

The impact of the High-Speed Train on interurban mobility in Morocco on the Tangier-Casablanca route: a qualitative study

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Abstract: This article examines the impact of the Moroccan high-speed train on intercity mobility, focusing on Morocco's first High Speed Line linking Tangiers to Casablanca. It sheds light on the experiences of a new clientele drained from the first year of operation of this new high-speed mode of transport since November 2018. These are commuter passengers, including civil servants, employees of state-owned companies or national offices, employees of private companies and corporations, as well as the professions and shopkeepers. Our research focuses on a qualitative analysis aimed at identifying and understanding the determining factors that influence the choice of means of transport for this population. The results of the study show that: time saving, travel quality, the possibility of working remotely on board the train, regularity of timetables, as well as differentiated pricing, and accessibility to intra-urban mobility thanks to a service combining train and car, in addition to the high level of confidence in the rail system, emerge as key elements influencing business users' preference for high-speed rail in Morocco. The study also highlights a number of economic effects, including reduced costs (particularly for executive travel) and the relocation of existing staff for businesses and companies.

Keywords: High Speed Rail Morocco; High Speed Train; Interurban mobility; Quality of rail service; Economic effects of HSR; Transport.

1. Introduction

In the rapidly changing landscape of intercity transport, the Moroccan high-speed train, represents a major step forward, changing not only the dynamics of mobility but also the economy and society as a whole. Inaugurated in November 2018, the Moroccan High-Speed Rail (HSR), ensuring for the first time in Morocco and in Africa high-speed commercial train traffic of 320Km/h, has been hailed as a milestone in the development of transport infrastructure in Africa, linking the metropolises of Casablanca and Tangier. This study looks at the implications of this major development, exploring the impact of Morocco's high-speed train on the habits, perceptions and experiences of business and regular travellers. The aim of this article is to unveil the various dimensions of the impact of high-speed rail, going beyond simple considerations of speed and convenience to embrace the wider socio-economic changes brought about by this revolutionary transport technology. Through a series of qualitative interviews with frequent users of the Moroccan high-speed train, such as civil servants, employees of state-owned enterprises or national offices, employees of private companies and corporations, as well as the professions and traders considered to be business passengers, this research offers a unique insight into the experiences, perceived benefits, as well as the challenges faced by users of this modern mode of transport. By situating the Moroccan HST within the wider context of intercity transport and



mobility studies, this paper contributes to a deeper understanding of how transport innovations can reshape urban dynamics, affect occupational and personal choices, and influence the socio-economic structure of a country. In addition, this study seeks to fill the gap in the existing literature on the impact of high-speed rail systems in non-European contexts, providing a much-needed new perspective on mobility in developing countries.

2. Literature review

The evolution of inter-urban mobility, exacerbated by technological advances and socio-economic changes, has considerably influenced people's travel patterns. [1] point out that these developments have not only improved travel efficiency but have also changed users' expectations and behaviour. In parallel, [2] examine how the growth of inter-city transport networks affects urban planning and location choices. They argue that the increase in inter-urban connectivity, particularly through rapid means of transport such as the HST, has redefined the relationship between urban and rural areas, influencing economic and residential decisions. This global transformation of mobility systems, accentuated by the increased speed and efficiency of transport, is having a significant impact on contemporary patterns of living and working. The HST's role in inter-urban mobility extends far beyond simply reducing journey times. [3] highlights how these rapid transport technologies are redefining mobility patterns, particularly in Europe. This transformation is also discussed by [4] who highlights the socio-economic impact of high-speed trains, particularly in terms of increased connectivity between urban and rural areas. These changes have a profound effect on the way in which individuals perceive and organise their travel, facilitating greater economic and social integration across different regions. In this sense, the HST is not just a means of transport, but a key factor in the reconfiguration of urban and inter-urban dynamics. The high-speed line between Tangiers and Casablanca is an emblematic example of the impact of transport infrastructure on economic and social development. According to the "Morocco Infrastructure Review" published by the World Bank in July 2019, Morocco's massive investment in infrastructure, including the HST line, has been a major driver of the country's economic growth and competitiveness. These investments, which are part of the policy of major construction projects that Morocco has been pursuing for more than two decades, have not only improved access to markets and basic services, but have also helped to reduce poverty and unemployment, while improving the quality of life. Morocco has seen remarkable development of its transport network, including one of the best rail networks in Africa and an internationally renowned port in Tangiers, which has had a significant impact throughout the country, including with at least one airport per administrative region. These developments have largely contributed to increasing access to services, improving the quality of infrastructure services and placing Morocco in a favourable position in terms of international competitiveness and attractiveness. Identifying the key variables in the study of inter-urban mobility via high-speed rail (HSR) is crucial to understanding its overall impact. [4] provides a framework for analysing these variables, highlighting aspects such as inter-city mobility, passenger behaviour, transport infrastructure and economic effects. In addition, [2] discuss the impact of transport infrastructure on location choices and travel patterns. They highlight how the HST changes not only travel patterns but also urban and inter-urban dynamics. In addition, [3] explores how rapid transport technologies transform mobility behaviour, focusing on passenger choices and preferences. These different perspectives enrich the understanding of the holistic impact of HSR, integrating changes in travel patterns, the operational and physical impact of transport infrastructure, as well as regional and national economic consequences.

