involved are similar among all the Type V cities. Generally, separate SIA is not necessary at the transport planning level. EIA reports and feasibility study reports usually cover a wider range of social issues with a higher level of detail compared to other types of cities. However, these cities are still deficient in a systematic and comprehensive social appraisal process for every type of transport project. SIA takes up just a small part of the transport appraisal. Though impact assessment is integrated with project planning, option selection and decision-making process, except for a small number of large-scale projects (e.g. Beijing Metro Line 4) which include SIA in both ex-ante evaluation and ex-post evaluation, SIA is usually included merely in the early planning stage, and has limited influence on decision-making.

Compared to other city types, Type V cities have more explicit sustainable development objectives and detailed appraisal outputs are published by their local governments. The governments cooperate with not only consultancy companies but also universities and research institutes to conduct transport impact assessments. Transport SIA in Type V cities covers a more complete set of social aspects, which tend to include impacts on equity across different population groups; accessibility to basic needs, employment and education; public attitude and participation; sense of identity; etc. For each social impact, the appraisal documents also provide key definitions, explanations of the appraisal process, and specific requirements for indicator selection and calculation. For instance, SSRA for Shenzhen Metro Line 5 (Shenzhen Municipal Design & Research Institute 2018) firstly listed potential risk factors (e.g. changes in local traditional culture, neighbourhood, living habits, and community quality; changes in floating population; changes in local income inequality; etc.), and conducted SIA through methods including field research, questionnaire surveys, expert workshops, etc. For the potential negative impacts, appropriate mitigation measures or alternative options were provided. However, transport SIA in Type V cities, especially for local transport plans and large scale projects, lacks multi-scale spatial assessment based on the specific local context, such as the pattern and stage of urban development and broader socio-economic contexts. The interactions between transport development and spatial development at multiple scales may cause unbalanced development across a city and negative impacts for neighbourhoods, which may result in limited social benefits from transport interventions, even unbalanced distribution of accessibility and quality of life in different areas and groups (Lee et al. 2021).

Though the practice of transport appraisal differs according to the type and scale of projects, municipal governments in Type V cities have provided explicit instructions for the relevant agencies and district authorities to follow. For instance, according to the national guidance, the Shanghai guidance on conducting an SSRA for key construction projects (Shanghai Municipal Development & Reform Commission 2011) further articulates the type of transport projects for which an SSRA report is required. This includes major bridges, tunnels, BRT systems, major roads and

highways, long-distance stations and traffic junctions. Details of roles and responsibilities are also made clear. The principles of appraisal content are given with a description to guide the assessment, these include validity, rationality, feasibility, safety, and other aspects such as risk level and preventive measures.

Type V cities are in the most populated areas of China and their local governments are facing increasing political pressure to improve mobility for all the citizens. Much effort is being put into expanding public transport systems. Advanced transport planning and appraisal systems are required to meet the surge in transport demand, and to appease the conflicts between different social groups (e.g. conflicts between residents with local and non-local citizenship). Type V cities also sit within the most economically developed areas. In order to improve the transport network and achieve sustainable development, local governments in these cities have provided many innovative transport projects. Since the national government has not provided specific guidance on some innovative projects (such as Intelligent Transport Systems), transport SIA for these types of transport initiatives in Type V cities have gone beyond the national requirements.

5. Interview analysis

5.1 Gaps in the current transport SIA practices

According to the participants from local and provincial governments, there is no independent transport SIA process in most small- to medium-sized Chinese cities. Social-relevant assessments are mainly included in preliminary EIA and feasibility reports, which follow the guidance issued by the national government and their respective provincial governments. These cover (1) general social impacts (i.e. impacts on local residents' income; quality of life; employment; disadvantaged groups; local culture, education and health; race and religion, etc.); (2) compatibility of the project with different groups of stakeholders and the local environment; and (3) SSRA (i.e. identifying social factors which may influence the project and predicting potential social conflicts and changes). This finding is generally consistent with the document review. Within the impact assessment process, the Transport Department as the competent department, is responsible for organising the relevant consulting units and other stakeholders, including the general public, to participate in the evaluation of the project. Cooperating departments include the Ecology and Environmental Bureau, the Natural Resources and Planning Bureau, and the Housing and Construction Bureau, which provide data and suggestions for the SIA. The Development and Reform Department acts as the final gatekeeper, examining and approving the SIA report. Consultancies, as a third party, are usually entrusted by the Transport department to undertake the job of data collection and compiling the SIA report. In some large-scale or complex transport projects, where there is a lack of past experience or data, the government may collaborate with scholars to conduct a social investigation.

