Station security for station business

HANDBOOK ON EFFECTIVE SOLUTIONS

INTERNATIONAL UNION OF RAILWAYS

STATION SECURITY FOR STATION BUSINESS: HANDBOOK ON EFFECTIVE SOLUTIONS
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CONTENTS

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- RZD - JSC Russian Railways (Russia)
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INFRASTRUCTURE ECONOMICS CENTRE

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INTRODUCTION

All railway trips start and end at railway stations. Stations are, thus, main concentration points of passengers and, besides, centers of attraction for citizens. This fact makes stations both attractive for the development of businesses and vulnerable from the security point of view.

Since 2013, there is a sharp increase in the number of terrorist attacks against the railway system. South Asia is the region that registers the highest number of terrorist attacks against railways (42%), with railways of India and Pakistan being the most affected by terrorism, Russia standing third on this rank. Attacks against railway lines account for 43% of the total rail incidents, followed by passenger trains with 25%, railway stations with 14%[1].

Still station security is not only about dealing with terrorism. Station security managers have to deal with vandalism, fraud, pickpocketing and many other issues.

On the other hand, station managers should do their best to organize passenger flows, to raise the commercial efficiency, to make stations poles of culture and social activities.

What is a higher priority, security or attraction for clients? Do security measures have real impact on the perception of stations by clients? Is this impact mainly negative or positive and are there any ways to change it?

The idea of this handbook is to give an overview of security measures and specific tools used for different situations in their relation to station management and especially to station business.

Chapter 1 of this handbook is dedicated to the description of station security tools and measures and proposals on station typology by security tools.

Chapter 2 presents analysis of the impact of specific tools on certain aspects of station management and station business.

Chapter 3 gives ideas and recommendations on strategies for different types of stations described in part 1.

This handbook can be used by security and station managers as a guide for best solutions and a description of measures and their impact on a stage of planning or redesign of security activities.

1. Abstract cited by: http://www.think-railways.com/massive-challenge-securing-railways-terrorism/. Original source: The changing face of terrorism. Responses to an evolving dynamic, AON Risk Solutions, White Paper 2015

CHAPTER 1
OVERVIEW OF STATION SECURITY MEASURES

Station security measures are special arrangements used to assure security of customers, staff and equipment of railways stations.

Station security measures may suppose use of one or several security tools. In some cases, one tool can already serve as a measure. In some cases, measures, such as institutional ones, cannot be split just into the combination of tools.

This chapter presents expert descriptions of measures, but for further formalized analysis of their impact some measures will be split into tools to assure more precision.

All measures are divided into 4 groups:

1) **Technical** measures: special technical tools or their combination and special equipment.
2) **Institutional, organizational and procedural** measures: relations between different security bodies and authorities, planning of security assurance and station security organization. These measures normally cannot be split into the combination of tools.
3) **Human factor** measures: arrangements referring to the role of staff as well as to the involvement of customers into assurance of their own security.
4) Measures referring to **design, construction and ambience**: actions taken at design or construction phases referring to the use of special materials or their placements, as well as establishment of special physical conditions at stations which can modify behavior of clients.

Descriptions of all measures “as is”, in a non-formalized way, are non-exhaustive. They are based on the experience of security experts of UIC Security platform and relative groups within this platform and are subject to local specifications. The achievement and the effect of the respective security measures also depends on particular country-specific circumstances (e.g. state regulations, applicable laws, environment, security culture). Especially the legal situation varies widely from country to country. Also, the mix and the implementation of security measures differs between the railway companies and depends on the results of the risk assessment, which systematically analysis potential threats to a specific target for different assets.

Benefits and limits are presented only for general reference. For more information list of related studies and companies with important experience in these measures are included into descriptions.

Measures are presented without any reference to their importance.

MEASURES DESCRIPTION

1. Technical measures

This chapter provides an overview of selected current or pilot-related technical measures. The exception is the security dog, which is also described in this chapter.

T1: Access control gates

Description:	▪ Installation of gates for a better control of access and passenger flow management. ▪ Gates may be installed at entrance to the station or inside, separating commercial part and platforms. ▪ Controls at gates assured by trained staff or in an automated way (automatic ticket control). ▪ Different types exist (e. g. (full) height turnstile, triple security barriers (tripods), two/single wing security barriers). ▪ May be combined with audio or visual mechanisms (e. g. enter/exit lights) to show directions to managing passengers flow.		
Purpose:	☒ Prevention ☐ Detection ☒ Response ☐ Recovery		
Benefits:	▪ Prevent access of persons who are not intended to travel and may commit illegal activities against travelers and railway staff. ▪ Efficient management of passenger flows especially in emergency situations or in mass situation / event.		
Limits:	▪ May create queues. ▪ Divide the station into different areas and create barriers. ▪ Can be overpassed if not surveilled.		
Practices & Samples: (non-exhaustive enumeration):	▪ CR ▪ FSI	▪ NS NL ▪ RZD	▪ SNCF ▪ SNCB
Combination with other measures:	▪ CCTV	▪ Security dog	▪ Security staff
Related tools for further analysis within this study:	-		
Studies / Projects:	▪ Project SECURESTATION (2011-2014) - http://www.securestation.eu/		

