

TeMA

This Special Issue of TeMA - Journal of Land Use, Mobility and Environment, collects twenty-seven contributes of international researchers and technicians in form of scenarios, insights, reasoning and research on the relations between the City and the impacts of Covid-19 pandemic, questioning about the development of a new vision and a general rethinking of the structure and urban organization.

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Special Issue

Covid-19 vs City -20

scenarios, insights, reasoning and research

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COVID-19 vs CITY-20

SCENARIOS, INSIGHTS, REASONING AND RESEARCH

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Given the short time to produce the volume, the Editorial Board of TeMA Journal carried out the scientific quality audit of the contributions published in this Special Issue.

The cover image is a photo collage of some cities during the Covid-19 pandemic quarantine (March 2020)

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Special Issue

COVID-19 vs CITY-20

SCENARIOS, INSIGHTS, REASONING AND RESEARCH

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Evolution of mobility sector during and beyond Covid-19: viewpoint of industries, consultancies and public transport companies

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Abstract

This paper presents the results of a survey carried out between April and May 2020, among a panel of chief executive officers (CEOs), consultancies in the mobility sector, and of Public Transport (PT) companies. We surveyed their expectation about the impacts of Covid-19 on urban mobility in the short-medium term and on their own business, and their opinions about the effectiveness and the sustainability of the measures proposed for coping with the emergency (e.g. incentives, public investment, regulatory measures, new supply of transport services and modes). Different views emerged between industry/consultancies, on the one hand, and PT companies, on the other. The formers show more optimism towards the future thanks to the opportunities foreseen to improve labor-efficiency and for developing new products after the crisis. On the other hand, Public Transport companies appear very much uncertain about the future and worried about the expected losses of demand and revenues, that, in the panel opinion, are far to recover the levels before the crisis (also in the long term). The measures proposed to deal with the interpersonal distances and with the reduced level of capacity are seen as effective, but some are perceived as not sustainable due to the induced increase in operating costs. Finally, poor trust in the administrative capacity is observed, to implement strong measures to manage demand peak (e.g. change in the times of the cities or of the factories) and to upgrade the PT service contracts.

Keywords

Short-medium term; Impacts assessment; Measure effectiveness and sustainability; Focus group; Survey.

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1. Introduction

The emergency from Covid-19 and the cities lockdown have had a strong impact on transport sector. Travel demand, in particular, registered an unprecedented overall contraction, with some relevant differences by sector and segment. In fact, on the one hand, freight transport, though declining, has maintained those levels close to the pre-crisis ones, due to an increase in urban deliveries, and in food and pharmaceutical freight distribution (see for example Borghetti, 2020). Passenger transport, on the other hand, has dramatically dropped down to less 90%-95% in the case of medium and long-haul (intercity) transport.

In the re-opening phase, travel demand is gradually resuming the levels before the crisis, but some structural changes in travel behavior are observed. In China, one of the first countries to re-open after several months of strict lockdown, the fear of contagion has moved travelers from public transport to using private vehicles. The outbreak of modal share shows an increase in the use of private cars from 34% to 66%, whereas the use of metro and buses drops down from 56% to 24% (Ipsos, 2020).

First evidences from the Italy show a similar pattern and confirm the perception of un-safety in using public transport, unlike traveling by car and on foot (Isfort, 2020): on a scale of 1 to 10, both journeys with private cars and on foot are perceived as very safe (8.7 and 7.3 as an average rating), the scores of all public transport do not exceed 3.5 on average (Tab.1).

Safety perception index	Average
car	8,7
on foot	7,3
bus/tram	3,5
metro	3,1
train (long distance)	3,3

Tab.1 Safety perception of traveling, by modes of transport (Likert scale: from 1=very unsafe to 10=very safe) - Source: Isfort, 2020 (adapted from)

An increase of passenger private mobility in the medium period is likely to happen also due to the reduced capacity of Public Transport, estimated between 50% and 20% of the level pre-crisis, in order to keep the (one-meter) interpersonal distance among travelers on board buses, trains and metro. The concern is particularly serious at the urban scale where, given the limited spare capacity of roads and parking spaces in the city center, the increase of travels by cars could lead to high level of congestion with severe consequences on the environment (landscape and air quality) and on people's quality of life.

