

ANALYSING STAKEHOLDERS' PERCEPTION OF LIGHT RAIL TRANSIT AS AN OPPORTUNITY TO ACHIEVE SUSTAINABLE MOBILITY IN GRANADA (SPAIN)

Abstract

Despite the growing theoretical recognition of Light Rail Transit (LRT) systems as potential instruments to achieve sustainable mobility outcomes at the city and metropolitan levels, few rigorous studies are available in relation to stakeholders' understanding on the positive contribution of LRT to urban mobility planning. The Metropolitan Area of Granada (Spain) is a case in point. To address this gap, this present paper presents the results of a participatory process (MOBYPANEL) used to analyse how a set of local stakeholders perceived the opportunities offered by the implementation of an LRT to achieve sustainable mobility goals. A total of 50 stakeholders were asked to participate, assessing the *suitability* of LRT to promote 42 mobility policies previously selected, and the *relevance* of these policies in leading LRT to reach five sustainable mobility goals. The results revealed an overall high consensus among stakeholders concerning the positive role of the LRT in the successful implementation of most of the policies analysed, with some exceptions within environmental and car-charging economic measures. Also, 'accessibility', 'intermodality' and 'efficient management' were, in general, more firmly considered than 'urban integration' and 'environmental quality' as goals for implementing sustainable urban mobility policies within the context of the LRT project. The study also provides a discussion on the role of the LRT as a means for sustainable urban mobility policy delivery and as an end for strategy making.

Keywords: Participation; Public transport; Metropolitan areas; Survey

1. Introduction

Light Rail Transit (LRT¹) systems are extensively recognized as catalysers of sustainable urban mobility policies in many cities, for their potential role in transforming the urban environment and the conditions required in the planning context for their successful integration (e.g. Babalik-Sutcliffe, 2002; Cervero, 1984; Hass-Klau and Crampton, 2002, Nolte and Yacobi, 2015). Among these conditions, the involvement of a variety of stakeholders can become critical in facilitating the suitability of many complex decisions, which rely on the collaboration between urban planners, transport planners, and transport companies, as well as other groups that usually participate in the decision-making process (Bertolini, 2012; Springer, 2007). The literature indicates the limited attention previously paid to how stakeholders perceive the possibilities opened by LRT projects (De Bruijn and Veeneman, 2009; Knowles and Ferbrache, 2014; Wangel, 2011). The metropolitan area of Granada (MAG) (Spain) provides a recent case study to analyse the multiple perspectives of stakeholders regarding this issue. Like other medium-sized cities of southern Spain, MAG was chosen by the regional government for a new LRT project (still under construction). LRT has spearheaded urban-mobility planning in Andalusia, seeking sustainable mobility goals such as accessibility, intermodality, and urban as well as environmental integration of transport. However, the perception of stakeholders on the LRT project has never before been explored. Therefore, the present paper examines the following question: *Is the Granada LRT Project perceived by local stakeholders as a real opportunity to encourage sustainable urban mobility?*

¹ "Light rail is a rail-bound mode of public transport for cities and urban regions. Contrary to train (heavy rail) and metro (subway, underground) light rail principally is able to be integrated within public realm, sharing public space with other traffic to some extent" (RVDB/Lightrail.nl, February 19, 2010, Amsterdam, Netherlands).

To address this question, the present research involves a participatory process (MOBYPANEL) to assess the opinion of stakeholders on the enabling capacity of the Granada LRT project to promote different urban-mobility policies (*suitability*) and sustainable urban-mobility goals (*relevance*). A panel-oriented survey, aimed at selecting participants that play a role as 'instrumental actors' in the MAG, was used to gather responses and measure suitability and relevance while determining potential sources of consensus or dissension for both.

The methodology underlying the present research was used to explore new techniques for assessing potentially conflictive transit projects, which, under the emergence of communicative planning paradigms, are expected to lead to subsequent transformations in transport decision-making towards more open, participative processes.