Picture sources: FSI

T2: Body Cameras

Description:	 ▪ Body cameras are a part of surveillance system that allow recording, storage and (optionally) transmitting video (images) and audio data. ▪ They are small, pager-sized and visible, clipped on to the staff uniform or sunglasses or are worn as aheadset. ▪ Usually they are in stand-by mode and only in use when a situation starts to escalate. It gives also the opportunity for the operational center or a third part to have a live connection to the situation and coordinate additional activities. ▪ For more effectiveness, it would be recommended to use a body camera type, where customer can directly see the video recording (reflection of behaviour).
Purpose:	☒ Prevention ☐ Detection ☒ Response ☒ Recovery
Benefits:	▪ De-escalation effect: in different test situations, the presence of bodycam and the announcement of use could prevent conflict from the very beginning (self-protection & deterrent effect). ▪ The knowledge that the staff behaviour could be monitored can assure correct staff performance. ▪ In case of a live stream during an emergency, the employees feel better supported. ▪ In case of a conflict between staff member and a customer, video (and audio) data can be used to clarify facts and as an evidence (transparency and accountability). ▪ High acceptance by police units.

Limits:	▪ Body camera may not always be effective to record a situation since the camera may not always be properly positioned. ▪ Rule of law (passenger information, storage, access, encryption of data). ▪ Administrative activities (voluminous of data) and costs (data network to transfer (bandwidth), cost of a body camera itself, replacement regarding lifecycle). ▪ Not working as a standalone measure.
Practices & Samples: (non-exhaustive enumeration):	▪ DB AG (images without audio, body camera with screen - Testing in 2016/2017) ▪ NS NL (images & audio, implementation approx. end 2017)
Combination with other measures:	▪ Advanced applications such as facial recognition ▪ CCTV ▪ Information process and communication measures ▪ Personal staff equipment to reduce attacks
Related tools for further analysis within this study:	▪ Body cameras with direct video streaming / translation ▪ Video recorders without direct translation
Studies / Projects:	▪ UITP (2017): PTSpotlight - Body Cam use by PT personnel ▪ Project PROTECTRAIL (2010 - 2014) - http://protectrail.eu/

Picture source: NS NL

T3. CCTV

Description:	 ▪ Closed-circuit television cameras (CCTVs) is an electronic system of cameras, control equipment, recorders, monitors/screens and related apparatus used for surveillance or alarm assessment. ▪ CCTV is often specifically targeted at key areas (areas in front of station entrances, external open areas (e. g. car park), halls and waiting rooms, underpasses, platforms). ▪ Cameras can either be analogue or network/IP. For the direct intervention network/IP ones are recommended. ▪ Video footage can either be recorded, viewed in real-time, or both. Real-time usage of video footage is generally used in static locations (stations, depots). Real-time usage of video surveillance allows live streaming (monitoring) or using live video as a tool during an incident. Additionally, video analytics can be added to support the detection of an incident.
Purpose:	▪ ☒ Prevention ☒ Detection ☒ Response ☒ Recovery ▪ Video surveillance is firmly a cross-functional tool, also used for safety and operational purposes.
Benefits:	▪ Improved perception of security for passengers, staff, and public. ▪ Can detect suspicious activities of many kinds. ▪ Real-time monitoring of areas and events exposed to risks. ▪ Reduces response time. ▪ Has a forensic value that may translate into deterrence. ▪ Does not require presence of specially trained staff at stations, all monitoring may be unified in one place. ▪ Continuous surveillance of public places is generally considered acceptable. ▪ New approach with authorities (e. g. sharing information).

Limits:	▪ Not effective against affective offenses like under drugs or alcohol (not scarring off). ▪ Not working as a standalone measure. ▪ Rule of law (passenger information, storage, access). ▪ High costs (data network, equipment, replacement, vandalism or anti-vandal extra-costs).
Practices & Samples: (non-exhaustive enumeration):	▪ Video surveillance is one of the most widespread technologies used for security in public transport in almost every country. ▪ Network rail – design of cameras as architectural elements of stations. ▪ NS - NL – prevention & evaluation.
Combination with other measures:	▪ Security operations centre ▪ Video analytics
Related tools for further analysis within this study:	▪ CCTV ▪ CCTV with videoanalytics
Studies / Projects:	▪ Project COUNTERACT (2006 - 2009) - http://www.uitp.org/content/counteract-0 ▪ Project PROTECTRAIL (2010 - 2014) - http://protectrail.eu/ ▪ Project SECURESTATION (2011 -2014) - http://www.securestation.eu/ ▪ UIC (2013): Leaflet New Technology – Protection measures for railway assets - http://uic.org/IMG/pdf/security_leaflet-newtec2013-2.pdf ▪ UITP (2015): Video Surveillance in Public Transport - http://www.uitp.org/video-surveillance-public-transport ▪ ERNCIP thematic groups: https://erncip-project.jrc.ec.europa.eu/networks/tgs

