# POSSIBLE UTILIZATION OF MOBILE BIG DATA ANALYSIS FOR TRANSPORT SECTOR IN VIET NAM

Dr. Nguyen Quang Tuan – Vice General Director
Institute of Transport Science and Technology

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# I. Overview

**Concept**

- Big data: Big Data is used to define a hyper set of data so complicated that conventional data processing tools are not able to handle, manage, store and analyze. The concept of Big data is also characterized by velocity, volume and variety.

# I. Overview

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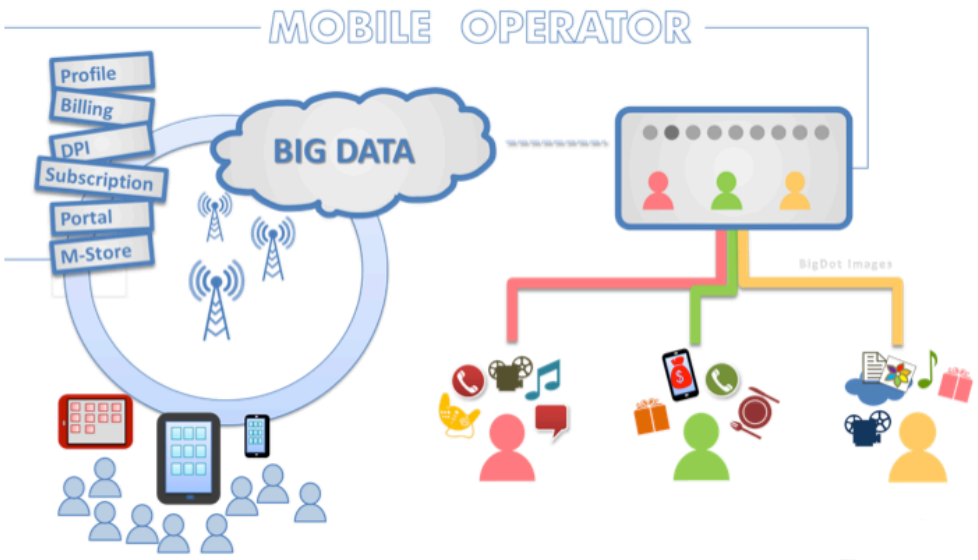
- Collection, storage and analysis of data is now on the rise and seems unbounded, which are promoted by fast increased processing capacity and significantly decreased costs in both computation and storage.
- Big data based management system can handle a large volume of complicated data.
- Big data is the solution to three problems: data storage, data analysis and data management.

# I. Overview

**Big data characterization**

- Data files can be so large and complicated they may become different when processed by conventional data processing applications and existing data management tools. Therefore, data collection, storage, search, sharing, transfer and analysis can be a big challenge.
- The trend for bigger and bigger data set is a result of many information being extracted from analysis of a data set comprising of various related data. More and more data are being collected by information sensing mobile devices, remote sensing devices, application logs. cameras and wireless networks.

