FROST & SULLIVAN

50 Years of Growth, Innovation and Leadership

SAFER CITIES

An Inevitable Trend in Urban Development

CONTENTS

Executive Summary

1   Factors that drive safer city projects are a strong city economy, level of safety and security threat, availability of internet protocol, susceptibility to natural disasters, and improved private and public partnership.

2   The emergence of smart technology from many devices, buildings, and critical infrastructure means that more information is widely available to gather and interpret. This analysis provides intelligence on how to act or react to critical situations. This is critical in making a city safe.

3   Technologies and the convergence of various technologies play key roles in the development of safer cities. Video surveillance, biometrics and advanced database systems are gradually changing the way intelligence is being gathered and processed. Without being noticed, CCTVs on the streets increase public safety through better surveillance.

4   Safer city solutions incorporate a wide array of technology. Integration and interoperability of various technologies is fundamental in obtaining better intelligence from various sources. From CCTVs to crisis management centres, technologies acts as key enablers for law enforcement, emergency services and local decision makers to optimise their response to the expected and unexpected.

5   With older technology reaching maturity, new security solutions are implemented to strengthen city safety. One such is Long term evolution (LTE), which is in an early stage of development. Frost & Sullivan expects LTE to have a significant impact on security systems in the coming years.

6   Other trends include move towards wireless transmission, growth of cloud computing, data mining and analytics, and integration of smart technologies.

7   With an economic crisis looming, governments at present are expected to invest about 0.5 percent of their GDP for a safer city project. Globally, by 2020, Frost & Sullivan estimates the contribution of different technologies towards the development of safer cities projects to be USD 80-85 billion.

8   North America is expected to contribute about 31 percent of the overall investments in different technologies for safer cities projects; followed by the EMEA (27 percent), followed by Asia-Pacific (24 percent), and rest-of-world (18 percent).

9   To identify potential hot beds for safer city projects across different geographies, Frost & Sullivan has formulated a framework encompassing a series of factors ranging from economic power, technology strategy, rate of urbanization, and threat perception.

INTRODUCTION

In the current age, threats to our lives, identities, and freedom come from an increasing number of sources, from terrorists to hackers and from overzealous governments to organized crime. One of the key causes of fear and insecurity in many cities today is crime and violence. As city populations and GDP continue to rise through urbanisation, so does the threat level, with increased populations leading to anonymity and the prevalence and clustering of high threat targets presenting anti-social groups with attractive opportunities. Emergency services, law enforcers, corporations and individuals alike are required to cooperate to tackle the ever growing need for security, worldwide. Safer City is a plan to enhance public security and welfare by deploying networked security systems across several entities in a society to optimise the necessary response from detection to action.

The emergence of smart technology is driving the creation of Safer Cities. Vast communication and sensor networks across cities enable law enforcement and other government agencies related to citizen safety to gather greater quantities of data; interpret them and react effectively. Greater interoperability allows technologies and networks to be linked and advanced analytics provides departments with the data they need to make effective decisions on time. This is driving changes to the way major cities across the world evaluate their security requirements.

Some of the other factors that drive Safer City projects are: a strong city economy, level of safety and security threat, availability of internet protocol, susceptibility to natural disasters, improved private and public partnership, and so on.

'Safer City' concept is expected to witness significant traction over the next few years as external/internal threat factors are given more importance by governments across the world. The higher the internal/external threat of terrorist attacks, the more probability there is of a city imple-menting a safer city project. In terms of adoption, the North American market has already seen some rapid progress after the 9/11 attacks. New York City is one of the most "surveilled" cities in the world with video surveillance cameras located at almost every junction, intersection, building, and public area in the city.

Countries such as the United Kingdom are stepping up security measures in the wake of increased terror threats and formulating strategies to secure its people and property from terror strikes. Recently, Britain has proposed plans to store details of all phone calls, text messages, emails and websites visited online as part of the government's new anti-terror plans. The country's security services are expected to have widespread access to information about who has been communicating with each other on social networking sites such as Facebook. Direct messages between subscribers to websites like Twitter and communications between players in online video games will also be stored.

Other major cities such as Tokyo, Los Angeles, and so on, are on the forefront in adopting safer city projects and related technologies. As critical assets in a city's infrastructure, security technologies and solutions in future cities will play an important role in promoting better well-being and will support city operators to better cope with security and safety challenges. In the next 5-10 years, Frost & Sullivan expects safer city projects to become an integral part of a city's development schemes proposed by the respective governments.

Figure 1 depicts the increase in crime rates across some major cities as their population grows in size.

Figure 1 : Safer Cities: Crime Rate Increase across Major Cities

Correlation between increases in city size and crime			
	1999 - 2002	2003 - 2005	2007 - 2010	CAGR %
Brussels Population	978,384	999,899	1,048,491	0.69%
Brussels Crime	149,876	160,724	174,646	1.54%
Stockholm Population	750,348	761,721	810,120	0.77%
Stockholm Crime	153,400	157,534	180,958	1.67%
Zurich Population	362,273	364,528	376,815	0.37%
Zurich Crime	38,531	45,671	69,284	6.04%

Source: Frost & Sullivan. Source: Eurostat

The following points highlight the reason behind the growing interest in safer city projects across the world.

1 **The rate of urbanisation is increasing and with city growth comes an increase in crime** and safety concerns due to concentrated populations

2 **Increasing pressure on local authorities to cope with expected and unexpected security threats against citizens.** Security and safety issues span across economic and political boundaries, making this a global issue

3 **Cities are centres of wealth creation and compete fiercely with each other to attract inward investment from large multinationals.** Cities that are able to demonstrate robust safety and security technology and planning will be able to leverage this to attract new business

SAFER CITIES IN CONTEXT OF SMART CITIES

Smart means intelligence. Intelligence is a key factor to keep a city safe. With the evolution of communication technology, the dissemination of information has become an extremely common task. When substantial investments are made in human and social capital, technology (communication infrastructure), and so on, that fuel sustainable economic development and increased quality of life, along with active participatory governance, the city can be defined as 'Smart'.

