



BSI Standards Publication

Smart city use case collection and analysis — Intelligent operations centre for smart cities

Part 2 : Use case analysis

National foreword

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A list of organizations represented on this committee can be obtained on request to its committee manager.

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**Smart city use case collection and analysis – Intelligent operations centre for smart cities –
Part 2 : Use case analysis**



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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions and abbreviated terms	7
3.1 Terms and definitions	7
3.2 Abbreviated terms	8
4 Approach for use case collection and analysis.....	8
5 Use case analysis in different application areas	10
5.1 General.....	10
5.2 Government affairs service.....	10
5.2.1 Use cases description	10
5.2.2 Stakeholder and user stories analysis.....	11
5.2.3 Technique and standards requirement analysis.....	12
5.2.4 Related documents	12
5.3 Public service	13
5.3.1 Use cases description	13
5.3.2 Stakeholder and user stories analysis.....	13
5.3.3 Technique and standards requirement analysis.....	15
5.3.4 Related documents	16
5.4 Living environment	16
5.4.1 Use cases description	16
5.4.2 Stakeholder and user stories analysis.....	17
5.4.3 Technique and standards requirement analysis.....	19
5.4.4 Related documents	19
5.5 Industrial economy	20
5.5.1 Use cases description	20
5.5.2 Stakeholder and user stories analysis.....	20
5.5.3 Technique and standards requirement analysis.....	22
5.5.4 Related documents	22
5.6 Urban governance.....	23
5.6.1 Use cases description	23
5.6.2 Stakeholder and user stories analysis.....	23
5.6.3 Technique and standards requirement analysis.....	24
5.6.4 Related documents	25
5.7 Public safety	25
5.7.1 Use cases description	25
5.7.2 Stakeholder and user stories analysis.....	26
5.7.3 Technique and standards requirement analysis.....	28
5.7.4 Related documents	29
5.8 Urban transportation	29
5.8.1 Use cases description	29
5.8.2 Stakeholder and user stories analysis.....	30
5.8.3 Technique and standards requirement analysis.....	33
5.8.4 Related documents	34
6 High-level use case analysis and results	35

6.1	General.....	35
6.2	Government affairs service.....	35
6.2.1	Relational mapping	35
6.2.2	Need statement analysis	35
6.3	Public service	36
6.3.1	Relational mapping	36
6.3.2	Need statement analysis	36
6.3.3	Precondition requirement analysis	37
6.4	Living environment.....	37
6.4.1	Relational mapping	37
6.4.2	Need statement analysis	37
6.4.3	Precondition requirement analysis	37
6.5	Industrial economy.....	38
6.5.1	Relational mapping	38
6.5.2	Need statement analysis	38
6.5.3	Precondition requirement analysis	39
6.6	Urban governance.....	39
6.6.1	Relational mapping	39
6.6.2	Need statement analysis	39
6.6.3	Precondition requirement analysis	40
6.7	Public safety	40
6.7.1	Relational mapping	40
6.7.2	Need statement analysis	40
6.7.3	Precondition requirement analysis	40
6.8	Urban transportation	40
6.8.1	Relational mapping	40
6.8.2	Need statement analysis	41
6.8.3	Precondition requirement analysis	41
7	System analysis and results.....	42
7.1	General picture of IOC use cases, stakeholders and non-human actors.....	42
7.2	Technical and realization analysis	43
7.3	Use case analysis and results	45
7.4	Needs statement, requirement and stakeholder integrated analysis results.....	46
7.4.1	Word frequency analysis of needs statements	46
7.4.2	Word frequency analysis of requirements for the standards.....	46
7.4.3	Stakeholder analysis.....	46
7.4.4	Integrated analysis and standard needs.....	47
	Bibliography	48
	Figure 1 – Approach for use case collection and analysis	9
	Figure 2 – Approach detail for use case collection and analysis	10
	Figure 3 – Government affairs service's relational mapping.....	35
	Figure 4 – Public service's relational mapping	36
	Figure 5 – Living environment's relational mapping.....	37
	Figure 6 – Industrial economy's relational mapping.....	38
	Figure 7 – Urban governance's relational mapping.....	39
	Figure 8 – Public safety's relational mapping	40