The paper is structured as follows: Section 2 describes a set of participatory processes associated with LRT implementation, while Section 3 shows the research design of the paper. Section 4 illustrates the results of the case study of the Granada Metropolitan Area. Finally, Section 4 presents the conclusions and recommendations for further inquiries.

2. LRT projects and stakeholder involvement

Transport planning faces challenging times. Significant changes have taken place during the last two decades, resulting in the emergence of a reclaimed transition from rationalistic approaches towards communicative planning paradigms (see e.g. Bertolini et al., 2008; Curtis, 2011). This means a shift from deliberative contexts, including one or a few dominant actors, to interactive contexts, which emphasize participation and learning in the planning processes (Klenk and Hickey, 2011; Laurian and Shaw, 2008; Zegras et al., 2004), and reconcile different ways of understanding planning opportunities. Communicative paradigms reorient planning from a form of scientific instrumental rationality to a consensual discussion basis (Willson, 2001). A structured involvement of stakeholders during the different stages of transport planning seems to be crucial for the latter. In this context, LRT projects are excellent cases to gain insights into the importance of combining multiple perspectives in transport decision making. The efficacy of LRT projects in mitigating environmental impacts such as traffic congestion and urban pollution is well known (e.g. Hass-Klau and Crampton, 2002; Soria-Lara et al., 2015). However, many problems arise in practice during LRT implementation because of the complexity of the situation, involving administrative authorities, railroad companies, citizens, etc. Despite the importance of effectively integrating different perspectives and sources of knowledge during LRT practice, this approach remains scarcely explored in academia.

Both the type of stakeholders to engage during the implementation of transport projects and how they can be involved can vary, fundamentally influenced by the context and the objectives pursued during the consultation phase (Wangel, 2011). In this sense, the broadest variety of stakeholders should be considered for the implementation of transport projects. These stakeholders, here called 'normative actors', include individual citizens, practitioners, decision-makers, politicians, etc.. An example in the context of LRT projects is the study made by Millar et al. (1999), who conducted a series of workshops with a large number of representatives from society to discuss the introduction of light rail transit into a small resort community, its negative effects, and potential benefits. Bailey et al. (2007) also applied a participatory methodology based on scoring desirable project alternatives to design a light-rail transit-oriented development in the context of a low-income urban neighbourhood. The results provided urban designers guidance on local preferences.

In addition, when the main objective of the consultation process is to test the effectiveness of transport projects to reach specific mobility objectives (e.g. in the context of economy, environment, etc.), it moves closer to the views of stakeholders who can ultimately achieve such objectives. They are mainly consultants, advisors, policy makers, and decision makers. These stakeholders are here called 'instrumental actors'. Vermote et al. (2014), for example, processed the views of such stakeholders by multi-criteria decision techniques in order to assess the territorial impact of a set of light-rail scenarios for Flanders

(Belgium). Boejharat (2004) also guided a consultation process engaging 'instrumental actors', based on an international survey to predict the feasibility and indicative cost of LRT projects.

Finally, when the objective is to assess the consistency of the transport decision-making process, in terms of how stakeholders were engaged and how their views were taken into account, stakeholders who ensure a critical distance with real life should be used. These are here called 'theoretical actors' and includes theoreticians, academicians, researchers, etc. In this respect, Yamashita et al. (2015) studied the validity of the pluralistic power concept following the decision-making process and the stakeholder's involvement during the implementation of a LRT project in local areas of Japan. Kato et al. (2008) also analysed how the consensus between stakeholders was built during the introduction of a light rail in Toyama (Japan). A final example comes from Springer (2007), who analysed the importance of bottom-up initiatives to foster the implementation of light rails in several USA cities.

It bears indicating that, while substantial differences can be recognized between the three reported types of stakeholders' participation during transport decision making, applications in practice are flexible, combining elements of each type and customizing the process for the particular situation.