It is of utmost importance to plan the re-opening based on the transport system's ability to offer safety conditions and adequate level of service according to travelers' needs. Technology could certainly give a contribution, but it will also be necessary to undertake actions to reorganize transport and to manage travel demand. To this aim, in view of a full re-opening of schools and other activities, Public Administrations and other Transport Associations are proposing a list of possible solutions including smart-working, modal integration, increasing PT services frequency, offering incentives for cycling and other innovative modes of transport ("micro-mobility"), providing PT companies with incentives to reduce fares and to compensate the losses of revenues. However, none of those seems to be effective on its own.

It is common belief that urban mobility should re-thought within a new system of rules of urban living encompassing new schedules for economic activities (e.g. offices, factories, ...), differentiated times for school and education. The challenge is not trivial at all, as it involves many stakeholders and requires some radical changes in people's lifestyle and households' habits. In practice, implementing such policies would not be

possible without listening at people's needs, without engaging stakeholders and businesses, without sharing responsibilities among the institutional levels.

This paper aims at giving a contribution to the undergoing debate by presenting the results of a survey carried out between April and May 2020, among a panel of chief executives officers (CEOs), consultancies in the mobility sector, and Public Transport (PT) companies. With respect to two different time horizons, i.e. short-term (September 2020) and medium-term (April 2021), the questions were about:

- the expected impacts on transport sector businesses in terms of supply (products /services) and demand (customers /travelers) and, in general, on the overall transport system;
- the effectiveness and economic sustainability of some measures proposed for dealing with the emergency;
- the criticalities that can be envisaged.

The paper is organized as follows. In section 2 the survey is described as well as a list of measures proposed by Public Administrations and other Transport Associations to deal with the Covid-19 emergency. Section 3 presents the results of the survey. In Section 4 these are discussed and some conclusions are drawn, providing ideas for future research directions.

2. Research methodology

The research methodology included a focus group and an online survey carried out between April and May 2020 with the CEOs of a panel of industries, consultancies in the mobility sector, and of Public Transport (PT) companies operating in the Lombardy Region that was the first and one of most affected region in Europe by the Coronavirus (Tab. 2).

Sector	Firm	Core Business
Industry	Alstom	Railway vehicles and signalling systems production
	Hitachi Rail STS	Railway signalling and integrated transport systems production
	Hitachi	Design and manufacturing of railway and mass transit vehicles
	Lucchini	Production of high-tech steel products
	Mercedes Benz	Vehicle manufacturing
	Mermec	Professional services for the railway industry
	Metra	Production of aluminum products
	Microelettrica Scientifica	Systems and components manufacturing
	Scania	Commercial vehicles manufacturing
	Società di Progetto BreBeMi	Motorway A35 construction, operations and maintenance
Consultancy	NET Engineering	Feasibility study and design
	Systematica	Mobility and accessibility planning
Public Transport Companies	ATM - Azienda Trasporti Milanesi	Integrated Public Transport service in the city of Milan
	Autoguidovie	Public Transport service in the city of Pavia
	Brescia Mobilità	Integrated Public Transport service in the city of Brescia
	Ferrovie dello Stato Italiane	Italian National Railways
	Trenord	Regional railways service operations (Lombardy Region)

Tab.2 The firms and companies included in the panel

2.1 Focus group

The focus group is a qualitative technique to get preliminary insights around a specific topic (e.g. Mobility after Covid-19) from individuals of different population segments and from stakeholders. In practice, it consists of an open discussion moderated by an expert, among a limited number (e.g. 10-15) of selected individuals with different socio-economic characteristics, background knowledge and perspectives about the considered topic. The members of the focus group do not have to be representative of a population rather they should have some experience about what the moderator is intended to investigate.

In this study, the open discussion within the focus group was set up around basically the following questions:

- What are the critical issues of the Covid-19 emergency that have affected your own business, both on the supply side (i.e. products and services) and on the demand side (i.e. customers and travelers)?
- What changes can be foreseen on the overall transport system after the Covid-19 emergency?
- How your business could contribute to support the overall mobility system during and beyond the crisis?

The focus group is particularly useful, on the one hand, to preliminarily explore attitudes and expectations to be further investigated analytically by means of a detailed questionnaire, and, on the other hand, to have general comments and feelings about the sustainability and the effectiveness of the measures to be eventually put in place.

The information obtained based on stated opinions, real experiences, and based also on the observation, during the discussion, of the reactions to the questions and the inputs given from the moderator, represents a basis of knowledge to identify the relevant variables to control in the subsequent phases of the analysis, and for designing the questionnaire for the survey.

