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Ex-post evaluation of the impacts of the tramway systems of Casablanca and Rabat-Salé – 2020

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Cover page

Left: A tramway in Casablanca during the evaluation period, at the junction of the two branches of line T1 as they were at the time, near the Abdelmoumen stop. This was when line T2 was still under construction (2017).

Right: Line L2 near the Medina in Rabat (2019).

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Key takeaways

The first tramway lines in Rabat-Salé (opened in 2011) and Casablanca (2012), have brought qualitative and quantitative changes of many kinds to the people who can benefit from them.

What effects have they had on mobility?

With 120,000 (Casablanca) and 110,000 (Rabat-Salé) passenger trips per day in 2018, the tramway lines have found their public. Within their catchment area, more than 10% of residents (not counting those who travel on foot) use them to get to work, according to the 2014 general population census. Women use the tramway almost twice as much as men. However, this growth has been at the expense of buses and shared taxis, but also, in the case of women, at the expense of travel as a passenger in private cars.

The key to this success lies in the confidence people have in this reliable, safe, and dignified means of transport, a peaceful bubble that is “equivalent to the private car” for users. That people project themselves positively in the tramway was an important factor in keeping households from acquiring a first or second car, and contributed to maintaining the share of public transport in the evaluation period, while in the same period both bus networks made a restart and collapsed.

What are the consequences beyond these effects?

The two tramway systems have been accompanied by an urban project that has enabled public action to begin on upgrading roads, street lighting, and public spaces, including in neighborhoods that receive less attention from the authorities. However, these improvements have been poorly coordinated with urban planning policies, which are now regionally managed and which take too little account of the tramway systems. Private initiatives are still not sufficiently developed to take full advantage of this infrastructure, meaning that the effects of the tramway systems on economic activity and real estate, as well as on the attractiveness to private companies, remain limited. Indeed, private companies are only just beginning to take an interest in their employees’ mobility, and retail businesses are starting to look for ways to adapt to the customers of the tramway systems. This could change, however, because in both

cities, people are already choosing to live and work along the route covered by the tramway systems so as to benefit from the areas’ greater accessibility. As such, the tramway systems could, over the long term, bring about a change in the economic fabric, of companies in general and retailers in particular.

Lastly, the two tramway systems are reducing greenhouse gas emissions by around 25% in Rabat-Salé, and around 56% in Casablanca. It is expected that carbon neutrality will be achieved in thirty years (with this figure taking into account emissions from construction). The exact date depends mainly on the rate at which the production of electricity, which currently comes mainly from hydrocarbons, is decarbonized in Morocco.

In Rabat-Salé, the tramway system plays a major role in quickly and efficiently linking the two cities along the Bouregreg river. This is fully reflected in the figures: apart from those who travel on foot, in 2014 25% of Salé residents living in the area covered by the tramway system took it for work and 35% for study. Students made up almost two-thirds of tram users. Currently, it is people living in Salé who come in the greatest numbers to work and study in Al Irfane and to shop in Agdal (both Rabat districts). But the tramway’s tracks go both ways and, with the installation of new equipment and with new residents settling along the tramway route in Salé, that city could eventually become more attractive. Overall, the urban area and urban spaces have changed around the tramway systems, to the benefit of the residents, who appreciate these changes.

In Casablanca, the mobility issues are even more significant. Young workers and women in general (but also people from all social classes) have particularly taken to using the tramway system on a daily basis (70% of journeys are made by those with tramway pass). To do this, they are prepared to walk further to get to a tramway stop, and to travel long distances by tramway (8 kilometers on average, compared to 3.5 kilometers in Rabat-Salé). Here too, the tramway has changed the city as a result of the improvements and upgrades to the road and lighting systems in the area covered by the project. However, the gains are still tenuous, mainly because maintenance has been inadequate. Line 1 of the tramway system is only the first of four lines, plus two bus rapid transit (BRT) lines, that will constitute the network in the short term, with the perspective

of upscaling mobility in the urban area in the longer term.

In the end, the two tramway projects have had impacts on the cities they serve. The two tramway projects have also provided a model for sustainable governance and financing of public transport in Morocco. This model is also being applied to the new bus networks that were launched in 2020. The challenge now is to integrate the various modes of transport, making the modes complementary by facilitating interchanges, so that more residents of Rabat-Salé and Casablanca can benefit from sustainable and dignified mobility conditions, which are essential to development.