The below mentioned technologies and processes in Figure 2 are expected to be the core engine of a safer city in the future. Projects currently underway, are already implementing some of these technologies with the main goal of achieving greater integration in the near future. The emergence of Smart Technology from many devices, buildings, and critical infrastructure means that more information is widely available to gather and interpret. This analysis provides intelligence on how to act/react to critical situations. This is critical in making a city safe.

Figure 2: How Smart Drives Safe - Intelligence Playing a Major Role in Safer Cities

SMART Buildings: At least 50% of Buildings Will be Green and Intelligent Built with BIPV; 20% of the Buildings Will be Net Zero Buildings.

SMART Mass Transport: Multimodal Transport Hubs Providing Excellent Air, Rail, Road Connectivity to Other Mega Cities.

SMART Energy: 20% of Energy Produced in the City Will be Renewable (Wind, Solar etc).

SMART Technology: Intelligent Communication Systems Connecting Home, Office, iPhone and Car on a Single Wireless IT Platform.

SMART GRID: Infrastructure to Enable Real Time Monitoring of Power Flow and Provide Energy Surplus Back to the Grid.

Satellite Towns: Main City Centre Will Merge with Several Satellite Towns to Form ONE BIG MEGA CITY.

SMART Cars: At least 10% of Cars will be Electric Vehicles. Free Fast Charging Stations at Every Half Mile.

Smart Drives Safe: The concept of 'Smart' is expected to drive the further evolution of connectivity and communication to enhance safety. When mentioning smart technologies, we talk about smart buildings, smart transport, smart energy, smart grid, smart cars and smart devices. These new state-of-the-art technologies are the main drivers for city connectivity. The information flow from smart buildings will provide an overview of the status of current utility usage and any variation in the flow of information can trigger an alarm for first responders. Smart transport delivers information from the field and will inform traffic officials that an issue occurred; this may trigger an immediate surveillance response and possible unit deployment. Smart energy and smart grids are a crucial element in the surveillance of critical infrastructure and may reduce the risk of power failures. Smart cars give perfect information feed for graphical information systems (GIS) which could be used for the identification of potentially hazardous (traffic jams, accidents, etc.) areas in the city. Smart devices (Smart Phones, Tablets, etc.) allow the mapping of people through GPS and Wi-Fi internet. This also is a crucial aspect to having graphical information about the movement of people.

Figure 3: How Smart Drives Safe - Communication & Connectivity are Essential Factors

Source: Frost & Sullivan analysis.
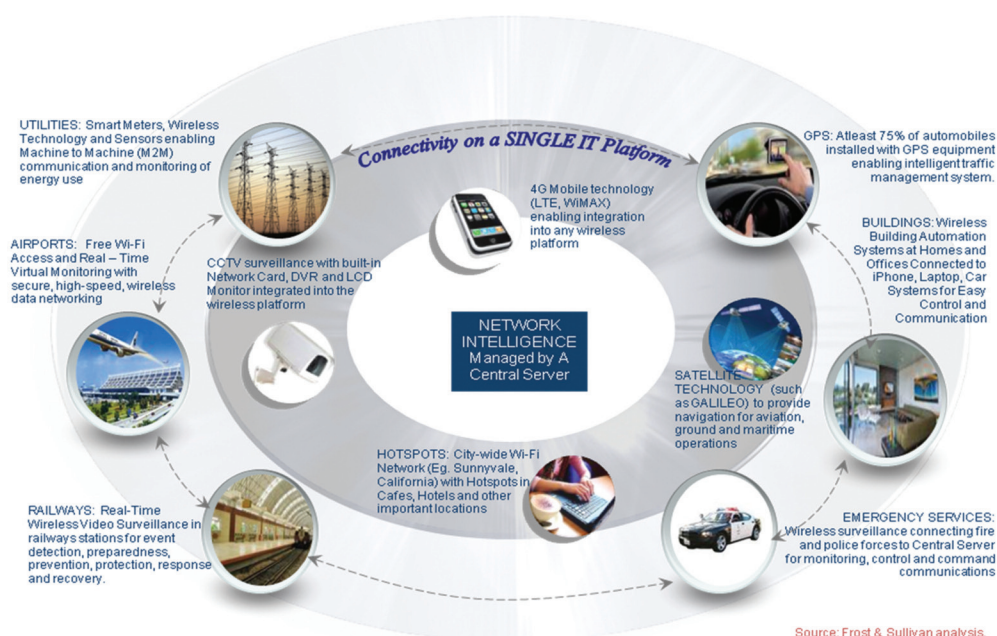
KEY MARKET DRIVERS FOR SAFER CITIES

Rank	Driver	1 - 2 Years	3 - 4 Years	5 - 7 Years
1	Strong City Economies	High	High	Medium
2	Security and Safety Threat	High	High	Medium
3	Natural Disasters	High	High	Medium
4	Internet Protocol	High	Medium	Low
5	Improved Private/ Public Partnership and Cooperation	Medium	Medium	Medium

Source: Frost & Sullivan

Strong City Economies

Strong City Economies are the main factor for implementation of Safer City projects. Growth in each city influences the level of technological adoption in that city. The stronger the economy is, the higher the probability will be to procure technology that would integrate existing security devices such as Closed-circuit television (CCTV), sensors and detectors. Newer city economy and expected higher growth in the long run denote the city is more probable to procure new solutions and integrate all security measures.

As cities expand, new infrastructure is developed to support the growing population. Cities that are able to build security solutions based on IP infrastructure rather than overhauling large legacy systems are more likely to adopt new and integrated systems. A further impact of urbanisation is the increased anonymity of people who are likely to present a threat. There is a correlation between city size and crime and the need for integrated security solutions become more important as the rate of urbanisation within a country increases.

Security and Safety Threat

Security & Safety Threat will be another factor influencing the implementation of Safer City projects in the coming years. A part of the security factor is the internal/external terrorism threat a city faces. The higher the internal/external threat of terrorist attacks the more probability there is of a city implementing a safer city project. Other elements that are included in the security and safety threat factor are natural disasters, crime, and so on. The element that is the most important in this segment is crime. The main purpose of Safer Cities is to decrease the crime rate and increase the feeling of safety amongst the citizens.

Natural Disasters

Natural Disasters are a major threat to safety and first response is critical to the success of the mission. With cities being susceptible to natural disasters, advanced information and communication systems must be deployed in order to minimize casualties and economic loss. In cities with high natural disaster threat levels, there is an increased possibility of Safer City programs which would reduce the amount of economic and civil loss.