2.1. Analysis of the Factors Determining the Choice of the HST High Speed Train

The importance of price and accessibility in the choice of transport modes is well documented in the academic literature. [5] discusses in detail how these two factors influence transport decisions. Price, in particular, plays a crucial role in travellers' sensitivities, affecting their choice between different options such as HSR and other modes of transport. Accessibility, on the other hand, particularly ease of access to HSR stations, is also a determining factor. This perspective is reinforced by other research, such as that by [6] analysing the impact of public transport accessibility on usage patterns. Together, these studies highlight the importance of considering both economic cost and practical accessibility when assessing users' mode preference. The length and quality of the journey, as well as the frequency of journeys and confidence in keeping to timetables, are essential variables in the choice of transport modes, particularly for high-speed rail. [6] highlight the importance of journey time and service quality in the choice of train for inter-city journeys. These authors emphasise that the perception of journey time and the quality of services offered are decisive criteria for users when choosing the train as a means of transport. Similarly, [7], in their study of transport preferences, stress the importance of the frequency of journeys and confidence in keeping to timetables. Their research illustrates how these factors influence travellers' decision to choose HSR. The regularity of train services and the reliability of timetables play a crucial role in building users' confidence in the transport system. These studies together highlight the importance of journey time, service quality, frequency of journeys and confidence in timetables as factors influencing the choice of HSR. For a more in-depth analysis of these variables, it is recommended that the work of [6,7] be consulted directly. Novelty seeking and external influences, such as social recommendations, play a significant role in travel decisions, particularly for modes of transport such as the HST. [8] discusses how the search for new experiences influences tourism choices. This perspective is relevant to understanding the appeal of the HST, often perceived as an innovative and modern travel experience. In addition, [9] theory of planned behaviour highlights the impact of social attitudes and subjective norms on behaviour. In the context of the HST, recommendations from friends, family or social networks may encourage individuals to choose this mode of transport for its innovative aspects. These studies together suggest that novelty seeking and external influences are important factors in the choice of HSR. They highlight the importance of considering not only the practical aspects of transport, but also how it is perceived in terms of experience and social recommendations. For a more in-depth analysis, it would be beneficial to consult directly the work of [8, 9]

2.2. Effects of the HST on Passenger Activities

The impact of the HST on the activities of passengers, particularly entrepreneurs and shopkeepers, is an important subject of study that encompasses several dimensions. Reorganisation and Functional Specialisation. The first dimension concerns the reorganisation and functional specialisation of professional activities. [4] highlights the importance of the accessibility economy. By improving access to markets and resources, high-speed rail can bring about a significant reorganisation of professional activities. This reorganisation encourages specialisation based on regional competitive advantages, enabling businesses to maximise their efficiency and productivity. The second dimension is the displacement effect and its impact on employment. [10] analyse how transport infrastructure, such as the HST, influences firms. They note that the HST can have a displacement effect, pushing companies to relocate to take advantage of better transport connections. This has direct implications for employment patterns, affecting where and how people work. Finally, the impact of HSR on the profitability of activities is a crucial aspect. [11] focus on how access to HSR affects firms' profitability and location strategies. Improved transport links can reduce transport costs and increase logistical

efficiency, resulting in increased profitability for firms. These different perspectives demonstrate that the HST is more than just a mode of transport; it is a catalyst for change in economic and business models. For a more in-depth look at these aspects, we recommend consulting the work of [4, 10, 11].