Introduction

This evaluation, which was commissioned by the Agence Française de Développement (AFD) (French Development Agency), Casa Transports, and the Société du Tramway de Rabat Salé (Rabat-Salé Tramway Company) (STRS), and carried out in 2019 and 2020, is a first in many respects: its aim was to assess, a little less than ten years after their inauguration, the impacts that the first tramway lines in Casablanca and Rabat-Salé have had on mobility and urban life. Both tramway systems are the primary mode of mass transit in cities where public transport is still notoriously poor, despite increased demand for transport. Line T1 in Casablanca, and lines L1 and L2, which make up phase 1 in Rabat-Salé, are only the first steps on the way to more extensive networks (four tramway lines, two of which are already in service, and two BRT lines are planned for 2022 in Casablanca, as well as extensions of the network that will go into service in Rabat-Salé in 2020). The question was therefore whether these tramways have lived up to expectations.

1. Two projects that are changing the lives of the people they are serving

1.1 Better access to jobs in the corridor served by the tramway and between Rabat and Salé

In Casablanca and Rabat-Salé, we are witnessing a progressive decoupling between place of residence and place of employment. In this context, does the tramway system facilitate access to jobs and essential services for residents?

First, before the tramway system was built, the shared taxis in Casablanca, which normally specialize in inter-city journeys, made up for a deficient bus network, thus allowing access to most of the metropolitan area. **Today, the tramway system means access to more jobs and services within a given time, as long as the user's point of departure and destination are close to the line.** The most significant contributions it has made are on the eastern leg

of the T1 in Casablanca (toward the popular Sidi Moumen district) and on the Rabat-Salé link.

However, the gains observed are not spread out evenly throughout the agglomeration. Thus in Casablanca, for example, the tramway is fast and the stations are fairly closely spaced, but the sometimes winding route in the southwest of the city makes travel times longer. Other modes of transport, particularly shared taxis, remain competitive in terms of travel time and cost (if not of comfort). In addition, in both cities, the different modes of transport are not only not connected, but the residents have also developed the habit of walking to avoid transfers, which are unreliable and expensive since fares are not integrated.

Finally, the poorest people are still excluded from the tramway system: they live increasingly on the outskirts of town, in poorly served low-cost housing, and can afford public transport only for exceptional purposes, preferring to use *khattaf* (unlicensed carriers) or three-wheelers—informal modes of transport—to get around.

1.2 The tramway system: A mode of transport that has found its ridership

Those living in Casablanca and Rabat-Salé have long had to develop mobility strategies: many of them have to use a combination of several modes of transport every day just to try to get from one place to another

Table 1 – Key ridership figures

	Casablanca (2017)	Rabat-Salé (2019)
Average ridership	120,000 (weekdays)	110,000 (weekdays)
Women	44 %	46 %
Students	38 %	63 %
Workers	55 %	32 %
Income	< 3,000 Dhs: 36 % 3,000-15,000 Dhs: 55 % > 15,000 Dhs: 9 %	< 3,000 Dhs: 8 % 3,000-15,000 Dhs: 87 % > 15,000 Dhs: 1 %
Riders with tramway pass (subscribers) (2019)	70 %	57 %

Sources : Société du Tramway de Rabat-Salé, Casa Transports.

Table 2 – Share of trips by tramway from home to work and from home to school

	MODAL SHARE OF TRAMWAY, BY PURPOSE (residents within 500m of a station, not counting those on foot, 2014).	
	Home-Work	Home-School
Rabat	9.8 %	28.8 %
Salé	25.1 %	34.9 %
Casablanca	12.6 %	12.6 %

Source : Haut-Commissariat au plan. Analysis : Systra.

(sometimes without success, due to a lack of service or space).

With 120,000 and 110,000 trips per day respectively, the tramway systems of Casablanca and Rabat-Salé have not revolutionized daily mobility for the majority of people, who continue to get around primarily on foot. In Casablanca, the share of trips made by tramway was 1.4% in 2018 or 4% of motorized means of transport, mainly at the expense of buses and shared taxis. **However, in its catchment area, and in particular for commuting—whether to work, school, or university—there is a real interest in the tramway system.** For example, according to the 2014 census, nearly 10% of Rabat residents living within 500 meters of a stop, and 13% of Casablanca residents, mainly took the tramway to get to work. And when it is the fastest mode, as is the case for Salé residents going to work in the center of Rabat, it shows its full potential: 25% use it to get to work; and 35% use it to get to school.

This preference also has its drawbacks: users are prepared to make very long journeys by tramway, especially in Casablanca (8 kilometers on average compared to 3.5 kilometers in Rabat-Salé) to avoid other modes, and this affects its capacity on certain sections.