From the perspective of the contents of SIA, some of the public servants indicated that SIA for projects of different types and scales show distinct differences both in significance and level of detail. Only large-scale construction projects are required to include a formal SIA process, other transport projects may not have a well-established SIA process. P8 and P15 said this is because in most cities, SIA for rail transit projects is considered more complete and important than those for roadway and waterway projects, while construction projects, for instance, road construction, tend to receive more detailed social appraisal than other kinds of transport projects (P3).

All the participants agreed one of the most crucial factors which limit transport SIA practices in China is that local transport planners lack awareness of the importance of social impact. Though different participants had various views on the factors that cause this lack of awareness, most of the participants agreed what should be identified as a social impact and why social impacts should be included are not clear to transport planners. Most of the public servants interviewed agreed there is an absence of an official definition of social impact; this creates variations in transport SIA practices in cities of different sizes. They pointed out that the central government has proposed a list of macroscopic social goals but there are no detailed guidelines or indicators for measuring progress towards these. As SIA is not compulsory for many types of transport projects, it is often neglected in the appraisal process. The scholars interviewed considered that local governments tend to downplay social impact as it often conflicts with local economic and environmental development goals. Nevertheless, about half of the participants, particularly public servants, stated that social appraisal has drawn increasing attention in the transport sector. This is largely related to national policies proposed in recent years, such as the Program of Building National Strength in Transportation issued by the Communist Party of China Central Committee (CPCCC) and the State Council (2019), which emphasises the importance of socially sustainable transport.

Another limitation mentioned by most of the public servants and scholars was that current transport SIA is largely based on experiences and experts' suggestions, few project appraisals include a field investigation or collation of supporting evidence. One reason for this is the limited funding and time available for smaller-scale transport projects. Local authorities tend to consider social surveys as too costly for

transport appraisal (P6). Another participant (P18) argued that conducting transport SIA is not cost-efficient as transport projects in small- to medium-sized cities tend to have lower budgets and fewer choices. Another reason, as viewed by some participants, is that the smaller the city is, the easier it is to appraise a project based on experience, thus less need to rely on quantitative analysis. One participant (P5) pointed out many quantitative studies are based on a series of assumptions and fixed models taken from other relevant research, thereby errors can arise when it comes to a specific project. For small cities, '*a quantitative study with an inevitable error range*' (P5) may not be more effective and accurate than transport experts' '*empirical judgement*'. However, this is not always the case, as participant P7 pointed out that specific projects in small- to medium-cities, such as roadway construction projects, sometimes include a complete SIA with detailed data collection.

Most of the consultants criticised that transport SIA practices are highly reliant on a fixed template without identifying specific social issues which may be important under the local context. Participants argued that important social impacts can be omitted since the template simply needs a coarse descriptive analysis of those general social themes which must be covered in the feasibility report. Around half of the participants agreed that distributional impacts are not fully considered. Transport SIA rarely divides the affected population into different groups and differential impacts on specific groups of people are neglected. As P9 discussed, if residents want to register opinions about a transport project, they need to submit their comments to the neighbourhood committee. These committees are only required to provide a conclusion to the government on whether the project has any negative impacts on surrounding areas, without identifying specific groups of residents. Though transport SIA also collects opinions from the general public via online participation, disadvantaged groups rarely take an active part in transport planning (P1). Therefore, it can be difficult to distinguish different social groups in the current appraisal process.

From the perspective of the appraisal process, approximately half of the public servants and consultants mentioned a lack of clarity around the timing and time frame of SIA for transport projects at the local level. In smaller cities, transport practitioners usually have limited time for project selection and appraisal as the planning period for transport projects is observably shorter than for similar projects in larger cities. Several consultants suggested that SIA is generally done during the early stages of project design and selection, and will be later compiled into the feasibility report. However, because of the short time frame for implementation, an SIA may not be finished until, or may even be abandoned, after the project is selected. The associated public participation process is usually a single consultation which lasts for only one to two weeks. Therefore, SIA usually has limited influence on option-selection and decision-making. In some major transport schemes, SIA may also be applied to double-check the surrounding area after the project has been finished. This is usually on an ad-hoc basis, an independent action by the local government.