3. Research design

3.1. Case Study

The Metropolitan Area of Granada (MAG) includes 32 municipalities, which add up to approximately 600,000 inhabitants. Population and activities are highly concentrated in the so-called 'urban agglomeration', which comprises a conurbation along Churriana de la Vega, Armilla, and south of Granada city outskirts, and major industrial and residential concentrations in northern municipalities such as Maracena, Albolote, Atarfe, and Peligros. Improvements in road infrastructures, such as the north-south by-pass, followed by significant residential growth in the immediate metropolitan ring, have fostered the demand for mobility in recent decades. In addition, the escalating reliance on private car reflects the lack of integration of public transportation modes in recent urban development, and also highlights the poor horizontal and vertical coordination between the agencies involved in spatial planning and public transport. The ineffective management of private metropolitan transport operators by the regional government reached a turning point in 2003 after the creation of the Metropolitan Transport Consortium in the MAG. Further steps have been taken by local interventions on urban mobility, framed within the sub-regional spatial plan (POTAUG, 1999), the local master plans (PGOUs) and the more recently introduced Sustainable Urban Mobility Plans (PMUS, 2003; PMUS, 2013) (see Fig 1).

The Granada Light Rail Transit project (called 'Metropolitano de Granada') is seen by the regional government as a new milestone to achieve an efficient, high-quality, and sustainable metropolitan multimodal transport system. The first line was planned along the north-south corridor (Soria-Lara et al., 2015), from the Armilla-Granada conurbation, through the most populated areas of Granada, to the main municipalities in the north of the urban agglomeration. With 15.9 km and 26 stops, the project provides unprecedented opportunities for bringing planning and transport innovations into practice (Valenzuela et al., 2009; Valenzuela-Montes, 2011; Valenzuela-Montes et al. 2011), but also generates new areas of confrontation between local stakeholders. For instance, the project has raised intense debates concerning the convenience of its route, its impact on local commerce or the technical difficulties of constructing an underground section, after the multiple interests of maintaining current traffic flow along a main street. This conflictive environment has made the Granada LRT project a noteworthy case for examining multiple perspectives among practitioners, interest groups, and academicians.

Fig. 1. Granada LRT project and planning overview. Adapted from Valenzuela et al. (2009), Valenzuela-Montes (2011) and Valenzuela-Montes et al. (2011).

3.2. MOBYPANEL: Objectives and web survey.

MOBYPANEL was a participatory process, intended to explore the perception of a set of stakeholders on the impact of the Granada LRT project, in order to promote sustainable mobility goals in the region. Two essential aspects were considered (Fig. 2):

- *Suitability*, defined as the stakeholders' perception of the LRT project's capacity to promote the successful implementation of a set of urban mobility policies.
- *Relevance*, defined as the stakeholders' perception on the significance of the aforementioned policies to orient the LRT project towards reaching specific sustainable urban mobility (SUM) goals, namely: 'accessibility', 'intermodality', 'efficient management', 'urban integration', and 'environmental quality'.

Fig. 2. Methodological scope for MOBYPANEL.

A web survey was conducted to explore the stakeholders' perceptions on *suitability* and *relevance*. It was built upon 42 selected policies, which were inductively grouped into 7 packages: environment, society, economy, technology, management, urban planning, and transport modes (Table 1). Accordingly, the web survey was divided in two main blocks, asking participants about their perceptions on: (i) the *suitability of LRT for the implementation of each policy*; and, (ii) the *relevance of each policy to fulfil each of the 5 SUM goals*. Each item was rated by respondents in a graduated symmetrical scale (Likert-type), with 5 levels ranging from 1, "not suitable" (first block) or "not relevant" (second block), to 5, "very suitable" (first block) or "very relevant" (second block).

Table 1. The set of policy packages (source: Valenzuela et al., 2009; Valenzuela-Montes, 2011 and Valenzuela-Montes et al., 2011).

