The Use of the Artificial intelligence Techniques to develop the transport sector In accordance with the principles of sustainability

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Soraya Chenbi
University of M'Sila

Abstract:

The artificial intelligence is considered as one of the modern computer science, which is searching for sophisticated methods of programming. The concern of it began in the mid of twentieth, its characteristics and structures play an important role, which are based on the representation of data and making research by its basic assets.

The basic assets are based on particular methods that used in many areas, the one we put into view is smart transport systems that appear in the advanced techniques, and its aim is to improve and facilitate the conduct of the transport sector, by making structures that show how the elements of the system work and exchange information.

In this study, we mention the achievements of some programs and strategy of the U.S.A in 2015 -2019 for the development of these systems in their states.

ملخص

يعتبر الذكاء الاصطناعي أحد علوم الحاسب الآلي الحديثة التي تبحث عن أساليب متطورة للبرمجة، بـــدأ الاهتمـــام بـــه في منتصف القرن ال20 م، وهو يلعب دورا هاما بفضل خصائصه وأساسياته، التي تقوم على تمثيل البيانات والبحث بواسطة مكوناته الأساسية وأصوله التي ترتكز على أساليب خاصة، تستخدم في مجالات عديدة، تبرز منها الأنظمة الذكية للنقـــل الـــتي تظهـــر في تقنيات متقدمة ترتبط أساسياتها أليا، وتهدف إلى تحسين وتسهيل تسيير قطاع النقل، بواسطة هيكلة تبين عمل عناصـــر الأنظمـــة وتبادل المعلومات بينها، ويتم التطرق في هذه الدراسة لبعض ما أنجزته الو م أ من برامج وإستراتيجية 2015-2019 لتطوير هذه الأنظمة في ولاياتها.

Introduction:

The artificial intelligence is technology and a branch of computer science that studies and develops intelligent machines and software.

The AI is considered as one of the modern computer science, which is searching for sophisticated methods of programming. The concern of it began in the mid of twentieth, its characteristics and structures play an important role, which are based on the representation of data and making research by its basic assets.

The basic assets are based on particular methods that used in many areas, the one we put into view is smart transport systems that appear in the advanced techniques here where we see in our study the problem of how to harness the artificial intelligence to develop the transport sector and reduce its various kinds of problems? Hypotheses of the study: We try in this study to confirm that the artificial intelligence provides methods and modern techniques that help to develop the sector of the transport through the intelligent transportation systems.

The importance of the study: The Intelligent transportation is one of the important strategies that the development of the transport sector relies on it, It represents the most important programs of artificial intelligence, which play an important role in many areas because of its contribution of alleviation a lot of risks and pressures on human being in areas that are complicated and those applications that need high concentration and quick decisions with no errors or delay.

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The objectives of the study: we aim in this study to clarify the meaning of artificial intelligence and intelligent transport systems as well as mentioning its supreme areas that used to develop the transport sector through applying the latest technology.

The content of the study: The study consists of two parts:

The first section: deals with concepts about artificial intelligence.

The second section: deals with its applications to the transport sector in the intelligent transportation systems.

The third section: exposure some of the United States programs related to intelligent transport systems and focus on the 2015-2019 strategy for intelligent transport systems.
The first section - Basic concepts about artificial intelligence

1- Definition of Artificial intelligence: (AI) is technology and a branch of computer science that studies and develops intelligent machines and software.

The exciting new effort to make computers think ... machines with minds, in the full and literal sense." The automation of activities that we associate with human thinking, activities such as decision-making, problem solving, learning ..." .[i]

2-The Objectives and the Importance of AI:

2-1- The Objectives of AI: the objectives of AI are: [ii]

- To Create Expert Systems: The systems which exhibit intelligent behavior, learn, demonstrate, explain, and advice its users.

- To Implement Human Intelligence in Machines: Creating systems that understand, think, learn, and behave like humans.

2-2-The importance of artificial intelligence: we indicate in: [iii]

- Artificial Intelligence plays an important role in many sensitive areas, such as assistance in diagnosing diseases and prescribing drugs, the professional consulting, security and military fields and many others.

- the Intelligent systems work in areas where the decision is made, these systems are independent, accuracy and objectivity, therefore, its decisions are away from error, bias, racism or prejudice, and it's away even from foreign or personal interventions.

