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MOBILE COMMERCE APPLICATIONS IN TRANSPORTATION SYSTEM

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Abstract: *Computer and Communications Industry With the advent of portable and networked within the Internet and the rapid advancement of information and communication technologies, have created a new face of the city. Internet cities in each country can provide the progressive, rational, scientific and economic phenomenon which is already valuable tool for measure of academic ability and the ability of countries to produce, distribute and use knowledge. Transportation has grown dramatically in our country. Targeted subsidies to citizens, especially considering the savings in fuel consumption and the use of personal devices have. It also provides travel information and monitoring capabilities to improve safety, help reduce congestion control, environmental protection, operational efficiency and productivity, factors provides convenience for citizens. This advantage will change using the tickets for the services. A ticket (for a specific user) connects a specific service to a specific service provider.*

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1- INTRODUCTION

Today, information technology has permeated many aspects of life. And actually by expand the data transfer; business productivity has increased in all areas of life. One of the most important development tools in this world is effective use of information and communication technology. This effective tool was born in 1980 and its most important feature was the use of Internet in information technology. The extent and speed of the progress so much that many scientists, futurists and economists believe the recent years a revolution similar to the industrial revolution will be happen that will enter the world into information age. What directly citizens as customers in the mobile commerce will face it on a very important role in creating value for them is the applications and services that transform the lives of routines. Moreover, the unique characteristics of wireless networks and mobile phones, have created other benefits for mobile commerce that has led it to be in excel situation than the electronic commercial [1].

2- INCREASING OBSTACLES TO LARGE-SCALE DEVELOPMENT OF PHYSICAL INFRASTRUCTURE

Major transportation construction projects are more expensive than they were in the past. Higher costs reflect the introduction of vastly improved community safeguards and environmental protection and extensive safety features (including, in California, earthquake engineering). Costs also reflect the reality that many of today's projects must be built or rebuilt in developed areas or through environmentally and socially important properties (e.g., wetlands, unique farmlands), with the result that projects are both more complicated and more likely to be contested. The tremendous cost and time overruns of such recent major projects as the "Big Dig" in Boston and Denver International Airport attest the difficulties major infrastructure projects face. Environmental regulations, community politics, and disputes over the goals and financing of projects combine greatly complicate the implementation of major physical infrastructure. Even if these processes are somehow streamlined, the basic concerns remain, and the political climate has been irrevocably altered. Any threat of major disruption to a community's perceived environment is unlikely to go unchallenged. Indeed, information technology allows communities of opposition to major projects to be rapidly formed and mobilized [2].

In addition, there increasingly are pressing needs to maintain and repair existing infrastructure. Not only is much existing infrastructure in need of attention, it is frequently very costly to do the necessary work. Diverting traffic from crowded freeways and arterials is not always possible, because there literally are no alternative routes with sufficient capacity to handle the diversions. Shifting to night construction helps somewhat, but is more costly and more dangerous for both workers and drivers. Further, with many urban and suburban freeways and arterials carrying heavy traffic loads for 16-18 hours a day, even night work can disrupt traffic substantially. Thus maintaining the existing infrastructure has become a major expense, further limiting both funding availability and political will for new construction.

3- INFORMATION TECHNOLOGY AS THE SOLUTION

At a time when travel demand is burgeoning due to a society "networked" through information technologies, the ability to roll out new infrastructure is impaired; however, information technology actually offers some solutions to the very problem it is helping to generate. Information technology allows transportation systems to be "smart", whereby complex and vast amounts of data can be sensed and managed in a comprehensive or iterative manner. Movements can be tracked and monitored, and facilities can be better managed. Existing in situ infrastructure can handle new increased capacities through the appropriate use of information technology. The very "stealthiest" of information technology processes also allows it to escape a great deal of protest or criticism. Information technology promises great improvements to transportation systems through the three principle organizational advantages it offers:

- ✓ Enhancing ease- of-use
- ✓ Inventory management
- ✓ Increasing flow capacity

3-1- Enhancing Ease-of-Use

Information technology can be used to make travel transactions easier and more convenient. Switching modes or utilizing different transport systems can be increasingly seamless, allowing for integrated multi- modal transport. Payment can come from a single source in the form of a "smart" card that can be detected by different devices. Tolls can be collected automatically, allowing for smooth, continuous movement. Other flexible payment schemes include parking meters and other fees being paid through cell phone accounts. Such systems are already operational in parts of Scandinavia.

One of the flaws of contemporary mass transit systems is the regular need to transfer and the annoyances involved with this process. With the “wireless” Internet, the technology exists for transit riders to monitor bus movements and to have reliable estimates of arrival times. This confidence of use would make transit more effective and likely more widely used. As will be discussed later, the central issue is actually reduced to one of implementation.