Internet Protocol

Internet Protocol (IP) is one of the key drivers when talking about convergence. The

technology of the future is expected to be most likely through high speed internet and that is why IP infrastructure will be a necessity for all systems to comply with each other. Safer City projects will definitely be driven by the development of systems infrastructure whether it's through fixed cable or wireless. The elements that influence this factor are the city's ability to spend and the most important element being the timeframe for the adoption of new technology. Current IP infrastructure is also an important part of the equation because existing infrastructures would allow cities to decrease their spending through the elimination of an important aspect which is the communication infrastructure. The more extensive the IP infrastructure, the higher the probability is for new technology adoption.

Improved Private/Public Partnership and Cooperation

Crime as a community problem is another important factor that allows society to unite with public services to fight criminal activities. Uniting the society to fight crime together is imperative for the livelihood of such projects. When we mention public awareness we are also focusing on the private businesses that are in the purview of criminals, natural disasters, etc. Allowing all the community entities to have a united security system will lead to efficiency gains, thus reducing the time to act and allow swift apprehension of the law breaking individual. The more aware the public is of security threats, the more open they will be to adopt security measures. Once the security measures are in place, the probability to integrate the systems with Municipal security, in turn creating a broad Safer City project, is high.

KEY MARKET RESTRAINTS FOR SAFER CITIES

Rank	Restraint	1 - 2 Years	3 - 4 Years	5 - 7 Years
1	Slowdown in Economy & Budget Cuts	High	Medium	Medium
2	Continued Presence of Legacy systems	High	Medium	Medium
3	Change of Government	Medium	High	Medium
4	Civil Rights	High	Medium	Medium

Source: Frost & Sullivan

Slowdown in Economy and Budget Cuts

The Economic Crisis & Budget Cuts that the European Union is experiencing currently will have a major influence on the creation of new safer city projects. Austerity measures and spending cuts at a local government level will make it increasingly difficult to raise investment for new Safer City related projects. There is a probability that more of the CCTV command centres maybe privatized and the municipalities would have to outsource this service. This is already visible in a few cities in the United Kingdom where the municipalities and the safer city programs outsource their CCTV information.

Continued Presence of Legacy Systems

Legacy Systems are old technologies, computer systems or applications that are still being used because they satisfy the needs of the end-user even though a new sophisticated technology, system or application exists. This is a major restraint for the integration of all the technologies that exist in Safer Cities. Legacy systems may hinder the implementation of new systems. The replacement of legacy systems would be extremely expensive and certain integration issues may arise when designing an integrated solution.

Change of Government

Government instability is seen as a restraint to Safer City projects. The long term development of safer city programs means that programs will stretch across election periods and the priority of governments can change significantly on the issue of security. Safer City programs are also a political hot potato. At a time of austerity and cut backs on public spending, governments do not want to be seen to be investing heavily on public security infrastructure projects whilst they are cutting back on police numbers.

Civil Rights

Civil Rights can act as a restraint for the procurement and deployment of the newest technology though this differs by region. Political challenges, policy implementation problems, civil society and the general public are a major issue to the implementation of surveillance programs. Notification requirements for places under surveillance are a drawback for secret security surveillance. Increasing concerns of privacy issues among general public is expected to remain one of the restraints for deployment of advance security systems.

KEY TRENDS IN 2012 FOR SAFER CITIES

- Move towards wireless transmission

- Growth of cloud computing, data mining and analytics

- Integration of smart technology

Move Towards Wireless Transmission

Wireless transmission is already present and fairly saturated today through mobile phone, tablet PCs, two way radios etc. The trend for 2012 will allow for large amounts of data to be transmitted wirelessly and real time at greater speeds. This includes development in Long Term Evolution Solutions (LTE), City Clouds, Machine to Machine communication (M2M), internet protocol (IP) technology etc. The development of the above technologies will allow for government agencies and departments to share information with one another seamlessly, thereby reducing the processing time for any activity. In terms of law enforcement, we are already seeing law enforcement agencies in India, China and Singapore using hand held smart devices to retrieve information from numerous vast databases. Mobile devices would also allow law officials to view city footage of key areas in a city remotely without having to be at a stationary location. Remote viewing would allow individuals to attend to a situation before the situation becomes more intensified. IP technology in video surveillance has allowed for cameras to be installed at locations where previously, because of the lack of infrastructure, wiring was not available for the cameras. Today, through IP technology, cameras can be installed immediately and effectively while also providing footage to multiple users across numerous remote locations.

Growth of Cloud Computing, Data Mining and Analytics

The growth of cloud computing will allow companies and government agencies to have their data stored in a virtual cloud thereby, allowing for access from numerous locations and more importantly, save on cost and space, which would otherwise be used by physical servers. The implementation of cloud technology will allow for faster data retrieval as well as an increase in the size of data that can be retrieved. Cloud computing also allows for data to be retrieved instantly across a large number of devices. Data mining and analytics will allow for government officials to have key data to help them to interpret situations that are taking place currently and accordingly allow them to take preventive steps.

Integration of Smart Technology

Smart technology is already present through the aid of smart phones, contactless payments, near field communication (NFC), integration of smart cards with biometrics etc. The next stage for smart cities will involve the integration of smart technologies with video surveillance, biometrics, access cards etc. Through this integration, law enforcement agencies will be able to identify criminals/offenders in a city and accordingly take steps towards apprehension. We are already witnessing the benefits of smart technology in the form of smart national ID cards in countries such as Malaysia, Singapore, Indonesia etc wherein the users details are present on the card itself thereby proving to be a key identification card for the user.

TECHNOLOGY LANDSCAPE

The key part of safer cities is technology. With the safer city concept becoming more popular on a worldwide basis, there will be a higher demand for new security solutions. Convergence is happening across industries and markets at a great pace and the security sector is no different from other infrastructure related markets such as energy and transportation. Technologies such as video surveillance, biometrics, and so on, are gradually changing the way intelligence is being gathered and processed. Without being noticed, CCTVs on the streets increase public safety through better surveillance.

