



THE KOCHI METRO EXPERIENCE:

A valuable contribution to
the history of Indian metros

July 2017



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This document was prepared by the French team in charge of the coordination of the two-year Technical Cooperation between AFD (French Agency for Development), CODATU (Cooperation for a Development of a Sustainable Mobility in developing countries), SYTRAL (Transport Authority of the Rhone region) and KMRL (Kochi Metro Rail Limited). Ms. Marion Hoyez (CODATU), Mr. Etienne Lhomet and Ms. Laura Cornelis (DVDH) coordinated the edition of the document, under the supervision of Mr. Mathieu Verdure, Project Manager at AFD Head office, and CODATU team.

INSTITUTIONAL PARTNERS



AFD, the *Agence Française de Développement*, is a public development-finance institution that has worked for seventy years to alleviate poverty and foster sustainable development in the developing world and in the French Overseas Provinces. Working on four continents, AFD provides financing and support for projects that improve living conditions, promote economic growth, and protect the planet.

In 2016, AFD committed €9.4 billion to projects in developing and emerging countries and in the French Overseas Provinces. These AFD-financed projects will provide schooling for children, improve maternal health, promote equality between men and women, support farmers and small businesses, and bolster access to drinking water, transportation and energy.

For more information: www.afd.fr



Kochi Metro Rail Limited (KMRL) is the public company in charge of planning, building and operating the Mass Rapid Transit System in the city of Kochi. It is a Joint Venture of the Government of India and the Government of Kerala. As per the National Urban Transport Policy of 2006, the objective of KMRL shall be to implement an eco-friendly, reliable, safe, efficient and customer-friendly system, which will contribute to the economic growth of the city and enhance the quality of life of the citizens.

In a first phase, KMRL is building a 25km-long elevated light metro system, equipped with the third rail technology, a CBTC (Communication Based Train Control) signalling. The construction has been entrusted to Delhi Metro Rail Corporation (DMRC), and it is the first metro project in India to connect water transport facilities and adopt an intermodal approach.

For more information: kochimetro.org

The SYTRAL logo consists of the word "SYTRAL" in white, bold, sans-serif capital letters on a dark grey rectangular background. To the right of the text is a vertical bar with a color gradient from purple at the top to red at the bottom.

SYTRAL (Public Transport Authority of Lyon Metropolis and the Rhone agglomeration, France) is in charge of developing and managing the Rhone public transport network, composed of metro, bus, trolley-bus, tram, cable-car, airport express line and on-demand transport for disabled people, and which includes 239 cities of the Rhone region. SYTRAL is also responsible for financing the network and defining the transport policy. The network's development includes economic performance, technological innovation, intermodal integration, place-making, with a sustainable approach.

For more information: www.sytral.fr

COORDINATION PARTNERS



CODATU gathers the different stakeholders of transport and urban mobility: local authorities and government departments, universities and research institutes, private companies and individual consultants. The association was founded in 1980, following the World Conference on Urban Transport in Dakar. It aims to stimulate the exchange of knowledge and know-how to promote the implementation of sustainable urban mobility policies in developing countries. It organizes international conferences, offers trainings to the leaders of the South and regularly publishes books on this topic. Moreover, CODATU support cooperation between local governments in the field of transport and urban mobility.

For more information: www.codatu.org



Since 2011, DVDH – Des Villes & Des Hommes (Cities and People) – provides services to communities with its expertise in the design of projects linked to urban planning and mobility. The company's activities aim at implementing efficient policies and projects in order to move towards a real sustainable development regarding economic, social and environmental issues. To succeed in its ecological transformation, cities need strategic, practical and effective proposals. Building on its experience and know-how, DVDH assumes the role of an accelerator of urban change, providing an integrated vision of mobility issues.

HOW TO SUCCEED IN YOUR METRO PROJECT?

NINE SUGGESTIONS COMING FROM THE KOCHI METRO EXPERIENCE.

Congratulations, you are in charge of (or you dream to) to develop a Metro Project! This is indeed a very good idea, which will contribute to overcome the problem of the growing traffic congestion and will very positively impact the daily environment of your co-citizens.

Of course, you have your own ideas about how to succeed in this complex urban challenge. But we thought that it might be helpful to share a few themes of reflection coming from our experience of privileged witnesses in the recently inaugurated Kochi Metro Project. We have tried to organize our messages, which are detailed in the next pages, according to five core values: **Inspiration, Integration, Innovation, Communication** and **Cooperation**.

Inspiration will be highly necessary to provide you strength all along the journey which will lead to the achievement of your super project. Inspiration is the result of many factors: your ability to envision what the result will look like, your permeability to new concepts and ideas, but it also should be deeply rooted in the territory and culture of your city. Each city has its own specific features and flavour which will nurture your project. This is very true in the case of Kochi, where the Kerala territory and culture were a major source of inspiration and were reflected in the design and implementation of the project. Message 1 would be “**#1 - Take your inspiration and strength from your own territory and culture**”.

You do want your project to bring a memorable contribution to the history of Metros in your country? Thus, you will need to be special, different and bold enough to launch new ideas. This will be a source of motivation for all team members and will raise interest from other persons. The second suggestion would be “**#2 - Create a bold and inspiring mindset for your teamwork**”.

You will soon realize that a metro is not sufficient to change the mobility pattern and bring the wind of change that your city deserves. Hence, you will have to “**#3 - Design a seamless integrated public transport system**” combining metro, main bus corridors, feeder routes, shared bicycles, these being well connected to the railway network. Starting from this observation that the advent of a Metro brings about disruption in the existing public transport system of Kochi, KMRL was keen to use the metro project as a tool for creative destruction by realigning the bus routes and other public transport systems (water transport), using the Kochi Metro Rail alignment as one of the central axes. From the very

beginning, the Project motto has been to implement “One network, One fare, One timetable”, and now Kochi Metro can claim to be a provider of sustainable urban transport solutions for the whole state.

Your project will also be a great opportunity to “**#4 - Rethink the use of public spaces**”, to reduce the space given to traffic flows and to re-build comfortable sidewalks and bicycles lanes. In the case of Kochi, wide walking places were planned on Hospital Road and Panampilly Nagar, and it was eventually proposed to pedestrianize MG road, the commercial heart of the City. Open Street Days were organized in order to show everybody how good it would be to live in a car-free city, with less noise and less pollution.