These tens of thousands of regular users make up the bulk of the ridership of the tramway systems: they are often from the working or middle classes, are loyal to this mode of transport, which they have been using for several years, and the majority are tramway pass holders. But beyond this core group, **the tramway has become a habit for most people.** As a result, a third of Casablanca residents use it at least once a week and only a third had never used it in 2018.

1.3 The keys to success with this public

1.3.1 – Affordability, a positive projection, trust, timeliness

The tramway is particularly popular with women, who make up almost half of its ridership, as well as with students and with young workers who do not have a car. This is the “market segment” for whom the tramway is quite affordable, while offering a mode of transport that preserves their dignity or their sense of their social status. The tramway is a comfortable mode of transport that is accessible to people with disabilities, and it is perceived as modern. Users appreciate this “bubble of living together,” which is peaceful and fraud-free, while also corresponding to their social ideal. It is well worth the price for those who take it. This positive impression was an important factor in keeping households from acquiring a first or second car. The downside is that a large majority of users now absolutely refuse to take the bus or informal transport, which they consider degrading.

It is also a mode of transport that inspires trust. Users can be sure that they will be able to make their journey, even during rush hour, for a set fare they know in advance, and that they will be able to do so safely. These are two points on which the tramway contrasts strongly with other modes of transport and that explains why users are prepared to walk long distances to catch the tramway if it will take them where they are going. In addition to facilitating regular trips to and from the same places, it also makes it easier to plan one-off trips to places that are far away or unknown, with complete trust, by imprinting the areas served on the users’ “mental maps.” All of this has helped to maintain the share of

public transport over the period in question, while the bus share went down.

1.3.2 – Women, the tramway systems' emblematic public

Women in particular have developed a genuine preference for the tramway, even if it means walking longer to take it. In the catchment area in Casablanca, 13.5% of the trips women took were by tramway, as against 7.7% of the trips men took. **Women often have to combine multiple trips, and the opportunity the tramway gives them to get to new neighborhoods is key.** They are also particularly mindful of the safety that taking the tramway provides, with staff present at the stops and in the tramways both during the day and in the evening. (In Rabat-Salé, by contrast, the service is less frequent and staff are less present at the stops).

The contribution the tramway system makes also spills over into its surroundings. In Casablanca, for example, 60% of the women surveyed said they prefer to take the tramway to get home because it is better lit and thus reduces the risk that they will be assaulted.

2. An illustration of the benefits of taking a project approach...

2.1 Taking a project approach: An advantage for obtaining short-term results and opening perspectives for better governance for urban mobility

The Rabat-Salé and Casablanca tramway projects were decided on and then undertaken in a manner that was quite distinct from the transport policy initiated at the beginning of the 2000s (which involved the implementation of an urban transport plan, investment scenarios, and so on). The companies in charge of construction and operation, Casa Transports and STRS, who have competent staff and who enjoy the support of the authorities, built their respective tram systems on time and within budget, providing a sustainable, high-quality service while also managing to almost break even, which is a challenge in most countries. In this respect, they differ from many other public or semi-public structures that have been set up in Morocco in recent years to tackle urban problems, and that have had mixed results.

The two tramway projects have made it possible to build a sustainable mode of governance and financing for public transport and, after much hesitation on the part of the authorities regarding risk allocation, have ended up serving as a model for the establishment of a bus service that meets public needs. In a pragmatic way, the Moroccan authorities now intend to rely on these two companies to become mobility operators. This process, which has not yet been completed, should be continued over the medium term.

2.2 The tramway system as an urban project, or the spillover of the tramway into the city

During construction, the tracklaying was accompanied by a complete renewal of the streets used by the tramway. This approach has enabled urban spaces close to the tramway to be improved. These spaces have been made more pleasant to walk around in (through the laying of paths, the reduction of pollution, less noise, and so on), as well as safer, particularly at night. **In the vicinity of the tramway, the city has changed, in general for the better, in many respects that are appreciated by the residents. This is particularly the case in Rabat-Salé,** and even more so in the Bouregreg valley area, since the tramway system is part of the urban renewal in this area.

The tramway system differs from other large-scale urban projects undertaken in recent years, in that it not only concerns city centers or areas in which the most affluent live, but also impacts working-class neighborhoods, which receive less attention from planners.

3. ... and of its limitations: Limited impacts outside the area served by the tramway system

3.1 Limited coordination with other urban policies

The limitation of the project approach is that it is done without overall coordination with other urban policies. This means that sometimes no investments are made in roads and neighborhoods in the immediate vicinity of the tramway. Moreover, maintenance carried out is ineffectual, given the low budgets allocated to it by the municipalities, especially in Casablanca.