- the intelligent machines reduce a lot of human risks and psychological pressures, It leaves human to focus on more important things, and stuff that is more humane.

3-The characteristics of the artificial Intelligence: The characteristics of the artificial Intelligence summarized in: [iv]

The symbolic presentation; The experimental research; Representation and embracing knowledge; Uncertain or incomplete Data; The ability to learn; Using a comparative method as a human method for solving complex problems; Dealing with hypotheses simultaneously and with high accuracy and speed; The existence of a specialized solution for each problem and each homogeneous class of problems; Operating with a fixed advisory and scientific level of without fluctuation; Requiring a representation of enormous operations for a particular field of knowledge; Processing symbolic data non-digital through logical analysis and comparison operations.

4-The artificial Intelligence components and Methods :

4-1-The artificial Intelligence components: The artificial intelligence based on two basic principles: [v]

- the representation of the data in several languages such as OWL and RDF, which they have been used in the representation of the data in the Semantic Web.
- The search process, the computer here search in the available options and evaluated, then it decides the best solution.

- Knowledge Base Artificial Intelligence consists of:

Gine Inferenceen - User Interface

.4-Methods of artificial intelligence: The science of the artificial intelligence based on these assets: Model Representation- Search And Match Methods- Goal Reduction-Reasoning. [vi]

5- The intelligent systems : An intelligent system is a machine with an embedded, Internet-connected computer that has the capacity to gather and analyze data and communicate with other systems. [vii]

They are expert systems, which have the same expert human behavior within specific applications, Some of the examples of intelligent systems are warning and protection devices, computing systems, smart networks and Intelligent Transportation systems.

Section Two: basic concepts about Intelligent Transportation Systems

The transport sector is one of the areas of the use of intelligent systems as an application of Artificial Intelligence. The intelligent systems in this area called the Intelligent Transportation Systems (ITS).

1- Definition of Intelligent transportation systems: Intelligent Transportation Systems mean the application of advanced information processing (computers), communications, sensor and control technologies and management strategies in an integrated manner to improve the functioning of the transportation system. These systems provide traveler information to increase the safety and efficiency of the ground transportation system for passengers and freight in both urban and rural areas and inter-city and international corridors, including border crossings. ITS also provide valuable, real-time information to system operators such as transit systems, commercial vehicle fleets, and emergency and security vehicle fleet operators. These applications bring system users, vehicles and infrastructure: [viii]

2- The basics of intelligent transportation systems: components of the intelligent transport systems elements are divided into three interrelated sections as follows: Means of data collection; Data Processing Technology; -

Command and control and the transfer of information technologies.

3- The Objectives of Intelligent Transportation Systems and fields:

3-1- The Objectives of ITS: the objectives of ITS could be summarized at these points: [ix]

- Improving the level of safety on the roads network, by reducing traffic accidents, deaths and injuries;

- Providing emergency services in the event of accidents, fast response and raise the level of emergency rescues;

- Ease the traffic and provide comfort and reassurance on the road network;

- Reduce the effects of transport and negative energy on the safety of the environment;

- Increase the effectiveness and efficiency of the road network at the present and future, and thus increase the productivity of individuals, institutions and economy sector in general;

- Raising the level of efficiency and management of the road network and the most efficient use of energy and capacity of the road network;

- Providing the investments, which related to the establishment and expansion of the road networks.

3-2- The Fields of ITS : There are several areas of the use of these systems:

Information and Communication Technologies applied to transport are therefore essentially based upon a series of supporting communication systems, which can be considered as the foundations developing any piece of technological equipment or ITS service. These systems include:[x]

- Telecommunication Networks (TLC); Automatic identification systems (AEI/AVI); Systems for automatically locating vehicles (AVLS); Protocols for the electronic exchange of data (EDI); Cartographic databases and information systems providing geographical data (GIS); Systems for the collection of traffic data, including Weigh-In-Motion (WIM) and systems for the automatic classification of vehicles; Systems for counting the number of users of a public transport system (APC).