Picture source: http://www.innerrange.com/pd/Integriti-System/Professional-Software-Suite/CCTV-Integration

T4. Drones and nano-drones

Description:	▪ Detection of prohibited items, malfunction or illegal access. ▪ Drones are launched and guided by special staff at station facilities (platforms, tracks), avoiding crowded areas. ▪ Maybe equipped with video recorder or streaming video. 
Purpose:	☒ Prevention ☒ Detection ☒ Response ☒ Recovery
Benefits:	▪ Allows overlook of hard-to-reach areas to prevent unauthorised access or leave of dangerous items. ▪ Can be used to view suspicious items located in hard-to-reach areas. ▪ Nano-drones are smaller and can be used in public areas (platforms).
Limits:	▪ Costs ▪ Normally not used within passenger buildings
Practices & Samples: (non-exhaustive enumeration):	▪ BNSF Railway (USA) ▪ DB AG ▪ IR ▪ Network Rail ▪ SNCF (current in testing situation)
Combination with other measures:	▪ CCTV ▪ Security operations centre ▪ Security concept ▪ Video analytics
Related tools for further analysis within this study:	▪ Drones and nano-drones
Studies / Projects:	▪ Project PROTECTRAIL (2010 - 2014) - http://protectrail.eu/

Picture source: DB Sicherheit GmbH

T5. Passenger & baggage screening

Description:	 ▪ Passenger and baggage screening using scanning (X-Ray) technologies to detect objects such as explosives and weapons. ▪ Screening can be applied on a sample, random or intermittent basis. ▪ Screening carried out by ○ Metal detection gates or hand-held devices ○ X-ray scanner to check luggage ○ Body Scanner ○ Human Surveillance
Purpose:	☒ Prevention ☒ Detection ☐ Response ☐ Recovery
Benefits:	▪ May improve perception of security for passengers, staff, and public. ▪ Detects explosive objects as well as weapons. ▪ Improves travel security thanks to the detection of forbidden items onboard.
Limits:	▪ Staff & space: Baggage screening equipment typically requires a large area and special staff both to assist passengers and to monitor images, as well as effective arrangements for responding to a positive detection. Equipment may include fixed metal-detecting arches or hand-held devices, but even manual searches require adequate space and staff. ▪ Implication and feasibility: It is not clear how baggage screening could be applied for rural services as well as for suburban and regional services. ▪ Customer: This measure is generally not accepted by the railway customers like the screenings at the airport. ▪ Costs: The level of costs for staff training and hiring is very high ▪ Mistake quote: ○ Objects with low density, e. g. liquids, powder, thin plastic cannot be recognized ○ It is not always possible to see items inside persons‘ bodies like in mouth, etc. ▪ Formation of crowds, which may create a potential terrorist target and favorable conditions for pickpockets. ▪ A more irregular flow in railway transports.

Practices & Samples: (non-exhaustive enumeration):	▪ RZD (all large stations) ▪ CR ▪ SNCB ▪ SNCF ▪ Adif
Combination with other measures:	▪ Access Control ▪ Video Cameras ▪ Video Analytics
Related tools for further analysis within this study:	▪ Detectors of dangerous chemical and biological items ▪ Dosimeters / radiometers ▪ Explosives detectors ▪ Explosion-proof containers ▪ Luggage screening with special technical means ▪ Manual metal detectors ▪ Passenger screening with special technical means ▪ Stationary metal detectors
Studies / Projects:	▪ The benefit of positive passenger profiling on baggage screening requirements / Rand Corporation (2004) ▪ A Cost-Benefit Analysis of Alternative Device Configurations for Aviation-Checked Baggage Security Screening / Risk Analysis, Vol. 26, No 2 (2006) ▪ Threat detection: a framework for security architects and designers of metropolitan rail systems, Urban, Planning and Transport Research / Hervé Borrion, Kartikeya Tripathi, Peng Chen & Sungpill Moon (2014) ▪ The acceptability of counter-terrorismmeasures on urban mass transit in the UK / Urban transport XV, p. 627

Picture source: http://vologda-portal.ru/novosti/index.php?ID=358432&SECTION_ID=151&special_version=Y