More broadly, **urban and planning policies today do not really take tramway systems into account.** These policies must be seen in the context of a long period within which the tramway's arrival is still quite recent. They were drawn up at the regional level with cars in mind, meaning that the centers served by tramways receive less attention.

3.2 The modal shift from private cars: A shift in modes that is still limited

The direct consequence of this observation is that, **without concerted action by the public authorities, the tramway alone cannot massively make motorists leave their vehicles at home.** The context is that of a sustained increase in car use by Moroccan households. However, it is not certain that any other mode of transport would have reduced car use either. All over the world, the decline in the share of cars, when it has been observed, is the result of congestion or specific policies to limit car use for environmental or other reasons. The shift away from buses and shared taxis that tramways have caused has probably helped to halt the decline in public transport use in both cities. And the move women have made away from being

passengers in cars shows that tramways can be an attractive alternative to cars.

However, this limited shift in modes makes a number of the impacts that tramway systems were expected to have, especially on traffic congestion, unlikely. This congestion, except for specific black spots that cause bottlenecks along the route, is caused less by tramways and more by the growing use of private cars among households, and by the very large number of formal and informal taxis that make up for the inadequate number of buses.

It should be noted that **86% of those who currently use tramways indicate that they plan to continue to do so in the future.** It remains to be seen whether this will still be the case if they have access to private cars in the future.

3.3 Major trends in real estate and economic activity: Stronger than the tramway system

In both Casablanca and Rabat-Salé, the tramway systems are not fundamentally changing the economic balance, especially as the most dynamic areas are often located on the outskirts, which the tramways do not serve.

The available data on the residential real estate market is of questionable reliability, and the results of our analyses must be viewed with caution. Nevertheless, we have identified, based on tax data, fairly limited effects on the prices of houses for sale, especially where they were lowest, such as in Hay Karima in Salé. The effects on rental prices may be more significant, but they are still hard to measure.

However, **the real estate market remains “blocked” overall.** Land is scarce. New construction is concentrated mainly on the outskirts and is for social housing programs, the prices of which are set by law. The supply on the open market, at prices that are often too high, is unsuited to the means of middle-class families, and they have difficulty to find buyers.

The trends for office real estate are not linked to the tramway system either. The supply of office space in the city center, which is well served

by the tramway systems, is considered obsolete by professionals. Overall, companies that are recruiting are continuing to move to the outskirts of the city, in a shift that is linked primarily to local attractiveness dynamics (appetite for new and larger premises), rather than to accessibility. At the same time, most companies are only just beginning to take an interest in the mobility of their employees. **They point to the consequences of the trams in terms of reduced delays and lower levels of stress among their employees, but so far they have not taken full advantage of the possibilities the tramways offer.**

Finally, retailers have only just begun to organize themselves so as to take advantage of the tramway. Those closest to the tramway suffered from the nuisance of the construction work and from the greater difficulty for clients to park their cars. The tramway brings new customers to certain areas, particularly in Agdal (Rabat), but the shops have not yet adapted to a more working-class clientele.

For all these reasons, and also because of the lack of dynamism in local taxation, **it seems unlikely today that the tramway systems will have an impact on finances,** though this does remain possible over the longer term.

3.4 Greenhouse gas emissions (GHG) related to the energy mix rather than to the mode of transport

Another illustration of the major trends affecting the balance sheet for the tramway is that of GHG emissions. A tramway requires less energy per passenger than most other motorized modes of transport, so it would be logical to expect positive consequences. **The calculations show that the tramway systems lead to a net gain in terms of emissions in Rabat-Salé (a 25% reduction in emissions compared to what would have been created by traffic) and especially in Casablanca (a 56% reduction), where the journeys are longer and the tramways fuller.**

Carbon neutrality over the entire project cycle (taking construction, equipment, and so on into account) seems feasible within thirty

years. However, this depends on two factors: first, the general changes in mobility in the two cities, because while the tramway does indeed replace more trips that emit GHGs, it also generates GHG-emitting trips, and what is more, a significant part of the first and last mile, such as taxis, uses fuel that emits GHGs. Second, and most importantly, the carbon footprint of the tramway system is directly dependent on the GHGs emitted during energy production. Nowadays, most electricity in Morocco is produced from coal and oil, which are particularly harmful to the climate: we have calculated that, if we consider the current emission levels for electricity production were those predicted for 2030 (0.55 kg CO_{2e}/kWh compared to 0.66 kg CO_{2e}/kWh at present—that is, twelve times more than in France), GHG emissions during the operational phase would be reduced by one third in Rabat-Salé and by two thirds in Casablanca.