4- Benefits of ITS: The potential benefits of ITS applications are considerable for all concerned including users and providers of services, the public sectors and the public at large. There are benefits, for instance, for users in congested urban areas as well as those in rural communities. The key benefits of ITS technologies are improved safety of the transportation system, reduced congestion and improved mobility, enhanced economic productivity, reduced travel time and government, traveler and operator costs, improved energy efficiency and reduced impacts on the environment: Increased safety; Time savings and operational efficiencies ; More reliable transportation; Enhanced economic productivity ; Reduced environmental impacts; Reduced accidents in rural areas .[xi]

5- Specialized functions for ITS and their types: The Intelligent Transportation Systems technologies achieve: the Automatic control – the Distracting control system

There are many specific types of ITS:[xii]

- Multi-modal navigation devices, which are enhanced mobile telephones designed to provide walking and public transit route, schedule, fare and security information;

- Traffic management, in which a control center monitors roadway conditions in order to coordinate traffic control, emergency response and traveler information;

- Traffic control, such as advanced signal light synchronization and ramp metering to improve traffic flow;

- Telematics, which refers to the use of telecommunications and computerized electronics that connect a driver or a vehicle to external services, such as navigation systems, pricing and emergency signals;

- Driver information, such as variable information signs on highways and parking lots, radio and Internet traffic reports that provide real-time information and advice, and Internet navigation systems. Newer systems integrate GPS transponders in a vehicle with electronic maps to provide route guidance to drivers;

- Fleet management, allows transit, taxi and truck fleet managers to monitor the location, condition and performance of vehicles and freight;

- Emergency warning systems, which alert drivers to excessive speed, roadway hazards, traffic and weather conditions;

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- Emergency response, including emergency beacons and roadside assistance systems integrated with vehicle location information provided by GPS;

- Automated vehicle control, such as automobiles that drive themselves;

- Electronic pricing, such as automated systems that collect transit fares, road tolls and parking fees. This reduces the inconvenience of mechanical fee collection and allows greater variability in rate structures;

- Transit information, such as route and fare schedules and real-time information on vehicle location and predicted arrival times. Some systems provide electronic user information through terminals at transit stops, while others provide information through mobile telephones;

- Transit priority systems, which give transit vehicles priority through an intersection.

- Computerized dispatching, which allows more efficient scheduling and routing of delivery and utility vehicles, demand-response shuttle services and taxis;

- Taxi Information, which improves taxi response time, navigation and security;

- Rideshare matching, which provides information to people who want to share a ride. Electronic matching systems allow "dynamic ridesharing," for individual trips (as opposed to regularly scheduled trips).

- The third section: (ITS) In USA

1- the Department Of Transportation:

The Department of Transportation was established by an act of Congress on October 1966 . The Department's first official day of operation was April 1,1967.

1-1- Administrations

The top priorities at DOT are to keep the traveling public safe and secure, increase their mobility, and have our transportation system contribute to the nation's economic growth.

DOT employs almost 55,000 people across the country, in the Office of the Secretary of Transportation (OST) and its operating administrations and bureaus, each with its own management and organizational structure. [xiii]

1-2- The Agencies of the Department: Office of the Secretary (OST)- National Highway Traffic Safety Administration (NHTSA)- Federal Aviation Administration (FAA)- Office of Inspector General (OIG)- Federal Highway Administration (FHWA) – Pipeline and Hazardous Materials Safety Administration (PHMSA)- Federal Motor Carrier Safety Administration (FMCSA)- Federal Railroad Administration (FRA)- Saint Lawrence Seaway Development Corporation (SLSDC)- Federal Transit Administration (FTA)- Surface Transportation Board (STB)- Maritime Administration (MARAD).[xiv]

2- The U.S. DOT's ITS program

2-1- ITS Joint Program Office: The ITS Joint Program Office (ITS JPO), within the Office of the Assistance Secretary for Research and Technology (OST-R), is charged with executing Subtitle C- Intelligent Transportation System Research of Public Law 109-59 Safe Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, enacted August 10, 2005, which requires the Department to:

Conduct an ongoing intelligent transportation system program to research, develop, and operationally test intelligent transportation systems and to provide technical assistance in the nationwide application of those systems as a component of the surface transportation systems of the United States.[xv]

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2-4- ITS Joint Program Office Research: The U.S. Department of Transportation's (USDOT) Intelligent Transportation System (ITS) Program aims to bring connectivity to transportation through the use of advanced wireless technologies — powerful technologies that enable transformative change.