T6. Security Dog

Description:	 ▪ Security dogs are specially trained to protect people and property in public areas. ▪ Dogs work in partnership with one or two (maximum) handlers. ▪ The main purpose of the dogs is patrolling, guarding, detecting, and tracking with an option on crowds control and pursuit. ▪ Not every dog breed is suitable as a security dog, therefore only selected ones are allowed (based on physical and character treats). ▪ Their presence alone may suffice to deter a potential attacker from carrying out his plan. ▪ Dogs retire either at a set age or whenever they can no longer physically perform their duty (around 10 years, although this is highly variable).
Purpose:	☒ Prevention ☒ Detection ☒ Response ☐ Recovery
Benefits:	▪ Application possibilities - efficiency detection of improvised explosive devices (IED) and dangerous substances (even in small amounts), graffiti, vandalism, metal theft. ▪ Improved perception of security for passengers, staff, and public. ▪ Deterrent effect, e. g. by big events for potentially rampaging fans. ▪ De-escalation effect, the presence of dogs could prevent conflict from taking place in potentially aggressive encounters, especially of aggressive, homeless or drug addictive people. ▪ In case of an emergency the dog can protect customers and staff (self-protection). ▪ Security dogs are not easy for disturbances and you can follow directly to the person. ▪ They are mobile and can be used in different stations. ▪ Cooperation with the police and therefore, shorten the process to analyse an abandoned object respectively IED.

Limits:	▪ Restricted regulations of the working time (no more than 2-3 hours) and equipment (e. g. shielded resting space). ▪ Basic patrol training takes 15 to 17 weeks, or 10 weeks for narcotics and explosive detection. During the work life, dog and handler attend re-training at different intervals – on average one day every two or three weeks. ▪ Costs (for the dog themselves, trainings, housing, equipment, insurance and transportation). ▪ Regularly checks of the health, vaccination, character (most every 12 months). ▪ Maybe fear of customer of (big) dogs. ▪ Religion aspects, for Muslims dogs are considered unclean.
Practices & Samples: (non-exhaustive enumeration):	▪ DB AG (focusing on de-escalating effect) ▪ PKP S.A ▪ SNCF (focusing on detection of IED and on de-escalating effect)
Combination with other measures:	▪ Video analytics ▪ CCTV ▪ Security concept (process of handling abandoned object respectively IED) ▪ Security staff
Related tools for further analysis within this study:	▪ Security dogs ▪ Staff presence
Studies / Projects:	▪ UITP (2014): PTSpotlight - K9 Security in PR Networks

Picture source: Transilien

T.7 Video Analytics

Description:	 ▪ Video analytics is a system of applications linked to or embedded in the surveillance system which send alerts when specific events are identified by the system. ▪ It can be performed by staff or software as well as in real-time or analysing the video footage in subsequent. ▪ It is a useful addition to make the use of video cameras and the coordination of human factor measures (e. g. Security Staff) more efficiency. ▪ It is not visible to customers.
Purpose:	☒ Prevention ☒ Detection ☒ Response ☒ Recovery
Benefits:	▪ Application possibilities: ○ Overcrowding detection, e. g. people counting by big events ○ Dwell time, e. g. manipulation of luggage storage areas or ticket machines ○ Identification of anomalous behaviour and/or abandoned objects ○ Face recognition and analysis of movement patterns ○ Tracking of marked persons and objects, e. g. security breaches ○ Graffiti behaviour detection ○ Tailgating/Gate jumping ○ Fire & smoke detection ▪ Post-Event Analysis (searching for specific person description). ▪ Crucial evidence in criminal cases. ▪ Police support and integration in police investigation, partnership.

Limits:	▪ General: You can only analyse what you know (like listed person, terrorists, known modus operandi). ▪ Software: Influence of the environment, error rate, false alert. ▪ Staff: Special regulations for this kind of work (e. g. restricted time to analyse the screening on the monitor). ▪ Rule of law.
Practices & Samples: (non-exhaustive enumeration):	▪ NS NL ▪ RZD (Integrated security system)
Combination with other measures:	▪ CCTV ▪ Security Concept ▪ Video Cameras
Related tools for further analysis within this study:	▪ CCTV ▪ Video cameras
Studies / Projects:	▪ Project COUNTERACT (2006 - 2009) http://www.uitp.org/content/counteract-0 ▪ Project PROTECTRAIL (2010 - 2014) - http://protectrail.eu/ ▪ Project SECURESTATION (2011 - 2014) http://www.securestation.eu/Project ▪ ERNCIP thematic groups: https://erncip-project.jrc.ec.europa.eu/networks/tgs