2.3. Comparison with existing studies

To gain a deeper understanding of the impacts of HSR, it is essential to draw on a variety of academic studies covering various aspects of inter-city transport and passenger behaviour. [12] provide an in-depth analysis of the socio-economic effects of major transport projects such as the HST. They highlight how such projects can transform not only the local economy, but also wider social dynamics. In addition, studies such as those by [13] complement this perspective by examining the specific urban impacts of high-speed rail. Impact of HSR on Passenger Behaviour, [14] look at changes in passenger behaviour in response to innovations in transport. They explain that the HST, by offering faster and more comfortable journeys, changes the way people use their time during the journey, opening the door to productive or relaxing activities. For a more recent perspective, research by [15] also analyse how modern technologies are transforming the use of travel time in times of digital connectivity. More recent research often focuses on the environmental implications and sustainability of HSR, as well as its role in changing urban and regional dynamics. For example, a study by the European Commission [16] provides updated information on the expansion of HSR in Europe and its economic and environmental impacts. This study examines how HSR contributes to achieving sustainability objectives and reducing greenhouse gas emissions. In addition, a study by [17] explores the effects of HSR on property prices in the areas served, highlighting the socio-economic transformations brought about by the development of these infrastructures. These joint references provide a rich and varied overview of the impact of HSR, covering economic, social, behavioural and environmental aspects. They suggest that the impact of HSR goes far beyond simply improving journey times, significantly affecting urban structures, working and living patterns, and overall socio-economic dynamics.

3. Methodology

This research adopts a qualitative approach to explore the impacts of Moroccan high-speed rail, focusing specifically on the Tangier-Casablanca line, the area where this type of train runs. The aim is to understand the experiences, perceptions and attitudes of business and regular travellers associated with the Moroccan high-speed train. These are passengers travelling between home and work. Here are the key stages in the methodology:

3.1. Choice of Qualitative Method

The qualitative method was selected for its ability to provide an in-depth understanding of the individual experiences and perceptions of professionals, essential for capturing the subjective impacts of HSR. The interview we conducted in July and August 2023 focused on passengers' choices between home and work, analysing the benefits of the high-speed train linking Tangier and Casablanca as well as the transport alternatives available. Our objective was to identify the determining factors that influence this choice for this population, as well as to study the effects of using these modern means of transport on their activity since November 2018, taking into account of course the neutralisation of the Covid-19 period.

3.2. Selection of the Target Population

The target population for this study is a diverse range of professionals, including civil servants, employees of state-owned companies or national offices, employees of private companies and corporations, as well as professionals and shopkeepers. The choice of participants was guided by their

specific role within their respective organisations, their previous travel experiences and practices, and any changes that may have occurred following the arrival of high-speed rail in Morocco.

3.3. Data collection - Semi-structured interviews

Semi-structured interviews We conducted semi-structured interviews with a representative sample of this professional population, comprising 55 cases. Each interview, lasting an average of 45 minutes, was conducted in person, allowing for a more in-depth and nuanced interaction.

3.4. Transcription and Data Analysis

The interviews were recorded with the consent of the participants and transcribed verbatim. Data analysis was carried out using thematic analysis methods, which enabled recurring patterns and themes specific to these professions to be identified.

3.5. Research ethics

This research was conducted in accordance with established ethical principles, guaranteeing the informed consent of all participants and ensuring their confidentiality and anonymity.

4. Data analysis

4.1. Visualisation and Analysis of Moroccan HST Users' Priorities

To visualise the predominant themes from the transcripts of interviews with users of the high-speed train in Morocco, we used the word cloud technique, a powerful tool for the qualitative analysis of textual data. This technique consists of generating a visual representation of the most frequent words in a corpus of text, where the size of each word is proportional to its frequency of appearance in the text. Common French linking words and stop words have been excluded to focus on the most significant and relevant terms.



Figure 1: Visualisation and Analysis of Moroccan HST Users' Priorities: A Word Cloud Approach.

The analysis began with tokenisation of the text, which breaks the text down into basic units, or tokens, followed by filtering to remove punctuation and uninformative words. The remaining tokens were analysed for frequency, and the results were used to create the word cloud, using the Python Word-cloud library. This visualisation was carried out in a Python programming environment, and the word cloud was saved as a PNG image for easy interpretation and presentation. The resulting word cloud highlights several key terms associated with the Moroccan HST user experience. Words such as 'quality', 'service', 'trust', 'safety' and 'value for money' appear in large size, indicating that these concepts are frequently mentioned by participants and are therefore important aspects of their HSR experience. The predominance of words like 'duration' and 'frequency' suggests that travel time and regularity of service are crucial considerations for users. In addition, the word 'novelty' reflects the importance of innovation and modernisation in the context of rail transport. Interpretation of the results reveals that professional HST users place a high value on the efficiency and reliability of the service. They are attentive to the balance between cost and quality of service, and consider HSR to be a factor influencing their productivity and professional activities. The visibility of location-related terms such as 'station' underlines the importance of infrastructure accessibility and connectivity. This analysis provides valuable insight into users' priorities and perceptions, which can inform future improvements to the HSR service and guide transport policy.