Environment Access restriction for high-emission vehicle (HEV) Bicycle lanes/paths network Noise barriers Noise-absorbent asphalt design Comfortable, environmentally sensitive urban design Promotion of clean vehicles (alternative fuels, hybrid/electric vehicles, etc.)	Society Integrated-multimodal fare system Public communication Parking and intermodal station surveillance Accessible design of public-transport facilities Integral system for user security and vandalism prevention Public funding to encourage sustainable mobility planning in companies
Economy Parking fare weighted by congestion levels Parking dissuasive weighted fare Urban toll Public transport subsidization Free park and ride service for public-transport users	Technology LRT-commuter rail combined operation Modulated service frequency and passenger capacity according to travel demand Contactless tickets and travel cards GPS tracking service for public transport and RT waiting-time monitoring Establishment of new user security technologies
Management Establishment of companies linked to public transport Parking reservation for public transport users Multimodal public information Car access-restriction schemes Frequency and reliability improvements Public bicycle rental Redirection of public transport flows (bus)	Urban planning Encouraging car-free urban developments Parking design linked to intermodal stations Multi-modal street design LRT urban project regional/metropolitan coordination Reduction of places for temporary parking permit Walking routes Urban severance reduction

Transport modes*Intermodal stations**Own right of way for public transport**Motorbike and bicycle reserved parking in intermodal stations**High-occupancy vehicle lanes**Light-Rail Transit system expansion**Bicycle-accessible design in public transport*

The selection of the 42 policies was based on a content analysis of master plans and documents pertaining to Andalusia practice (Valenzuela et al, 2009; Valenzuela-Montes, 2011; Valenzuela Montes et al., 2011). The documents consulted were: 1 Andalusian regional plan (P.O.T.A); 2 sub-regional plans (in Granada and Seville); 14 local master plans (including municipalities affected by Granada LRT-project); 4 additional documents related to cross-sectorial planning in the region. The content analysis was performed in two codification rounds, as suggested by Bryman (2012). During the first round, a total of 94 policies were identified; in the second round, those 94 policies were finally summarized by 42 policies according to their similarities, and, at the same time, inductively grouped into 7 packages. Both the identification of policies and the inductive process of compiling them into policy packages were inspired by critical success factors of LRT implementation signalled by the academic literature in the field (Table 2).

Table 2. Summary of success factors of LRT implementation (selection of studies).

Studies	successful factors for LRT implementation
Priemus and Konings (2001)	<ul style="list-style-type: none"> -Urban renewal associated with light-rail lines -Linking light-rail lines to tourist routes -Multimodal network between light-rail systems and other public transport systems -Inter-municipality organization to manage light-rail systems -Prioritizing Light-rail transit against car transit -High transit frequency for light-rail systems
Babalik and Sutcliffe (2002)	<ul style="list-style-type: none"> -Urban renewal associated with light-rail lines -Multimodal network between light-rail systems and other public transport systems -Light Rail stations as locations for park and rides. -High transit frequency for light-rail systems -Multimodal tickets for public transport including light-rail systems -Adaptive master-plan of cities to light-rail characteristics
Hass-Klau and Crampton (2002)	<ul style="list-style-type: none"> -Car restrictions in areas with light-rail systems -Light-rail lines connected to urban centralities and nodes -Inter-municipality organization to manage light-rail systems
Zhang (2009)	<ul style="list-style-type: none"> -Light-rail lines connected to urban centralities and nodes -Multimodal network between light-rail systems and other public-transport systems -Light-rail stations as locations for park and rides.
Zlatkovic et al. (2011)	<ul style="list-style-type: none"> -Car restrictions in areas with light-rail systems -Light-rail stations as locations for park and rides. -Prioritizing light-rail transit against cars and public buses
Soria-Lara et al. (2015)	<ul style="list-style-type: none"> -Urban renewal around light-rail stations

	<ul style="list-style-type: none"> -Multimodal network between light-rail systems and other public-transport systems -Design light-rail lines according to urban density and diversity criteria -Light-rail stations as locations for park and rides.
Nolte and Jacobi (2015)	<ul style="list-style-type: none"> -Marketing promoting light-rail systems -Prioritizing light-rail transit against cars and public buses -Using light-rail system as an instrument to achieve a social equality.