# I. Overview



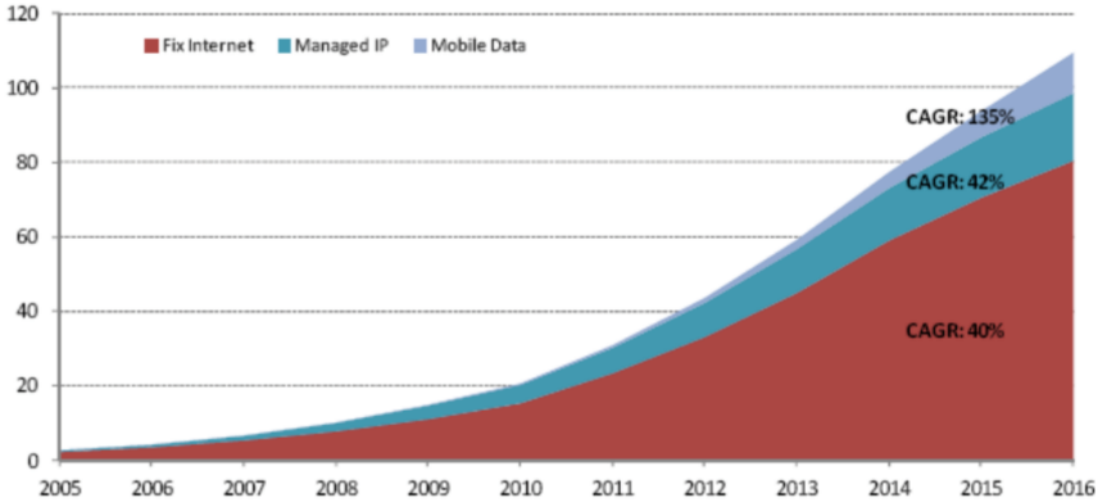

Mobile Big Data

# I. Overview

**Mobile big data**

- More and more people are  using mobile phones around the world. By 2020, about 11.6 billion mobile devices will be connected to networks. At the present, mobile phones have changed the way people communicate and work. Applications and innovations are so frequent as seen in the mobile phone industry are triggered by big data analysis.
- Big data analysis on mobile devices is one of the most important factor in success of mobile application. By using mobile data, it is possible to track and monitor major trends of users in order to make decisions to increase interaction and guide collection purpose.

# I. Overview




Yearly Global IP traffic (source: OECD)

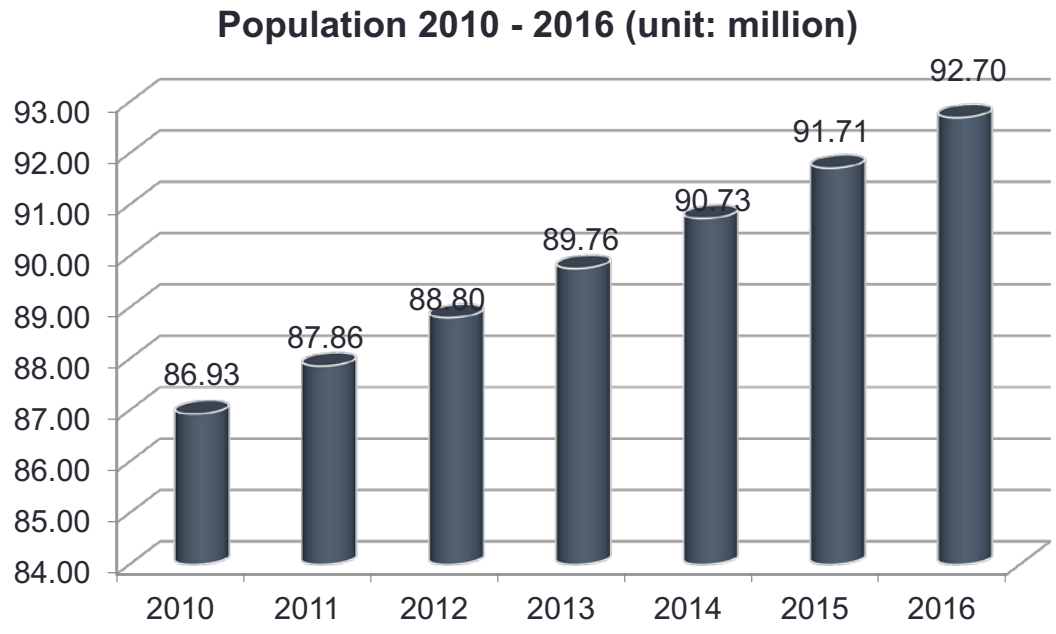
# I. Overview

- Mobile phones are now used to collect big data by various organizations so that they can get information volume bigger than ever before. Most of the modern mobile phones are equipped with global positioning system which can help to locate positions of the phones.
- Apart from routing data, mobile phones are containing a treasure of information, including call logs, SMS messages and social network posts.
- Mobile phones also work as individual sensors which collect information from the surrounding environment. Collection and analysis of information from millions of mobile phones may lead to important information, which can be used to send notifications to the mobile phone users.