The vision of the ITS Program's research is of a national, multimodal surface transportation system of connected vehicles, infrastructure, and passengers' portable devices. This connected environment will leverage technology to maximize safety, mobility, and environmental performance. The environment will include cars, trucks, transit vehicles like buses, and even pedestrian cell phones. In addition, the USDOT supports research that helps to expand deployment of traditional ITS technologies.[xvi]

a/ Connected Vehicle Research: A system of connected vehicles has the potential to transform the way we travel through the creation of a safe, interoperable wireless communications network. The technology will enable cars, trucks, buses, and other vehicles to "talk" to each other with in-vehicle or aftermarket devices that continuously share important safety, mobility, and environmental information. Connected vehicles can also use wireless communication to "talk" to traffic signals, work zones, toll booths, school zones, and other types of infrastructure.

The vehicle information communicated does not identify the driver or vehicle, and technical controls have been put in place to help prevent vehicle tracking and tampering with the system.

The Department's research into connected vehicles focuses on the following areas: Connected Vehicle Applications , Connected Vehicle Policy and Institutional Issues , Connected Vehicle Technology.

a/1 Connected Vehicle Applications Safety: Connected vehicle safety applications will enable drivers to have 360-degree awareness of potential hazards and crash situations—even those they cannot see. In-car warnings will alert drivers of imminent crash situations, such as merging trucks, cars on the driver's blind side, or when a vehicle ahead brakes suddenly.

- Vehicle-to-Vehicle (V2V) Communications for Safety; Vehicle-to-Vehicle (V2V) Communications for Safety; Vehicle-to-Infrastructure (V2I) Communications for Safety is the wireless exchange of critical safety and operational data between vehicles and roadway infrastructure; Mobility; Data Capture and Management (DCM); Dynamic Mobility Applications (DMA); Environment ; Road Weather:

a/2 Connected Vehicle Policy and Institutional Issues: The USDOT is also researching and analyzing the critical policy and institutional issues that may limit or challenge successful deployment of connected vehicle technologies. The research supports the development and comparison of effective policy options; the analysis will result in structured recommendations for policy and decision makers.

a/3 Connected Vehicle Technology: The development and deployment of a fully connected transportation system that makes the most of multimodal, transformational applications requires a robust, underlying technological platform. The platform consists of well-defined technologies, interfaces, and processes that combine to ensure safe, stable, interoperable, reliable system operations, thereby minimizing risk and maximizing opportunities.

b/ ITS Short-Term Intermodal Research: Although research in support of connected vehicles is a central part of the ITS Program, additional ITS research is being conducted that reinforces the overall vision of ITS. Specifically, a set of short-term intermodal research programs will further the USDOT's goal of leveraging technology to maximize safety, mobility, and environmental performance.

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Three key short-term, intermodal ITS research programs include:

b/1 Active Traffic Demand Management (ATDM);

b/2 Intelligent and Efficient Border Crossings;

b/3 Commercial Vehicle Information Systems and Technologies (CVISN) .

c/ ITS Exploratory Research: The ITS Program recognizes that technology evolves rapidly and that the community is filled with new, creative ideas for approaches to connectivity, safety, mobility, and environmental mitigation. Thus, the vision of ITS Exploratory Research is to harness the creativity of a broad public audience to find innovative options and solutions for government. Three activities comprise the Exploratory Research portfolio:

-Technology Scan;

- Innovation Challenges; Exploratory Research on Future Initiatives.

3- Decision Factors and Effects for Implementation of ITS in USA:

With almost 20 years of ITS deployment experience, Intelligent Transportation Systems (ITS) is at a crossroads, with the first generation of ITS technologies at a saturation point for mature ITS applications, especially in the large metropolitan areas across the United States. As they move forward toward the connected vehicle environment and coordinated operations system envisioned for the future, understanding the motivating factors used by state and local agencies, automobile manufacturers, and the commercial vehicle industry for adopting ITS technology is of critical importance.