Figure 9 – Urban transportation's relational mapping	41
Figure 10 – General picture of IOC use cases, stakeholders and non-human actors	43
Figure 11 – IOC technical architecture level of four layers	44
Figure 12 – IOC system realization.....	44
Table 1 – List of stakeholders and description in smart market supervision	11
Table 2 – List of stakeholders and description in on-line government service	12
Table 3 – List of stakeholders and description in public health emergency management.....	13
Table 4 – List of stakeholders and description in assisted independent living management.....	14
Table 5 – List of stakeholders and description in cold-chain management	15
Table 6 – List of stakeholders and description in electricity conservation.....	17
Table 7 – List of stakeholders and description in medical waste monitoring	18
Table 8 – List of stakeholders and description in smart water.....	18
Table 9 – List of stakeholders and description in smart campus	20
Table 10 – List of stakeholders and description in urban business environment.....	21
Table 11 – List of stakeholders and description in Urban economic operation monitoring	21
Table 12 – List of stakeholders and description in urban investment management.....	22
Table 13 – List of stakeholders and description in urban management	23
Table 14 – List of stakeholders and description in intelligent pipeline network	24
Table 15 – List of stakeholders and description in CIM	24
Table 16 – List of stakeholders and description in emergency response	26
Table 17 – List of stakeholders and description in safety network.....	27
Table 18 – List of stakeholders and description in natural disaster management	27
Table 19 – List of stakeholders and description in fire management	28
Table 20 – List of stakeholders and description in barrier-free transportation.....	30
Table 21 – List of stakeholders and description in smart parking	31
Table 22 – List of stakeholders and description in smart crosswalk	32
Table 23 – List of stakeholders and description in intelligent rail transit.....	32
Table 24 – List of stakeholders of intelligent rail transit.....	33
Table 25 – Needs of standards by different group of stakeholders.....	46
Table 26 – IOC standard need list	47

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**Smart city use case collection and analysis -
Intelligent operations centre for smart cities -
Part 2: Use case analysis**

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The text of this Systems Reference Deliverable is based on the following documents:

Draft	Report on voting
SyCSmartCities/383/DTS	SyCSmartCities/393/RVDTs

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC SRD 63302 series, published under the general title *Smart city use case collection and analysis – Intelligent operations centre for smart cities*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

Digital solutions are accelerating the integration of real-world applications in urban areas, including city governance, healthcare, environment, traffic, education, security and so on. However, many smart solutions are still implemented within single-domains, providing isolated city services. The data flows and data across the various services can be suitably integrated to provide sharing and re-usability. To be effective, the coordination of data and service requires an overarching framework coupled with an intelligent operations centre (IOC).

An IOC is tailored to provide urban managers, enterprises and citizens with access to operational and organized solutions. Based on city-level database and new technologies, such as big data, AI, cloud computing, blockchain etc., the IOC processes city information and provides innovative services for urban managers, operators and other stakeholders. Compared with single-domain systems, the IOC can better support monitoring and visualizing, decision making and cross-domain cooperation. The IOC will play an important role in integrating city services such as police, health services traffic management and rescue services, including but not limited to the following methods.

- a) The centralized operations dashboard and mobile application will allow real-time monitoring and information processing to improve response to emergencies.
- b) The centralized and intelligent platform will enable noticeable improvements in the management of public safety, like crime prevention, emergency response, threat prevention and response, and traffic management.
- c) The IOCs technologically advanced analysis, integrated communications, GPS and video surveillance capabilities will help residents and domain (energy, water, horticulture, waste and security) supervisors to collaborate in a smarter way.
- d) The integrated data visualization, near real-time collaboration and deep analytics it provides will help agencies prepare for problems, coordinate and manage response efforts and enhance the efficiency of services.
- e) IOC will enable residents to report issues such as broken street lights, electricity failure, water wastage, etc. and check resolution status using their mobile devices.
- f) IOC will include cyber security, privacy, artificial intelligence trustworthiness and digital ethics safeguards to protect infrastructure, places and citizens.

