Smart City Companies in Turkey

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Abstract: Smart Cities use Information and Communication Technologies to manage the resources and services offered by a city more effectively and to bring them closer to all stakeholders (citizens, corporations and public administration). Public or private companies implement smart city practices among stakeholders. Smart city practices are expected to accelerate economic growth and social development. However, it is a fact that a country has become fully smart cities but only with domestic and national companies. Technology companies that manufacture smart city in Turkey can be a domestic-national company or a company which is distributor belongs to a foreign company. In this study, national and regional levels, market research and analysis have been performed related to smart cities in Turkey. As a result of this study, company's type and produced technologies are handled. Thus, the current studies will reveal about the companies located in Turkey related to smart cities. It will be beneficial to all stakeholders involved in smart cities.

Keywords: Smart cities, Companies, Market research, Stakeholders

Introduction

Smart City is a city that uses the resources and services offered by a city to manage it more effectively and to improve people's quality of life. In this direction, people must be in the center of smart cities. In smart cities, people should be superior to technology and companies. The realized smart systems must exist in order to increase people's standard of living. These technologies should not limit people and help people.

Data needs to be a smart city, and technology companies need to process it. There are many different technologies available when the data are taken. These different technologies, protocols and subscriptions can be listed as follows. Long-range (5G / 4G / 3G / GPRS / GPRS + GPS / LoRaWAN / LoRa / Sigfox / 868 MHz / 900 MHz) medium-range (ZigBee / 802.15.4 / DigiMesh / WiFi) and short-range (RFID / NFC / Bluetooth 2.1 / Bluetooth Low Energy), Industrial Protocols (RS-232, RS-485, Modbus, CAN Bus, 4-20mA.).

Along with all these wireless technologies, many wired solutions are available. As you can see, the same systems can be realized with many different technologies. The fact that these technologies are in contact with each other is a necessity for smart cities. In this way, the data can be coexistent and accurate, integrated decisions can be taken for forward. Companies need to take this into account when implementing smart systems.

There are many companies that are leaders in their sector in our country. For example, companies such as GSM Operators (Vodafone, Turkcell, Avea), White Goods Markets (Arçelik, Beko, Bosch, Electrolux, LG, Profilo, Samsung, Vestel etc.), known companies (Microsoft, Ericsson, Oracle, Cisco, Huawei, Hitachi, IBM, Intel, etc.) are available to a large number of IT companies. According to the "Global Smart City Market 2016-2020" research conducted by independent research institute TechNavio, the Smart City Market is expected to grow by about 20 percent annually in 2016-2020 and reach 1.5 trillion dollars worldwide by 2020. The above companies are trying to present some systems that they can do in their own field under the smart city category because of the size of the smart city market, although their basic fields are different.

Companies

Some of the companies that are located in the smart city market in our country and the products or technologies that they have developed are given below.

Ausis

Ausis (http://www.ausis.com.tr/) only contributes to smart cities within the context of Smart Transportation Systems. The operations and explanations made within the scope of these systems are given below. Vehicle and Resource Tracker: The fleet tracking and management solution helps to reduce operational costs of the fleet with real time tracking of the firm's vehicles and collects information that will save employees' workforce. The solution consists of in-vehicle hardware and software components that monitor key activity parameters of the vehicle and thus control the drive. All information is accessed via a web-based platform. The solution is designed to serve every size fleet, every type of vehicle and transport type. Eco-Driving, Driver Evaluation, Fuel Inspection and Control, Temperature Control, Route and Order Optimization, Monitoring and control points: Speed, Route, Mileage, Fuel consumption, Working hours and conditions, Travel, Expedition history, In-car computer data, Vehicle maintenance information can be followed. Accident / Collision Prevention System: Pedestrian and Bicycle Collision Warning, Accident Warning, Lane Departure Warning, Tracking Distance Warning, Smart Long Beam Control, Speed Limit Indicator and Traffic Sign Recognition information can be followed.

Deloitte

Deloitte (https://www2.deloitte.com/tr/tr.html) refers to one or more of Deloitte Touche Tohmatsu Limited ("DTTL"), which is established in accordance with the UK legislation, the companies in the member company network and the associated legal entities. It is an organization that has extensive work on smart cities. There are many smart systems in the company. These are: Smart Mobility, Smart Safety, Smart Energy, Smart Water, Smart Waste, Smart Buildings, Smart Homes and Living, Smart Health, Smart Education, Smart Finance, Smart Tourism and Leisure, Smart Retail, Smart Logistics, Smart Manufacturing, Smart Construction, Smart Government.