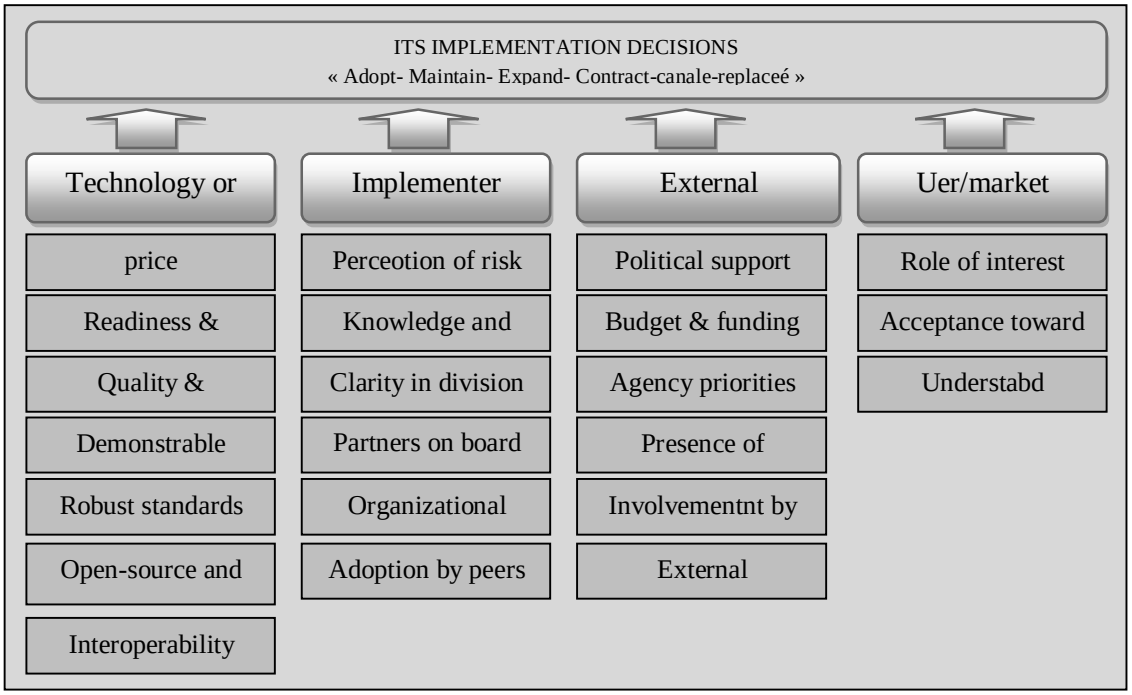
The Longitudinal Study of ITS implementation (LSI), conducted by Noblis and its partners, American Transportation Research Institute (ATRI), Merriweather Advisors, and Cambridge Systematics, provides a foundation that captures the state of knowledge for motivating factors influencing ITS adoption, maintenance, and for continuing its use and deployment through:

- a comprehensive literature review on technology innovation;
- an interview-based approach to further analyze decision factors;
- post-hoc studies reviewing deployments, costs, and benefits at early ITS deployment sites;
- and a workshop focusing on considerations for future ITS policy and initiatives.[xvii]

3-1-Decision Factors for Implementation of ITS:

The Noblis team analyzed information obtained from public sector, trucking, and automobile manufacturer decision makers to address the key factors and issues related to decisions concerning the adoption, growth, maintenance, replacement or cancellation of ITS systems. The locations chosen for site visits represented diversity according to geography, metropolitan size, agency responsibility (transit, highway or arterial), level of congestion, ITS decision time frame, and maturity of technology deployed. The set of decision factors were organized into four categories: technology or application factors, implementer factors, external environment factors, and user/market factors, as presented in Figure 01 . The relative importance of each of these categories and specific factors were explored qualitatively and quantitatively through the public sector interviews. These factors were modified and assessed with the trucking industry to identify factors of importance this sector.[xviii]