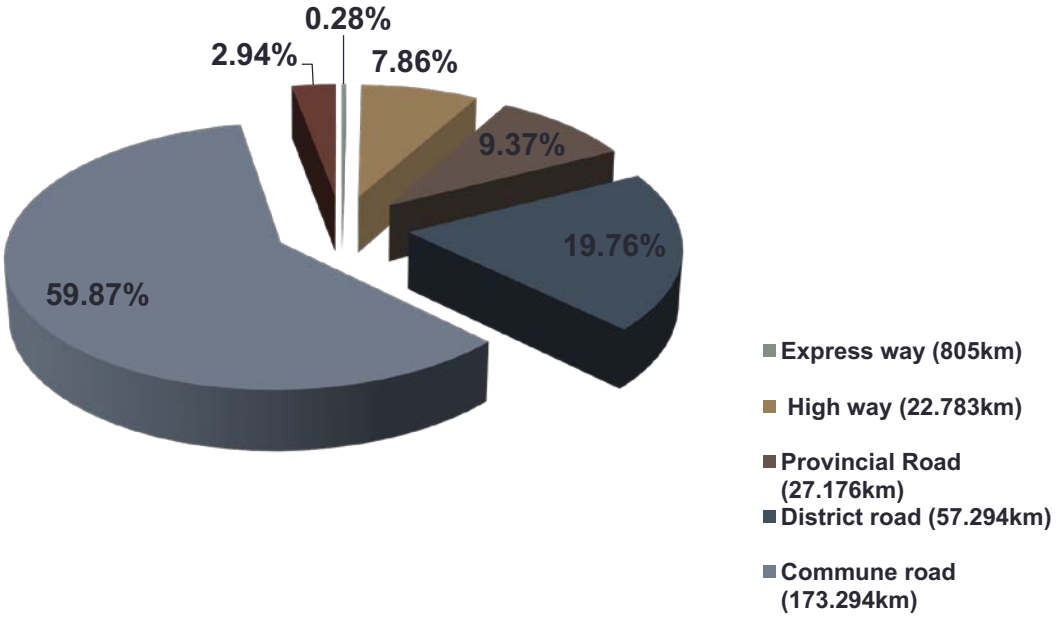
# II. Roles of Mobile big Data in Transportation

- According to the General Statistics Office, Vietnam's population as of 2016 was about 92.7 million with an average growth of 1.08% per year.
- Forecast shows that Vietnam's population is still growing. By 2025, the population estimate100 millions and by the mid of the century, may reach 110 millions.
- Population growth has placed a challenge to great urban centers. Increased population also means increased demand for transport vehicles. Pressure from fast population growth, especially in big cities, has forced the Government to provide adequate strategies for infrastructure development.