You will soon realize that, to coordinate all those projects, you will need to “**#5 - Gather all forces under the common umbrella of a Unified Metropolitan Transport Authority**”, or UMTA. Although it is a long and complex project, which is ongoing in India, Kochi decided to go into that direction, and has been acting as an interim UMTA even before the legal approval. Significant work of coordination with private and public bus operators has been achieved, a bike sharing system has been implemented and some important beautification works were undertaken in many places of the city.

Since you act in a high-tech sector, it will be a must to keep in touch with technological innovations and to “**#6 – Get the best out of Intelligent Transport Systems**”. In Kochi, the Operation Control Centre (OCC) is of the latest generation, you can use your Credit card as a mobility card, and very soon, you will be able to use your Smartphone thanks to the Near Field Contact (NFC) technology. Moreover, the major junctions like Edappally use Smart technology to efficiently share the green light times between cars, buses, autos and pedestrians coming from the metro.

But technology is nothing without taking into consideration the citizens. Therefore, it is also necessary to “**#7 – Rely on societal innovations**”. In Kochi, it was decided to work with Kudumbashree, a poverty eradication and women empowerment programme of the Government of Kerala, to take responsibility of the house-keeping, ticketing, crowd management, customer relations, and gardening in every metro station. For the first time in India, the transgender community was also made part of the team. And the management of the whole company aims at revealing the potential of everyone, through participative brainstorming sessions and the reduction of the hierarchical structure.

Communication will be a very important tool to ensure the involvement of all members of the community: from ordinary citizens, to influent shopkeepers or entrepreneurs and powerful decision-makers. To “**#8 – Take full advantage of a professional communication**”, you will need to rely on energetic and talented collaborators. From the very beginning of the project, Kochi Metro has extensively used all social networks to tease and inform its citizens. A special effort was made on branding, working with a highly-reputed company specialized in this field, but also on the aesthetics of the stations as well as

the rolling stock. Before the official opening of the metro, a special ride was dedicated to differently abled children, elderly people and migrant workers. Everything was done to ensure a widespread adherence to the project presented as a new milestone in the already rich history of Kochi.

Finally, it is highly recommended to “**#9 – Take the best out of international cooperation**”. Throughout the project, Kochi Metro has benefited from first-hand experience from major French Metro designers and operators. Through quarterly brainstorming workshops and yearly study tours, Kochi Metro has progressively developed its own innovative concepts and proposals, well adapted to the territory and culture of the people of Kerala.

Now, it is your turn to mark a new milestone in the history of world-class metros. We wish you the very best and we sincerely hope that this short leaflet will be helpful in the discharge of your huge responsibilities.

Best regards from Kochi,
The Franco-Kerala Cooperation team.

1/ TAKE YOUR INSPIRATION FROM YOUR OWN TERRITORY AND CULTURE

An Overview of Kochi City

Kochi is the commercial capital of Kerala as well as the largest and most vibrant agglomeration in the state, with the highest Human Development Index in India. It hosts a major port, enjoying a strategic location between China and Europe, and it is composed of several islands and backwaters.

The economy of this growing metropolis is predominantly classified as the tertiary sector and the important business sectors include tourism, Information Technology, ship manufacturing, exports of seafood and spices, chemical industries, health services, banking, construction etc.

In the past decade, Kochi has witnessed increased economic growth with improved investments in projects such as Vallarpadam International Container Terminal (VICT), port based Special Economic Zone, industrial parks like Smart City and Info

Park and Vytila Mobility Hub. All these strategic investments have given a boost to the regional economy and employment.

Kochi is well connected by road (three important National Highways: NH 47, NH 17 and NH 49), by rail (three railway stations) and by air (Cochin International Airport connected to Indian and International Cities with 24 airlines).

Public Transport represents 49% of the modal share and offers an efficient and affordable service, with 1400 buses, 9 boats, around 15000 rickshaws, taxis, local trains and a 25-km long metro line. Historically, most of the daily trips were made by boat. Today, the water transport represents only 15 200 passengers per day. Urban sprawl is mostly happening towards the north-east, and to lesser extent towards the south of the region.



1. SWTD boats at Ernakulam Boat Jetty © KMRL



2. A private bus on Park Avenue © CODATU



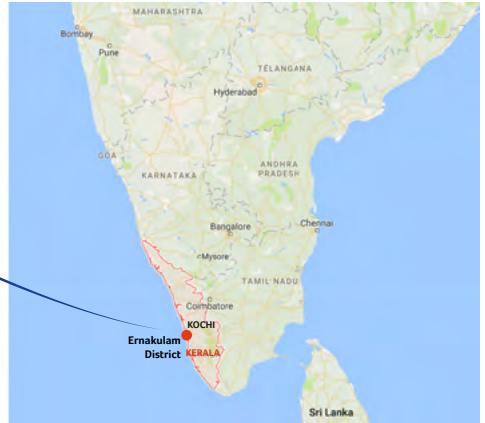
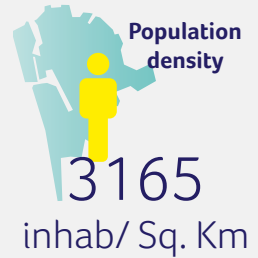
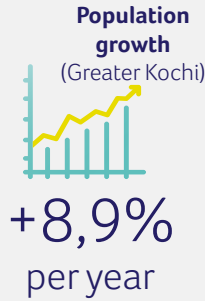
3. A Rickshaw in Fort-Kochi © CODATU



4. Kochi Metro wrapped with sceneries of Kerala



KEY FIGURES



Why a Metro in Kochi?

Despite this excellent level of service, the Public Transport network covered only 49% of the Greater Kochi, frequency of the bus service drastically came down after 8pm, there was no passenger information, the various modes of transport were not integrated and competition between public and private buses caused reckless driving. For all these reasons, the modal share for public transport came down from 73% to 49% in only 10 years (2005-2015). The other major challenges faced by Kochi in its development were the limited right of way, the lack of land availability and the need for open spaces.