Safer City solutions incorporate a wide array of technology. Integration and interoperability of various technologies is fundamental in obtaining better intelligence from various sources. From CCTVs to crisis management centres, technology will act as a key enabler for law enforcement, emergency services and local decision makers to optimise their response to the expected and unexpected. With older technology reaching maturity new security solutions are implemented to strengthen city safety. The figure below depicts the life cycle of different technologies:

Figure 4 : Safer Cities Market: Life-cycle of Different Technologies
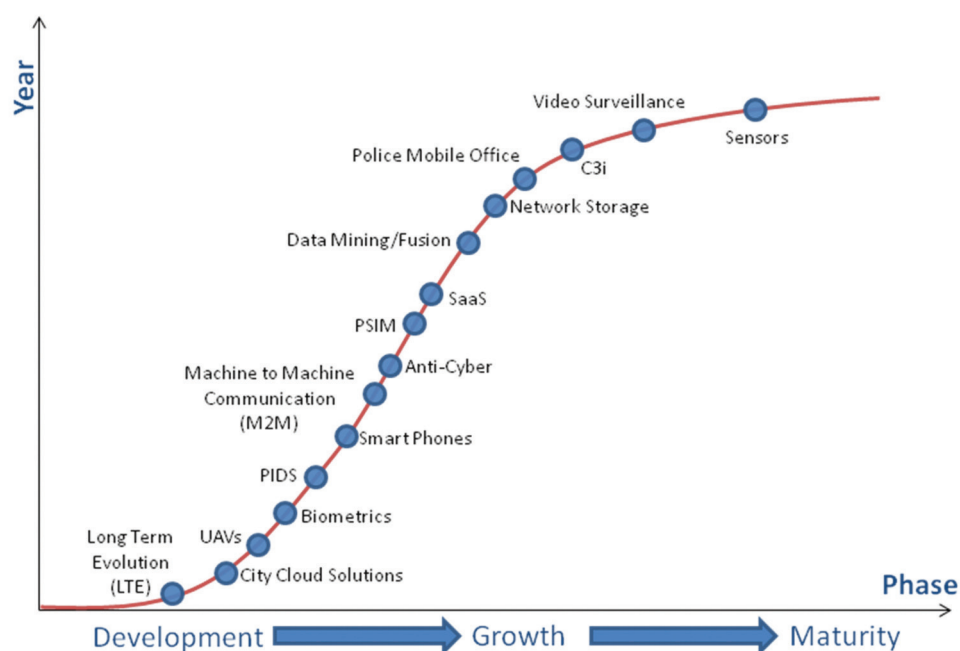
Source: Frost & Sullivan

Long term evolution (LTE) is in the earliest stage of development. Frost & Sullivan expects LTE to have a significant impact on security systems in the coming years.

ANALYSIS OF DIFFERENT TECHNOLOGIES

Frost & Sullivan has identified key technologies which are expected to play a significant role in the growth of safer cities market in the coming years. These technologies are analyzed in detail in the following section.

Video Surveillance

The Video Surveillance Market is segmented into Video Surveillance Cameras, Video Servers/Encoders, Video Surveillance Storage, Video Surveillance monitors & Video Surveillance Software. The market is expected to have generated revenues of about **$10.3 billion** in 2010, with a growth rate of 9.8 percent over the previous year. The revenue includes video surveillance applications and with increased urbanization, Frost & Sullivan expects the growth of this technology in cities to be stronger.

Following are some of the major drivers of the global video surveillance market:

- Need for intelligent analytical capabilities

- Increased need for network-based solutions

- Greater need for Surveillance

- Interoperability and compatibility

Following are some of the major restraints of the global video surveillance market:

- Fragmented decision making and budget limitation for upgrades

- Encroachment on personal freedom

- Network based technology issues

Figure 5 : Video Surveillance Market: Percent of Revenues by Region (global)
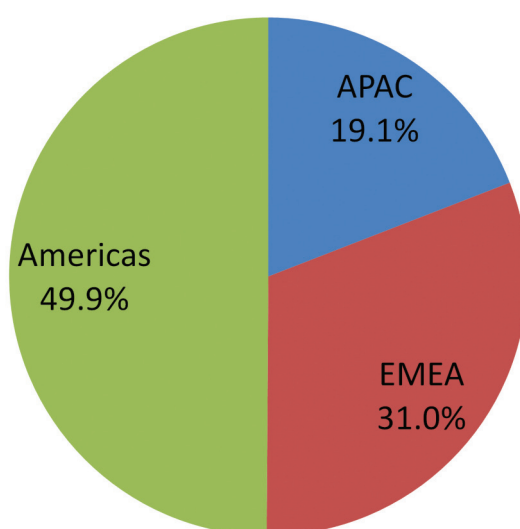
Source: Frost & Sullivan

The widespread use of video surveillance in Western economies is spreading to Asia-Pacific and Latin American regions. The developing nations in those regions are the main engines for future city surveillance growth and Frost & Sullivan predicts that the APAC region will produce higher revenues than EMEA by 2015. We also predict that the Video Surveillance market will increase its revenues from product types such as: Software, Encoders and Storage.

Legacy Video Surveillance solutions are expected to continue to witness growth in the forecast period. Although that has been the case for the past few years, we can see a significant drop in the adoption of Legacy Surveillance Solutions and this is primarily because of the introduction of IP-based Video Surveillance Solutions. What is most apparent from the Video Surveillance industry is the migration from legacy to IP. Frost & Sullivan estimates that by 2016, IP-based Video Surveillance Solutions will have 47.1 % of the global market. The adoption of IP-based technology will continue to overtake Legacy and with the spread of LTE, this solution will increase its dominance in the coming years.

Perimeter Intrusion Detection Systems (PIDS)

The overall perimeter security market is significantly gaining importance. There will be increased adoption of perimeter security since awareness of potential hazards has increased. Critical infrastructure buildings are using this technology and adoption will lead to an increase in revenue for PIDS. Although this is an overall market assessment, many urban industries and critical infrastructure sites will adopt this technology and have a significant influence on the market revenue.

There are three major types of PIDS in the market. They are listed below:

- Free Standing - Volumetric or point to point sensors. These sensors are free standing on Poles, attached to buildings, and even mounted on fences

- Fence - Mounted on a fence, wall or pipeline. They can also be deployed as a fence itself in the case of a taut-wireitself in the case of a taut-wire

- Buried - Cable sensors that are deployed just underground close to the fence.