Logiba

Knowing the critical importance of energy use, Logiba (http://www.logiba.com/) develops eco-friendly and innovative products by keeping energy efficiency and cost optimization in mind for all products it designs and produces with the concept of smart cities. The smart city solutions that Logiba offers are:

Smart Lighting Solutions: Logiba ASAS, which makes the lamps in the park and on the streets smart, is compatible with both classic and LED lamps. With motion, traffic and light sensors integrated in Logiba ASAS, bushings, bikes and vehicles in parks and streets are always light. When the traffic intensity is low, when no one is in the park or on the street, the lighting level is reduced and lighting is done when necessary. The faults and lifetimes of the lighting fixtures are recorded.

Smart Waste Tracking Solutions: Garbage levels are tracked precisely and a centralized warning signal is sent when the specified limit is exceeded. In addition, the temperature of the container is monitored and an emergency warning system is activated in case of fire. Central records are evaluated and planned garbage collection routes are established.

Meterology Solutions: Meterology analysis solutions allow you to access meteorological parameters such as weather, temperature, and temperature information locally. You can retrieve it retrospectively, and view it via reports and graphs.

License Plate Recognition Solutions: Plate recognition systems, which can be used to control the vehicle entry and exit in parking lots, shopping malls, hospitals and schools, help to record the entry and exit vehicles. They are the systems that can calculate how many hours are spent inside the car parks and the amount of payment according to the length of stay.

Power Analysis: Nowadays it is very important to control energy consumption. To provide energy consumption control, it is first necessary to analyze the energy. Power analysis solutions monitor and analyze energy consumption in networks and systems and present energy reports of user network and systems.

Proline

Proline (https://www.pro-line.com.tr/tr/SitePages/home.aspx) supports smart cities with Geographic Information Systems Solutions and Smart Security Management System.

Geographic Information Systems Solutions is a map-based management information system that enables users to collect, store and analyze spatial information. With Smart Security Management System, vehicle information can be continuously checked by registering city entrance and exit times, plate number and lane details. In case that the behavior detection alarm is triggered, the image can be reflected on the screen at the same time and can be defined as Crowd violation, Navigation, Zone entry, Missing object, Standing object, Standing vehicle identification. Vehicle tracking system and safety devices can also be monitored simultaneously on the map. All video content is automatically analyzed and changes can be reported simultaneously to the operator. With the appropriate calibration settings, objects can be defined by size / speed characteristics. Using the most advanced technology monitoring solutions and real-time images with Cameras and Monitoring Software; Safety strike violations, Red light violations, Safe track crossing violations, Vehicle use on the reverse side, Instant speed measurements, Average speed detection, Incorrect parking detection and many other violations are detected simultaneously. In addition to instant detections, images of any past time interval can be re-evaluated. This advanced technology is not just traffic rule violations; The suspicious packet is detected instantaneously at various occasions such as the detection of the called party, and it is possible to generate automatic notices by this system.

Turksat

Turksat's (https://www.turksat.com.tr/tr) vision is to regain Turkey's eGovernment and IT strategies with appropriate smart municipal services. The Smart City Components offered by Turksat are:
IOT management platform: IOT management platform can be presented, with interface options designed to suit customer needs.

Smart Environment: Smart Lighting Systems, Smart Irrigation Systems, Waste Management Systems
Smart Life: City Promotion Systems and Information Kiosks, Security Services, City Monitoring Systems, Educational Services, Tourism

Smart Networks and Information Communication Infrastructure: Broadband Infrastructure, Fiberoptic Lines, WiFi Networks, Wireless Network Points, Service Focused Information Systems

Smart Transportation: Smart Interchange and Signaling Systems, Electronic Control Systems (EDS), Traffic Measurement Systems, Variable Traffic Sign Systems (VMS), Pedestrian Protection Systems, Park Orientation Systems, License Plate Recognition and Control Systems, National and International Accessibility, Smart Stop Systems , IT Infrastructure, Sustainable Innovative and Secure Transportation Systems

Health Services: Panic Button, Chronic Patient Tracking Systems, Medical Coaching Service