Figure 01: Sets of Factors Influencing ITS Implementation Decisions

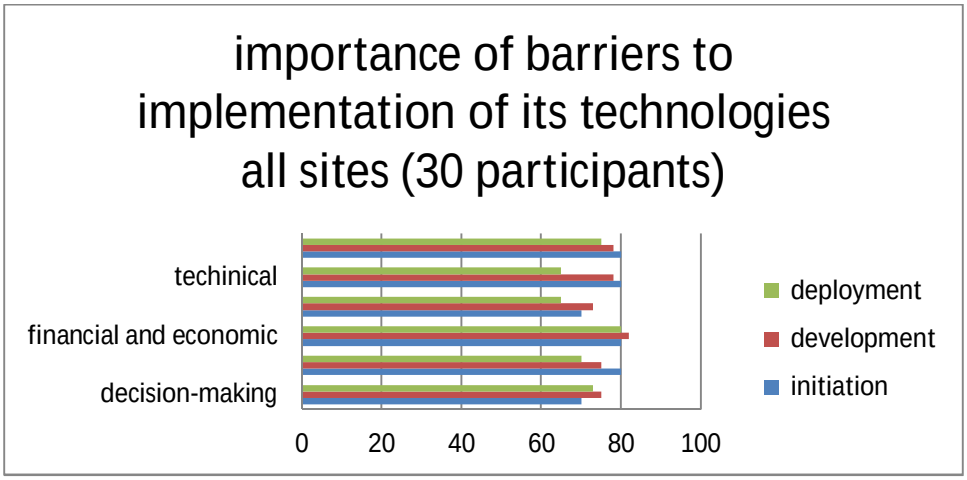


Source: Longitudinal Study of ITS Implementation : Decision Factors and Effects Final Report —April 2013 Publication Number: FHWA-JPO-13-067. U.S. Department of Transportation, Research and Innovative Technology Administration Intelligent Transportation System Joint Program Office . p02. www.its.dot.gov/index.htm

3-3- Barriers to ITS Adoption in USA:

The respondents were also asked to rate barriers to ITS adoption. As the ITS implementation moves from initiation, through development, and into deployment, knowledge, technical, and societal barriers became more critical. Legal and regulatory, financial and economic, and decision making barriers were more important during the development stage compared to the initiation or deployment stages of ITS implementation.[xix]

Figure 02: Rating of Importance of Barriers to ITS Implementation



Source: Longitudinal Study of ITS Implementation : Decision Factors and Effects Final Report —April 2013 Publication Number: FHWA-JPO-13-067. U.S. Department of Transportation, Research and Innovative Technology Administration Intelligent Transportation System Joint Program Office . p20. www.its.dot.gov/index.htm

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3-4- Valuation of Benefits after Initial ITS Deployment

The post-hoc analyses examined how the performance of various systems have changed over time, either due to expansion/enhancement of the systems, or changing traffic patterns or traveler behavior. Evaluations include assessment of: [xx]

• a transit traveler information system in Portland, Oregon

• a ramp metering deployment in Kansas City,

• high occupancy toll (HOT) lanes in Minneapolis/St. Paul, and

• an arterial management system in Phoenix, Arizona.

The single evaluation in Phoenix, Arizona with significant variations in population and demand during the evaluation period proved more complex to evaluate and interpret.

3-6-Support for ITS Investment Decisions

The site visits enabled interviewees to expand on five timely topics, each with implications for how the U.S. DOT could best support public sector stakeholders in making ITS planning, implementation, O&M, and replacement decisions.[xxi]

4- Considerations for Next Generation ITS and Connected Vehicle: Overall, cross-cutting analysis of the stakeholder interviewers, post-hoc data analysis, and workshop revealed several major themes for the federal government to consider regarding next generation ITS and the connected vehicle environment:[xxii]

- Clearly define and publicize benefits for connected vehicle technology to engage stakeholder interest.

- Recognize that private sector prefers a market driven approach on the vehicle side while public sector seeks stronger federal guidance on infrastructure deployment.

- Ensure demonstrations include diverse constituents demonstrations of connected vehicle technologies should include diverse constituents in terms of modality, levels of congestion, and size of deployment to establish a robust peer group for market share growth.

- Focus on education and information dissemination.

- Support resolution of governance issues including security, privacy, and adherence to standards.

- Secure the future with supporting commitments from other U.S. Government agencies.

- Recognize that competing technologies will temper consumer, trucking industry and OEM enthusiasm for a connected vehicle technology rollout.

- Reduce the likelihood for long-term risk aversion by establishing incremental successes with connected vehicle pilots and demonstrations.

- Consider ways to provide federal support for continued operations and maintenance of existing and future ITS infrastructure and systems.

- Define national guidelines for connected vehicle implementation.

These considerations necessarily focus upon the needs of the three stakeholders interviewed: public sector transportation agencies, automobile manufacturers, and the trucking industry. There is a fourth stakeholder whose views have not been included in this study due its research scope - the end-user of connected vehicle technology. The Connected Vehicle Safety Pilot Program .