5.2 Local priorities for transport SIA

Participants were asked what social issues should be prioritised within SIAs for different city and project types. For most public servants and consultants, their chief concerns are issues listed in the national guidance on compiling project feasibility reports (Ministry of Transport 2010), such as safety and social stability. Many of them agreed that though these issues have been included in feasibility reports, the methodologies applied to appraise these impacts need to be improved, as the appraisal outcomes were too general in some cases. Furthermore, nearly all the government and consultancy participants stressed that priority is given to social impacts which are closely related to local economic developments.

Equity was mentioned by participants from all types of cities. However, as equity has not been clearly defined in transport policy, different kinds of participants presented different priorities on transport equity. Scholars considered the main issue for improving transport equity is to provide equal accessibility for different groups of people. Some participants wanted greater clarity as to which vulnerable groups should be considered, and felt this lack of clarity had led to certain groups being neglected. For instance, P3 suggested that households who are having to relocate as their current home is being demolished to make way for the transport planning and migrant workers without local citizenship are key groups to be considered in transport planning, but they may be neglected because there is no clear statement regarding these social groups in the national guidance. Public servants from provincial and local governments emphasised the distribution of land use and inequities in regional development. Most of the consultants discussed equity in terms of the type of compensation given for land acquisition, a major point when they conduct SIA for the Transport Department.

Accessibility was mentioned by participants of all types. Several participants (P2, P7, P13) suggested accessibility has not yet been well combined with equity assessment. P2 considered accessibility to be largely assessed through modelling the connectivity of transport networks, without considering people's travel preferences.

Empowerment and participation were also mentioned by participants of all types. Many participants

argued that it is important to reflect the level of participation, as well as how public opinions affect decision-making in the transport appraisal outcome. However, nearly half of the participants deemed the public still lacks the capacity and enthusiasm to participate in transport planning, therefore the emphasis of transport practitioners is on (1) whether the concerns raised by the public are addressed; and (2) how satisfied the local residents are with the proposed project. P7 and P11 suggested that the quantitative performance indicators of public participation should be included in transport plans, such as participant diversity, the number and resolution rate of problems raised by the general public.

Although convenience and comfortability are important dimensions of wellbeing (Weingaertner and Moberg 2014), they were not considered local priorities by most of the practitioners interviewed. However, a few participants from academia (P5, P13) did consider convenience and amenity, especially for disadvantaged groups, to be key issues which need to be included in transport project appraisal. P13 mentioned older people, women, and disabled people as three major vulnerable groups to be focused on. Other participants suggested local residents' satisfaction is important, but the cost and difficulties of field investigation and data collection for this kind of impact may place too much burden on local authorities and, therefore, tends to be omitted from SIA.

5.3 Suggestions for improving transport SIA

When asked to provide suggestions for improving transport SIA, around three-quarters of the participants agreed it is helpful to provide local governments with a systematic transport SIA framework, including a compulsory indicator set which applies to all types of cities, along with an extended optional indicator set and general guidance on how to conduct transport SIA referring to local priorities. Many participants mentioned the different development states of Chinese cities; while '*transport SIA practices in large cities are getting good to better, small- to medium-sized cities are starting from scratch*' (P1). Therefore, it is impractical to propose a one-size-fits-all guideline for all cities. Around three-quarters of participants agreed giving local government a level of discretion was important, enabling them to conduct transport SIA according to local context, and in accordance with local capabilities. However, a few participants (P9, P11, P15, P18) argued for a completely obligatory transport SIA process and indicator set provided by the central government for local governments to refer to. They argued this would make transport appraisal easier and clearer at the local level as it avoids the influence of political preferences and any misunderstandings from local transport practitioners. Nevertheless, nearly all the public servants agreed the situations for which an SIA is necessary and the requirements for conducting transport SIA need to be specified; it would then be easier, when examining a project appraisal, to see if it meets the requisite standard.