Turk Telekom

Turk Telekom (http://www.sehirlerakillaniyor.com/) is working to make cities more livable with 214,000 km of fiber infrastructure and 4.5G network. The biggest difference of Turk Telekom Smart Cities from other narrow-scale solutions is to bring 20 different solutions together with full integration and provide citizens with a real smart city experience. From smart traffic to smart irrigation, smart lighting and special convenience for the disabled, the service is offered in many sub-titles. The solutions used for smart cities have been developed by Turk Telekom Group and its solution partners. Even in the solution from abroad so as to make production agreements have been made in Turkey. Business partners of Turk Telekom are Borda, ISSD, Jenoptik, Isbak, Ortem Elektronik, Sesa, Udea, Boni, Verisun and Sade. In order to establish smart cities, Turk Telekom has

made a protocol and cooperation with the Karaman Municipality and Karaman Governorship on the subject. On the Karaman Municipality page, no developments or conclusions regarding this cooperation have been seen. Smart city applications and content on the page of Turk Telekom are given below.

Traffic Density information: TEDES instantly captures speed and red light violations. This ensures safe traffic flow and avoids accidents.

Park Camera View: The city becomes safer with the BuluTT eye. The images are stored in Turkey's first Tier 3 certified data center.

BuluTT Eye: With BuluTT Eye your office can be more secure. You can view your office on the web for 24 hours and keep records backwards.

Intersection: By means of the smart intersection, if the number of cars in the intersection is greater than the number of cars in the intersection, the vehicles on that intersection are allowed to pass. Thus, the number of cars waiting at the intersection is shortened.

Parking Fill Rate: The biggest problem of the cities is the parking problem. With smart parking, citizens can see the nearest free parking area via mobile application or web, and there is no need to search the parking area for a long time to park the car. There is no time loss and CO_2 emissions are reduced.

Monthly Water Saving Information: Irrigation systems need to be used extensively and efficiently in order to be able to use water effectively, which is the most important natural source of life and future. With smart irrigation, parks, gardens and green spaces in the city; sensors that detect the amount of moisture in the air and the earth are being watered in the right amount at the right time. With the central management system, which is part of the application, all irrigation procedures can be followed; there is a serious water saving throughout the city.

New Age Technologies

New Age Technologies (http://yenicagteknolojileri.com/) have contributed to smart cities through developed sensor nodes and gateway nodes. The company is working in the field of Wireless Sensor Networks and is producing projects in this area. In addition, the company offers Electronic Services, Mobile Solutions and Web Solutions. The applications and contents according to their catalogs are given below.

Home Automation Applications: Smart Home Systems, Building Security Systems.

Commercial Applications: Vehicle Tracking Systems, Person and Object Tracking Systems, Energy Line Monitoring Systems, Lighting Control Systems, Traffic Light Control Systems, Fire Systems.

Health Practices: Systems for determining the location of doctors at the hospital, Systems for monitoring the status of patients, Systems for monitoring the elderly, Systems for monitoring various healthful parameters.

Environmental Applications: Weather Systems, Air Pollution Detection Systems, Flood, Earthquake, Forest Fire Monitoring Systems, Agricultural Activity Monitoring Systems, Animal Farm Monitoring Systems.

Military Applications: Monitoring systems of war zones, Monitoring systems of enemy movements, Discovery systems for land, Monitoring systems of personnel and military vehicles, Monitoring systems of friendly forces, Systems for detecting the speed and positions of targets.

Discussion and Conclusions

As we have seen, the formation of smart cities in Turkey has just begun. Most companies have taken steps in this regard. These companies are engaged in both technological production and realization of their applications. But it should be known that smart cities are a matter of being from transport to environment, from economics to governance, from life to health, from industry to security. Just implementing a small part of a system should not mean that the city is smart. For the technologies implemented by the companies for smart cities, firstly a testing site should be established and the related technologies should be examined from the technical point of view as well as the environment and health. In this way, the final products and processes must be applied in real cities

after the testing environment. Otherwise, unexpected bad results may occur. For companies' technology development, they need to use the data of institutions. However, unfortunately, a public institution still cannot share its data with other public institutions. The more data is shared, the faster it will be for city solutions. If inter-agency cooperation is not possible, it is unlikely that the smart applications of cities will be successful. American and European countries are at an advanced level at the point of smart cities. This countries are in the advanced level, because they have a lot of technology companies. However, there is not exactly a smart city available right now. At the point of smart cities in our country, the number of domestic and national companies should be increased. At the point where our country provides smart cities, it is necessary to get support from these domestic and national companies. Because the applications that will be used throughout the country to collect important data must belong to that country at both hardware and software point. This provides both a contribution to full independence of this country and information that can create intelligence is kept within the country.

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