4. Reasons to be optimistic

4.1 Synergy effects to be expected

This evaluation looks at the first step in the construction of larger mass transport networks. Although they have had mixed impacts at this stage, the current tramway systems in Rabat-Salé and Casablanca have certainly proved their worth: **the fact that they are used, even if only occasionally, by the majority of the population, that the residents have confidence in them, and that they feel like they are in a car, are essential building blocks for a wider reconfiguration of mobility in cities.**

The level of service has remained very high over a decade, and remains so today. It will be essential to keep up this level of quality, which is particularly important to users, and to ensure that it is also extended to the new bus networks, which will have to regain the confidence of residents if public transport is ultimately to be really improved in the two cities.

4.2 The potential for an urban reconfiguration, which involves choices by the inhabitants

Public policies have yet to take full advantage of the tramway's potential to improve the wellbeing of residents, but regular users have already begun to change their habits in order to get the most out of it. Our survey shows that the tramway system has become a major criterion for them when they are choosing a job and a home. As such, **the residents of Casablanca, Rabat, and Salé are beginning to organize themselves so as to make the tramway a factor that structures their lives.** They benefit from improved accessibility and from the time saved using the tramway, as well as from the positive effects on the adjacent districts, the improved quality of public spaces, all the lighting systems that have been put in place, and so on. This development is particularly noteworthy on the Rabat-Salé link: today, traffic is increasing, especially in the morning from Salé to Rabat. But “the trams go both ways” and the current dynamics are evidenced by the settlement of new populations along the route served by the

tramways. As this trend continues, shops and businesses should also follow. Several call centers for large multinationals, which need a qualified workforce, are setting up near the tramway to increase their potential labor pool, with significant gains in accessibility as a result.

4.3 A dignified mode of travel as a driver of development

The stakes of social cohesion are high in Morocco, especially in a context that generates a feeling of *hogra* (social contempt coupled with a feeling of injustice and social exclusion, felt by the working and even the middle classes), of which the extremely run-down bus networks were a symbol.

The tramway counters this feeling. It is a major public investment (in total, 1.5% of Morocco's 2007 GDP) made for the benefit of the working and middle classes, and it is perceived as such. It brings a "new normality" that seems akin to that of richer countries: it is comfortable, quiet, does not smell, and so on. **It also offers a convivial environment in which passengers feel completely safe**, and is a place of social diversity in which people with disabilities are included (but from which the poorest are excluded), and which corresponds to the aspirations of Moroccans in terms of civility.

According to the Indian economist and philosopher Amartya Sen, investments in development should be judged by how well they empower people to improve their own lives through their own choices and to regain self-esteem (Sen, 2001). Enabling dignified travel is thus a powerful driver of this power to act, which is given back to the people.

5. Evaluation method

This evaluation of the impacts of the Casablanca and Rabat-Salé tramway systems aimed to take into account all the expected effects of these infrastructure projects. To do this, we used the principles of contribution analysis, a theory-based approach to impact evaluation (Mayne, 2012; Delahais and Toulemonde, 2017). For each of the twenty-eight impact themes initially identified (Delahais et al., 2020), we sought to identify "impact pathways": the ways in which the tramway could have consequences for the various subjects mentioned. In total, seventy paths were identified, discussed, and prioritized during workshops attended by Moroccan stakeholders and the AFD.

The ability of such an evaluation to provide evidence about the impacts of tramway systems depends heavily on the data available. Without gender-disaggregated data from the 2014 census and the 2018 Casablanca household survey on commuting, it would not have been possible to report on how women have seized the opportunity offered by the tramway systems in Morocco. In contrast, the absence of a recent household survey in Rabat-Salé on commuting has largely limited the studies that could be done in this city. There are other subjects on which the data that were used remain insufficient (e.g., trade), or are questionable (e.g., real estate). The final report makes mention of these limitations.

We also collected a substantial amount of data as part of this evaluation: in addition to observations and interviews with project stakeholders, we surveyed 1,600 users at the stops, later interviewing 200 of them at home using a more-in-depth series of questions. Also consulted on specific topics were 235 persons who represent specific groups (including women, students, people with reduced mobility, and new residents along the line) and 165 companies, businesses, and other organizations. Several Moroccan and European experts provided support throughout the evaluation as well.

The material collected was then analyzed so that, for each theme, we could report on the changes observed (such as in the real estate market) and the contributions the tramway is making to these changes.

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List of acronyms and abbreviations

AFD	Agence française de développement (French Development Agency)
GHG	Greenhouse gases
BRT	Bus rapid transit
STRS	Société de Tramway de Rabat Salé

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