Picture source: http://www.surveon.com/vms/va.asp

2. Institutional, organizational and procedural measures.

O1: Alcohol prohibition

Description:	 ▪ The consumption of alcohol has an influence on violent crimes against customers and employees. Especially on weekend, major and sport events the numbers of incidents under alcohol increases. This situation is also relevant to loitering groups, like young or homeless people. ▪ Alcohol prohibition may be a permanent or a temporary measure (used during special periods only, e.g. sport events) is an option to mitigate the violence. ▪ It may include alcohol consumption prohibition or alcohol sale prohibition and also may differ by the type or volume of alcohol (sometimes only strong alcohol is prohibited). ▪ For the sustainable effect, increasing penalties by repeat behavior are useful.
Purpose:	☒ Prevention ☐ Detection ☐ Response ☐ Recovery
Benefits:	▪ Prevents uncontrolled behaviour or aggressions under alcohol intoxication. ▪ Prevents accidents causing injuries. ▪ Improved perception of security for passengers, staff, and the general public. ▪ Especially useful during mass events.

Limits:	▪ In case alcohol sale is prohibited in station cafes or restaurants, it may have a negative effect for consumers and for commerce. ▪ For special periods, when alcohol is not allowed to be carried into stations, absence of information may cause undesired reactions. ▪ This measure usually causes a lot of societal discussions. ▪ If the railway station is shared by different public transport associations it is necessary to harmonize the house rules. ▪ The enforcement of the alcohol prohibition requires permanently more security staff.
Practices & Samples: (non-exhaustive enumeration):	▪ DB AG (Munich, Nuremberg, Germany) ▪ IR ▪ SNCF (Euro-2016 period) ▪ RZD (prohibition of alcohol sale at all stations until April 2017)
Combination with other measures:	▪ CCTV ▪ Interaction with 3rd parties ▪ Security Concept ▪ Security dog ▪ Security staff
Related tools for further analysis within this study:	▪ Alcohol consumption prohibition ▪ Alcohol sale prohibition
Studies / Projects:	▪ Leisure facilities in railway station areas / Tim van de Kruijs, Unviersiteit Twente, 2013 http://essay.utwente.nl/64251/1/KruijsTWvande_0112186_openbaar.pdf

Picture source: http://www.abendzeitung-muenchen.de/inhalt.alkohol-debatte-bei-der-deutschen-bahn-bald-kein-bier-und-wein-mehr-in-zug-restaurants.6b2d42ea-84f9-4362-9b1f-468eeeb01f20.html

O2. Interaction with third parties

Description:	 ▪ To increase security is not only the responsibility taking part by the railway companies. 3rd parties are very often involved to handle security incidents within the railway system. Therefore, it is useful to sign up forμ partnerships with other parties to exchange knowledge, have a better understanding of the needs and the process from the partner. ▪ Useful cooperation could be established with state institutions, national security policy, other public transport associations, research companies, universities as well as cooperation with law enforcement and judicial authorities for more effective prosecution of offenses.
Purpose:	☒ Prevention ☒ Detection ☒ Response ☒ Recovery
Benefits:	▪ Improved perception of security for passengers, staff, and customers. ▪ Shorten processes, e. g. investigations. ▪ Forecasting and planning tasks. ▪ Fight against terrorism. ▪ Effective handling of crisis situations
Limits:	▪ Different objectives of different parties. ▪ Poor organisation of interaction may be a limit for effective actions.
Practices & Samples: (non-exhaustive enumeration):	▪ Almost all companies
Combination with other measures:	▪ Security concept ▪ Security operations centre ▪ Technical security measures
Related tools for further analysis within this study:	-
Studies / Projects:	▪ COLPOFER ▪ RAILPOL ▪ UIC