# II. Roles of Mobile big Data in Transportation



# II. Roles of Mobile big Data in Transportation

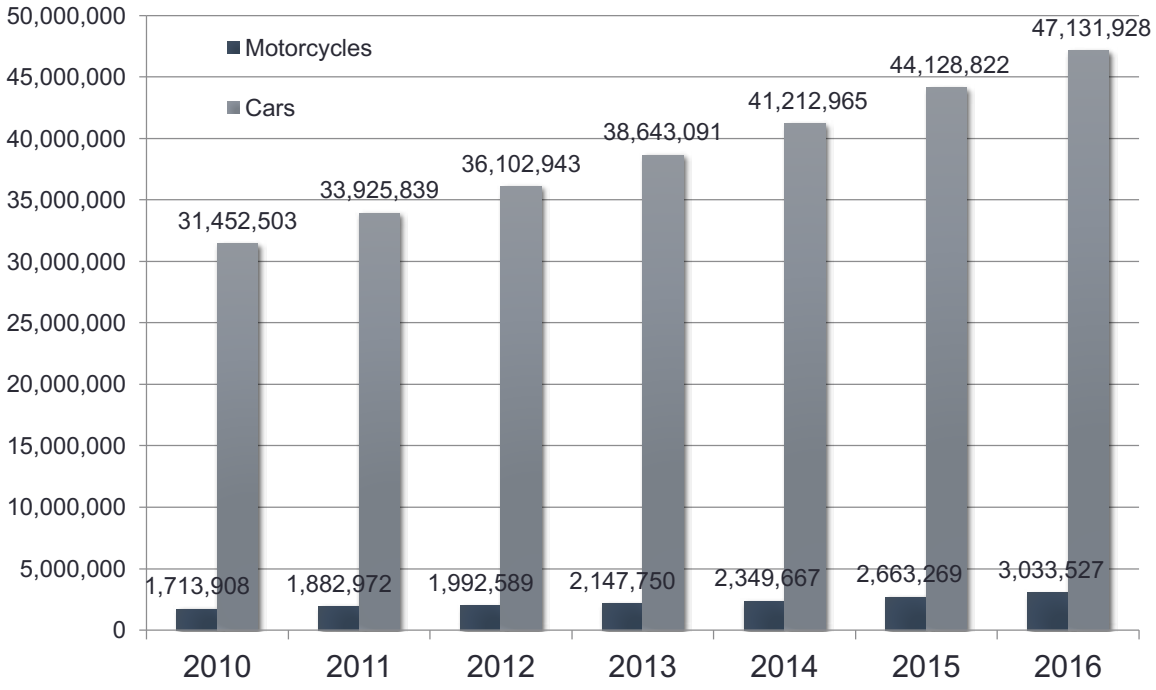



# II. Roles of Mobile big Data in Transportation

**Roads**

- Vietnam's road network from North to South is 289,880 km long, which include expressways 805km and national highways 22,783km, as of 2016, and accommodating more than 3 million automobiles and 47 million motorcycles, as of 2016. Automobile and motorcycle ownership increases by 10.24% and 7.5% per year. Many road sections and intersections have been now overloaded – 3 or 4 times or more than the design capacity, even 22 times during peak hours.
- Both infrastructure and vehicles are expected to increase in the coming period. Management as well as planning will require accurate data on the current situation. Therefore, development of mega database now is needed and urgent.

# II. Roles of Mobile big Data in Transportation




# II. Roles of Mobile big Data in Transportation

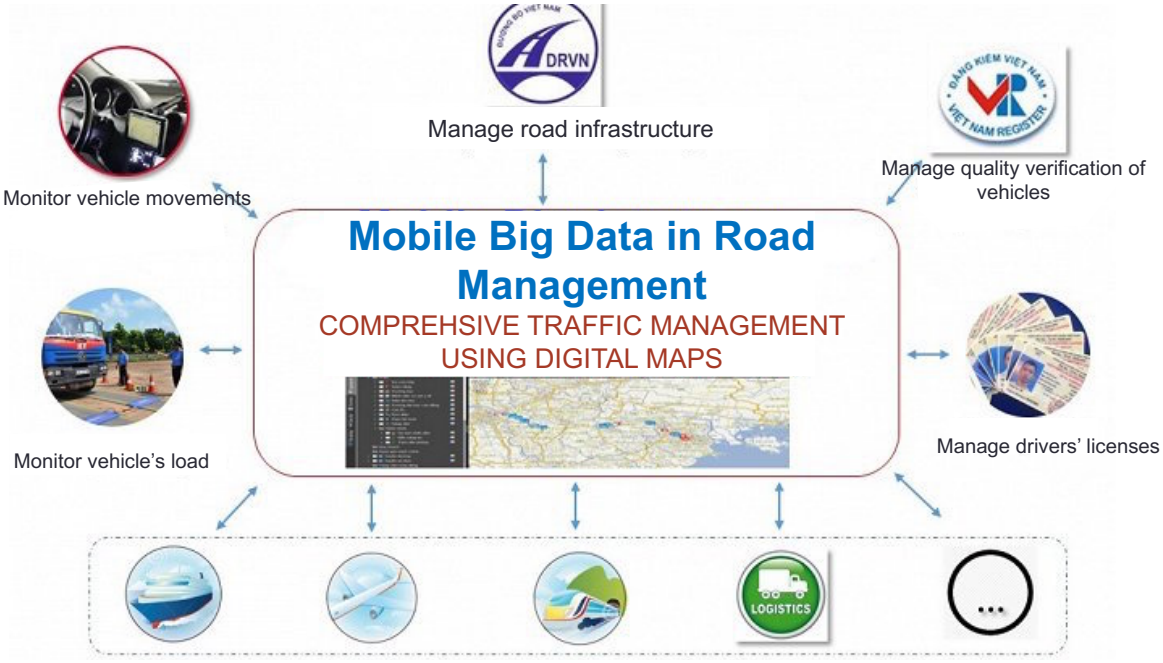
- Furthermore, population growth is lead to traffic is getting denser with all kinds and sizes of vehicles. Traffic accidents may occur any time. The problem for managers, leaders to reduce negative impacts the traffic volume and traffic accidents in big cities still has no effective solution.
- Insufficient transport facilities are also a big concern, but they are not yet planned to provide convenience, safety while ensuring townscape values. A good plan requires for reliable data as input and basis.