Currently, IOC solutions are being implemented in different cities around the world, and the stakeholders of these smart cities face similar challenges, including cross-domain cooperation, monitoring and visualizing, intelligent analysis, user-oriented experience, etc. The provision of standardization is considered as one of key factors to support IOC development, including the development of the conceptual model, data exchange, IT infrastructures, services, and so on.

1 Scope

This part of IEC SRD 63302 deals with the intelligent operations centre for smart city from the perspective of market relationship based on the analysis of IEC SRD 63302-1. This document establishes a framework between existing standards and stakeholder requirements, aimed at scoping out standard requirements and further standardization work. This document is a contribution to the IEC use case management repository, which aims to collect, administer, maintain, and analyse use cases.

2 Normative references

There are no normative references in this document.

3 Terms and definitions and abbreviated terms

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1 Terms and definitions

3.1.1

stakeholder

individual, group or organization that has an interest in an organization or activity

Note 1 to entry: Usually a stakeholder can affect or is affected by the organization or the activity.

[SOURCE: IEC 60050-741:2020, 741-01-30]

3.1.2

building information modelling

use of a shared digital representation of a built object (including buildings, bridges, roads, process plants, etc.) to facilitate design, construction and operation processes to form a reliable basis for decisions

Note 1 to entry: The acronym BIM also stands for the shared digital representation of the physical and functional characteristics of any construction works.

[SOURCE: ISO 29481-1:2016, 3.2]

3.1.3

Internet of Things

IoT

infrastructure of interconnected entities, people, systems and information resources together with services which processes and reacts to information from the physical world and virtual world

[SOURCE: ISO/IEC 20924:2024, 3.2.8]

3.1.4**big data**

extensive datasets – primarily in the data characteristics of volume, variety, velocity, and/or variability – that require a scalable technology for efficient storage, manipulation, management, and analysis

Note 1 to entry: Big data is commonly used in many different ways, for example as the name of the scalable technology used to handle big data extensive datasets.

[SOURCE: ISO/IEC 20546:2019, 3.1.2]

3.1.5**cloud computing**

paradigm for enabling network access to a scalable and elastic pool of shareable physical or virtual resources with self-service provisioning and administration on-demand

Note 1 to entry: Examples of resources include servers, operating systems, networks, software, applications, and storage equipment.

[SOURCE: ISO/IEC 17788:2014, 3.2.5]

3.1.6**artificial intelligence**

branch of computer science devoted to developing data processing systems that perform functions normally associated with human intelligence, such as reasoning, learning and self-improvement

[SOURCE: ISO/IEC/IEEE 24765:2017, 3.234]

3.1.7**intelligent operations centre****IOC**

facility that gathers and analyses data from many city systems to provide a unified view of all city agencies to enable the city to predict events and respond quickly and appropriately

Note 1 to entry: The IOC is also referred to as "command control centre", "integrated control centre", "city brain" or "city operation hub". No matter what name is used, these all share very similar functions, bringing together information from around the city into a common hub, translating this into insights regarding city operations and guiding city management to be more efficient.

3.2 Abbreviated terms

3D	three dimension
CDC	centre for disease control and prevention
CIM	city information modelling
DRT	demand responsive transport
IOC	intelligent operations centre
IoT	Internet of Things
PC	personal computer
SOE	state-owned enterprise

4 Approach for use case collection and analysis

This document adopts a top-down approach to generate and collect the use case of intelligent operation centre, as showed in Figure 1.