The following are some of the major drivers of the global PIDS market:

- ncreasing man guarded costs

- Push for greater security from critical infrastructure

- Increased awareness and performance improvements

- Interoperability and compatibility

Following are some of the major restraints of the PIDS market:

- Lack of regulations impede the adoption of PIDS

- Slow technology improvement caused by outdoor environment

The global PIDS market was expected to have generated revenues of about $241.9 million in 2010, with a growth rate of about 5% over the previous year. The following chart depicts the percent revenue contribution by the three types of PIDS in 2010 in various regions.

**Figure 6 : PIDS Market: Percent of Revenues by Region (global), 2010**
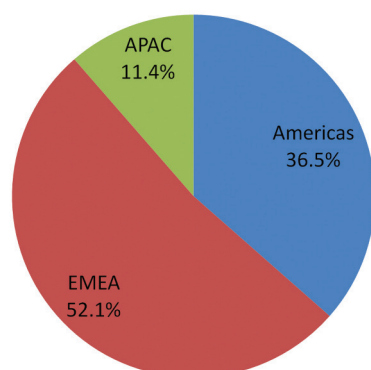
Source: Frost & Sullivan.

Biometrics

Biometrics has been a tool used in Law Enforcement agencies for decades in order to solve cases. They have gone a long way from paper finger-print checks in order to verify the person.

Currently the law enforcement agencies use the Automated Fingerprint Identification Systems (AFIS). The system is used to identify criminals and it is a substitute for manual paper identification. Portable devices are increasing in importance which allows police officers to verify people in the field in real-time. This will improve criminal apprehension as well as reduce the cost of bringing in the criminal for identification to the precinct.

The global biometrics market was expected to have contributed about **$808.2 million** in 2010.

Figure 7 : Biometrics Market: Percent of Revenues by Region (global), 2010
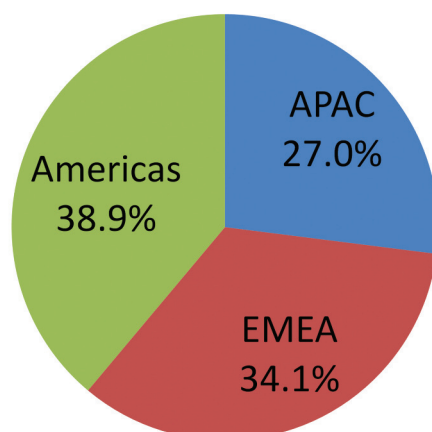
Source: Frost & Sullivan.

The total biometric market revenue will continue to rise. This is primarily influenced by the new handheld devices that will be deployed by law enforcement agencies as well as the AFIS system maintenance and upgrades.

Physical Security Information Management (PSIM)

PSIM is an integration software that enables data gathering, evaluation, confirmation, resolution and reporting of security threats by integrating the intelligence gathered from disparate systems.

Key drivers for PSIM includes migration of technologies to IP, increased awareness of benefits such as allowing First Responders to better leverage existing technology and falling prices due to increasing competition. The current perception that PSIM is expensive is the main barrier in a market segment that is experiencing significant budget reductions.

Physical Security Information Management (PSIM) market generated revenues of about $115 million in 2010, with a CAGR of about 40 percent over 2009. Whilst growth has been slower than expected to date, a string of successful projects and growing interest in the technology from customer groups will attract interest from the system integrators.

*Figure 8: PSIM Market: Percent of Revenues by Region (global), 2010*
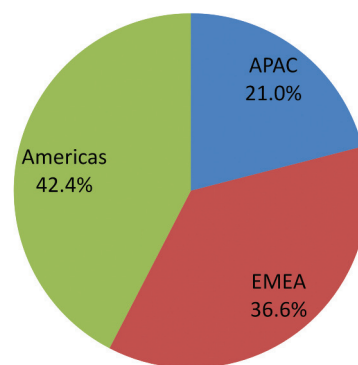
PSIM offers a complete solution awareness and management solution in order to effectively manage any form of security, business-related, or emergency situation in real time. Since traditional command centre solution providers have already started accepting PSIM concepts in order to turn security data into business intelligence, PSIM is emerging as a rapidly growing technology category promising increased year-on-year revenue.

Security- as- a-service & managed Services

Security-as-a-service (SaaS) is a fast emerging outsourcing model for security management and the technology is expected to play a significant role in the development of safer cities in the coming years. It may refer to security management provided in-house by an external organization. Numerous security vendors are planning to leverage cloud-based models to deliver security solutions. With growing interest from various security solutions providers, Frost & Sullivan expects this technology to fast catch up and witness significant growth in the coming years.

Various types of SaaS are listed in the figure below:

Figure 9: Safer Cities Market: Security as a Service
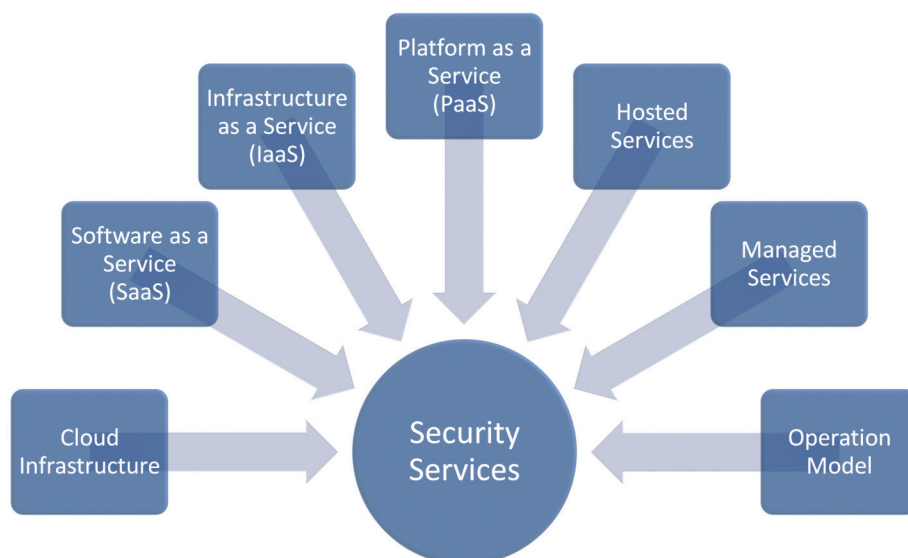
The following are some of the major drivers of the global SaaS market:

- Replacement of human resources

- Convergence of physical security

- Switch from CAPEX to OPEX

- Complexity reduction

Following are some of the major restraints of the SaaS market:

- Privacy & data concern

- Reduced control of security systems

SAFER CITIES CASE STUDIES

The following is a brief description of some of the safer city projects that have been implemented and are in progress in India, Brazil and Mexico.