Another suggestion mentioned by around half the participants is for a database of SIA cases; this would help solve difficulties around lack of evidence and resources. One consultant (P10) suggested social investigation (e.g. surveys) could be conducted regularly for certain types of projects. Data collected can be stored in the database and used for future SIAs. The Trip Rate Information Computer System (TRICS 2014) in the UK can be referred to as an example. This would not only allow transport practitioners to refer to past transport SIAs in their regions, but would also enable cooperation between cities. Cities with generally poor transport SIA practices could draw on the experiences of cities with similar development conditions and get inspiration from cities with better practices.

Several participants from local and provincial governments in Type I, II and III cities suggested a team specialising in social research is needed for most small- to medium-sized cities. Local authorities usually turn to scholars when encountering problems in social surveys, but it can be difficult for small-sized cities to find relevant experts if local education resources are limited. Local governments need to recruit more social experts who are familiar with '*the rights and interests of disadvantaged groups*' and '*modelling of social studies*' (P8), as well as build cooperation with research institutes.

6. Discussion

Except for a few megacities, transport SIA in Chinese cities is generally weak compared to cities in developed countries. Social impacts in the transport sector have received less attention than economic and environmental impacts. Impacts such as social stability and coordination with land use are given higher priority through a well-established appraisal process and methodology. Though other social dimensions which are stressed in the Western literature and planning practices, such as equity, social inclusion, and well-being, have been mentioned in many transport plans, the analysis of these impacts tends to be oversimplified with no support from a systematic indicator framework and methodology. Though other social dimensions which are stressed in the Western literature and planning practices, such as equity, social inclusion, and wellbeing, have been mentioned in many transport plans, the analysis of these impacts tends to be oversimplified with no support from a systematic indicator framework and methodology.

This is in line with the findings in Western countries, as despite the endorsement of a general procedure in 'Guidelines and Principles for Social Impact Assessment' (Social Impact Assessment 1995) and the outlines provided by various scholars, many SIA reports lack adequate details about methods, sources and assumptions (Esteves et al. 2012). The Guidance providing clear definitions of social impacts, as well as appraisal tools, are needed to improve transport SIA in China. However, Western methods and indicators may not be directly applicable due to differing local priorities, financial status, data availability, and other factors. Though there is limited research focusing on transport SIA in developing countries, Lee et al. (2020) research on transport infrastructure in London and Seoul revealed that social impacts are closely related to specific local development patterns and conditions, therefore a context-specific approach to evaluate social outcomes and for adaptive management is needed.

Both the document and the interview analyses revealed that the imbalance in transport SIA quality and application among different-sized Chinese cities is significant. The five categories of SIA practice in Chinese cities developed through the SIA document review were broadly confirmed in the interviews with Chinese transport practitioners, with Type I cities showing the most deficient practices and Type V cities exhibiting the best practices. From the perspective of city size, while around 27% of sample large cities fall into Type I and II, around 70% of medium cities and 90% of small cities are included in these categories. Small- to medium-sized cities tend to have more limited transport SIA with less supporting data and methods compared to large cities. Though a few small- to medium-sized cities have better transport SIA practices than some of the large cities, we found that these cities are located in the more developed Eastern China, while large Type I and II cities were concentrated in Western and Central China which is relatively less economically developed. On the other hand, only a few large cities include SIA in both the initial decision-making stage and the evaluation after the projects are launched. For most of the large cities and all small- to medium-sized cities, SIA seems to act as a supporting tool to facilitate smooth and timely implementation of transport projects for which the decision to proceed has been already made. In these cases, transport SIA rarely identifies potential negative impacts or provides corresponding mitigation measures. As the SIA research indicates, follow-up of SIA is important (Mottee and Howitt 2018), however, it is often ignored in the planning process (Stjernborg 2023). Stjernborg (ibid.) argued that how social perspectives should be addressed in different stages of transport planning is an important issue to be considered, but it is clear that social perspectives should be brought in early (Vanclay et al. 2015), even if the level of detail or the spatial scale may change in the planning process.