2.2 Questionnaire

The questionnaire, carried out two weeks after the focus group, was structured in three sections.

The first section aimed at probing the perceptions of the respondents about the impacts on their own company both in the short and medium period. In particular, the focus was on the supply (of products and/or services), on the demand (of customers and/or users), on the provisional budget, on the organization of work and, more generally, on what impacts they would expect on the mobility and transport market, for example, whether they do expect a modal switch towards private cars or an increase of production of bikes, scooters mopeds. In addition, few questions were asked about whether any opportunities could be envisaged after the crisis, e.g. how likely the number of business travels could be reduced by smart-working and video-conferencing, both for managers and employees. For each item, a Likert scale from 1 to 5 has been adopted, where 1 corresponds to "very low" expected changes, 2 "low", 3 "neutral", 4 "high" and 5 "very high" expected changes. Both the effectiveness and economic sustainability of individual measures for public transport were investigated in the second part of the questionnaire. This was addressed only to PT companies with respect to the list of measures emerged from the discussion during the focus group, such as:

- differentiated fares by time-of-day;
- seat reservation or reservation for travel-time slots in order to access stations/buses stops;
- use of protection mask and scan of the body temperature of passengers;
- interpersonal distance on-board the vehicles;
- sanitization of vehicles;
- introduction of demand-responsive PT services or dedicated home-to-work shuttle services;
- increasing PT service frequency to improve PT capacity.

In the third and final part of the questionnaire, interviewees were asked about their perceived effectiveness of two clusters of measures:

- public investments, in infrastructure and in rolling stock;
- incentives, for electric mobility, for active mobility and for public transport companies to compensate the losses in revenues.

Respondents were finally asked about their trust in the public administration and about any other critical issues related to the actual applicability of strong regulatory measures to reduce travel demand peaks, such as modification of times of the school, offices and factories, and adjustment of PT service contracts to cope with the new conditions.

3. Results

Different views emerged from the focus group between industry and consultancies, on the one hand, and Public Transport (PT) companies, on the other. As shown in Figure 1, a very negative common sentiment is observed in the short period characterized still by the strong negative impacts of two months of lockdown on the production levels. However, in the medium period, the Industries showed more optimism towards the future thanks to the opportunities for developing new products after the crisis. In particular, the new business of scooters and other means of transport under the umbrella term of “micro-mobility” looked the most promising one, followed by an expected increase of electric vehicles demand for both private and collective transport (i.e. cars and buses). On the other hand, PT companies appeared very much uncertain about the future and worried about the expected loss in demand and revenues, that, in the panel opinion, are far to recover the levels before the crisis (also in the long term). The expected loss in passenger demand on the long distance was estimated between 75% and 85%, and on the regional service between 40% and 50%. For Railways freight transport the figures were less negative, i.e. -50%, but still alarming not only for the losses of the operators, but also for the potential impacts of more trucks on the environment and on road safety.

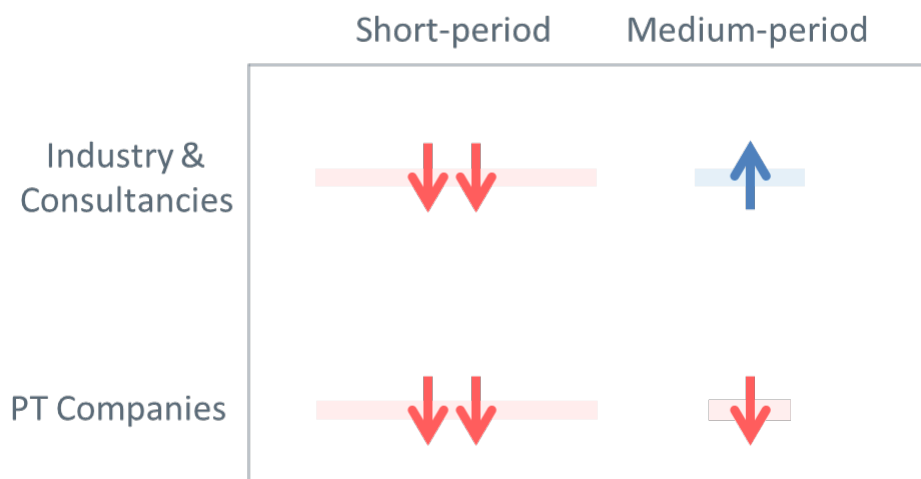


Fig.1 Overall sentiment of the respondents in the short and medium periods

The above figure is also reflected in the responses to the questionnaire about the new opportunities hidden behind the crisis. In particular, as shown in Fig. 2, about half of industries and consultancies in the panel see rooms for the development of new products and services, and about one third for a better organization of labor. PT companies show lower percentages, but some of these see the emergency as an opportunity to innovate selling processes, e.g. by the introduction of e-ticketing. In fact, digitalization is seen central to cope with the emergency and to develop integrated transport solutions (e.g. digital platform for Maas, Mobility-as-a-Service).