India

India is expected to be an attractive market for safer city solutions with seven announced projects to be completed in the next 10 years. Initially known as the Mega City Policing Project, each individual project aims at invigorating policing capabilities to detect and counter potential threats in urban areas. The key objective is to neutralise growing threats to individuals and residences; critical infrastructure; economic centres.

The Safer City initiative will integrate new technologies with the existing security apparatus. The ultimate goal of new technologies and solution is to improve the response time and support a flexible and coherent work between different city operators. New Delhi has started the process of implementation by testing initial concepts across its local law enforcement agencies. The other 6 cities will closely watch the progress and follow up on best practices and lessons learnt.

In 2010, the country had started an ambitious project termed as "Aadhar" which is a unique identity card provided to every citizen in the country. This card would have key data pertaining to the individual user and would eventually become the sole card to identify an individual. Currently, there is no means to identify an individual because there are various cards that are provided by the government in identifying an individual (PAN card, ration card, LPG card, driver's license card etc). As a result of so many cards which differ from state to state, there is no standard template for a law enforcement officer to identify an individual. The Aadhar program hopes to provide a standardized card throughout the country in the initial phase but more importantly, will also have biometric templates of the individual on the card which the user, will eventuallyl be able to use for logical and physical access for various facilities across the country.

In order for such a project to be successful, it is essential to have the basic infrastructure in place. It is in this respect that the development of 7 mega cities (Ahmedabad, Bangalore, Chennai, Delhi, Hyderabad, Kolkata and Mumbai) is taking place. As part of the development, numerous satellite towns are being developed around each city respectively which will eventually decongest the mega cities. These satellite towns will attract future IT companies, manufacturing centres, business centres etc thereby creating the need for better infrastructure. There is already the development of the "Metro" taking place in these mega cities with the aim of reducing traffic and pollution levels. There are already city surveillance projects that are being implemented as well as various physical security solutions for companies across the satellite towns. All the satellite towns in the country are expected to be completed by 2020 by which time video surveillance systems will be completely operational along with a more modern law enforcement agency.

In line with the envisioned Safer City concept, some of the key requirements for the implementation of the project are:

- HD surveillance cameras
- GPS and GIS systems
- Surveillance cameras
- Portable X-ray machines

- Vehicle scanners

- Modern riot protection gear

Brazil (Sao Paulo)

With the requirements to enhance infrastructure and security measures in light of the 2014 world cup games, Brazil is expected to heavily invest in security measures, especially in the 12 major cities where the games will take place. There have been attempts to deploy safer city concepts across the country – especially in the Northern cities, such as Recife and Fortaleza. However, no major investment has been made to integrate security measures as a full safer city project.

City Scenario

The issue that Sao Paolo faced was increasing crime, monitoring systems that were outdated and mainly used for monitoring transportation flows. Metro Sao Paulo wanted to increase the safety of the passengers by increasing the number of surveillance cameras as well as digital video recording technology which was not employed previously. In short, the city wanted to update its surveillance technology allowing the local law enforcement agencies to ensure minimal response time. The technology that has been employed in order to increase passenger safety was an extensive network of CCTV cameras (121 fixed and 17 dome cameras) and the cameras are managed by ten DVR's a BIS video engine.

Result

The project was worth **$2.1 million**. The Subway Security Control Center employs this technology and monitors all occurrences that happen in the Subway jurisdiction. This system has allowed the control centres to communicate in a more sophisticated way. They can also react to critical situations and act in a swift manner. These are initial steps taken for the subway. All these steps are in line with the implementation of a safer city for Sao Paulo in the coming years with investments projected to reach more than ten times the initial value over the next few years.

Mexico (Mexico City)

City Scenario

With a vast amount of people living in urban areas, cities must find a way to properly assess and reduce potential harm in crisis situations. The challenge that is put forward here is interoperability of public bodies to resolve life threatening issues. The solution included data gathering from all security systems scattered around the city, whether they were new or legacy systems, this did not make a difference. The information gathered would come from systems such as CCTV, GPS tracking, image analysis, gunshot detection systems and from unmanned aircrafts patrolling the city. The system would also integrate information and correlate the information in order to properly manage real-time events. The project included the installation and integration of the following

- 8080 CCTV cameras, 80% with video analytics

- 380 Gunshot sensors

- 255 automatic number plate recognition (ANPR)

- 180 Traffic monitoring cameras on key routes

- 2 Tactical mobile command & control centers

- Unmanned Reconnaissance aircrafts

- 5 Regional C2 (command and control centers)

- 1 National C4I (command, control, communication, computers and intelligence centers)

- And a city-wide network of emergency call points and citizen terminals

Result

The total cost of the project was estimated to be **$460 million** and it was supposed to be implemented in three years after its inception. The project is funded by the government of Mexico City. This project is to be fulfilled by Telemex (a leading Latin America telecommunication company), Thales (an international leader in security systems) and the Mexico City Police Department. The result of this project will be improved resource allocation during crisis incidents. This means that the amount of responders can be managed more efficiently through analysis of previous incidents. This will allow police departments, emergency services, and fire departments to reduce/relocate their staff and this will increase the effectiveness of their departments. Another positive tool that systems integration permits is infrastructure management which allows government officials minimize the reaction time.