Picture source: http://www.presseportal.de/blaulicht/pm/64017/2951236

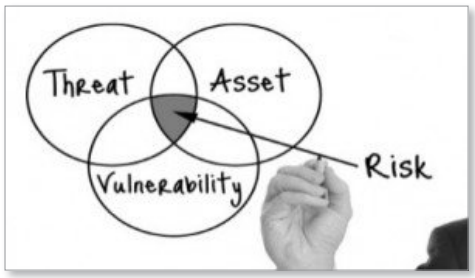
O3. Security operations centre

Description:	▪ Location within stations or out of stations used by security staff to supervise the situation in one or several railway stations and surrounding territories with use of data processing coming from the supervised location(s), e. g. via video, staff or customers.  ▪ In general, security operation centre works as a single point of contact regarding the handling of security issues and their management. ▪ Allows direct data transfer to other levels, up to decision-makers, can as well be connected to the third parties (police, security authorities, etc.).
Purpose	☒ Prevention ☒ Detection ☒ Response ☒ Recovery
Benefits:	▪ All information in our place and in one information transfer point. ▪ Immediate reaction in case of corresonding events. ▪ Permanent surveillance – useful for recovery purpose. ▪ Distant surveillance – useful for respose purpose. ▪ (Automatic) detection of illegal actions or incidents is possible.
Limits:	▪ Costs of organization, including costs of CCTV ▪ Human factor in case of low automatisation level ▪ Legal limits for some functions (e.g. face recognition)
Practices & Samples: (non-exhaustive enumeration):	▪ Almost all companies
Combination with other measures:	▪ CCTV ▪ Cooperation with third parties ▪ Security concept ▪ Videoanalytics
Related tools for further analysis within this study:	-
Studies / Projects:	▪ Building security : handbook for architectural planning and design / Barbara A. Nadel. New York: McGraw - Hill, 2004. ISBN 978-0-07-141171-4

Picture source: PKP S.A.

O4. Security concept

Description:	▪ A security concept is usually based on the results of a security risk assessment, which systematically analysis potential threats to a specific target. ▪ It may contain a description of roles and responsibilities, selected measures (protective and reactive), their implementation and evaluation. ▪ Selected measures consider particular country-specific circumstances (e.g. state regulations, applicable laws), security culture and environment. ▪ The concept should be regularly reviewed or adjust in response to security incidents or by a changing situation.
Purpose	☒ Prevention ☒ Detection ☒ Response ☒ Recovery
Benefits:	▪ Better planning and implication of actions, including financial aspects. ▪ Better allocation of security functions between units and 3rd parties.
Limits:	▪ New challenges in coping with threats.
Practices & Samples: (non-exhaustive enumeration):	▪ Almost all companies
Combination with other measures:	▪ A Security concept is the basis for all planed and realized security measures
Related tools for further analysis within this study:	-
Studies / Projects:	▪ Protecting Public Surface Transportation Against Terrorism and Serious Crime: Continuing Research on Best Security Practices / Mineta Transport Institute (2001) http://transweb.sjsu.edu/MTIportal/research/publications/documents/01-07.pdf ▪ Project SECURESTATION (2011 - 2014) http://www.securestation.eu/Project ▪ UIC (2016): Rail High Speed Network - Security Handbook http://uic.org/IMG/pdf/2015-hs-security_handbook_public.pdf



Picture source: https://www.linkedin.com/pulse/process-physical-security-planning-satendra-kumar-cpo-cpo-i-mpm

3. Human factor measures.

H1. Help applications

Description:	▪ Mobile applications with opportunity to call for emergency assistance in case of illegal actions and incidents. 
Purpose	☐ Prevention ☒ Detection ☒ Response ☐ Recovery
Benefits:	▪ May be used by both customers and staff. ▪ May be used all aroud station facilities and in the trains. ▪ May be used in a discreet mode, without attracting attentions of aggressive elements. ▪ Fast way to call for help. ▪ Knowledge about such applications may passively reduce aggressions.
Limits:	▪ Need access to Internet. ▪ Require specific software. ▪ Require actions plan in case of incoming information about emergency situations. ▪ Require informing about such applications for customers.
Practices & Samples: (non-exhaustive enumeration):	▪ DB AG ▪ SNCF
Combination with other measures:	▪ CCTV ▪ Information for passengers about security actions ▪ Security Staff ▪ Videoanalytics
Related tools for further analysis within this study:	▪ Help applications
Studies / Projects:	-

Picture source: Transilien

H2. Help points at stations

Description:	▪ Special points at stations allowing to call for help. ▪ Often combined with information points and with direct connection to a video camera, so the staff can have a first look at the situation. 
Purpose	☐ Prevention ☒ Detection ☒ Response ☐ Recovery
Benefits:	▪ May be used all around station facilities and in the trains. ▪ Fast way to call for help or for informations. ▪ May help to get information about disruptive behaviour. ▪ Useful for mass events and in case of crowds.
Limits:	▪ Require specific software. ▪ Require actions plan in case of incoming information about emergency situations. ▪ May be subject to vandalism. ▪ May be subject to false alert. ▪ Useless in case of incorrect location at stations. ▪ Not always useful in case of aggressions, as their usage may cause more aggressions. ▪ Frequency of use: nowadays, the people prefer to use their own smartphone.
Practices & Samples: (non-exhaustive enumeration):	▪ Most railways
Combination with other measures:	▪ CCTV ▪ Help applications ▪ Security staff ▪ Videoanalytics
Related tools for further analysis within this study:	▪ Help points
Studies / Projects:	-