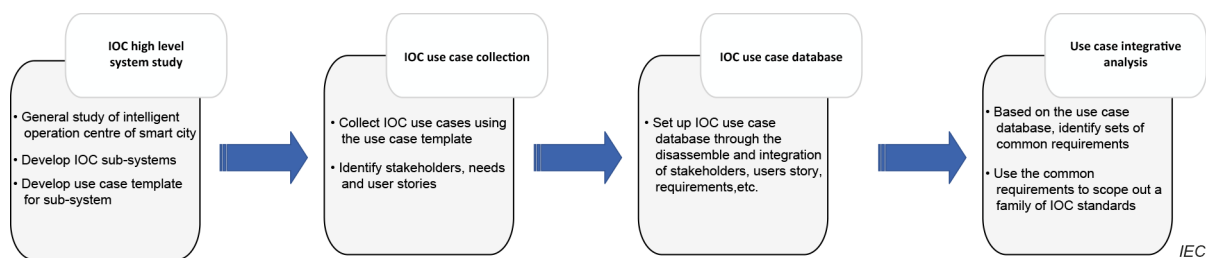


Figure 1 – Approach for use case collection and analysis

Firstly, a thorough study of intelligent operation centre is necessary at the beginning of use case collection and analysis. The purposes of the work of IOC high level system study include identify sub-systems, identifying basic stakeholder needs, and develop IOC use case template for sub-system based on the IEC TR 62559-1 and IEC 62559-2.

Secondly, generate and collect a list of user databases about intelligent operation centre including databases for use cases, human actors and their user stories, non-human actors and their technique requirements (both functional and non-functional requirement). We develop a list of significant user stories based on the collected use case, as well as a list of technique requirement based on the aspect of non-human actors. In each corresponding area, user stories and technique requirements are generated for each specific actors following a consistent template.

Thirdly, conduct an interactive analysis based on the illustration of the relationship among 5 aspects in the use case analysis database, through which the preconditions and need statements are generated. We further build up the high-level use case analysis database according to those previous results, preparing for the integrated analysis that serves the formation of requirements for standard.

Lastly, conduct an integrative analysis based on the high-level use case database, and identify the standard gaps for intelligent operation centre and requirements for a family of intelligent operation centre standards.

This document focuses on the third and fourth steps of the work approach.

As a complement to Figure 1, the chart shown in Figure 2 illustrates the research route and the links between the different clauses of this document in more detail.

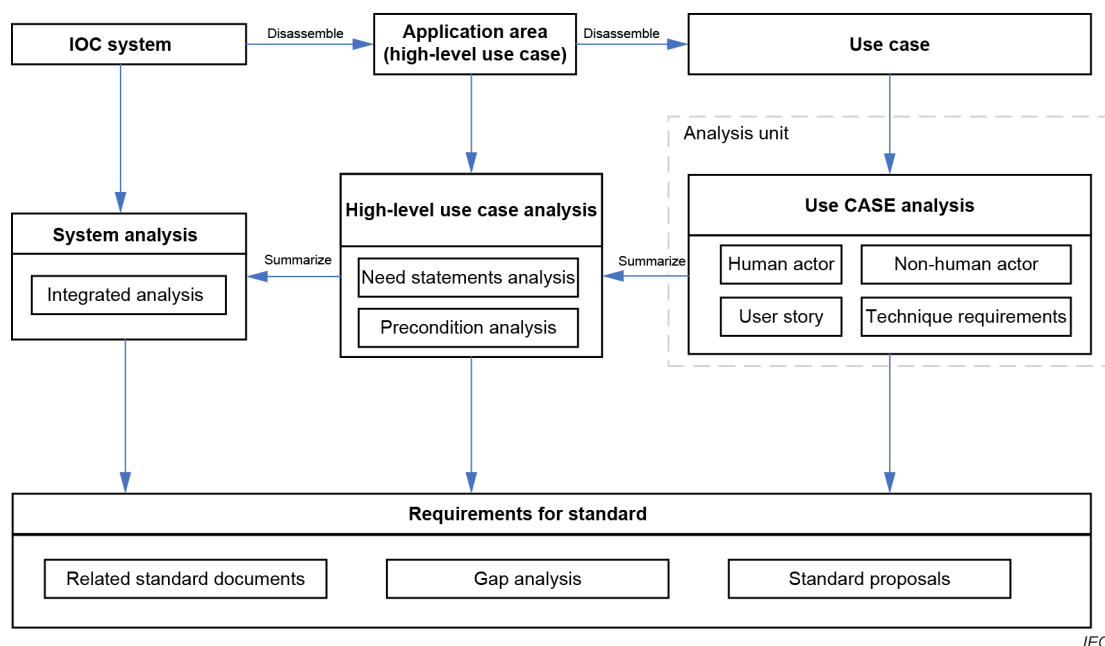


Figure 2 – Approach detail for use case collection and analysis

5 Use case analysis in different application areas

5.1 General

Aimed at systems integration and services collaborating in urban management, the IOC of smart city fully utilizes perception technology, information technology, and communication technology to process and analyse data collected from different devices and systems, and to provide a visual simulation and management platform for urban managers. Based on this platform, urban managers can get real-time city status, conduct necessary analysis and prediction, and obtain scientific basis for decision-making in public services, social management, industrial development, and other aspects of the city.