Therefore, the discussion about building an elevated metro system in Kochi started in 1999, the project was approved by the Kerala Government in 2008 and by the Central Government in 2012. It was decided that the project would be implemented in a joint venture basis, with investments from the Central and State Government, and hence, a Special Purpose Vehicle (Kochi Metro Rail Limited) was formed in 2013. Assistance from AFD (French Agency for Development) was sought and approved in the same year, representing 20% of the total budget of the project (EUR 180 million).

Read more about the Project Genesis...

Since the opening of the Delhi Metro in 2002, there is a real fascination for elevated metros in India: Bangalore began commercial service in 2011, Gurgaon in 2013, Mumbai in 2014, Chennai and Jaipur in 2015, followed by Kochi in 2017. And twenty-five other projects are under construction or under the planning stage. However, the National Institution for Transforming India (NITI Aayog) – former Planning Commission – has issued negative opinion on the recent metro projects, considering that they are not scaled for certain tier-two cities, and is rather promoting the development of other modes of lesser capacity (BRT, at-grade LRT).

The public company Kochi Metro Rail Limited (KMRL) was created in 2012, as a joint venture of the Government of India and Government of Kerala, to build and operate a 25-km long elevated metro system in Kochi, with 22 stations. Apart from the contribution from both governments (50%), this EUR 800 million project got partly funded by the French Agency for Development (AFD) –20%-, and through private and cooperative bank loans (30%).

The works started in 2013 and were entrusted to DMRC (Delhi Metro Rail Corporation), a Centre-state owned company. Regarding the technical aspects of the project, the Line 1 of the metro is based on a CBTC (Communication Based Train Control) technology, with a third rail system. The trains are composed of three coaches, manufactured by ALSTOM in Sri City (India), near Chennai.

The first phase of the metro project was inaugurated on 17th June, 2017, in the esteemed presence of Mr. Narendra Modi, Prime Minister of India.



5. Chief Minister Pinarayi Vijayan, Prime Minister Narendra Modi and governor P. Sathasivam come out after taking a ride on Kochi Metro on Saturday. SUNOJ NINAN MATHEW © Deccan Chronicle, 18/06/17

On account of the rather negative mood which welcomed the metro project and considering the lack of public consultation, KMRL has done tremendous efforts to make the best out of the project and use it as a tool to transform mobility in the city. Indeed, from the start of the project, KMRL has been committed to do “more than a metro”, through various initiatives, and has succeeded in earning an excellent reputation in the city, in the country and even worldwide.

One of the lesson learnt from KMRL is not to be ‘output oriented’, which consist in selecting a mode of public transport before understanding the travel pattern and the ridership.

2/ CREATE A BOLD AND INSPIRING MINDSET FOR YOUR TEAM WORK

What is so special about KMRL?

From the beginning of the project, KMRL has shown a willingness to prove that any project can be qualitative, sustainable and implemented without corruption. Leading federative actions and innovative thinking, KMRL has succeeded in changing the initial mindset and create a real craze about the metro project.



6. KMRL's signage boards © KMRL

It started with the implementation of “quick-win” projects which were not directly related to the Metro but which contributed to the credibility and good reputation of the organization amongst the population. For instance, KMRL resurfaced few roads around the metro corridor to ease the traffic during the works and raise the standards in terms

of quality and maintenance of such infrastructure. KMRL, in accordance with Cochin Municipal Corporation (CMC), also tried to set an example in terms of quality and efficiency of the signage boards, through a standardisation all over the city.

KMRL has also invested a lot of time and energy in:

- Developing KMRL into a **flat organization** which promoted cross-cutting collaboration within the staff and created internal dynamism, resulting in the creation of a common comprehensive vision on urban transport challenges;
- Working on a powerful **communication strategy**, to foster a feel of ownership in the population and keep everybody informed about the various initiatives and the overall progress of the project;
- Having a **social resonance** in the country through the promotion of gender parity among the staff (in all departments) and the recruitment of employees from the Transgender community;
- **Highlighting the rich and fascinating Kerala's history, art, culture, and literature**, through specific themes given to the main stations.

A willingness to do more than a metro

The main reason why KMRL stood out of the other metro companies in India, and in the world, is its public statement that “the metro alone will not solve the congestion problems in the city” and that, to be successful, the metro needs to be accessible to pedestrians and cyclists, well-integrated with the urban landscape, and well-integrated with the other modes of transport. This vision has propelled KMRL from a Metro company to the Urban Planning and Mobility Agency of the city of Kochi. And ultimately, KMRL intends to become the Metropolitan Transport Authority (MTA), a unique organisation overseeing and regulating all public transports in the city. All these items will be developed further in the next chapters, including the special attention given to Intelligent Transport Systems (ITS) and ticketing.

This willingness to stand out and initiate a paradigm shift in mobility also took the form of **maintaining close ties with International partners**, notably through the two-year agreement signed in 2015 between KMRL, AFD, CODATU and SYTRAL (Transport Authority of the city of Lyon, France) to share experiences and good practices, and ponder the development of Public Transport networks all over the world.