# II. Roles of Mobile big Data in Transportation

**Management of Infrastructure**

- Data is used to optimize management processes or provide data-based processes. This includes the use of data to improve management efficiency in transport sector (intelligent transport).
- Traffic has a significant impact on the livability and efficiency in cities. Effective use of data will help manage traffic more effectively, respond well to infrastructure demand from increased population.
- Intelligent traffic management aims to make driving in urban areas seamless and efficient. As smart cities grow, services and infrastructure will be more integrated. In addition, issues such as traffic, waste management and energy will benefit greatly from concept of Big Data and IoT.

# II. Roles of Mobile big Data in Transportation



# II. Roles of Mobile big Data in Transportation

**Planning and Organization**

- The problem now is how to organize and manage transport network appropriately and assign proper transport modal splits to the current and future road network so as to meet the travel demand, especially in big cities.
- Data analysis is used to help planners determine the causes of the congestion. Planners may consider to make infrastructure allocation decisions to meet future demand.

# II. Roles of Mobile big Data in Transportation

**Traffic Management**

- Big Data contains a lot of valuable information that, if successfully extracted, will be useful to a lot of scientific researches, prediction and even determining real-time traffic conditions. Therefore, these data must be collected, organized, stored, searched, shared in a different way than usually done.
- The data helps identify alternative routes, thereby encouraging traffic users to take alternative modes.

# II. Roles of Mobile big Data in Transportation

- Mobile network operators use cell phone tower signals to cross-check locations of mobile phone users and identify patterns of incidents and congestion based on data analysis.
- The data and information is provided to third parties in order to use the data to plan the implementation of the necessary tasks to create a usage environment. For example, Orange - the French mobile telecommunications service company using Floating Mobile Data technology (FMD) collects mobile phone traffic data to determine travel speed and density at a certain point of road networks and deduce travel time or formation of traffic jams.

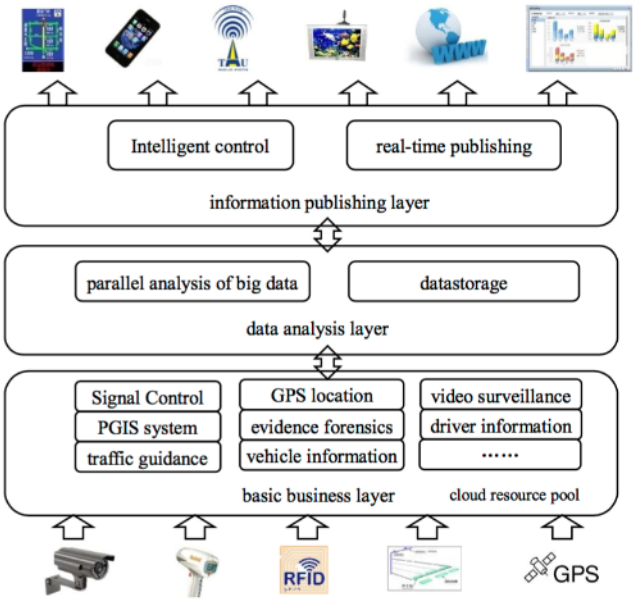
# II. Roles of Mobile big Data in Transportation