Picture source: http://flameretardantrubber.co.uk/

H3. Information for passengers about security actions

Description:	▪ General information regarding to the behavior should be described in the station house rules (e. g. no begging, illegal sale of tickets and substances). ▪ In addition to this, the customer should be informed about security actions and specific security issues, e. g. pick pocketing, unattended luggage. ▪ Possible audio or video channels inter alia are announcements, posters, leaflets, video clips, web radio. 
Purpose	☒ Prevention ☐ Detection ☐ Response ☐ Recovery
Benefits:	▪ Customers awareness about security procedures or actions in different situations resulting in better perception of security level at stations. ▪ Involving passengers in their own security and increase the awareness for suspicious situations (vigilance messages, staff alerts, etc.). ▪ May ease evacuation and other processes in case of attacks. ▪ May result in easier response stage.
Limits:	▪ In some cases (like information about terrorist attacks) the feeling of security may go down due to constant reminder about possibly insecure situations.
Practices & Samples: (non-exhaustive enumeration):	▪ Most railway companies
Combination with other measures:	▪ Interaction with 3rd parties ▪ Present of security staff ▪ Presence of police staff ▪ Present of railway staff
Related tools for further analysis within this study:	▪ Audio informing about actions with unattended luggage ▪ Audio informing about pickpocketing ▪ Audio informing about possible terrorist attacks ▪ Video informing about actions in case of terrorist attacks ▪ Video informing about security procedures at stations
Studies / Projects:	▪ UIC (2015): Rules of Behavior for Passengers and Visitors at Railway Stations, platforms and Trains and in Emergency Situations) http://uic.org/human-factors-91. ▪ UIC Extranet (2017): TACT Training, Awareness, Communication Toolbox - registration necessary ▪ UIC (2017): Recommendations on Crisis Management http://uic.org/IMG/pdf/crisis_management_report.pdf

Picture source: FSI

H4. Pre-designed signage for evacuation

Description:	▪ Clear signage and navigation to allow faster evacuation for customers and staff. ▪ This measure may be considered as both related to human factors and to design, but as the main objective is not the signage itself, but its clearness to users, it is supposed to be linked more to human factor. 
Purpose:	☐ Prevention ☐ Detection ☒ Response ☐ Recovery
Benefits:	▪ Management of crisis situations.
Limits:	▪ May not work in proper way without simulating and tests. ▪ "Proper" signage may cost more than a common one, made without modelling and real-life tests.
Practices & Samples: (non-exhaustive enumeration):	▪ Most railways.
Combination with other measures:	▪ CCTV ▪ Security concept ▪ Security operations centre ▪ Videoanalytics
Related tools for further analysis within this study:	▪ Pre-designed signage for evacuation
Studies / Projects:	▪ Project SECURESTATION (2011-2014) http://www.securestation.eu/documents/securestation.pdf

Picture source: http://www.safetysign.com/evacuation-signs

H5. Railway uniformed staff presence

Description:	 ▪ Human factor input into security assurance seems still to be a leading one. ▪ The presence of railway staff assuring railway processes or helping customers. ▪ Especially the presence of security staff may prevent illegal actions or enable the fast intervention by incidents against customers and frontline staff. ▪ Use of visible uniform increases their perceptibility. Also, they may be equipped with personal protection equipment. ▪ The regularly integration of security aspects within trainings for the (frontline) railway staff assure the detection of serious situations as well as their fast and confidence response.
Purpose:	☒ Prevention ☒ Detection ☒ Response ☒ Recovery
Benefits:	▪ May help to detect suspicious behaviour of persons or situations, e.g. left items. ▪ Have a good influence on customers‘ behaviour thanks to „uniform presence effect“. ▪ Positive impact on the subjective sense of security from the customer and frontline staff (e. g. service staff). ▪ Helps to shorten the response time in case of an incident. ▪ May pass information to other staff.

Limits:	▪ Costs (normally staff costs more than technical means) ▪ Need of constant training ▪ Increasing violence against uniformed personnel.
Practices & Samples: (non-exhaustive enumeration):	▪ Most railways, especially at larger stations
Combination with other measures:	▪ Body cameras ▪ CCTV ▪ Interaction with 3rd parties (especially police and private security companies) ▪ Security concept ▪ Security dogs ▪ Security operations centre
Related tools for further analysis within this study:	▪ Presence of police staff ▪ Presence of rail (not related to security) staff in special uniform ▪ Presence of security staff (rail security, private security agencies)
Studies / Projects:	▪ Project COUNTERACT (2006 - 2009) http://www.uitp.org/content/counteract-0 ▪ Project SECUR-ED (2011 - 2014) - http://www.secur-ed.eu/ ▪ UIC (2015): Rules of Behavior for Passengers and Visitors at Railway Stations, platforms and Trains and in Emergency Situations) http://uic.org/human-factors-91