3/ DESIGN A SEAMLESS INTEGRATED PUBLIC TRANSPORT SYSTEM



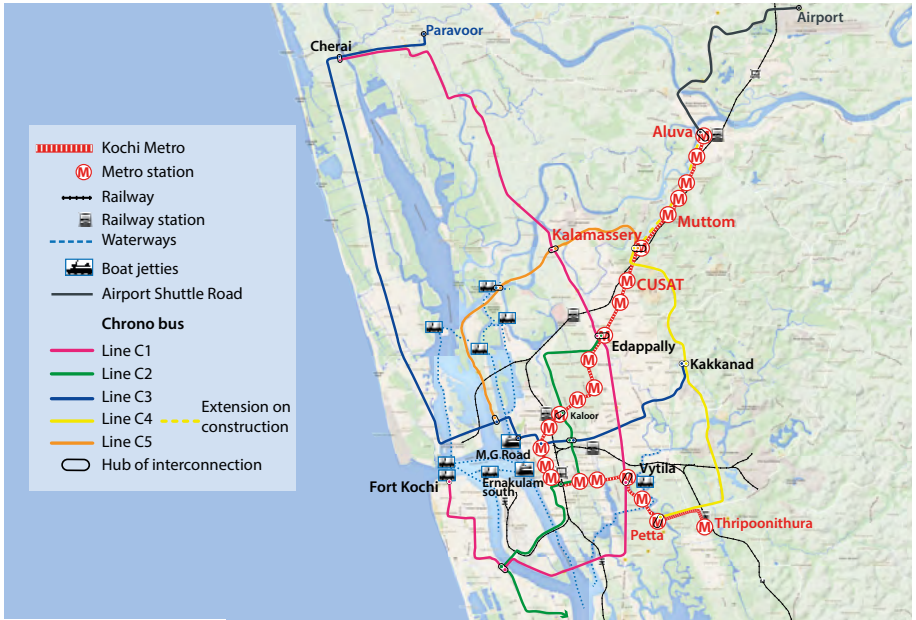
The vision of a network well integrated with the existing modes of transport in the city came in the early stages of the project, in line with the directives of the Indian Ministry of Urban Development (MoUD). Indeed, one of the first initiatives taken by KMRL was to revamp the **Water Transport system** to improve the accessibility to the main land for the thousands of islanders, and develop it as a feeder service to the metro. This mode of transport had been ignored over the last few decades and had been undergoing a steep decline in ridership and infrastructure, mainly due to the emphasis given to the improvement of road infrastructures. This project made Kochi the first city in India to significantly invest in Water Transport (747 Crore INR – EUR 100 Million), with the assistance of the German Development Bank KfW. In total, the network will be composed of 16 routes, 78 modern ferries, around 38 jetties, serving 10 islands, and should be in place by the year 2018.

The second key initiative of KMRL has been to undertake **specific studies** related to Non-Motorised Transport, Public Transport Integration and the long-term planning of Mobility in the Greater Kochi Region (called Comprehensive Mobility Plan), with the support of the renowned consulting group UMTc (Urban Mass Transit Company). These studies constituted the common thread to ensure that the project includes all the components of an integrated

network and insisted on the fact the metro is only a tool in the larger objective of improving mobility in the city. These studies also contributed to the **knowledge capitalisation** on mobility.

As part of the study dedicated to Public Transport Integration, KMRL prepared a **route rationalization plan** for all the buses plying in the Greater Kochi Region (GKR), with three clear objectives: avoiding competition with the metro, ensuring a better coverage of the territory and ensuring an efficient integration with the other modes of Public Transport. Indeed, the Metro Line 1 follows the National Highway 544 (Salem-Kochi Highway) which represents the major mobility corridor for buses, resulting in losses for both KMRL and the bus operators. Along these lines, KMRL conducted extensive discussions with the private bus operators to understand the implications of such rationalization. It resulted first in the creation of four bus societies, with the objective of making major savings in fuel, insurance and maintenance, but also of avoiding competitive running.

A similar approach has been conducted by KMRL with rickshaw drivers and owners, acknowledging that the rickshaw is certainly the best way to ensure the last-mile connectivity. Hence, 15 000 rickshaw drivers formed a society to provide feeder service to the metro and realise the same



7. Proposal for a rationalization of bus routes. Outcome of CODATU Workshop #4 - December 2015

economies of scale. Few auto-rickshaws also started plying as “shared autos”, practice which is popular in many cities in India but new for Kochi.

in 2011 to host long-distance buses, city-buses, and the water transport, which is now hosting a metro station, and which has a good scope of getting upgraded with open spaces, comfortable walkways and property development.



8. Design of “Vyttila Mobility Hub - Phase II” by EGIS Rail

Finally, KMRL engaged in a reflection on the design and implementation of 13 intermodal hubs at key locations, to ensure a smooth interconnection between the various modes of public transport. The best and most advanced example is certainly “Vyttila Mobility Hub” which was designed

Besides that, KMRL is now in the process of analysing other alternatives for Kochi integrated public transport network, such as BRT (Bus Rapid Transit), LRT (Light Rail Transit) or bus corridors, which would complement the existing and planned Metro network. With all these initiatives, KMRL can claim to be Kerala’s Urban Transport Solutions Provider!

In a few words, a metro project needs to be seen as a piece in the puzzle of urban mobility and it is essential to include all existing modes of public transport in the reflexion process, to create an accessible and integrated network for all citizens.

4/ RETHINK THE USE OF PUBLIC SPACES



The specificity of KMRL lies in the fact that its ambition did not stop at the transport planning, but expanded over all **mobility related planning**. Indeed, KMRL gave a lot of importance to the development of open spaces, walkways and cycle-tracks, to ensure an **equitable sharing of the public space** among the citizens of Kochi, whether they are car users, pedestrians or cyclists; this being in response to the current tendency to widen the roads to the detriment of pedestrians.

Within the scope of the study on Non-Motorised Transport (NMT), a Master Plan was prepared and the first pilot project was inaugurated in July 2016 in Panampilly Nagar, a residential area whose vacant land was transformed into a 750-meter-long **walkway cum cycle-track**. More than a mobility project, this was mainly an urban project intended to show how, with a limited budget, an area can be transformed and revamped, with proper lighting, greeneries, proper slops at each intersection and universal accessibility.



9. Panampilly nagar walkway cum cycle-track © KMRL

The huge number of kochiites using the infrastructure every day shows the urgent need for more projects of this kind and besides, KMRL is now building a similar walkway in the CBD area, to improve the connectivity between the boat pier and the nearest metro station.

To illustrate the ambition of KMRL for the city, one symbolic event was the first **Open street Day**, or ‘Street Festival’ (‘Theruvulsavam’ in Malayalam) organized in Kochi on May 1st, 2016. It consisted of closing the road to traffic over 1km and organizing various sports and cultural-related activities such as zumba, kite-flying, painting, cycling, reading, football etc. It gathered around three thousand people, who thoroughly enjoyed this concept of reclaiming the street, and it represented a powerful tool to prefigure KMRL’s future pedestrianization projects.



10. Poster of “Theruvulsavam”

In a nutshell, a mobility project shall be seen as an opportunity to transform the city and its infrastructures, to create a more inclusive and pedestrian-friendly city. The success of the project will mostly depend on its integration in the existing urban fabric.