- Big data comes from all places, including websites, social media, networks, log files, video files, sensors and mobile devices.
- In particular, data sources from mobile devices are especially important because most of us keep our phones 24/7, and each phone has a set of sensors, including GPS, camera, microphone, and motion sensor.

# II. Roles of Mobile big Data in Transportation

- Moreover, most of the time of phone users is not spent on calls but on applications such as email, gaming, web surfing and social networking applications – these applications acquire 90% of phone users on the phone. A huge source of data that makes Big Data is from mobile data, and this data source is constantly being created at mind-blowing rate.
- Big data traffic applications: Use of past data to estimate traffic flows in the city at peak hours, and then to formulate detailed and reasonable traffic assignment plans to reduce traffic jams. In addition, it would be also possible to notify traffic users with options available for traveling from one place to another, including time and routes ... In addition, big data helps analyze device user locations, record details in real time and minimize traffic congestions.

# II. Roles of Mobile big Data in Transportation




Intelligent Transport Architecture based on Big Data

# III. Application of Mobile Big Data in Vietnam's Transport Sector

**Road**

- Application of Big Data in Database System Development: vehicle tracking system, driving license system, road toll collection monitoring system, bridge management system.
- Specifically, in road transport management, the center for processing and exploitation of database from trip monitoring equipment has been established and operated. The system develops the traffic database and controls traffic smartly, including receiving, monitoring, recording and analyzing the database and exports the reports for management of Vietnam Road Administration Department and localities.

# III. Application of Mobile Big Data in Vietnam's Transport Sector


Road Management System

# III. Application of Mobile Big Data in Vietnam's Transport Sector

- Mobile big data is also applied to specific sub-sectors: Cable monitoring system, non-stop automatic road toll collection system, "digital map-based smart traffic management system", the system connected to database of Vietnam Registration Department
- Especially AI application, Vietnam Road Administration Department has introduced AI in road surface condition analysis (PMS software); completion of database systems, especially road asset database, infrastructure, transportation, etc.
- The applications allow connection and deeper analysis on economic indicators such as traffic volume, natural hazard forecast, geographical space for asset management.

# III. Application of Mobile Big Data in Vietnam's Transport Sector

**Aviation**

- Big data may revolutionize all aspects of the air transport sector. With stimulus database on passengers' behaviors, airlines can understand the entire experience of the passengers.
- Diversity of data related to transport capacity has been improved significantly. Real time data could be reported from modern plane fleet at any place on the world and information about crews and passengers.

# III. Application of Mobile Big Data in Vietnam's Transport Sector


Mobile big data in civil aviation

# III. Application of Mobile Big Data in Vietnam's Transport Sector

Mobile big data is also introduced in air transport services to improve quality of various services, including:

- Data processing
- Service pricing
- Online ticket reservation
- Smart registration
- Barge monitoring
- Passenger experience's improvement
- Service optimization and
- Flight optimization

# III. Application of Mobile Big Data in Vietnam's Transport Sector

**Waterway and Marine**

- In Marine, it is reported that big data and analysis has introduced in commercial shipping. Big data application based on wireless communication, advanced sensor technology and AD HOC net has been more and more popular in oceanology, transport data, ship fleet data, cargo data, and accident data.
- Positioning technologies have also introduced in navigation for many years and big data is applied to collect key navigation information about transport journeys and routes in order to maximize the efficiency as well as warning of weather conditions on the routes.