GLOBAL MARKET ANALYSIS FOR SAFER CITIES

The North American market has already seen some rapid progress in terms of security especially after the 9/11 attacks. Airport security is one of the most stringent in the world with the latest in video surveillance and access control systems. In the last three years, X-ray devices - which are able to take a scan of an entire individual - have been installed at some key airports in the region. Local police departments have been equipped with the latest in surveillance and communication technologies. Cities like New York and Dallas have their police forces equipped with mobile police teams wherein the officers are provided with vehicles that are able to connect with a central database for real-time information and surveillance without having to rely on their headquarters. New York city is one of the most "surveilled" cities in the world with video surveillance cameras located at almost every junction, intersection, building, public area in the city. All of these feeds can be accessed by local law enforcement agencies which are then able to take necessary action.

In line with security threats and a fragile economy, companies and governments have been working towards creating more sustainable cities that are both economical (public transportation, improved communication lines, availability of data) and also safe. In this aspect in the development of a safer city, there are numerous costs involved which range from implementation of technologies to infrastructure development to even people management. So far, the cost for just implementing a technology and integrating the same in cities like New York and Sao Paulo are in the range of 11 and 2.1 million USD at this point of time. This however, does not take into consideration the cost of infrastructure, government grants, people management, system services etc. In order to estimate the market size for safer cities today, it is necessary to understand the volume of investment which governments are looking at in order to implement a safer city. Many believe that with a current economic crisis looming over the governments of numerous economies and unemployment rates also increasing, governments at present would be looking at investing not more than 0.5 percent of their country's GDP for a safer city project.

Figure 10 : Market Size of Key Regions (2011 – 2020)

|	Region	Percentage of GDP	Market Size (Billion USD)
1	Slowdown in Economy & Budget Cuts	0.3 - 0.5	48 - 80
2	Continued Presence of Legacy systems	0.1 - 0.2	16 - 32
3	Change of Government	0.2 - 0.3	3 - 48

Notes:

1 The revenues mentioned above are inclusive of technology cost, people management cost, infrastructure cost, integration cost, etc

2 F&S has estimated the tentative percentage contribution through extensive secondary research and inputs from safer cities participants and stakeholder

3 The approximate GDP percentage was also estimated based on proposed government spending on safer cities projects, investments in various technologies, and so on

The above table lists the market size for the three main regions in the world i.e. North America, Europe and Asia for the period of 2011–2020. Many of the safer city projects which are in place currently are expected to be completed by 2020.

Globally, by 2020, Frost & Sullivan estimates the contribution of different technologies towards the development of safer cities projects to be in the range of USD 80-85 billion. Since the concept of safer cities is new and as various projects by governments across the world are in the planning stages, the actual market estimates could only be ascertained when concrete plans are laid out in the next 1-2 years.

Figure 11 : Estimated Revenue Contribution (in %) of Different Technologies (global), 2020
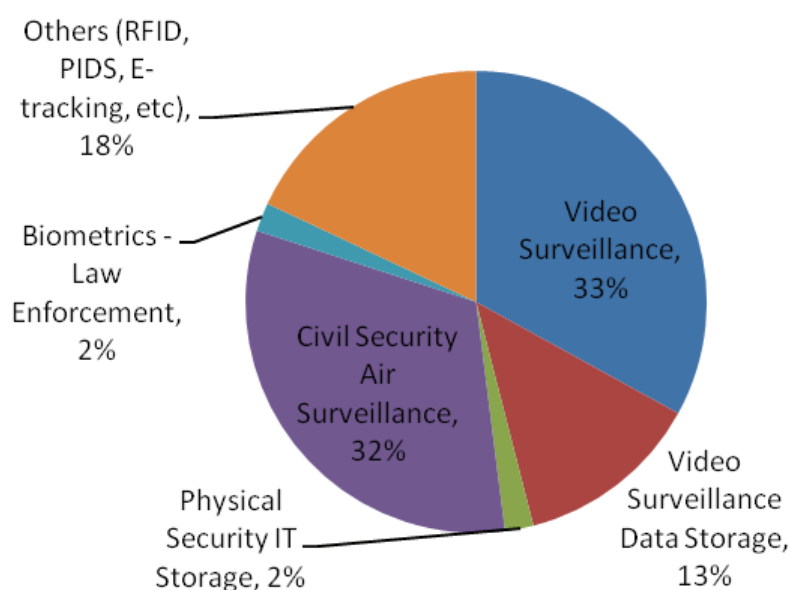
Source: Frost & Sullivan

As discussed earlier, there are numerous costs involved in the development of safer cities. Technologies such as video surveillance, biometrics, advanced database systems, etc. are expected to play a critical role in aiding the implementation of safer city projects across the world. Vast communication and increasing convergence of various technologies enable law enforcement and other government agencies related to citizen safety to gather greater quantities of data, interpret it and react effectively. Greater interoperability allows technologies and networks to be linked and advanced analytics provides departments with the data they need to make effective decisions.

**Figure 12: Estimated Revenue Contribution by Technologies (in %)
Across Major Geographies (global), 2020**
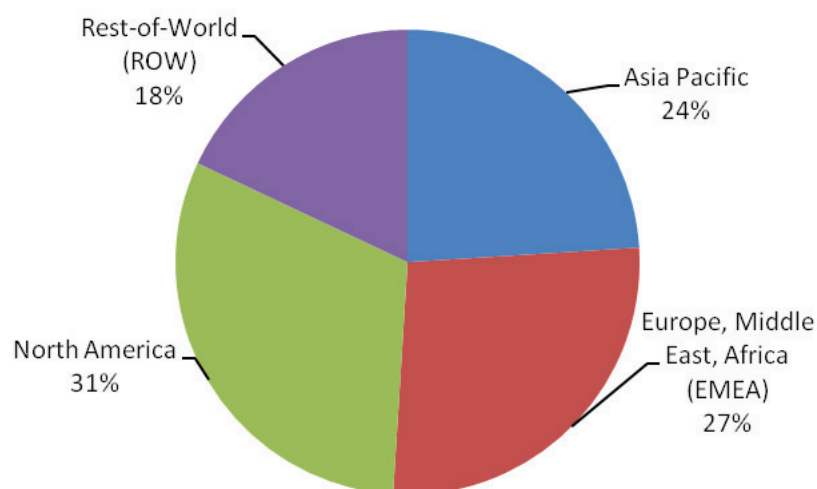
Source: Frost & Sullivan

In terms of geographical contribution, North America is expected to contribute about 31 percent of the overall investments in different technologies for safer cities projects; followed by the EMEA region with 27 percent, mainly by the Europe region; followed by Asia-Pacific region with 24 percent, and rest-of-world with 18 percent.