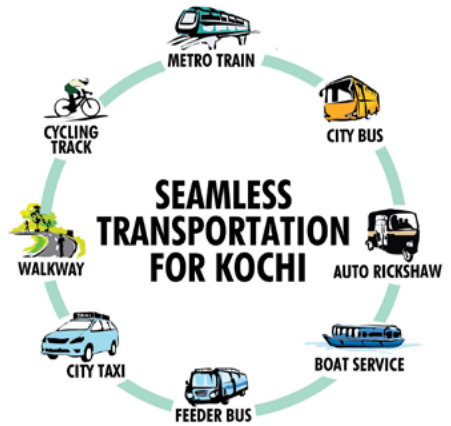
5/ GATHER ALL FORCES UNDER THE COMMON UMBRELLA OF A UNIFIED METROPOLITAIN TRANSPORT AUTHORITY (UMTA)



In 2006, the Government of India (GoI), through the Ministry of Urban Development (MoUD), released the National Urban Transport Policy (NUTP), as a response to growing urban transport challenges. One of the key recommendations of this policy was certainly the creation of an UMTA in all “million plus cities”, in order to facilitate coordinated planning and manage integrated urban transport systems.

Very early in the project, KMRL was convinced about the absolute necessity for such organization, and was committed to initiate its creation. Indeed, a coordinated planning would solve many issues related to the integration of the various modes of public transport, and would enable the implementation of the vision of “One Network, One Fare, One Timetable”. The text notably provides for the creation of an Urban Transport Fund (UTF) and gives the freedom to the UMTA to find its own resources. It also provides for the regular update of the Comprehensive Mobility Plan (CMP) and its implementation.

The text is currently under review and shall be passed by the Legislative Assembly by the year 2018.



11. Logo representing the ambition of Kochi of a seamless transport network

Hence, institutional integration is essential to provide an efficient mobility service to the citizens, through an integration and interconnection of all modes of public transport in the city.

6/ BRING OUT THE BEST OF OF INTELLIGENT TRANSPORT SYSTEMS (ITS)



KMRL also acquired its good reputation through the implementation of innovative projects using Intelligent Transport Systems (ITS), which is a critical component of every transport project.

To begin with, KMRL introduced an **EMV-based smart-card** – ‘Kochi One’ card – through a unique PPP model. Indeed, KMRL signed an agreement with AXIS Bank, wherein the Bank invests the entire funds required for the Automatic Fare Collection System (AFC) and maintains the system for the next ten years. Moreover, a royalty of 2.09 billion Rupees (30 Million Euros) is paid to KMRL for the right to be KMRL’s partner. This co-branded debit card can be used as a **Mobility Card** to access all modes of public transportation, but also as a Debit card, with 20% of the transactions being transferred to KMRL over the next ten years. The card can also be used for other purposes than transit, such as utility service payment and internet transactions. This is for AXIS Bank an incredibly powerful advertisement, but also an assured new clientele and potential future contracts in other Indian metros. Indeed, this is the first time such an innovative model is being launched and it is expected to revolutionize funding models for AFC systems in the metro industry globally.

The second great enterprise has been the development of the ‘Kochi One’ **Mobile App**, which is not only a journey

planner, but which also generates QR (Quick Response) code tickets for travel, and allows you to pay your public utility bills and access to information related to city services and city life. This unique application has an electronic valet integrated to it which is linked to the ‘Kochi One’ card. The development of the application is one of the projects which will be implemented jointly by KMRL and the CSML (Cochin Smart Mission Limited), as part of the Smart-City national scheme, won by Kochi in January 2016. Through this scheme, Kochi City will benefit from a funding of 14 Million Euros (100 Crores INR) over five years.



12. Official launch of KMRL-Axis Bank co-branded mobility card on 17th June, 2017 © KMRL

Mobility cards and Mobile Applications are inevitable tools to enable an intermodal integration and improve the accessibility and convenience of the system for the users. This domain is in full swing which the access and use of Open Data.

7/ RELY ON SOCIETAL AND MANAGERIAL INNOVATIONS



However, technology is nothing without taking into consideration the people involved in the project as well as the users of the system.

The management in KMRL promoting **cross-cutting collaboration** within the staff was an asset to develop a common comprehensive view on urban transport challenges and create internal dynamism. As an example, in 2015, KMRL started weekly “Vertical Meetings” wherein each staff could get involved in one particular group called “Vertical”, which was not necessarily linked to his or her field of expertise. These brainstorming sessions enabled any employee to come forward with out-of-the-box ideas, and were at the origin of several measures that made KMRL famous. The Management team also insisted on working as a flat organization, with a reduction of the hierarchical structure, to help revealing everyone’s potential.

Coming to the societal innovations, KMRL has taken the early commitment of being the first metro company in the world to have a balanced recruitment of men and women across departments, and to resort to a women-empowerment organisation for all the activities related to house-keeping, ticketing, customer relations and gardening in the metro stations. With 682 women being recruited, this is the largest crew of women of any metro in the world. The agreement was signed

in 2016 with ‘Kudumbashree’, a poverty eradication and women empowerment programme of the Government of Kerala, which already works in various domains: parking management at railway stations, catering, waste collection, farming, data entry, day care, ‘She’ taxi service, building construction etc. This is also a significant step towards making the metro stations and the overall metro system more inclusive and “women-friendly”.



13. Kudumbashree ladies in Palarivattom metro station ©CODATU

Last but not least, KMRL has drawn the world’s attention when they decided to hire 23 transgenders from Kudumbashree as part of the crew, for house-keeping and ticket selling. This is the first time in India that such measure is being taken by a government-owned company. The state of Kerala is itself one of the first states in India to develop a transgender policy with the objective of bringing Transgenders into the mainstream by offering jobs and reservations.

FOCUS ON KMRL's Green initiatives:

KMRL has invested a lot of time and effort in making the project environmental friendly. They started very early in the project, with trees being planted across the city and lately with vertical garden being set up on every sixth pillars of the metro, using biodegradable waste from the city instead of soil.



14. Vertical garden on metro pillars - © Times of India

As shown by KMRL, a metro project can be an opportunity to experiment new managerial techniques (taking advantage of the young blood), restore gender equity through an equal recruitment of man and women, work with local NGOs promoting women empowerment and set an example in the inclusion of transgenders.

