WORLD MARKET STUDY ON MONORAIL SYSTEMS

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- This document contributes to the market assessment of the client, its members and other companies interested in monorail systems. The final results are presented.

CONTENT

FIGURES

ACRONYMS

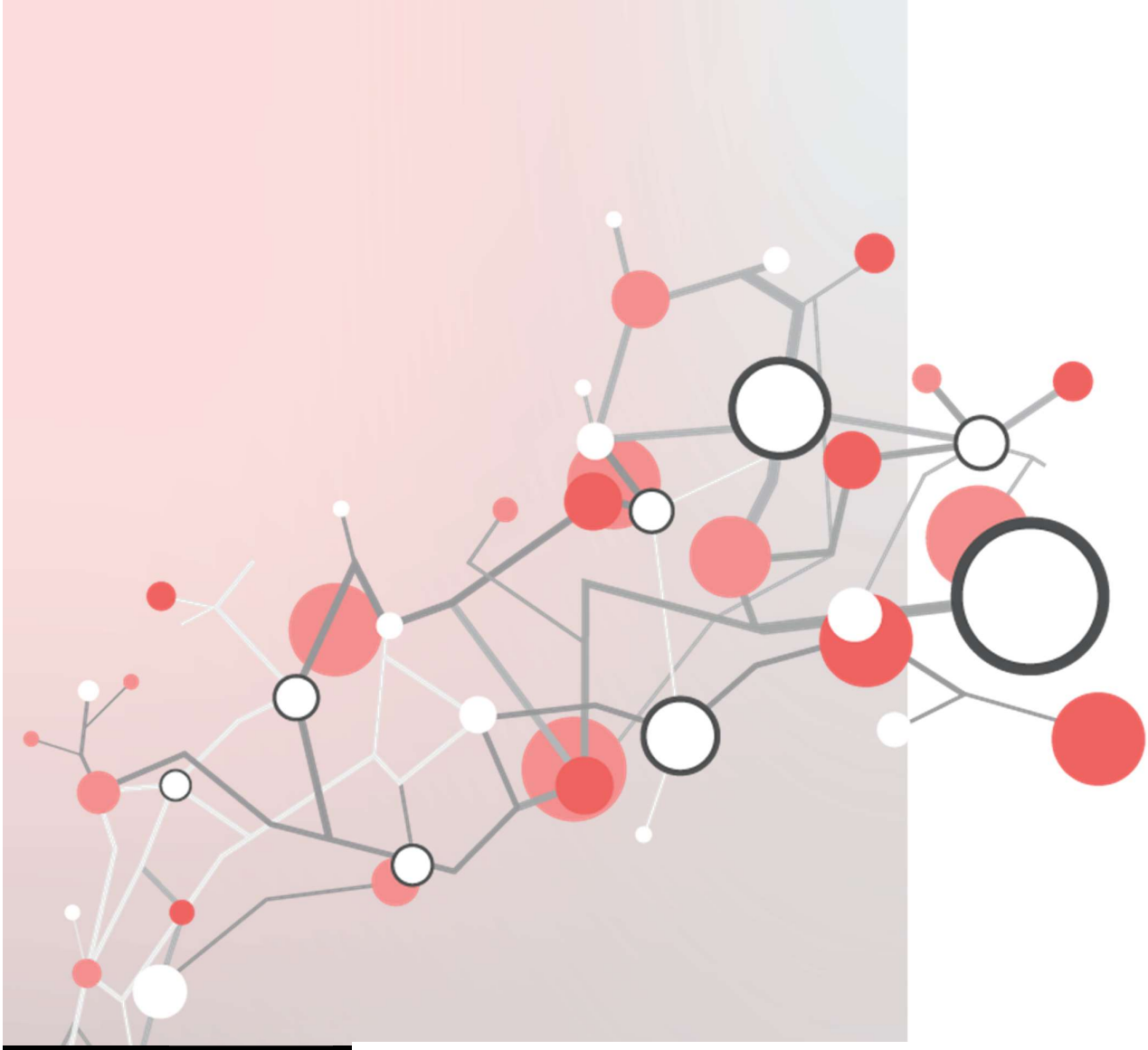
pphpd	Passengers per hour per direction
LRV	Light Rail Vehicle
AGT	Automated Guided Transport
APM	Automated People Mover
Maglev	Magnetic levitation
US	United States of America
BRICS	Brazil, Russia, India, China, and South Africa
Next Eleven[1]	Eleven countries namely Bangladesh, Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, the Philippines, South Korea, Turkey, and Vietnam
IMF	International Monetary Fund
DSW	Deutsche Stiftung Weltbevölkerung
GDP	Gross Domestic Product
OEM	Original equipment manufacturer

DEFINITIONS

Segmentation

Public Transport	A system for public transportation
Public Transport / Airport	A system for public transportation with a link to an airport
Theme Park / Tourism	A system for transportation of theme park visitors or city tourists
Other	Other segments are shopping malls, fairs, and zoos

[1] The „Next Eleven“ have been identified in the Global Economics Paper No. 134 of Goldman Sachs (published December 2005) as countries with a high economic development potential in the 21st century and promising outlook for investment and future growth in addition to the BRICS countries



1 Classification of Monorail Systems

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Monorails

A monorail is a transport system that travels either on (classic or straddle monorail) or under (suspension monorail) a single narrow track or, better, a guide beam. The beam can take on different shapes and be made of different materials, it is designed as one structural element. The monorail guide beam consist of a single structural rail, in most cases taking both loads, the capacity (vertical) load and the guidance (lateral) load. Monorails are usually driven by onboard electric motors. The types commonly referred to the term monorail can thus be classified according to their carrying and guiding principle and vehicle placement.