# III. Application of Mobile Big Data in Vietnam's Transport Sector

Mobile Big Data in Maritime Sub-sector

# III. Application of Mobile Big Data in Vietnam's Transport Sector

- In inland waterway transport subsector, information technology has been introduced in administrative services, digital map-based online database development for list of inland waterway routes, berths and infrastructure as well as GIS database.
- Advanced systems have been development recently, including: online-report on waterway transport routes and safety, I-ENC nautical chart for rivers and canals in Mekong River Delta; AIS technology-based fleet management and monitoring, river beacon management by GPS. Moreover, IZIFIX e-trading has been developed for efficient commodity trading for inland waterway transport.

# IV. Application Potentialities

- Vietnam has enormous information data with billions of information from single sources. They are not processed concentratedly by managed independently ministries, industries, localities and enterprises. They are valuable assets and must be collected and processed for future development. Any resource which are not used properly will be wasteful.
- When data sources are collected and processed as a Big Data and IT is applied to process the big data, the administrative agencies and road users can utilize the bigdata to make optimal decision smartly. Bigdata is a revolution, affecting and changing working methods and thinking.

# IV. Application Potentialities

- Bigdata application in supply chain management will support better forecast results and better understanding of consumer cycle for estimation of future warehouse capacity based on the past data. Successful exported information from the database will be useful for enterprises' business, especially logistics and supply chain industries.
- All information including road, transporter, delivery time, transport mode, pricing place, revenue, income and profit has been collected and achieved in the enterprises' database.

# IV. Application Potentialities


Bigdata application in supply chain

# IV. Application Potentialities

- Transport sector is a diversified industries with different applications in non-stop road toll collection, speed measuring on expressways, traffic signals, online train ticket reservation, updating and adjustment of traffic lights from the operation center, among others.
- In order to develop a smart transport system, the data and information is required to develop specific solutions and applications. Vietnam has enormous information but they should be processed at a single center for application in the transport sector.

# IV. Application Potentialities

# IV. Application Potentialities

- Bigdata strengths lie in diversified, rich and real-time data – three precisive factors of any data or information source. Bigdata is significant to transport development, including better forecast results, detailing of development trends and situation analysis to provide information for addressing of issues and promoting social development; original data could be utilized to promote multi-modal transport.

# IV. Application Potentialities

- Other great application potentiality is using of smart application based on Machine to Machine (M2M) communication. For example, smart cars are provided wit sensors to monitor and transmit status of their components as well as monitoring other vehicle movements which promote opportunities for car manufacturers introducing new services, including thief-proof equipment, positioning device and emergency services.

# IV. Application Potentialities


# V. Conclusion

It is proposed that MOT and relevant ministries should consider policies to promote bigdata utilization. It is important to integrate single data sources to Bigdata for optimization of solutions and applications as well as IT application in transport development. In order to develop effective and practical bigdata source a policy framework and implementation regulations are required, specifically:

- Cooperation in collection of different data sources (database development);
- Integration and linking of split and single data sources;
- Selection and use of valuable data; data control and security.

# V. Conclusion

- The transport sector is using data with low frequency but the data volume is increasing significantly. This is an opportunity to improve efficiency in transport sector by selecting transport routes smartly and development of new services from smart applications.
- Smart route selection based on real-time transport data can be practical using positioning systems. Some systems are special hardware equipment but individual positioning on smart phone application are developing rapidly.

# V. Conclusion

- In order to fully taking advantages of the data-based renovation policy makers must provided necessary infrastructure and policy institution. The first step is well understanding the importance of the data-based renovation in public and private sectors.
- Mobile Big Data is a challenge to organizations and enterprises in the digital era. One big data is owned and utilized properly, it will create great comparatives with more accurate and cheaper data. There are debates on big data and this is a new industry in Vietnam. Let’s try our best for the new future from Mobile Big Data.

# THANK YOU FOR YOUR ATTENTION!

## Q&A