Transport SIA also shows great disparities between different project types, as large-scale projects in most of the sampled cities involved a more detailed SIA, while for small-scale projects without construction, such as bus fare adjustment projects, SIA was usually crude or even missing. Regarding social themes covered, small- to medium-sized cities tend to focus on social issues that were highlighted in national and provincial guidelines, such as accessibility, safety, and demographic changes related to land use. Large cities often include more social dimensions in the appraisal process (e.g. travel experience, empowerment and participation, etc.). However, only a few large cities involved important social themes such as equity in the project appraisal. As Mottee (2021) suggested, it is crucial to evolving governance approaches which can target the appropriate scale in ensuring urban governance and transport infrastructure project management that better recognises and responds to social issues.

It is difficult to propose a one-size-fits-all SIA template for local-level transport SIA because of the differences in current practices and the level of economic development discussed above. For Type I cities, the priority must be to improve the awareness of the importance of social impact, and to ensure a SIA process for transport projects of different scales and types. For Type II cities, the key concern should be clarifying the transport SIA process and developing a social indicator set based on local conditions, providing stronger evidence to support the appraisal of those social issues already mentioned in plans and project goals. For Type III cities, as priority areas in Chinese development strategies, greater emphasis is needed on those social issues which may arise as a result of rapid development, such as equity. Type IV cities would benefit most from including smaller-scale projects in the SIA process. SIA guidance needs to take into account the differences between transport projects of different sizes in terms of time frame, funding, etc. With the need to manage a transport demand far above the national average and priorities for sustainable development, Type V cities have a greater need to implement manifold indicators than other less-developed cities. Current national guidance on transport appraisal may not be sufficient to cover all the essential issues in the local transport development agenda and reflect local priorities and advantages. For example, Type V cities face fewer financial pressures, but limited land supply and high population densities create other pressures which these cities need to capture in SIAs. Furthermore, high levels of migration, and a diverse population make social problems like unequal resource distribution particularly prominent in Type V cities. Therefore, local governments in Type

V cities would benefit from a certain degree of autonomy to propose transport SIA practices which go beyond national guidance. Mottee et al. (2020) research on Metro infrastructure planning in Amsterdam found that project stakeholders were primarily concerned about technical design, land use, stakeholder and community engagement, and social risks, which are similar to the major issues raised in the interviews with Chinese practitioners. Mottee et al. (ibid) highlighted the benefits of engaging and empowering community participation, prioritising public needs in project alternatives, identifying social risks and impacts, and applying adaptive strategies, which can be enhanced by a clear SIA process. The application of SIA in line with project management and governance frameworks can benefit transport planners in managing the social impacts of different-sized cities and different-scale projects.

7. Conclusion

This paper has identified significant disparities in transport SIA practices in different-sized Chinese cities, including differences in the clarity of processes, comprehensiveness of social issues including, level of detail, project types covered, indicators and methodologies applied, and consistency with the national guidance. Reasons for the differences are complex and intertwined, including socio-economic development, demographic structure, local priorities, and other factors.

Current guidance on transport SIA in China is relatively general and ambiguous compared to many developed countries, an established transport SIA framework and indicator set for local governments to refer to are lacking. Based on the results of interviews with Chinese transport practitioners, suggestions for improving transport SIA practices across a range of city types include (1) highlighting local priorities for transport SIA, such as equity and distributional impacts; (2) establishing systematic frameworks which allow local authorities to address their local priorities and specific concerns within transport SIA; (3) establishing and maintaining local evidence and experts databases; and (4) setting up criteria to aid cities with different development conditions to select appropriate SIA indicators. The differences in transport SIA practices among Chinese cities are unlikely to be eliminated in the short term. Compromises will need to be made to allow for the specific development background and capability of different cities. For example, the most developed cities could be required to address a broad range of social issues, while less developed cities may be required to cover a smaller set of priorities.

The outcomes of the document and interview analysis provide a foundation for improving SIA practice and, following from that, social sustainability in the transport sector in different-sized Chinese cities. However, there remain some limitations which need to be addressed in further research. The document review is biased towards projects with a higher availability of appraisal documentation and lots of examples of transport SIA. Though the interviews attempted to fill this gap, it proved difficult to contact relevant practitioners from cities with limited numbers of transport project reports in the public realm. Our results may not fully reflect transport SIA practices in these kinds of cities, hence the level of improvement required may be underestimated. Additional fieldwork may be needed to better understand the social impact of transport in smaller-sized cities and the constraints they face when conducting SIA for transport projects. Secondly, the proposed improvements need further development and testing to ensure they work for small-sized Chinese cities.