Monorails have been around for more than a century; however, only recent developments have enabled transport authorities to consider monorails as a real alternative in public transportation to meet their needs in mass urban transit. Monorails are often easier to integrate into existing urban areas as they are comparatively easy to build elevated, taking up little valuable traffic space at the street level and requiring no expensive tunnelling. The special track design of monorails generally supports a cost-effective, elevated construction method and a very fast implementation. Despite a significantly increasing numbers of applications, monorail systems still maintain a niche existence.

For reasons of delimitation of the present study, but also because of the niche character, it seems to make sense to explain monorails in an introductory way, to make a distinction from other rail systems and to give an overview of different monorail systems on the market.

Dual Rail – the Conventional Rail

Conventional rail systems can be attributed to wheel-rail systems, whose vehicles are guided on two rails. Applications range from common regional transport to connect the countryside to urban areas, to long-distance applications to connect different cities, to high-speed transport. And of course, classic railways are also used in urban transport - in the form of LRVs and metros they are represented worldwide. Automatic people movers (APMs), despite most of them having rubber tyres and often running on concrete tracks, are classified as two-rail systems and are not considered as monorails. The same applies to automatic guideway transit (AGT). Figure 1 shows the common rail applications on a double rail basis.

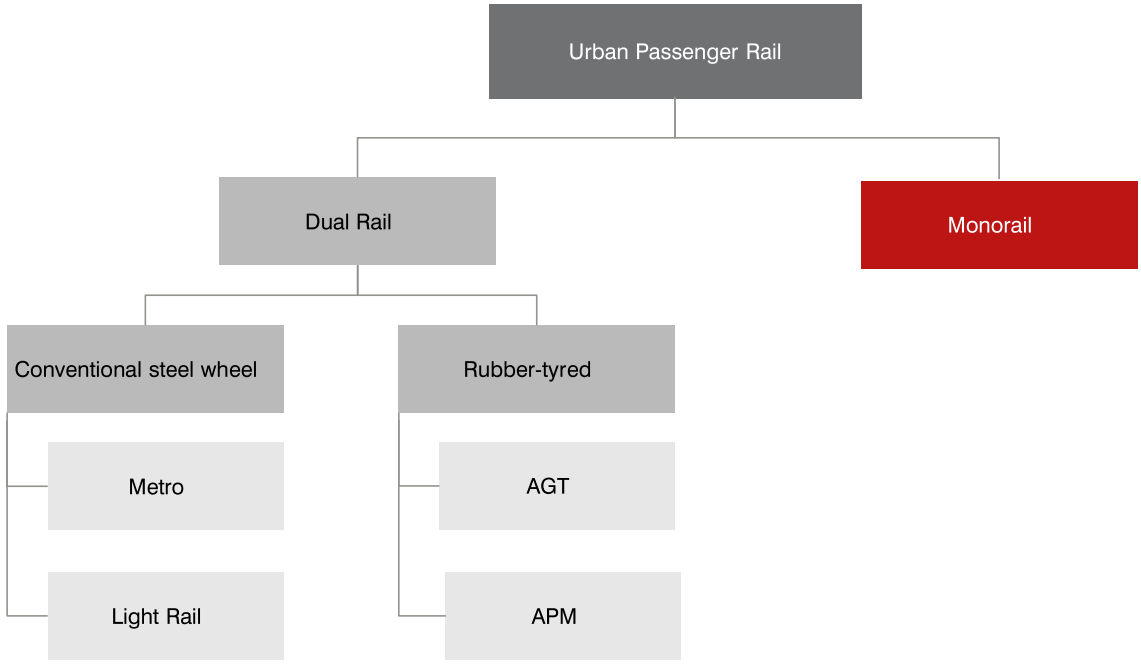

Figure 1: Common urban passenger rail applications

Suspended Monorails

In addition to the first suspended monorails (such as the Wuppertal suspension railway), where steel wheels with flanges on both sides carry the vehicle and guide it on the steel rails, suspended railways are also designed with guideway girders consisting of a slotted hollow steel profile. Two vertical wheels to the left and right of the slot carry the vehicle, and horizontal rollers guide the vehicle on the vertical inner flank of the profile on both sides. The edge length of the hollow profile can be up to 2 m. Nevertheless, there exist many rubber tired suspended monorail systems running on the inner side of the hollow beam, as well guided on the same beam on the inside side walls.