3.3. Selection of stakeholders and data gathering

The present research focused on engaging stakeholders who would potentially participate in transport policy-making processes in the MAG. Within the broad universe of possible stakeholders, we narrowed the selection over a group of practitioners, policy-makers and decision-makers who could be acknowledged as ‘instrumental actors’ (as defined in Section 2). Therefore, aspects such as training and experience fields diversity were equally taken into consideration. This particular choice seeks to relax the usual ‘expertise-level’ criterion of traditional expert panels, by taking the advantage of combining adequate judgment capacity and understanding of the survey statements with a high diversity of personal perspectives and opinions gathered from real experience in transport policy-making processes. For the same reason, a group of local academics (from University of Granada), with previous involvement in transport policy-making processes in Granada region, was also included in the study. Their double role as ‘theoretical’ and ‘instrumental’ actors would also add a presumed critical perspective.

Finally, a total of 50 stakeholders were asked to participate during the consultation process, considering the following professional groups: (i) Transport planning and traffic engineers (9 participants); (ii) environmental consultants (12 participants); (iii) academics (12 participants); (iv) urban planners (17 participants). However, a high variability of professional profiles, roles and approaches can be found even inside each particular group, making difficult to establish a strict and reliable classification of participants into homogeneous groups. A detailed composition of the panel appears in Appendix A.

3.4. Results processing

Following the aim of the study, the exploration of the survey results required ways to elicit differences in opinions and their meaning, while summarizing relevance and suitability levels from stakeholders’ perceptions. Two indexes, ‘Suitability Index’ (SI) and ‘Relevance Index’ (RI), were specifically designed in order to embed levels of ‘potential consensus’ in a quantitative suitability and relevance measure. Both SI and RI, for each set of suitability and relevance answers in the graduated scale, combine the median value (m) with a ‘potential consensus’ coefficient (c), given the following expression:

$$\begin{aligned}
 \text{if}(m - 3) \geq 0 &\rightarrow SI \text{ or } RI = \frac{2c + m - 3}{4} \\
 \text{if}(m - 3) < 0 &\rightarrow SI \text{ or } RI = \frac{-2c - m + 3}{4}
 \end{aligned}$$

The ‘potential consensus’ (c) coefficient (from 0 to 1) was determined by comparing the proportion (p) of answers at opposing levels (1, 2... 5) of the graduated scale. Thus:

$$c = 1 - 2\min\left\{p_1 + \frac{p_2}{2}; p_5 + \frac{p_4}{2}\right\}$$

SI and RI were computed for each policy, as well as each policy package (see Section 4). The index is designed in a way that absolute values can be related to a low level of consensus within a range from 0 to 0.5, in each set of answers, while the sign, positive or negative, helps to identify two tendencies: more suitable/relevant measures and less suitable/relevant measures (see Fig. 3).

Fig. 3. Steps in computing the Relevance and Suitability indexes.

4. Survey results

It bears noting that the overall high perception rate of the Granada LRT project offers an opportunity to implement most of the selected policies, as around 83% of them show SI values of more than 0.5, and none of them less than -0.5. More diverging situations arise when relevance to achieve SUM goals are considered, with a remarkable number of policies within the low potential consensus range: a majority of policies indicate low levels of potential consensus for 'urban integration' and 'environmental quality' (60% and 52%, consecutively), compared with 'intermodality' (26%), 'accessibility' (24%) and 'efficient management' (36%). Only in a few policies are SUM goals clearly positioned as 'less relevant', such as the overall 'environment' package for 'intermodality' and 'accessibility'; or individual policies within packages (e.g. 'establishment of companies linked to PT transport' for 'urban integration', 'contactless cards' for 'environmental quality').

Policy-package results are further described and contextualized below.