4.2. Frequency and relevance of themes raised

The qualitative analysis of the interviews conducted with a diverse group provides detailed insights into the aspects considered crucial in their respective fields. The following table illustrates the terms most frequently mentioned by these professionals, highlighting their main concerns and areas of interest in their professional practice.

Tableau 1: Analysis of interviews with Moroccan HST users. Frequency and Relevance of Topics Raised.

| Key word | Occurrences |
|-----------|-------------|
| HST | 237 |
| Quality | 155 |
| Travel | 127 |
| Service | 98 |
| Station | 89 |
| Frequency | 84 |
| New at | 80 |
| Duration | 77 |
| Prices | 71 |
| Activity | 65 |
| Trust | 58 |
| Stations | 57 |
| Choice | 56 |
| Factor | 54 |
| Travel | 50 |

Analysis of the terms most frequently used in interviews with a range of professionals, with significant occurrences, reveals notable trends concerning the efficiency of HSR linking city centres and the major interest of users in time savings.

Terms such as 'confidence', 'innovation' and 'safety' often emerge, underlining the emphasis placed on performance and development in this mode of transport. 'Quality' is also a recurring term, illustrating the importance attached to excellence in the delivery of services or the conduct of business. Concepts such as 'remote working', 'telephone communication to dedicated space' appear frequently, indicating a focus on continuous improvement and importance to those passengers who are prepared to pay a premium price to enjoy these benefits. 'Innovation' and 'technology' are also recurring themes, reflecting a trend towards the adoption of new rail technologies that adapt to the new competitive production culture in the age of globalisation.

4.3. Analysis of verbatims: User perspectives through verbatims

Professionals from a wide range of sectors emphasise the efficiency and positive impact of time savings on their professional activities. As one said: 'The adoption of advanced technologies has made my work more efficient'. This improvement in efficiency is corroborated by others, with comments such as: 'Since using Morocco not only as a means of travel, but also as an office by working remotely on board, I have noticed an improvement in my professional activity'. Cost is also an important issue, with opinions varying: 'Effective cost management is essential in my frequent travels, returning to my home at the end of the day and saving on accommodation costs,' says one professional, while another expresses reservation about increases in diesel prices for valeting: 'A significant increase in diesel costs plus motorway charges and driving fatigue would drive me to explore Morocco, since I keep using it'. In addition to the relatively high price for certain categories, which has been criticised on many occasions. However, a positive opinion was expressed regarding the quality-price indicator. The differentiated pricing was also praised, with a multiple offer including various promotions and appreciable flexibility. There were also massive complaints about the poor or non-existent Internet connection on board these trains. These testimonials, although not exhaustive, give a clear idea of the new clientele that the Moroccan HST has attracted, in addition to the induced traffic, thus confirming the growing attraction of new types of passengers over time.

5. Discussion of results

The introduction of high-speed rail in Morocco represents a significant turning point in the history of intercity transport in the country, offering a new perspective on mobility, the economy, and social dynamics. This section discusses the implications of our findings, highlighting the perceived benefits and challenges faced by business users, as well as the wider economic and social implications of this major infrastructure project. This section discusses the implications of our findings, highlighting the perceived benefits and challenges faced by business users, as well as the wider economic and social implications of this major infrastructure project.

5.1. Implications for Professional Mobility

Our results highlight the crucial role played by Morocco in improving inter-city mobility for professionals, in particular by significantly reducing journey times and providing a space conducive to working during the journey. The possibility of working on board the train, mentioned by several participants, reflects a transformation in the perception of commuting time, now seen as a productive extension of the office rather than simply a transition. This development has far-reaching implications for time management and work-life balance, offering professionals the flexibility they need to optimise their use of time.

5.2. Economic

In economic terms, the introduction of high-speed rail in Morocco has contributed to a reduction in travel costs, particularly for senior staff, suggesting an improvement in operational efficiency for companies and institutions. The relocation of the workforce, facilitated by increased mobility, also indicates a potential for the geographical redistribution of talent, which may contribute to greater equality of career opportunities across the country. With regard to the jobs created by the increase in the workforce, the contribution of Morocco's rapid transport mode remains ambiguous. Indeed, participants' responses on this subject only confirmed the relocation and reduction of expenses through daily travel, thus saving on accommodation and catering costs. Consequently, more in-depth studies need to be carried out to provide definitive answers to this question.