8/ TAKE FULL ADVANTAGE OF A PROFESSIONAL COMMUNICATION



From the very beginning of the project, KMRL developed an efficient communication strategy to ensure a progressive ownership by the population and ease people's mind, despite the vociferous protests which emerged on account of the traffic jams created by the metro works. KMRL started with a promotional campaign which used the old proverb related to gooseberries - "Bitter now, Sweet later" - referring to the difficult period of the metro works, which would soon turn "sweet". This campaign was very popular and was even given an award.



15. Gooseberry Campaign by KMRL (2014)

In the same lines, the second famous awareness campaign of KMRL depicted children dressed up like metro workers, to make people realize that the problems faced due to metro construction are temporary and will make way for a better tomorrow for the next generations.



16. Awareness campaign by KMRL (2015)

KMRL also made a special effort to create and ensure an interactive dialog with the Kochiites, through very active Facebook and LinkedIn pages where each comment would be answered and taken into consideration on a daily basis. Moreover, not a single day would go by without news in the papers and on KMRL's blog.

In 2015, KMRL conducted an internal reflection to change their logo and choose one which would better fit with their ambitions. Together with Brash Brands, a Dubai-based branding agency, KMRL designed a logo which represents both the lines of the integrated public transport network and the objective of Kochi Metro to link people with places and opportunities. The logo was further customized for each mode of public transport (Metro, Water metros, Buses, Cycles, Taxis...) to symbolize the unity of the network.



17. Logos designed by Brash Brands for KMRL in 2015

KMRL also made the wise decision to entrust the design of the stations, including wayfinding and train wrapping, as well as the design of the Mobility App, to a single design company: Tata Elxsi. Indeed, KMRL was determined to make the journey of the Kochiites a unique experience and has been precursor in making the metro stations a tourist destination as well as a reflexion of the rich and amusing history of art, culture and literature of Kerala. Six major stations were designed with a unique theme (Cultural and Artistic Heritage, Maritime History, Spices and Crops, Sporting Heritage, Western Ghats, History of Ernakulam) and a continuous Kerala theme was applied in the remaining stations. With this project, Tata Elxsi won the “iF Design Award 2017”, which is the global award for design excellence.



18. Design of Kalamassery metro station © KMRL



19. Design of Muttom metro station © KMRL

In the same lines, KMRL is now undertaking an intensive drive to fill the metro stations with thought-provoking pieces from Indian and World literature, which will give people something to reflect upon while they wait at the metro stations. KMRL is aiming to be the most literature-rich metro in the world.

Hence, the success of KMRL also lies in the quality of its communication campaigns, its close interactions with the citizens and the great decision to entrust all customer-experience related aspects of the project (signage, theming...) to one single agency, to ensure the unity of the project.

9/ TAKE THE BEST OUT OF AN INTERNATIONAL COOPERATION



In 2015, AFD, CODATU, SYTRAL and KMRL signed a two-year partnership agreement to organize cooperation activities and accompany the Metro project in various domains related to intermodal and institutional integration, place-making around the stations, and operation and maintenance, taking as a partner city “Lyon” which has close similarities with Kochi in terms of inhabitants, size and mobility challenges. Indeed, 40 years ago, Lyon has gone through the whole process of implementing a mass transit system, interlinking it with the surface transport, setting-up an overall institutional framework to allow an efficient and coordinated management of all public transport modes, establishing a Mobility Plan for the city, developing urban projects around public transport, making the city more liveable and accessible for its citizens, and developing a real expertise in the smooth operation and maintenance of mass transit systems.

This technical cooperation, financed through AFD by funds provided by the French Government called FEXTE, was the first of this kind to be implemented in India. The FEXTE aims at funding cooperation in middle-income countries in order to foster a dialog on public policies and enhance the French expertise.

AFD was already present in Kochi since 2013, through a loan granted to KMRL and accounting for 20% of the total amount of the Metro project. Considering the willingness of KMRL to work on all the

topics related to the smooth integration of the metro project into the urban fabric (as extensively developed in the above chapters) and to benefit from International expertise, it was mutually agreed between KMRL and AFD to start this programme. From the early stages of the project, one important element on which all four partners insisted was to have a dedicated person from CODATU, based in KMRL throughout the partnership, and in charge of the daily coordination and follow-up of the various projects.

Over a period of two years, CODATU and SYTRAL organized eight interactive workshops in Kochi, three study tours in Lyon (France), one preliminary study on “Medium-capacity modes for Kochi Public Transport Network”, coordinated the organization of an “Open Street Day”, and, based on the outcome of the workshops, AFD launched two independent tenders to select (i) an engineering company specialized in the development of urban projects around a mass transit system, (ii) a consultant specialized in the operation and maintenance of a metro system.

As part of the first tender, the French engineering company *EGIS Rail* was selected for the design and implementation of three urban and transportation pilot projects in the city of Kochi, based on the excellent work done by the Lyon Town Planning Agency. The objective of these three projects was to show how qualitative urban projects can be implemented in a short time, with a

limited budget, and can contribute to the transformation of the city.

➤ The first pilot project consisted in the metamorphose of the commercial heart of the city (MG Road) through a semi-pedestrianization of one side of the metro viaduct, to foster the pacification of the city-centre. In 2016, despite the positive response from the citizens, the project was put on hold due to worries from the commercial establishments.



20. Sketch of MG Road pedestrianization project, by Lyon Town planning Agency (UrbaLyon)

➤ The second pilot project identified during the workshops was the transformation of Edappally Junction, located at the intersection of two major highways (NH-66 and NH-544) and one of the busiest junction is Kerala. With the arrival of the metro station, the first objective of this project was to ensure a smooth and safe movement of private vehicles, buses, pedestrians and cyclists in the area, with comfortable walkways, qualitative open spaces, sufficient parking spaces for two-wheelers, pick-up/drop-off zones for rickshaws and a relocation of the existing bus stops to ensure an easy access from/to the metro station. The project has been successfully approved by the authorities and the preliminary works started in April 2017.