Note

1. The SSRA focuses on the impact of a project on surrounding areas and residents affected by expropriation. It is required when the surrounding area is not government-owned land and is inhabited by local residents. For small transport projects, the SSRA forms a chapter in the feasibility study report, while for larger projects it is compiled separately. Slow-mode transport projects, such as walking and cycling, are merged into a corresponding road construction project, without compiling a separate appraisal report.

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Appendix 1

Table A1. Key themes of social impact.

Themes	Explanation
	Traditional
Basic needs	Basic needs refer to establishing a minimum requirement for people to maintain their livelihood, which can be defined as the requirements for habitation, food, clothing, mobility and information for supporting people's physical and psychological health (Omann and Spangenberg 2002). Social impacts related to basic needs involve providing and distributing social resources, as well as setting up social orders to guarantee the basic needs are met for all individuals.
Education & Employment	Employment is the main source of not only income but also the entitlement to social security payments, and social contacts in the workplace are important for individual wellbeing (Omann and Spangenberg 2002); while education, in many cases, provides people with the skills to get better jobs. Social impacts related to education and employment refer to enhancing individual ability and achieving self-realisation (Kingdon and Knight 2006), as well as establishing mechanisms to provide adequate access to education and employment opportunities.
Equity	Equity addresses meeting the requirements of all, both intra-generationally and the intergenerationally. Equity includes three major categories: (1) horizontal equity – individuals and groups with equal ability and need should be treated the same in the distribution of benefits and costs; (2) vertical equity related to income and social class – concerns the distribution of impacts between individuals and groups with different income or social class; (3) vertical equity related to mobility need and ability – concerns the distribution of impacts between individuals and groups that differ in mobility ability and need, and it also favours access to basic services rather than luxuries (Litman 2002).
Human rights	Human rights are "generally agreed values and exist to ensure human dignity and the fulfilment of basic human needs" (van der Ploeg and Vanclay 2017, p. 35). Respect for human rights should be the foundation of all SIA actions (Vanclay 2003). The core values and objectives of SIA and Human Right Impact Assessment (HRIA) show commonalities, therefore can complement each other (Götzmann et al. 2016). Social impacts related to human rights are related to the enhancement of rights for the individual or a social group through environment settings, human society settings, and institutional settings.
Poverty	Poverty focuses on the most disadvantaged groups. The alleviation of poverty has been stressed in a lot of national sustainable development agendas and government policies (Bramley and Power 2009). Poverty can have negative social impacts on supporting the livelihood of individual and the maintenance of a social groups.
Emerging	
Demographic change	Demographic changes mainly include the amount, quality and structure of population, which related to issues such as ageing, migration and mobility, etc. Demographic changes can have short-term social impacts as direct outcomes of an intervention, which directly affect the activities and knowledges of individual/social groups. Also, demographic changes are cumulative components to long-run indirect social impacts, which related to the characteristics and history of the affected community and the proposed mitigation measures. It is important to analyse the changing context and consequent effects on community cohesion based on the understand the drivers of in-migration and out-migration (Smyth & Vanclay 2017).
Social capital	The core of social capital is social relationships. It can be broadly defined as "*a collective asset in the form of shared norms, values, beliefs, trust, networks, social relations, and institutions that facilitate cooperation and collective action for mutual benefits*" (Bhandari and Yasunobu 2009, p. 480). This concept encompasses how human activities, knowledge and values are affected by other members of a social group.
Empowerment and participation	Empowerment refers to an intentional and continuous process, centred on the local community, through which people are given the power to take control over their lives and participate democratically in making decisions that affect their lives in the community (Perkins and Zimmerman 1995). Participation refers to opening up the planning processes to democratic scrutiny and involve the public in decision making and policy delivery (Rydin and Pennington 2000). Empowerment and participation are directly and indirectly related to people's behaviour and living conditions.
Social cohesion	Social cohesion refers to the way society 'hangs together' through all the components fitting in and contributing to society's collective goals and well-being, as well as the absence or minimization of conflict between societal goals and groups, and disruptive behaviour (Kearns and Forrest 2000). The sustainability of community is related to social capital and social cohesion that encompass social networks, and the integration of resulting social behaviour (Dempsey et al. 2011).
Sense of identity, place and culture	Sense of identity, place and culture is a part of social value. O'Connor et al. (2015) defined this concept as people's awareness of their unique traits and idiosyncrasies as individual identity and their sense of being part of a social group with whom they have something in common.
Health and safety	Health and safety include the state of physical, mental, and social wellbeing instead of merely the absence of disease or infirmity, as well as people's perceptions about their safety and their fears about the future of their community (Vanclay et al. 2015). This dimension can be associated with social impacts at the individual level (i.e. personal wellbeing) and the social level (i.e. the development of the society) in both short-term and long-term way.
Wellbeing and quality of life	OECD (2011) defined a high quality of life for a whole society through a list of desirable social conditions based on social concerns, which includes health status, education and skills, work and life balance, social connection, civic engagement and governance, personal security, environment quality, and subjective wellbeing. The concept of quality of life is related to the physical environments, the adequacy of both physical and social infrastructure, and how people feel about their surroundings (Vanclay, 2002).