From a system perspective, sharing mobility and active modes, such as bikes and scooters are seen as effective to promote sustainable transport. These could contribute to enlarge the catchment area of stations and could help Public Transport to contain the loss of demand.

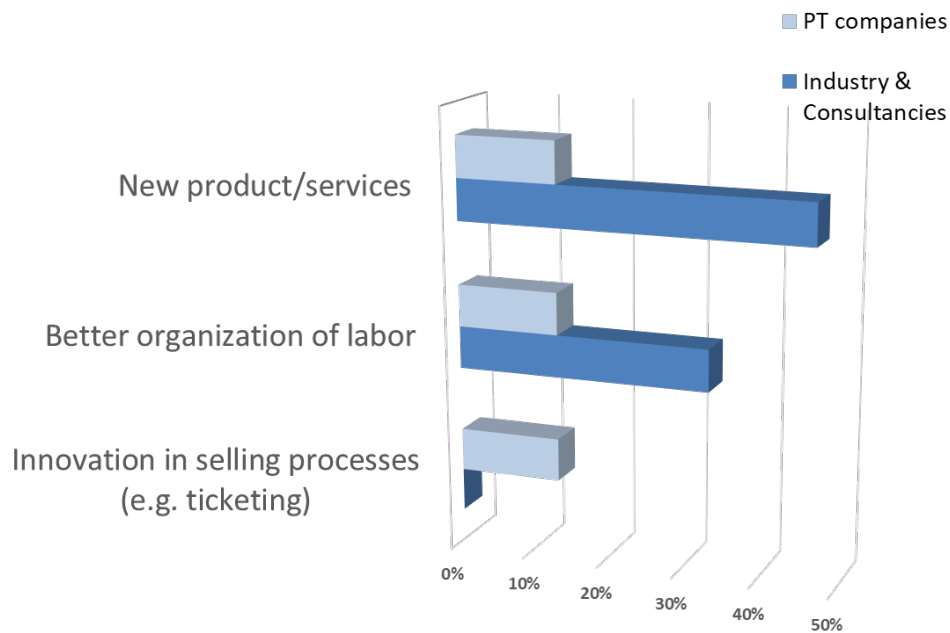


Fig.2 Areas for opportunities and business development after the crisis

Another chance to transform the emergency in an opportunity is seen in a better organization of labor. As shown in Fig. 3, the areas of possible improvement are the workplace safety, the use of smart working and videoconferencing to reduce working and business journeys, in particular for managers. As expected, Public Transport companies are less sensitive to the impact of smart working as many employees are drivers and obviously their presence at workplace is required.