21. Design of Edappally junction by EGIS Rail

➤ The third project which emerged from the discussions with KMRL and local stakeholders is the implementation of the phase II of Vyttila Mobility Hub, to allow an efficient interchange between the metro, the city buses, the long-distance buses, the boat service, and in a longer term, the railway service. The overall idea was to work on three dimensions: the priority given to pedestrians and cyclists access, the development of the hub into a sub-centre through property development, and the introduction of open spaces. In 2017, the project was put in the hands of the Government of Kerala which shall adjudicate on the project implementation.



22. Design of Vyttila Mobility Hub, by EGIS Rail

The second tender emerged from the Workshop #3 where the complex topic of the Operation and Maintenance was thoroughly discussed with experts from KEOLIS, RDTA (RATP Dev Transdev Asia) and other Indian metros. Considering the decision of KMRL to keep most of the operational and maintenance aspects in-house, it was mutually decided to nominate a team who would provide support to KMRL during the six months leading up to the commercial operation. The consultant selected by AFD appointed one Mission Head, based full-time in Kochi, and one back-up team working from Europe and visiting Kochi for specific visits and meetings. Their expertise was requested on the following domains: establishing an O&M outsourcing strategy, putting in place a robust Asset Management System (AMS), fixing the basics for the development of a high-performance O&M entity and optimising the costs for Operation and Maintenance.

Coming back to the workshops organized every three months in Kochi, each of them was designed in such a way that it would fit with the current challenges met by KMRL. International experts were carefully selected according to the topic, and spent quality time trying to understand and contribute to the project, through case studies and benchmarking. A special focus was given to the facilitation methods, to ensure an active involvement of all participants through group activities and brainstorming sessions, and to the variety of stakeholders involved (from NGOs, to transport operators, urban planners, architects, members of the civil societies and key advisors, local elected members, research centres, universities etc.). CODATU also gave a priority to the project-oriented approach, to make sure that concrete projects would emerge from the debates and brainstorming. It is indeed

very interesting to see how ideas can arise and evolve in a short timeframe, when the right people are meeting at the right place. Moreover, the dynamism and receptivity of KMRL have played a crucial role in the success of the partnership.

The actual contribution of this international partnership on ground has been minimal if we look at the overall project, but it contributed in planting quick-germinating seeds which are already growing and can be seen in the urban projects and in the various initiatives taken to ensure intermodal integration.

Let's think about potential improvements...

Future cooperation might approach topics directly related to infrastructures and equipment. As an example, the role of designers in the architectural conception of stations would be a great subject to be discussed. The recent metro projects in Lyon (France) and other cities have brought many fresh ideas in the last ten years. And now, the mega project of the *Grand Paris Express* prompts futuristic ideas that might be shared with the reputed Indian and worldwide designers.

French designers also play an important role in the industrial conception of the rolling stock. The impact of the initial design on the reliability and maintainability of the rolling stock is enormous. And those topics will surely rise in recently opened Indian projects.

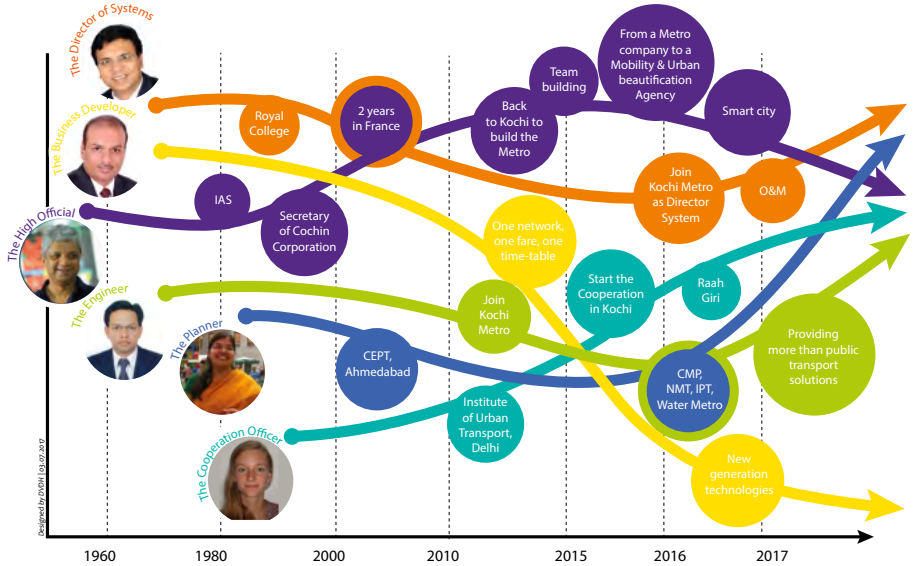
From an operational point of view, the idea to settle a Performance Management System (PMS) would also be an interesting subject to reflect upon. Most of the French public

transport networks now rely on Performance Departments, to improve their financial, commercial, technical and environmental results. Their recent experiences are certainly worth being discussed and challenged by Indian metro operators.

Additionally, the technical cooperation could start at an earlier stage and contribute to the discussion about outsourcing or keeping in-house the Operation and Maintenance (O&M). In the case of Kochi, it was decided to keep most of the O&M aspects in-house, except few elements of maintenance which require special expertise. This scheme has also been followed in the Delhi Metro.

Eventually, the idea to benchmark a project with other Indian and foreign projects seems to be quite relevant. Kochi Metro has taken the lead in the data collection process. Contributing to a dialog between Indian cities would also be a useful target for future cooperation.

OUR COOPERATION: A STORY OF PEOPLE...



23. Our cooperation: A story of people.

How they all contributed to the Kochi Metro project and how their lives changed

Great projects are the fruit of the hard work of many persons: political leaders and administration officials, planners and engineers, employees and workers... This is indeed a fantastic collective human adventure which tangles many destinies.

We have chosen to focus on five emblematic characters, to show how they were prepared to enter the Kochi Metro adventure, how they eagerly contributed to it and how the course of their lives got

changed. Hence, we will talk about the exchanges of good practices between India and Europe, the impact of economical regulations, and even the importance of literature in the construction of a metro.

Mr. Elias George, the High Official, was born in Kerala in the late fifties. Very talented, he would soon be selected to enter the prestigious Indian Administrative Service (IAS). As a young man, he was even appointed as Secretary of the Cochin

Municipal Corporation between 1985 and 1988. People might see him on MG road, carrying a big pile of books. A few years later, he would travel to France to learn more about the European administration of public affairs. And after a few years of responsibilities in Delhi, he was asked to conduct the giant project of the Kochi Metro. He very quickly realized that the Metro might not only help people in their daily commuting, but should also be an essential tool to metamorphose and re-harmonize Kochi. And he would still carry with him a small book of English poetry and a backpack to hike over Keralan mountains.