4.1. *Environment package*

Opportunities to introduce environmental policies in the LRT-project context were not clearly perceived by the stakeholders, with the package SI index under 0.5. Only 'bicycle path/networks' and 'comfortable, environmentally sensitive public-space designs' showed slightly higher levels of suitability. This may be due to the already well-consolidated urban project linked to the direct infrastructural intervention of the LRT line, after which a mild increase in walking, cycling, and green spaces is expected (around 0.8%, with significant improvements of up to 60% in some sections). 'Access restriction for high-emission Vehicles', even when considered in urban and sub-regional plans and in the LRT-project, generated some degree of dissent among participants concerning the enabling capacity of the LRT system; the same was true for the 'promotion of clean vehicles'. Lastly, the SI index of impact-correction solutions ('noise barriers' and 'noise-absorbent asphalt') also prompted opposing views.

Given the nature of this policy package, the 'environmental quality' goal scored the highest RI with respect to the other packages. Urban planning and design instruments (public space, access restriction, and bicycle network) were also well envisioned to pursue 'urban integration'. Other modal and transport goals were left apart or generated no uniform positions among stakeholders, except with cycling infrastructures, for which the potential to raise overall consensus contradicts the relatively low importance of this mode in the MAG.

4.2. *Economy package*

No clear consensus emerged for the potential of the LRT project for implementation of charges to vehicles ('urban toll' and 'parking-congestion fares'), with SI values under 0.5 in both cases; the only exception was the 'parking dissuasive fare', which has long been preceded by an existing temporal permit scheme in the main local urban centres over the MAG. By contrast, the implementation of policies supporting free parking for transport users was unilaterally perceived as well suited to the Granada LRT project, over subsidies and parking charges.

Likewise, with respect to RI values, public-transport incentives ('PT subsidies' and 'Free P&R for PT users') rendered more goal-bound views, compared to the above-mentioned charging mechanisms, where low consensus was observed for almost all SUM goals. Furthermore, an absence of explicit connections between 'urban integration' and economic policies is induced from the survey results, which is also observed for the 'environmental quality' goal only in relation to the three charging-type policies.

4.3. *Management package*

The potential of LRT projects to spread public-transport management innovation has been already stated in Andalusia. This is also true of the MAG, where the new transit system aims to improve frequency and reliability (4-minute headway), information provision, and is being accompanied by new public-

transport operators, as well as the reorganization of the previous urban bus system. Furthermore, Granada's mobility and local master plans have already implemented car access-restriction policies in commercial centres and residential areas. This situation probably led to a good perception of the LRT project to enhance the related policies, which translated as a high suitability score in all cases.

Also, a major advance towards 'intermodality', 'accessibility' and 'efficient transport management' was perceived in this package. A less clear scoring tendency was observed in the stakeholders group for its relevance for 'urban integration' and 'environmental quality'; nonetheless, policies such as 'car-access restriction', 'bicycle rental' and 'bus-flow redirection' seemed relevant from both perspectives to most of the participants surveyed.

4.4. Transport-modes package

Stakeholders appeared to perceive high levels of suitability of LRT project linked to the advanced implementation of modal improvements. 'Own right-of-way for TP' policy excels within this package, regarded as a one of the main design features of Granada's LRT for achieving high frequency and reliability.

The RI results also point to a high multi-purpose potential of this package with regard to SUM goals. Although yet poorly consolidated, regional, urban, and mobility plans promote new 'intermodal stations'; the strategic importance inferred from this fact was also expressed in the resulting high RI. The opportunity to foster most of SUM goals through cycling-LRT infrastructure design ('PT-bicycle accessible design' and 'bicycle parking in PT stations') is also well perceived. By contrast, 'high-occupancy vehicles lanes' are absent from any planning measure of the MAG, and this may cause some degree of ambivalence among participants in the relevance perception concerning most of SUM goals, despite the high suitability rate of the LRT regarding this policy.