5- ITS Strategic Plan 2015–2019: The United States Department of Transportation (USDOT) has long been a leader and strong supporter of research, development, adoption, and deployment of intelligent transportation systems (ITS) around the nation. The ITS Strategic Plan 2015-2019 presents the next set of priorities, strategic themes, and program categories under which ITS research, development, and adoption activities will take place. The plan was developed with significant stakeholder input from all relevant parties, both within and external to the USDOT. Close collaboration with all surface transportation modes and other agencies within the USDOT helped shape the direction of the ITS Strategic Plan 2015–2019.[xxiii]

5-1-Strategic Priorities and Themes: Building on the momentum and success of prior and current research, and working on the areas that are at the forefront of ITS research going forward, two primary strategic priorities have been defined. These are: Realizing Connected Vehicle (CV) Implementation and Advancing Automation. The first builds on the substantial progress made in recent years around design, testing, and planning for CVs to be deployed across the nation. The second shapes the ITS Program around research, development, and adoption of automation-related technologies as they emerge. The priorities reflect a sense of where the bulk of transportation research and innovation is heading, but are not exclusive of other technologies or research areas.The strategic themes set the direction for the plan, like the priorities, and are meant to focus the attention of the ITS community on intended outcomes of new technologies and systems as they are developed, tested, and eventually adopted.[xxiv]

5-2- Program Categories: While the priorities and themes provide high-level direction and structure for the ITS Program, individual programs perform the work that produces new systems to advance the goals of the USDOT and the ITS community at large. The plan includes program categories to provide the necessary structure for research, development, and adoption of ITS technologies. These categories reflect modal and external stakeholder input about the areas where attention, focus, and resources should be devoted. The lines between the program categories are not hard and fast, and it is expected that individual programs within these categories will often overlap or share resources, goals, deliverables, and timelines. Short descriptions of the program categories are included here:[xxv]

a/Connected Vehicles: The USDOT will focus much of its CV program activities on adoption and eventual deployment of CV systems. CV research, development, and eventual adoption fall into two areas based on activities in the USDOT, including NHTSA plans to issue a proposal by 2016 on vehicle-to-vehicle (V2V) safety messaging. This categorie include:

- V2V communications based on dedicated short-range communications (DSRC) technology.

- Other CV technologies and communications that are enabled by either DSRC or other networks, such as cellular, Wi-Fi, or satellite. Although the USDOT is not researching regulatory decisions related to these other communications technologies, they are very much a part of the overall research and development foci.

b/ Automation: The automation program will focus on research about automated roadvehicle systems and related technologies that transfer some amount of vehicle control from the driver to the vehicle.

c/ Emerging Capabilities: The USDOT’s emerging capabilities program initiatives will focus on future generations of transportation systems. As the scale of CV implementation grows and automation of transportation systems increases, vehicle manufacturers, infrastructure providers, innovators, and entrepreneurs will discover new opportunities to use the technologies and data generated , while also protecting consumer privacy.

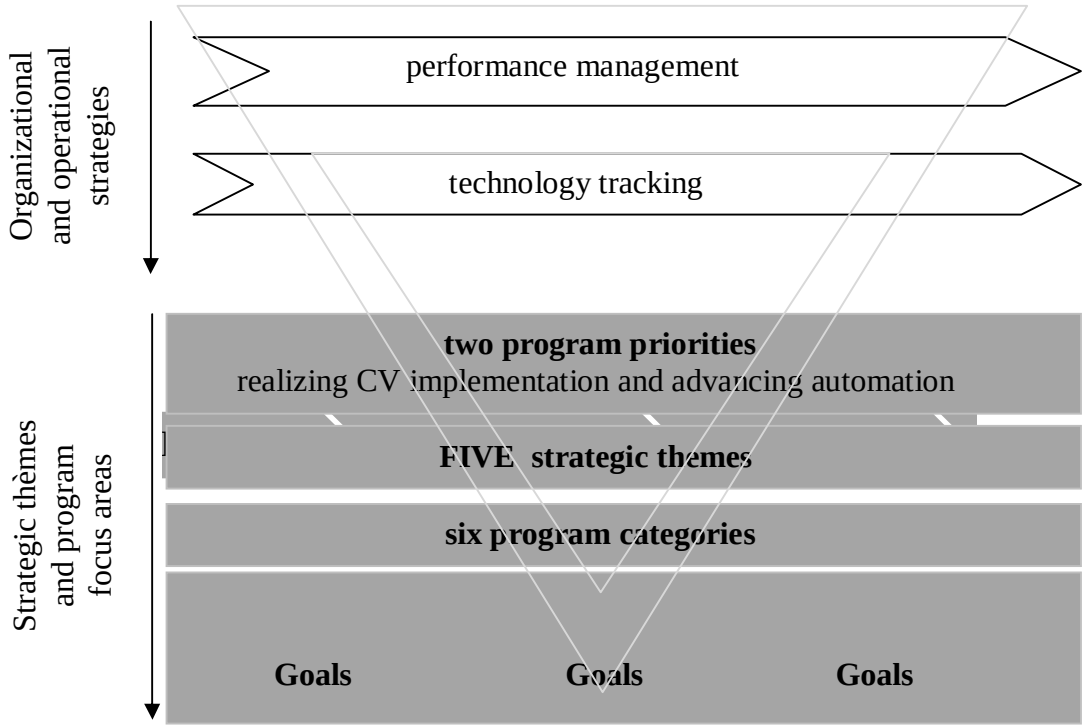
d/ Enterprise Data: With increased connectivity among vehicles, organizations, systems, and people, unprecedented amounts of data are being generated. New methods to collect,