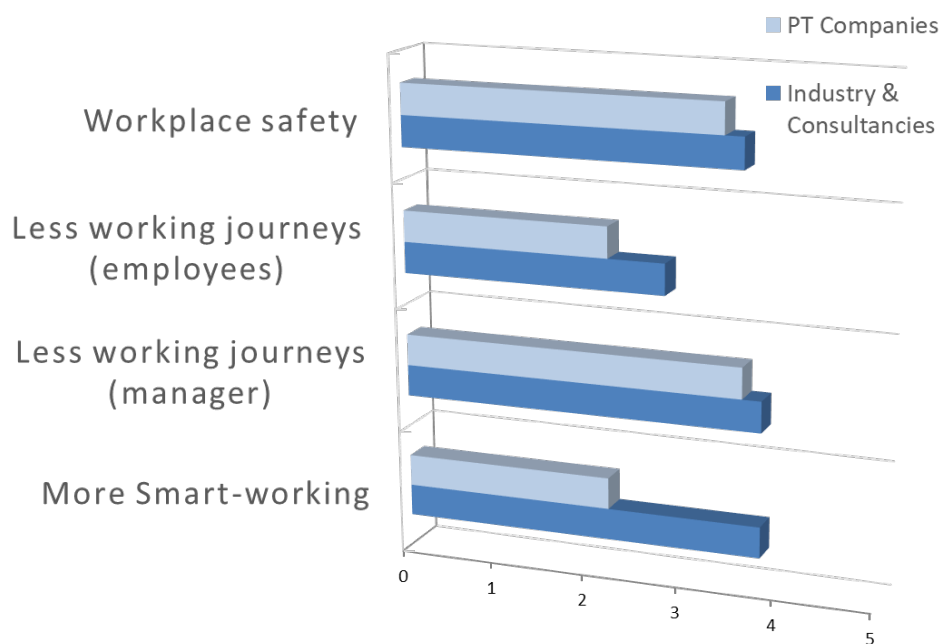


Fig.3 Areas of improvement in labor organization

The measures put in place or proposed to cope with the emergency can fall into four domains identified by their effectiveness and sustainability as evaluated by the panel (Fig. 4). We can distinguish between measures with:

- High effectiveness and High sustainability (HH);
- High effectiveness and Low sustainability (HL);
- Low effectiveness and High sustainability (LH);
- Low effectiveness and Low sustainability (LL).

The introduction of fares differentiated by time-of-day, the obligation of seat reservation and of the reservation for travel-time slot to access the stations/vehicles fall in the domain of high effectiveness and high sustainability, however some respondent has expressed concerns about the actual applicability of these measures, in particular for what concerns the enforcement outside the stations to regulate access (note that in Wuhan, China, these measures have been put in place with the support of the Police and the National Army).

The use of protection masks, the scan of the body temperature of passengers, keeping the interpersonal distancing measures on-board the vehicles, and the sanitization of vehicles are all seen as effective measures but not sustainable in particular for the additional operating costs to be borne by PT companies and by the lack of personnel to be allocated to these tasks.

The introduction of demand responsive PT services and home-to-work shuttle services for employees are considered as neither effective nor sustainable.

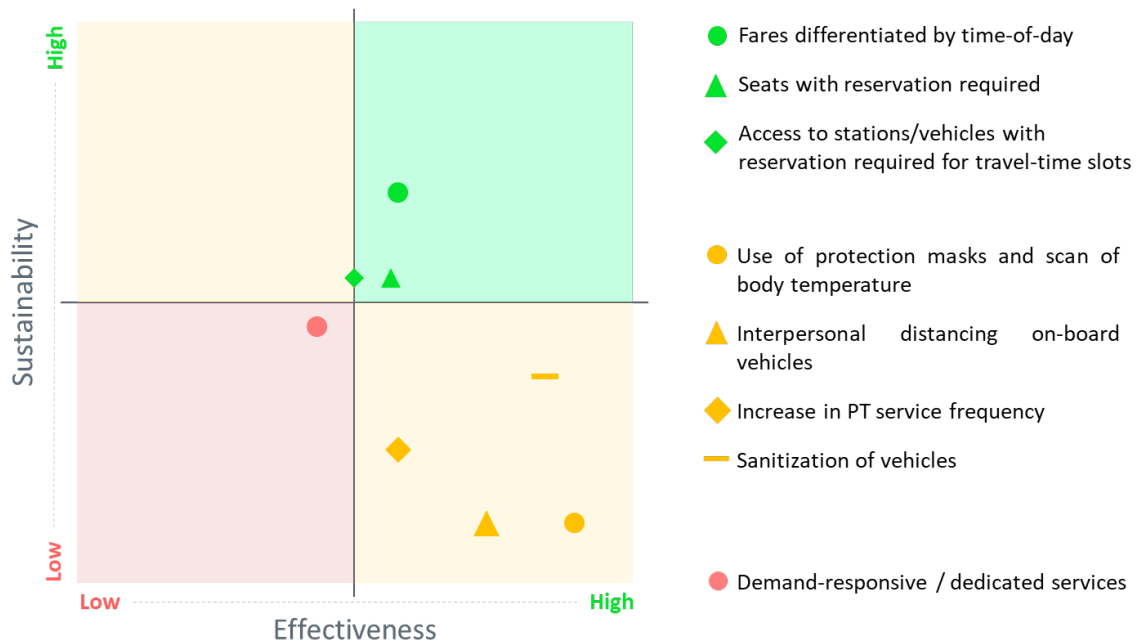


Fig. 4 Domains of effectiveness and sustainability of the proposed measures to cope with the emergency

Increasing PT service frequency is valued as an effective measure to cope with the limited capacity of vehicles (buses, metro and trains) to keep the interpersonal distance. However due to limited numbers of drivers and vehicles this measure is perceived as unfeasible both in the short period and in the medium period. Note that the time to the market of new vehicles is about 18-20 months and hiring new drivers is even longer due to the administrative procedure. As a matter of fact, the only way to cope to the reduced capacity of PT vehicles is to reduce the volumes of demands (e.g. by promoting smart-working) and to smooth demand peaks

by spreading the flows along the entire daytime (e.g. by changing the times of the cities), as schematically depicted in Fig. 5.