Appendix 2

Table A2. List of cities sampled for the document review.

Province	Large	Type	Medium	Type	Small	Type
N/A	Beijing	V	–	–	–	–
N/A	Tianjin	V	–	–	–	–
N/A	Shanghai	V	–	–	–	–
N/A	Chongqing	IV	–	–	–	–
Hebei	Shijiazhuang	IV	Hengshui	I	Qianan	I
Shanxi	Taiyuan	II	Jincheng	II	Shuozhou	II
Nei Mongol	Huhehaote	I	Chifeng	II	Tongliao	I
Liaoning	Shenyang	III	Liaoyang	II	Haicheng	I
Jilin	Changchun	III	Tonghua	II	Siping	II
Heilongjiang	Haerbin	III	Hegang	II	Heihe	II
Jiangsu	Nanjing	V	Yancheng	IV	Suqian	IV
Zhejiang	Hangzhou	V	Wenzhou	V	Jinhua	III
Anhui	Hefei	III	Huaibei	III	Huangshan	I
Fujian	Fuzhou	IV	Quanzhou	III	Putian	I
Jiangxi	Nanchang	II	Jiujiang	I	Ganzhou	II
Shandong	Jinan	III	Weihai	III	Liaocheng	III
Henan	Zhengzhou	IV	Nanyang	IV	Xinyang	I
Hubei	Wuhan	III	Huanggang	I	Xianning	I
Hunan	Changsha	III	Yueyang	III	Loudi	IV
Guangdong	Guangzhou	V	Qingyuan	III	Puning	I
Guangxi	Nanning	IV	Guilin	IV	Beihai	II
Hainan	Haikou	III	Sanya	II	Danzhou	I
Sichuan	Chengdu	III	Deyang	I	Dazhou	I
Guizhou	Guiyang	II	Zunyi	I	Tongren	I
Yunnan	Kunming	II	Qujing	I	Yuxi	I
Shaanxi	Xi'an	IV	Xianyang	II	Yanan	I
Gansu	Lanzhou	IV	Tianshui	I	Wuwei	I
Ningxia	Yinchuan	IV	Shizuishan	I	Wuzhong	I
Xinjiang	Urumqi	I	Kelamayi	I	Kashi	I
Qinghai	Xining	I	–	–	Haidong	I
Tibet	–	–	Lhasa	I	Rikaze	I

Appendix 3

Table A3. List of Chinese interviewees.

Interviewee	Job	Type of cities
1	Consultant	Large-sized city
2	Scholar	Large-sized city
3	Public servant (local government)	Medium-sized city
4	Scholar	Large-sized city
5	Scholar	Large-sized city
6	Public servant (provincial government)	Large-sized city
7	Consultant	Medium-sized city
8	Public servant (local government)	Small-sized city
9	Consultant	Medium-sized city
10	Consultant	Medium-sized city
11	Public servant (local government)	Small-sized city
12	Consultant	Small-sized city
13	Scholar	Large-sized city
14	Public servant (provincial government)	Large-sized city
15	Public servant (local government)	Small-sized city
16	Scholar	Medium-sized city
17	Public servant (provincial government)	Large-sized city
18	Public servant (local government)	Small-sized city
19	Consultant	Medium-sized city