4.5. Society package

SI results on social policies reveal a strong shared vision of the LRT as a means of introducing 'integrated multi-modal fare systems'. Suitability is also rated relatively high in the rest of the policy package; 'accessible designs in PT facilities' (low platforms, spacious vehicles) and 'integral systems for user security' are on the way to being implemented in Granada's LRT, resembling other user-oriented technologies and services included in the present and other packages (i.e. technology, management), which manifest similar positive tendencies in suitability scores.

RI reflects significant differences across policies. While 'accessible designs in PT facilities' generated high relevance scores for almost all SUM goals, 'multi-modal fare integration' and 'public communication' sustained a clearer vision of relevance only towards 'intermodality', 'accessibility', and 'efficient management' goals. On the contrary, a lack of potential consensus was found concerning the role of 'integral systems for user security' from a sustainable urban-mobility perspective. Surprisingly, incentive policies to sustainable urban-mobility planning ('public funding to encourage SUM planning in companies') also show high divergence of relevance answers across goals, with the exception of 'efficient management' and 'environmental quality', a fact that could point to differences in understanding about the role of these planning instruments.

4.6. Technology package

Again, the advanced state of implementation of these policies in the existing public transport system, such as 'contactless cards', 'modulated capacity on demand' and 'real-time GPS monitoring in stops, and their inclusion in the Granada LRT, may be behind the high suitability levels found. Particularly, the latter policy together with 'user security technologies' stand out in this sense. Despite its highly hypothetical condition in the MAG, as no commuter rail service exists, proximity between new LRT line and train stations opens the possibility for an 'LRT-commuter-rail combined operation' scheme, which probably accounts for the intermediate levels of suitability expressed for the SI.

RI also shows good recognition of the strategic value of most of the policies in the technology package towards 'intermodality', 'accessibility', and 'efficient management'. 'Urban integration' and

'environmental quality' are also better envisioned in 'LRT-commuter rail combined operations' (widely known as 'tram-train', following the innovation in Karlsruhe, Germany) policy, while not clear or unanimously rejected in the others.

4.7. Urban-planning package

Stakeholders' views on urban-planning policies shows, in relative terms, a shared perception of good opportunities about their delivery in the MAG. Only the 'urban severance reduction' policy prompted contradictions among participants, probably due to the features of the project (i.e. prevalence of urban itinerary, combination of surface and grounded sections). On the other hand, the high SI for the 'reduction of places for temporary parking permit' could be linked to the existing relocation schemes impelled by the urban master planning, or by a shared notion about the suitability of link 'push' measures to public transport improvements. The same can be applied to the high SI of 'park and ride spatial designs'. In the LRT project, stakeholders also considered some level of suitability for implementing 'car-free development', 'multimodal street designs' and 'walking paths'; this pinpoints potential areas of intervention along the LRT corridor, both directly related to the infrastructure project (e.g. sidewalk expansion, removal of on-street space for car, bicycle lanes, PT platforms...) or through urban development mediated by regional and urban master plans (e.g. residential growth and new metropolitan focuses for activities in city outskirts).

After sub-regional master planning recognized the role of inter-municipal coordination in LRT implementation, followed by the establishment of the Metropolitan Transport Consortium of Granada, stakeholder's opinion could also conceive of the metropolitan dimension of the LRT as an opportunity to further promote 'regional and metropolitan coordination' in the LRT urban project.

A high potential consensus also dominated concerning the capacity of urban-planning policies to achieve most of the SUM goals in the context of implementing the Granada LRT. The high relevance of 'park and ride spatial design', 'multi-modal street designs' and 'walking paths' for all goals could be connected to the enclosed potential synergy between those policies, as indicated by Valenzuela et al. 2009; Valenzuela-Montes 2011 and Valenzuela-Montes et al. 2011. Similarly, 'regional/metropolitan coordination of the LRT urban project' was found to be highly regarded, especially for 'intermodality' and 'efficient management' goals. Only 'temporal parking reduction' in the city centre, proposed by the Mobility Plan in Granada, failed to suggest any clear strategic advantage in the light of SUM goals, despite being seen as an opportunity by the stakeholders. 'Urban severance reduction' is highlighted in terms of 'accessibility' and 'urban integration', but opinions were divided with respect to the other goals.