transmit/transport, sort, store, share, aggregate, fuse, analyze, and apply these data will be needed for management and operations of transportation systems.

e/ Interoperability: Interoperability is essential to ensure effective connectivity among devices and systems. Interoperability focuses on enabling ITS elements in vehicles, devices, infrastructure, and applications to effectively communicate with other parts of the system as needed, regardless of where they are built and where or when they are used.

f/Accelerating Deployment: As new ITS technologies and systems evolve into marketready products, the ITS Program must address questions associated with adoption and deployment.

Figure 03: Holistic View of Organizational and Operational Discipline Components as They Relate to the Strategic Themes and Program Categories



Source ITS Strategic Plan 2015–2019. P viii . www.its.dot.gov/landing/strategicplan2015.htm

5-3- Plan Layout: This is the first ITS Strategic Plan that includes a comprehensive structure that can be used to develop actionable goals, program milestones and timelines, and outcome measures to determine success. As such, several principles and guiding areas that were incorporated to create this structure and provide direction and focus to ITS research, development, and adoption. Figure 1 shows how the various pieces of the plan fit together and influence each other, as well as how high-level concepts are deconstructed into greater levels of detail with program categories and goals. This approach is aimed towards execution of the USDOT ITS Program that is coordinated to manage the complexity of the total portfolio; applies a holistic approach to program management that delivers measurable results; and balances exploration of the state-ofthe-art with elevation of the state-of-the-practice in close coordination with the modal agencies of the USDOT.

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Conclusion:

The evolution, which made by the artificial intelligence in many sensitive areas, makes us care about what it achieves from progression and modernization of an important sector as the sector of transport, through intelligent systems that are considered as advanced technologies system, which utilised in facing many challenges in the sector, whether related to modes of transport or infrastructure.

This is what we tried to show in this study, the USA is one of the biggest leaders in this field since it has high interest on it and its achievements for the development and prosperity in the use of these systems.

The USA was able to eliminate many problems of the transportation and the preservation of the environment and it could achieve sustainable transport.

Results of the study: we have come to some results.

- The Intelligent Transportation Systems assist in providing a larger capacity, with more efficiently and without the need for new facilities, and the use of new transportation systems in the new facilities will accommodate future traffic growth;

- The Intelligent Transportation Systems operate modern technologies in the control areas, collection of information, control, communications and computer programs, In order to use the most of the capacity of roads network and other means of transport, help in the flow of traffic, facilitate to access to the places to be accessible and contribute to speed the processing of traffic accidents and emergencies through the information that is available within the technology and its component devices;

- The Intelligent Transportation Systems is not only led to improve the performance of operating transport networks, but it has many applications and uses that address different modes of transport problems (land, sea, air), and help to improve the usage, raise the level of performance and ease the operation;

- The advanced intelligent transport systems applications will deal with cases of traffic jams on normal and public roads and inside cities, Moreover, the evolution and the adjustment of monitoring electronically to prevent exceeding of limited speeds, maintain the safety of citizens, protection from accidents, as well as to facilitate the movement of vehicles and traffic through monitoring by satellite.

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