3-2- Inventory Management

Reservations management is the great capability triumph of information technology. The flexibility of information technology can be utilized to better manage inventories of people and vehicles. Reservations management can be applied to seat allocations, parking spaces, and times of use: basically anything that can be scheduled. It should be no surprise that the airlines were pioneers in the utilization of information technology. Since the 1960s, information technology has radically transformed airline operations and allowed for significant efficiencies. The ability to reserve spaces remotely and in advance greatly enhances the “load factor” of the use of a facility. The continuous stream of data on availability and demand that can be provided through information technology allows for variable pricing schemes, allowing for more efficient utilizations. For example, at times of heavy demand, a reservation is quite expensive. At times of low demand, a reservation is inexpensive or free. Instantaneous, flexible pricing maximizes the inventory capacity of parking lots, buses, trains, etc., allowing consumers to make choices on the necessity of their use of the facility. Car-sharing programs, for instance, can be greatly enhanced through information technology, as the availability of certain vehicles can be quickly recognized.

3-3- Increasing Flow Capacity

Related to its capabilities in inventory management, information technology can also increase flow capacity with little additional physical infrastructure. Information technology is thus capable of enhancing capacities of transportation equipment and facilities with little or no new physical expansion. Examples of enhancing flow capacity with little additional physical infrastructure include Traffic Congestion Management (surveillance of congestion points), freeway ramp metering, and “smart” traffic signals. Vehicle capacities themselves could also increase significantly, as new innovative forms of transit or "jitneys" could have a renaissance in a "wired" world. Arranging shared rides may be easier than ever before in an era of mobile phones and the Internet. In their theoretical development, automated highways would also offer [3].

4- KEY UNDERLYING TECHNOLOGIES FOR ITS

✓ **Global Positioning System (GPS).** Embedded GPS receivers in vehicles' on-board units (OBUs, a common term for telematics devices) receive signals from several different satellites to calculate the device's (and thus the vehicle's) position. This requires line of sight to satellites, which can inhibit use of GPS in downtown settings due to "urban canyon" effects. Location can usually be determined to within ten meters. GPS is the core technology behind many in-vehicle navigation and route guidance systems. Several countries, notably Holland and Germany, are using or will use OBUs equipped with satellite-based GPS devices to record miles traveled by automobiles and/or trucks in order to implement user fees based on vehicle miles traveled to finance their transportation systems.

✓ **Dedicated-Short Range Communications (DSRC).** DSRC is a short- to medium-range wireless communication channel, operating in the 5.8 or 5.9GHz wireless spectrum, specifically designed for automotive uses. Critically, DSRC enables two-way wireless communications between the vehicle (through embedded tags or sensors) and roadside equipment (RSE). DSRC is a key enabling technology for many intelligent transportation systems, including vehicle-to-infrastructure integration, vehicle-to-vehicle communication, adaptive traffic signal timing, electronic toll collection, congestion charging, electronic road pricing, information provision, etc. DSRC is a subset of radio frequency identification (RFID) technology. The technology for ITS applications works on the 5.9GHz band (United States) or the 5.8GHz band (in Japan and Europe). At present, DSRC systems in Europe, Japan, and the United States are generally not compatible (although there are indications that Europe may be trying to migrate to 5.9GHz). In 2004, the U.S. Federal Communications Commission (FCC), atypically for a U.S. regulator, prescribed a common standard for the DSRC band both to promote interoperability and to discourage the limitation of competition through proprietary technologies.2

✓ **Wireless Networks.** Similar to technology commonly used for wireless Internet access, wireless networks allow rapid communications between vehicles and the roadside, but have a range of only a few hundred meters.3 However, this range can be extended by each successive vehicle or roadside node passing information onto the next vehicle or node. South Korea is increasingly using WiBro, based on WiMAX technology, as the wireless communications infrastructure to transmit traffic and public transit information throughout its transportation network.

✓ **Mobile Telephony.** ITS applications can transmit information over standard third or fourth generation (3G or 4G) mobile telephone networks. Advantages of mobile networks include wide availability in towns and along major roads. However, additional network capacity may be required if vehicles are fitted with this technology, and network operators might need to cover these costs. Mobile telephony may not be suitable for some safety-critical ITS applications since it may be too slow.4

✓ **Radio wave or Infrared Beacons.** Japan's Vehicle Information Communications System (VICS) uses radio wave beacons on expressways and infrared beacons on trunk and arterial roadways to communicate real-time traffic information. (Arterial roadways are moderate capacity roadways just below highways in level of service; a key distinction is that arterial roadways tend to use traffic signals. Arterial roadways carry large volumes of traffic between areas in urban centers.) VICS uses 5.8GHz DSRC wireless technology.

✓ **Road side Camera Recognition.** Camera- or tag-based schemes can be used for zone-based congestion charging systems (as in London), or for charging on specific roads. Such systems use cameras placed on roadways where drivers enter and exit congestion zones. The cameras use Automatic License Plate Recognition (ALPR), based on Optical Character Recognition (OCR) technology, to identify vehicle license plates; this information is passed digitally to back-office servers, which assess and post charges to drivers for their use of roadways within the congestion zone.

✓ **Probe Vehicles or Devices.** Several countries deploy so-called "probe vehicles" (often taxis or government-owned vehicles equipped with DSRC or other wireless technology) that report their speed and location to a central traffic operations management center, where probe data is aggregated to generate an area-wide picture of traffic flow and to identify congested locations. Extensive research has also been performed into using mobile phones that drivers often carry as a mechanism to generate real-time traffic information, using the GPS-derived location of the phone as it moves along with the vehicle.