This document summarizes the description, objectives, results, and use cases of IOC application scenarios, and describes the key role of the IOC from user perspective. This document mainly introduces application scenarios in the following 8 fields: government affairs service, public service, living environment, industrial economy, urban governance, public safety, and urban transportation, then analyze their requirements for technology and standards, and provide related documents.

5.2 Government affairs service

5.2.1 Use cases description

5.2.1.1 Market activity management and regulation

For the smart market supervision use case, an IOC integrates the information that impacts on market activity by providing access to information to ensure for the efficient production, distribution, consumption and disposal of resources such as traded goods, agriculture and retail supply chains, enforcement of standards on goods and services, property development, operation and management. This enables multiple markets and regulators to operate efficiently and effectively together.

5.2.1.2 Government services

For on-line government services use case, the integrated online platform facilitates access to private government data and public data resources to strengthen business collaboration, to more efficiently deliver high quality government services in a needs-based targeted way via an intuitive Web portal or mobile application supporting single or same sign on for easier trusted secure access.

5.2.2 Stakeholder and user stories analysis

Stakeholders in smart market supervision mainly include mayor and supervision official, informatization management personnel for market supervision, business management personnel for market supervision and supervision and law enforcement officer. See Table 1.

Table 1 – List of stakeholders and description in smart market supervision

No.	Identifier	Area of city life	Name of stakeholder or actor	Description	Role in city
1	IOC-MS-01	Market supervision	Deputy mayor or market supervision	Deputy mayor in charge of market supervision.	Take charge of the overall work of market supervision. Make major decisions based on information collected.
2	IOC-MS-02	Market supervision	Director of Market supervision bureau	Senior officer who carries out deployment, follow-up and analysis of daily management tasks, conducts command and dispatch for major events and activities in market supervision area.	Take charge of the overall work of the Market supervision bureau.
3	IOC-MS-03	Market supervision	IT management personnel for Market supervision bureau	Front-line officer who is responsible for system construction and maintenance in market supervision area.	Developer of market supervision system, responsible for organizing technology developers to provide services.
4	IOC-MS-04	Market supervision	Business management personnel for market supervision	Senior officer who deploys, follows up, analyses and relays the daily management tasks of market supervision.	Responsible for monitoring the risk in market supervision area.
5	IOC-MS-05	Market supervision	Law enforcement officer for market supervision	Front-line officer who executes the task from senior officer.	Executor of related tasks of the Market supervision bureau including overall supervision, inspection, and law enforcement.

Stakeholders in on-line government services mainly include business handling department, public data management department and individuals and enterprise. See Table 2.

Table 2 – List of stakeholders and description in on-line government service

No.	Identifier	Area of city life	Name of stakeholder or actor	Description	Role in city
1	IOC-OG-01	On-line government service	Business handling department	Officer who handles business to provide services to individuals and enterprises.	Officer responsible for enhancing general efficiency for department operation.
2	IOC-OG-02	On-line government service	Public data management department	Person who designs and builds online platform.	Make sure the platform is functionally useful.
3	IOC-OG-03	On-line government service	Individual and enterprise	Person who applies for government services.	Beneficiary.

5.2.3 Technique and standards requirement analysis

5.2.3.1 Market activity management and regulation

IOCs can assist in city operations and management and also at a micro level in regulating business activity. For example, an IOC can manage complex supply chain quality controls for trade and commerce aligned to investment and finance. It can manage the supply chains of advanced manufacturing, agricultural or drug production to consumer production, distribution, consumption and disposal, the handling and reported use of intellectual property rights and the use of specialist equipment.

