

Priorities of IT and BI Projects for Digital Transformation in the Rail Industry

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Abstract

In this short communication article, the priorities of some prereduced projects for the digital transformation in rail industry in the field of Information Technology (IT) are stated. Digital transformation based on Business Intelligence (BI) in passenger and freight transport industries, is one of the most fundamental and challenging issue of any future local, nationwide, and worldwide economic and political condition. Rail transport as one of the sub-sectors of transport industry has a key role in economic growth as well as culture and society. Recently, new technologies especially in creation and utilization of high-speed railways has been practiced in many developed countries. Today, the digital transformation of the railway industry and finding appropriate approaches to increase capacity, reduce costs and increase the share of rail, has been the focus of many researchers all around the world.

Keywords: Business Intelligence; Digital Transformation; Rail Industry; Digital Twin

Introduction

The strategic position of rail transport as a green transport and driver in the sustainable development of countries is one of the basic strategies of special attention of officials and policy makers [1]. The issue of integrated design of the country's rail network based on new technologies, especially artificial intelligence and data mining, is one of the most important issues at the level of strategic transportation planning of any country [2]. Many challenges such as limited financial resources, difficulty in changing organizational culture, inefficient organizational structures, non-optimal processes, lack of movement towards service-oriented organizational architecture, etc. face the digital transformation of the rail industry, each of which has different dimensions that often cause differences [3]. Comments are made on the priorities of balanced and integrated development of the railway network [4]. Business intelligence management dashboards seek to create a roadmap and display priorities, such as prioritizing logistics hubs, building new corridors, and improving the capacity of existing rail corridors, and so on [5].

The purpose of using business intelligence and data mining in the expansion of the rail network is to minimize all economic, environmental and social costs imposed on the rail networks and roads of the country by considering constraints such as budget, capacity of rail axes and logistics hubs, network pricing, supply interactions and domestic freight and passenger demand, as well as international transit, as well as the consideration of rail-road and rail-rail or combined (rail-road) competition [6]. The digital transformation of the rail industry and the increase in the share of green rail transportation in the movement of goods and passengers will have transient side effects, including helping to optimally manage energy consumption [7].

Finding the optimal method [8] for designing a rail network requires attention to various dimensions [9] [10]. The construction of a new railway axis or the improvement of the capacity of the existing railway axis can make many changes in the pattern of interaction between railway lines and logistics centers and change the desirability of rail, road and combined transportation for

different source-destination pairs in the network [11,12]. Business intelligence must also be able to model both national and corporate attitudes of the private sector simultaneously to determine the behavior of the private sector and the owners of freight and rail fleets in the face of major government decisions [13]. Business intelligence in the rail industry must be able to provide an accurate picture of the real space governing rail transport in each country based on that country’s governance model [14].

Proposed priorities of IT and BI projects for digital transformation in the rail industry

Projects related to the digital transformation of the railway industry can be classified into three levels: information technology activities and business intelligence activities, and finally, prerequisite activities for digital twin [15] and the digital transformation of the railway industry [16]. The finalization of the proposed projects is after consulting with the experts and receiving commercial proposals, including costs, capital and income, through legal procedures and procedures [17]. This process requires recognizing the commitment, experience and expertise of global and local companies active in the fields of intelligence and data mining interested in operating in the rail industry [18]. Cooperation proposals can be in various forms, including implementation, investment, partnership, financing and support, taking into account technical and economic and digital twins [19] considerations [20]. Prerequisite information technology activities to create the necessary platform for the digital transformation of the rail industry:

- Improving and developing enterprise communications and railway data center, launching cloud services, cloud computing, professional support services, security services, backup services, management services, network load distribution services.
- Improving and developing payment services and solutions in the field of fintech in the field of passenger in reservation systems.
- Establish a local access network and provide integrated cultural content services to travelers before, during and after the trip.
- Deploy a business process management dashboard with the goal of anything anywhere, anytime at the level of human resources, fleet and property in accordance with rail performance standards.

- Establishment of a system of supervision and data collection and Internet of Things.
- Establishment of an electronic system for selling passenger tickets on intercity and suburban trips
- Establishment of graph system and planning of freight and passenger trains.
- Establishment of train formation system.

Business intelligence activities for transformation Digital Rail Industry:

- Logistics
- Deploying business intelligence in the freight and passenger ecosystem,
- Creating a value-added cycle of each trip in exchange for intercity and suburban passenger ticket sales data
- Integrated design of the country’s optimal railway network
- Promoting integration in railway network development planning and increasing the efficiency of existing capacities
- Improving the train operation system
- Improving the process of handing over and renting wagons.

Conclusion

The list of prerequisite activities in the field of information technology and business intelligent for the digital transformation of the railway industry is presented in this short communication article. The priority of this projects depends on the conditions of each railway company. The provided project IT and BI list should be customized based on the provided information before digital transformation in rail industry.

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