Fig. 4. LRT suitability and policy relevance, according to their related indices in the survey results.

5. Conclusions and discussion

Research results, in the light of the initial question (*is the Granada LRT Project perceived by local stakeholders as a real opportunity to encourage sustainable urban mobility?*) and the design of MOBYPANEL, can help to understand the perception of stakeholders on the opportunities of the Granada LRT project in two ways: *as a means* to transform sustainable mobility policies and *as an end* to consolidate the strategic position of public transport in sustainable urban-mobility planning.

When considering the Granada LRT *as a means*, stakeholders seem to share a high perception of the suitability of the project for most of policies, with only few items registering a low consensus (17%). Most of the policies reflecting diverging positions are concentrated on 'environment' and 'economy' packages (e.g. 'access restriction', 'noise barriers', 'noise-absorbent asphalt', clean vehicles promotion, 'parking-congestion fare' and 'urban toll'). Well-known conflicts discussed in research literature with respect to economic instruments have also arisen for the MAG in the survey results; for instance, the low suitability observed for urban tolls and congestion charges may contradict the theoretical advantages of public-

transport improvements to enable acceptance and effectiveness of these policies, which is also a contested issue in the literature on congestion charging schemes (Kottenhoff and Brundell Freij, 2009). On the other hand, transport technologies (such as 'real-time GPS monitoring', 'user security systems'...), modal improvements ('own right of way', 'LRT system expansion', 'PT-bicycle accessible design'...) and management instruments ('frequency / reliability improvements', 'redirection of bus flows'...) were perceived by stakeholders as best to be delivered after the Granada LRT project.

Concerning stakeholders' perceptions of LRT *as an end*, 'accessibility', 'intermodality' and 'efficient management' were the three SUM goals conceived best to be fostered by the whole set of policies covered in the survey, according to Relevance indexes, whereas 'urban integration' and 'environmental quality' showed more dissension among stakeholders. The reason behind this result could be the very composition of the policy set used in MOBYPANEL or could be related to the innovative or complex nature of the two later goals, while the other three more directly involve well-known features of transport systems. Nonetheless, policy packages vary sharply: from those packages with a 'multi-goal' vocation ('transport modes', 'urban planning') to those partially enhancing environmental quality ('environment' package) or promoting 'accessibility', 'intermodality' and 'efficient management' ('economy', 'society', 'technology').

This interpretation on suitability and relevance of LRT project may help focus policy makers on the development of highly synergistic policies (i.e. those with high relevance and suitability). Even in policies showing lower rates in both aspects, measuring potential consensus could help to frame each policy (or policy package) development in different decision-making contexts (i.e. from more 'means-oriented', led by 'instrumental actors', to more 'end-oriented', led by 'normative actors'). Therefore, a tool such as MOBYPANEL could benefit the effective management of decision-making processes (namely, by scheduling and work-group design), avoiding the prevalence of conflicts such as those that arose among stakeholders and institutions during different design phases of Granada LRT project.

Finally, a future contribution could be made by transforming MOBYPANEL into a monitoring tool for collaborative planning, able to integrate periodical feedback with more specific stakeholder work groups. This could also contribute to further research on the precise role of each type of actor (i.e. 'instrumental', 'normative', and 'theoretical') in transport planning and their interactions.

Acknowledgments

This research was carried out within the framework of the following research projects:

- "MITIGA: Tools for the assessment of urban scenarios facing climate change" (P12-RNM-1514, 2014–2018), funded by the Regional Government of Andalusia (Spain) and FEDER.
- "BACK-SCENE: Backcasting scenarios as collaborative learning process: involving stakeholders in transport climate policy", funded by European Union's Seventh Framework Programme, Marie Skłodowska-Curie actions (COFUND - Grant Agreement no. 291780) and the Ministry of Economy, Innovation, Science and Employment of the Junta de Andalucía (Spain)

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