5.3. Effects on accessibility and connectivity

Improving accessibility to intra-urban mobility by combining train and car services reflects an integrated approach to mobility that is crucial to sustainable urban development. By offering a competitive alternative to traditional modes of transport, rail plays a central role in promoting environmental sustainability. By reducing dependence on personal vehicles, rail transport is helping to reduce the urban carbon footprint, especially as it has been using 100% clean energy sources to run its high-speed trains since January 2022, more than two years ago.

5.4. Implications for Professional Productivity

The integration of the High-Speed Train into the Moroccan transport network has not only transformed inter-city mobility but has also revolutionised the working habits of professionals on the move. The use of laptops on board the HST, facilitated by the presence of individual power sockets and a quiet environment, highlights a significant evolution in modern working, reflecting the increasing flexibility of working environments and the fluidity between professional and personal life. This section explores the implications of being able to work on board the HST, focusing on the productivity aspects benefiting from technological innovation by exploiting the dead time of travel.

5.5. Productivity in Motion

The ability to work efficiently during HST journeys represents an optimal use of time, traditionally perceived as wasted during travel (dead time). Professionals can now use these periods to get on with their tasks, prepare for meetings, or respond to emails, contributing to a significant increase in overall productivity. This increased efficiency is particularly beneficial for employees who regularly commute long distances, as well as for entrepreneurs and sales people whose work requires frequent mobility.

5.6. Work-Life Balance

Improved productivity on the HST also has a positive impact on work-life balance. By optimising journey time, professionals can reallocate time previously spent travelling to personal or family activities, contributing to a better overall balance. This transformation of travel time into productive time means that work and personal commitments can be managed more flexibly, leading to greater well-being and reduced work-related stress.

5.7. Technological Innovation and Nomadic Work

Working on board the Moroccan HST highlights the importance of technological innovation in facilitating nomadic working. Improved access to reliable Internet connections and the availability of power sockets for recharging devices are essential aspects that promote professional efficiency on the move.

This trend towards greater professional mobility highlights the need for companies and transport services to invest in infrastructure that enables workers to remain connected and productive, regardless of their location.

5.8. Challenges and opportunities

However, working on the move also raises issues around data security, confidentiality and working comfort, requiring particular attention to technology solutions and appropriate company policies. Organisations need to consider strategies for securing sensitive communications and data, while ensuring that employees have the tools and support, they need to work effectively outside the traditional office environment.

6. Conclusion

The Moroccan high-speed train represents a major milestone in the development of the country's transport infrastructure, offering an innovative perspective on inter-urban mobility and its economic, social and professional implications. This study has highlighted the multi-dimensional impacts of the Moroccan HST, emphasising not only the improved mobility for professionals but also the positive effects on the economy, society and the urban environment. Through in-depth qualitative analysis, we explored the experience of business users of the Moroccan high-speed train, revealing significant appreciation for the time saved, the quality of the journey, and the opportunity to work efficiently on board. These aspects underline the importance of the HST as a catalyst for professional productivity and work-life balance, reflecting the needs and expectations of an ever-changing modern society. The economic repercussions, including reduced travel costs and the relocation of workforces, indicate that Morocco's high-speed train is playing a crucial role in strengthening the competitiveness of businesses and promoting a more balanced distribution of economic opportunities across the country. At the same time, improved accessibility and connectivity contribute to greater urban and regional integration, fostering sustainable development and social cohesion. However, this study also recognises the continuing challenges, particularly in relation to pricing and affordability, which require continued attention to ensure wider uptake of Moroccan high-speed rail across all segments of the population. In addition, the implications of working on Morocco's HST highlight the need for continued investment in technology and infrastructure to support modern business mobility. In conclusion, the High-Speed Rail (HSR) is not simply a transport infrastructure project; it is a symbol of progress, innovation and a vision for the future of Morocco. It embodies the aspirations of a nation to promote sustainable development, social equity and economic efficiency. To maximise its potential, a holistic approach integrating fair pricing policies, technological investment and intelligent urban planning is essential. As Morocco moves forward into the complex intercity transport landscape of the 21st century, investment in high-speed rail will remain a central element of its mobility strategy, stimulating innovation and driving social and economic transformation. This development will be supported by an ambitious ongoing programme of similar infrastructure, such as the LGV for other lines such as Casablanca - Agadir, in preparation for the mobility plan for the 2030 World Cup.

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