As a related example, in Beijing, more than 10,000 taxis and commercial vehicles have been outfitted with GPS chips that send travel speed information to a satellite, which then sends the information down to the Beijing Transportation Information Center, which then translates the data into average travel speeds on every road in the city. [5]

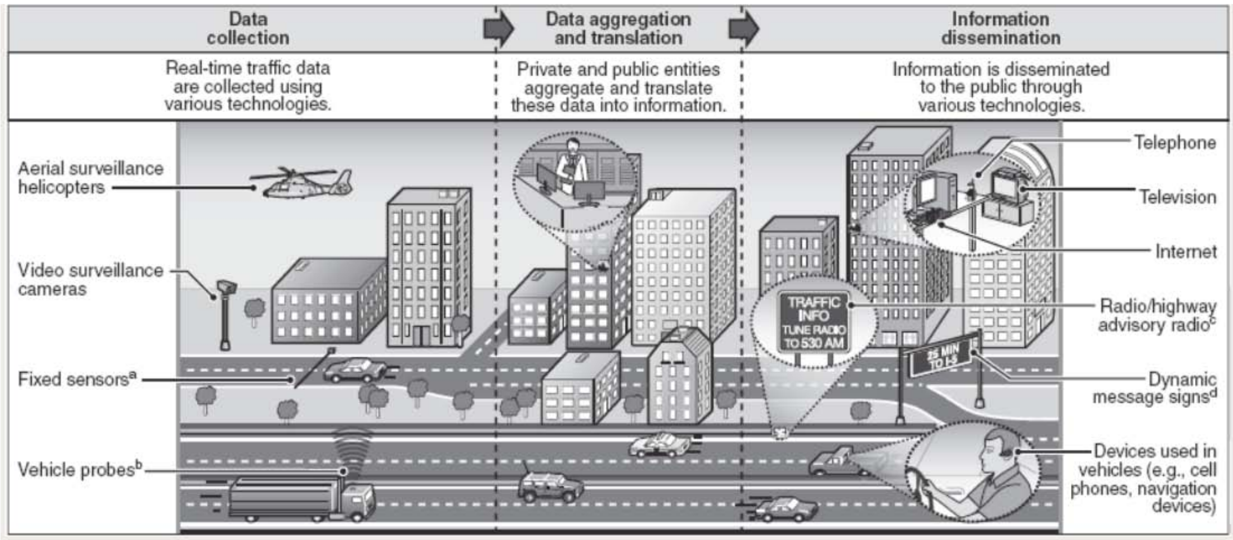

Figure 1: example of Technologies associated with real-Time Traffic Information systems

5- APPLICATIONS

Some of the applications of wireless technologies to e-commerce activities that have started to appear across the globe are summarized here. Many of these are currently constrained by technology limitations and issues described previously. Two fundamental application issues that researchers and developers must address are what tasks users want to do without regard for temporal or spatial constraints and how to provide support for these tasks through wireless applications.

E-commerce payment systems can also benefit from wireless technology. One scenario involves a consumer not having to stand in line to make a purchase, but simply paying for an item though a wireless device. Final payments might even be billed to a telephone company. Bluetooth technology may enable a list of available services to be generated automatically on a device when a user walks close to a Bluetooth-equipped cash register.

Wireless technology is well suited for bringing e-commerce to automobiles and other forms of transportation. Traffic advisory systems can warn of impending traffic jams. Cars will eventually be able to report potential problems to service centers themselves. The service center might even make minor adjustments to the car online. Car-mounted devices will eventually allow regular Internet access, although safety issues of "browsing while driving" must be addressed [6].

While most initial mobile commerce applications seem to be aimed at the business-to-consumer market, business-to-business and intranet applications are also appearing. Service technicians can be dynamically assigned new tasks and sent problem information while they are traveling. Sales people can go literally anywhere in the field and access product information and customer accounts, although the applications right now are still subject to the constraints of current wireless devices. Organizations must address the issue of designing complex, robust applications that work well within these current (and any foreseeable) device limitations. Flexibility can be integrated into designs to enable future functionality.

6- CONCLUSION

Transport has a strong and direct relationship with other sectors such as the economy and society. So, transportation industry is transformed to the important section in economy. As for the assessment of growth and economic development, transport sector is also examined.

So rebuilding and strengthening the transportation system, Equipped with intelligent systems, Application of Mobile Commerce in its, Computer networks, mobile networks for data transfer, payment transmission, better use and more of portable technology in transportation, will bring development and growth.

Iran's economic development plan and the removal of fuel subsidies have created huge economic interests for government and people. Finally, application of mobile commerce in the transportation industry ability to reach the following benefits:

- ✓ Management of travel demand
- ✓ Public transport operations
- ✓ Electronic payment
- ✓ Crisis Management
- ✓ Security and control systems of cars in the city
- ✓ Passenger Advanced Control Systems
- ✓ Traffic and informing
- ✓ Decrease of costs

- ✓ No need for frequent counting of money during travel
- ✓ Increased security to prevent ticket forgery
- ✓ Creating distinguish for holder

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