SAFER CITIES INDEXES

In order to identify potential hot beds for safer city projects across different geographies, Frost & Sullivan has formulated a framework encompassing a series of factors ranging from economic power, technology strategy, rate of urbanization, threat perception, and so on.

Figure 13 : Total Safer Cities Market: Key Index Factors

Security & Safety Threat examines the extent of possible terrorist attacks, natural disasters and crime. This factor is of crucial importance to distinguish the need for safer city projects.

Economic Power is one of the main criteria's that influences the safer city adoption index. It allows us to distinguish the cities with the healthiest economies and predict the future development of cities.

Urbanization Culture allows us to study the way the city is growing. This factor will have great affect on the extent of the project and the future of safer city technology procurement.

Technology Strategy is another critical aspect of the safer city adoption index since it allows us to distinguish what state the city is in regarding technological procurement.

Economic Power

Technology Strategy

Safer City Adoption Index

Threat Perception (Security & Safety)

Urbanization Culture

Source: Frost & Sullivan

Economic Power

The economic index allows us to envision the future economies of cities. The most important factor is the expected GDP in 2020. The current GDP is also a very crucial aspect in the economic index because it underlines the current city status. Short, medium and long-term growth are also an essential part of the equation and it allows us to properly assess the procurement of technology. Through the analysis of the economic index we can currently state that Tokyo and New York are two most prominent economies in the world, followed by Shanghai, Mumbai and Los Angeles. The emerging economies are considered highly prominent for the Safer City project due to high GDP growth up to 2020.

Technology Strategy

The technology adoption index allows us to assess the certainty at which a city will adopt Safer City technology. The higher the IP penetration, the more certain can we be that IP cameras and security systems will be integrated. That is why IP Penetration is the most important factor. Another factor worth mentioning is technology adoption. The higher the adoption score, the more willing the city will be to adopt new technologies. The analysis gives us another clear picture of Tokyo and New York being the main technology adopters.

Threat Perception

The threat perception index allows us to examine the need for security that each city needs. Crime is the main factor that influences the municipalities to adopt safer city programs. Terrorism threats and incidents also have a substantial influence on safer city adoption. Natural disasters also influence the adoption of safer city security devices to decrease the amount of loss during a critical situation.

Here we underline that Ankara, Delhi, Moscow, Jakarta, and so on are some of the cities which have the highest threat index.

Urbanization Culture

The urbanization index allows us to properly assess the need for security in a given city. The urbanization of the country is a crucial aspect to this index. Population size and population growth allow us to determine how this city may grow. This will influence the type of security deployed in the city. City urbanization being a driver of Safer City adoption has been analyzed on a city level and the top 5 cities are Sao Paolo, Shanghai, Riyadh, Singapore, and Buenos Aires.

Apart from these key factors, Frost & Sullivan has included other factors such as privacy index to estimate the safer city adoption index. The privacy index expresses the amount of governmental involvement in the privacy of their citizens. It allows us to envision the privacy laws that are in place and the city's attitude towards surveillance. The most important factor in this index is Video Surveillance. Constitutional protection, statutory protection and privacy enforcement are scored at the same level with their involvement being relatively important. The top 5 are Singapore, Moscow, Metro Manila, St. Petersburg, and London.

Through the above mentioned index factors, we have managed to identify the most prominent cities to adopt Safer City programs. Figure 3.5 depicts the city attractiveness for implanting safer city projects across some major cities of the world.

Figure 14 : Total Safer Cities Market: City Attractiveness (global)
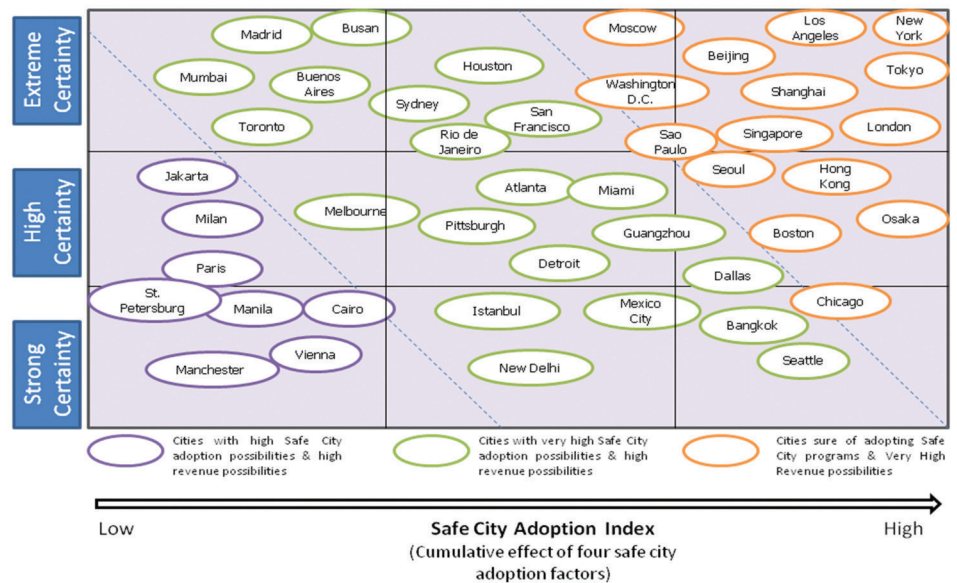
- Extremely Prominent: New York, Los Angeles and Tokyo. These three cities are mature economies and have legacy security systems in place. This means that upgrading and integrating these systems will likely be the prime focus of city officials in these city economies.

- Highly Prominent: Shanghai, Beijing, and London are cities where economies are extremely important for their countries. Shanghai and Beijing are developing economies and it is most probable that they will be adopting the newest technology on the market while in the case of London; their legacy systems will make a push for upgrades and integration of those legacy systems.

- Significantly Prominent: Osaka, Seoul, Hong-Kong and Singapore are cities that have a significant position on the global picture and are likely to adopt Safer City technologies. These are cities that have mature infrastructure but also have an elevated GDP growth rate which indicates that apart from legacy systems these cities are most likely to improve security technology by implementing new solutions.

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