5.2.3.2 Government services

IOCs would need to establish standards for compliance and comparative analysis and would rely on ICT with suitable security and privacy controls (video, sensor, cloud services, blockchain, AI/ML data analytics and automated controls) to regulate and not disrupt the competitiveness of industries or communities and citizens reliant on them.

There can be exceptions: the IOC cannot manage openly such as sensitive activities that are deemed secretive where additional access controls and encryption apply. Governance oversight and accountability is critically important for all IOCs, especially those operating in sensitive and or secretive activities.

5.2.4 Related documents

Six related documents have been released internationally:

- ISO 18091;
- ISO/IEC 24039:2022;
- ISO/IEC 30182:2017;
- ISO 37106;
- ISO 37120;
- ISO 30146.

5.3 Public service

5.3.1 Use cases description

5.3.1.1 Public health emergency management

A public health emergency command and decision-making system can be built that integrates intelligent multi-point and multi-channel monitoring, early warning, intervention, disposal, evaluation, prediction and decision-making, and command and dispatch, to display information intuitively with alert detection and notification and options to drill down to more detail, compare data and predict outcomes in various formats including 2D and 3D formats to monitor incidents, such as a medical emergency, epidemic, intense weather event, accident or terrorist situation, to support a coordinated response with communications to the grassroots level.

5.3.1.2 Assisted independent living management

Independent living can help citizens live for longer in their own homes, reducing demand on GP's, hospitals and care homes. The inactivity of elderly people over a defined period of time can be detected by utilizing IoT sensors that can detect motion and humidity level.

5.3.1.3 Cold chain management

Cold-chain management uses IOC scheme to grasp the real-time status of imported frozen goods and logistics information, know about the panorama of cold storage, provide contents about monitoring of frozen products warehouse in-out, traceability inquiry and early warning to respond to the epidemic risk.

5.3.2 Stakeholder and user stories analysis

Stakeholders in public health emergency management mainly include CDC, health administrative departments and medical institutions. See Table 3.

Table 3 – List of stakeholders and description in public health emergency management

No.	Identifier	Area of city life	Name of stakeholder or actor	Description	Role in city
1	IOC-HWM-01	Public health emergency management	Director of emergency command centre	People who ensure the epidemic situation is controllable.	Make decisions and give commands on epidemic prevention and control.
2	IOC-HWM-02	Public health emergency management	Director of emergency office of the health commission	People who ensure proper emergency response.	Issue emergency disposal instructions, command and dispatch.
3	IOC-HWM-03	Public health emergency management	Director of information centre of the health commission	People who command and dispatch information, and provide the information system support required by the emergency office.	Undertake the planning and construction of public health emergency decision making and command system.
4	IOC-HWM-04	Public health emergency management	Director of CDC	People who provide coping strategies to minimize the impact on public health.	Study and verify the public health emergencies, and share research results with the public to guide the public coping methods.

Stakeholders in assisted independent living management mainly include citizens, device companies, city officials and emergency and police department. See Table 4.

Table 4 – List of stakeholders and description in assisted independent living management

No.	Identifier	Area of city life	Name of stakeholder or actor	Description	Role in city
1	IOC-MSD-01	Smart motion sensing device	Citizens	They can request the social welfare service.	They provide data through the device. Once the motion-sensing device is installed, if any inactivity is detected for a certain period of time (over eight hours), an alert is sent to IOC.
2	IOC-MSD-02	Smart motion sensing device	Device companies	They create and provide the device for the users.	Provide IoT sensor devices that can detect movements to IOC.
3	IOC-MSD-03	Smart motion sensing device	City officials	Provide social welfare service to citizens living alone.	Provides social welfare service to the elderly who are living alone – taking care of their health and making sure that the environment of the households is kept adequate.
4	IOC-MSD-04	Smart motion sensing device	Emergency and police department	An officer at the emergency or police department is responsible for the emergency alerts they get from the IOC.	React to emergency situations.

Stakeholders in cold-chain management mainly include mayor, market supervision official, supervised warehouse administrator, food distributor, business owners in the market, logistics operator and citizen. See Table 5.