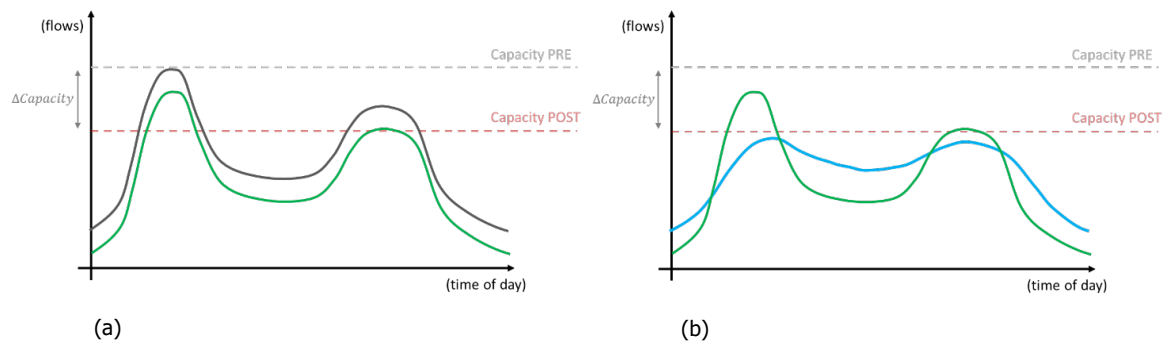


Fig.5 Schematic representation of the combined effects of reducing demand levels (a) and spreading flows along daytime (b) to cope with the reduced capacity of Public Transport

Measures to reduce demand peak such as changes in times of the schools, differentiated schedules in office and factories working hours, changes in the times of the cities (e.g. shopping, public services, medical cares,...) as well as measures to upgrade PT service contracts would require strong political action and great administrative capacity, since they may induce a radical changes in households' habits and daily routines. In this respect the panel has expressed very little confidence and trust in the ability of the public administration to implement such measure (see Fig. 6): the main criticalities pointed out are the lack of system vision, bureaucracy and time to market. In particular 75% of respondents see a barrier in the bureaucratic procedure to access the available funding, but also in the coordination of Public administrations at different levels (local/regional vs. national) as well as in their overall capacity to manage complex processes, especially in an emergency situation.

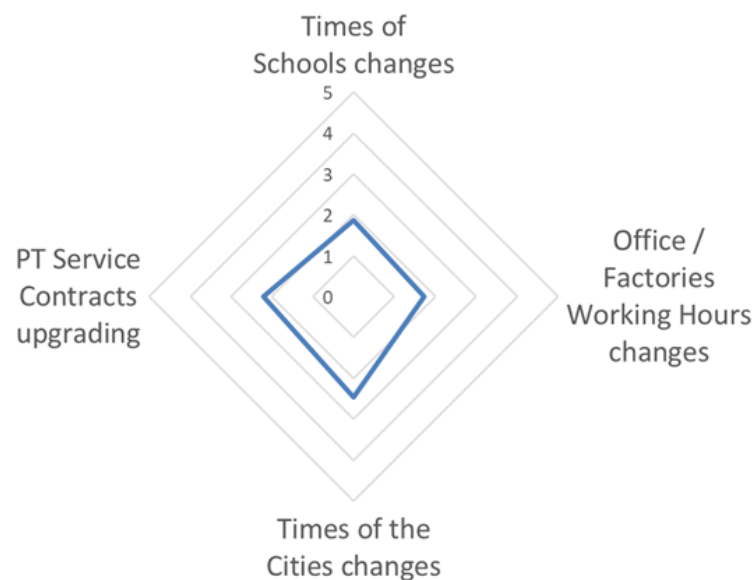


Fig. 6 Panel average evaluation of the capacity of Public administration to implement strong policies to spread demand peaks and to upgrade Public Transport service contracts (Likert scale: from 1=very low to 5= very high)

Finally, investments in new infrastructure and rolling stock as well as incentives for any form of sustainable mobility (i.e. active mobility, public transport and electric mobility) are considered effective (Fig. 7). The fact that incentives to electric mobility are less effective than the others can be explained, on the one hand, because

the diffusion of electric vehicle could increase private transport and congestion, and, on the other hand, because electric buses could have longer deployment and higher costs than traditional ones (with internal combustion engines).