Mr. Ved Mani Tiwari, the Business Developer, always had a lot of interesting and original ideas popping-in every day. He realized very early that mobility and the digital revolution have a lot to share: apps on mobiles, smart cards, Intelligent transport services. And he convinced everybody that the Kochi Metro would set a new high-tech standard. After traveling to Lyon and to other European cities, he soon understood that a metro alone cannot be the solution. It would be necessary to build an integrated network: one network, one fare, one timetable would become his new motto. And he pinned a map of Kochi just in front of his desk. Ved Mani was just a teenager during the economic revolution of 1991, but he soon became a tycoon of the new economy juggling with renewable energies and new generation telecommunications.

Mr. Praveen Goyal, current Director Systems at KMRL, once occupied a high position at the Indian Embassy in Paris. But he decided to come back to India as an Engineer to meet improbable challenges with Indian Railways and other metro projects. When he was told that the Operation and Maintenance of the Kochi metro would

remain fully in-house, he realized that, apart from building 1000 pillars and opening a high-tech project, he would also have to create a new managerial culture of public transport. He welcomed with great enthusiasm the arrival of an experienced Portuguese fellow who faced the same issues in his own country few years ago. On the day of the Inauguration, he felt happy that he could gather all technical strengths. What a tremendous advantage to be an Engineer and a Diplomat at the same time!

Mr. G.P Hari, the Engineer, was born and brought-up in Kerala and worked for many years for the Indian Railways in Goa, Mangalore, Udupi and Bangalore (Karnataka), Delhi and Guwahati (Assam). He is a pure product of his country. His wife is highly skilled in the demanding practice of Kathakali (classical Indian dance), and Malayalam is of course the first language for everybody in the family. He started to work on the purchase and design of the rolling stock for Kochi Metro, but quickly moved to other innovative technologies: water metro, new generation tram, Intelligent Transport Systems (ITS), electric buses, smart management of junctions, and even high-speed trains for Kerala! One thing that is for sure: he is fully convinced that Kerala deserves the best technology, and nothing can stop his vibrant energy and innovative spirit.

Ms. Swati Khanna, the Planner, lives part time in Delhi and part time in Kerala. She was educated at the Centre of Excellence for Public Transport (CEPT) in Ahmedabad, Gujarat, and really enjoyed the time spent in this nice campus shared with fellow architects. She easily moves from topic to topic, which is no surprise since she used to practice roller-skating in her teens. She is fond of traveling to foreign cities and picking up new ideas for the

various studies that she conducted for Kochi Metro: Comprehensive Mobility Plan, Integrated Public Transport, Non-Motorized Transport, Transit Oriented Development (TOD) and even the Water Metro Project. And she dreams of settling in Kerala.

Ms. Marion Hoyez, the Cooperation officer, was born in the North of France in the nineties. She studied maths and literature, spent two years in India working with children and eventually specialized in France in Urban services for developing cities. Soon, she came back to India to work with the Indian Institute of Urban Transport (IUT) in New Delhi. This internship paved the way for her next position in Kochi, where she was in charge of the coordination of the Indo-French partnership between AFD, SYTRAL, KMRL and CODATU. She got passionate with the people and culture of Kerala, and spent long hours with her colleagues to make sure that Kochi would be recognized as a smart city. In the meantime, she also organized several workshops, launched the first "Open Street Day" in Kerala, and would never miss a football match. Back to France, she joined CODATU headquarters and she now works on several cooperation projects in India and elsewhere.

ABBREVIATIONS



AFC	Automatic Fare Collection
AFD	French Agency for Development
BRT	Bus Rapid Transit
CBD	Central Business District
CBTC	Control Based Train Control
CEPT	Centre of Excellence in Public Transport
CMC	Cochin Municipal Corporation
CMP	Comprehensive Mobility Plan
CODATU	Cooperation for a Development of Urban Transport
CSML	Cochin Smart Mission Limited
CMP	Comprehensive Mobility Plan
DMRC	Delhi Metro Rail Corporation
EUR	Euros
EMV	EuroPay VisaCard MasterCard
FEXTE	Fonds d'Expertise technique et d'Echanges d'Expériences
GKR	Greater Kochi Region
GoI	Government of India
KfW	Kreditanstalt für Wiederaufbau
KMRL	Kochi Metro Rail Limited
IAS	Indian Administrative Service
INR	Indian National Rupees
ITS	Intelligent Transport System
LRT	Light Rail Transit
MoUD	Ministry of Urban Development
MTA	Metropolitan Transport Authority
NFC	Near Field Communication
NH	National Highway
NMT	Non-Motorised Transport
NUTP	National Urban Transport Policy
O&M	Operation and Maintenance
OCC	Operation Control Centre
PMS	Performance Management System
QR	Quick Response
SYTRAL	Syndicat mixte des Transports pour le Rhone et l'Agglomeration Lyonnaise
SWTD	State Water Transport Department
TOD	Transit Oriented Development
UMTA	Unified Metropolitan Transport Authority
UMTC	Urban Mass Transit Company
UTP	Urban Transport Fund
VICT	Vallapadam International Container Terminal

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Kochi



Green initiatives

Team work

Metamorphose

INNOVATION

Kerala



Pedestrian-friendly

Feeder buses



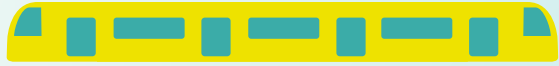
INSPIRATION



Social inclusion

more than a metro

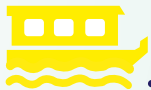
Unified Metropolitan
Transport Authority



COMMUNICATION

Water Metro

Cycling



Women empowerment



CODATU

• One Fare • One Timetable • One Network •

KMRL

AFD

Multimodality

KERALA'S URBAN TRANSPORT SOLUTIONS PROVIDER



Passenger
experience



INTEGRATION



SYTRAL

Comprehensive Mobility Plan

COOPERATION

DVDH