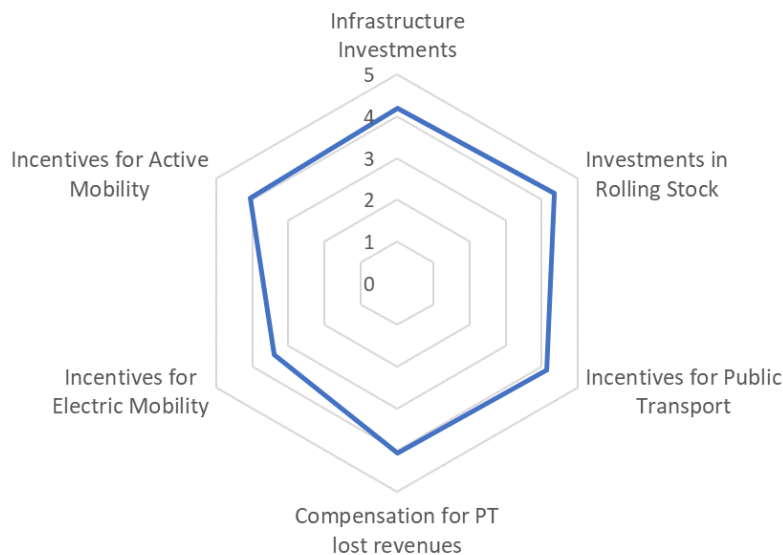


Fig. 7 Panel evaluation of public investments and incentives (Likert scale: from 1=very low to 5= very high)

4. Conclusion

Mobility sector has been severely affected by Covid-19 emergency and will be central for resuming a “new normality”. Re-opening the cities after the “lockdown” period should be carefully designed and fine-tuned according to the capacity of the transport system and to the ability of supplying safety conditions and appropriate level of service to travelers’. Technology will certainly give a contribution, but it will also be necessary to re-think policies and undertake actions to reorganize services and manage the demand. Furthermore, it will be necessary to carefully assess the sustainability (in particular, economic and social) of the measures that will be implemented and to monitor their effectiveness.

The survey presented in this paper although limited in the sample size (i.e. 17 respondents), is significant since it presents the viewpoint of CEO of industries, consultancies in the mobility sector, and of major Public Transport (PT) companies operating in the Lombardy Region, i.e. one of the most severely affected Region in Europe by Covid-19 emergency. We surveyed the impacts on their own business as well as impressions, information and ideas on how to resume the overall mobility sector. On the other hand, we asked their opinion about the effectiveness and the sustainability of a list of the measures proposed for coping with the emergency (e.g. incentives/investments, regulatory measures, new supply of transport services and modes).

The results have shown that industry and consultancies see in the crisis some opportunities to improve their business (in particular to improve labor efficiency by exploiting smart-working and reducing unneeded business journeys), and also to develop new products, in particular for modal integration (e.g. scooter) and new innovative mobility services (e.g. MaaS platform). On the other hand, PT companies are very much worried about the losses in revenues due to the reduction of travel demand, which, in their opinion, is far to recover the level pre-crisis, even in the medium term.

A general consensus about the importance of sustaining local public transport has been observed not only to preserve a strategic sector for urban mobility but also because an unmanaged increase of journeys by cars could lead to high level of road congestion with severe consequences on the environment (landscape and air

quality) and on people's quality of life. In other words, the failure of urban public transport would mean a collapse of the overall urban transport system.

Incentives and public investments are only partly perceived as a solution, since they have long deployment times and, in some cases, delays due to the bureaucracy within the public administration. In the medium term, the solutions that gained more consensus within the panel have been the reduction of the demand levels by adopting, wherever possible smart-working solutions, and by smoothing the demand peaks by differentiating the times of the activities in the cities (e.g. schools, offices, shopping,...). However, such measures would induce radical changes in households' habits and in their daily routines, which in turn would require a strong political action and a great administrative capacity, which our panel does not seem to trust in.

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