Picture source: DB AG

H6. Reception desks

Description:	▪ Information or welcome desks / points / centers at stations with presence of special staff. ▪ May provide information onstation or generally railway services to passengers. ▪ Staff of reception desks is usually in contact with other railway or security staff to resolve customers' problems or inform about dangerous situations. 
Purpose:	☒ Prevention ☒ Detection ☒ Response ☒ Recovery
Benefits:	▪ Point of observation for main station halls. ▪ Unique point of contact for clients. ▪ May inform station or security staff about suspicious persons, items or activities. ▪ Staff of reception desks is always on front line for any abnormal situations (evacuation, information for passengers, etc.). ▪ May be equipped with video recording.
Limits:	▪ Reception desk staff must be carefully instructed (and trained) about actions in different situations and relations with security managers. ▪ Risks of desinformation for customers / other staff. ▪ Normally dedicated staff is only in charge of relations with customers and is not focused on detection of potentially dangerous situations (at least this is not the main objective of this measure).
Practices & Samples: (non-exhaustive enumeration):	▪ Most railways / station managers, mainly at larger stations
Combination with other measures:	▪ Help points at stations ▪ Information for passengers about actions ▪ Interaction with security bodies ▪ Security concept ▪ Security operations centre
Related tools for further analysis within this study:	▪ Reception desks with presence of station staff
Studies / Projects:	-

Picture source: RZD

H7. Social Media Analysis

Description:	▪ The goal is to analyze manually or automatically the content from social media platforms and get information, when an attack or action, e. g. demonstration, is planned. ▪ It could also be used to solve a security incident (e. g. if a person/group admit a crime). ▪ It is often in interaction with 3rd parties. 
Purpose:	☒ Prevention ☒ Detection ☐ Response ☒ Recovery
Benefits:	▪ Early warning indicator. ▪ Speed up preparing and reaction. ▪ Has a forensic value. ▪ Can help to avoid misinformation of customers.
Limits:	▪ Access to the information of closed groups (in case of planned terrorist attacks). ▪ Getting information from the beginning. ▪ Possibly (unconscious) dissemination of false information.
Practices & Samples: (non-exhaustive enumeration):	▪ SNCF (Euro 2016, France) ▪ DB AG (G20-Gipfel 2017, Germany)
Combination with other measures:	▪ CCTV ▪ Interaction with 3rd parties ▪ Video analytics
Related tools for further analysis within this study:	-
Studies / Projects:	▪ Project: CIPRENet (2013-2017) - https://www.ciprnet.eu/home.html

Picture source: http://bimajolt.ndunda.com/2016/04/water-water-everywhere-and-not-drop-to.html

4. Measures related to design, construction and ambience

A1. Calming ambience

Description:	▪ Use of special lightning or colour schemes, as well as special calming scents and music at stations to create a calm ambience. ▪ This measure is used to prevent suicides and to calm down crowds. ▪ May be used all over station or in certain areas only. 
Purpose:	☒ Prevention ☐ Detection ☐ Response ☐ Recovery
Benefits:	▪ Prevention of aggressive behaviour and suicides. ▪ Raise of satisfaction level of clients and attraction of customers. ▪ Do not need general station re-design or changes in station layout. ▪ Positive impact on the feeling of security. ▪ Especially music concepts shorten the waiting time for the customers.
Limits:	▪ Decisions on colours or aromas should be pre-studied with psychologists. ▪ Possible negative effects for smaller groups of clients (allergy or similar). ▪ In some cases, such measures (for example, in commercial areas) may be considered as manipulative.

Practices & Samples: (non-exhaustive enumeration):	▪ Adif – Madrid Atocha station garden ▪ JR East ▪ FSI - music concept (web radio at stations) ▪ MRT Singapore ▪ Network Rail ▪ NS NL – piano concept ▪ SNCF – For EURO 2016 period ▪ RZD – scented waiting halls at some stations and project "Music at station"
Combination with other measures:	▪ Transparent materials
Related tools for further analysis within this study:	▪ Calming colour scheme in crowded areas ▪ Calming scent at stations ▪ Classic or calming music
Studies / Projects:	▪ Project COUNTERACT (2006 - 2009) http://www.uitp.org/content/counteract-0 ▪ http://www.telegraph.co.uk/news/worldnews/asia/japan/6578256/Blue-lights-installed-in-Tokyo-train-stations-to-stop-suicides.html

Picture source: http://thesmartlocal.com/read/photogenic-mrt

A2. Car barriers

Description:	▪ Bollards or similar architectural forms to protect stations from hostile vehicles attacks. ▪ May be installed before entrances to stations or around station squares. ▪ May have an attractive design (trees, sculptures, etc.). 
Purpose:	☒ Prevention ☐ Detection ☐ Response ☐ Recovery
Benefits:	▪ Prevention of vehicle attacks risks may be combined with attractive design. ▪ Raises the perception and the feeling of security. ▪ This measure becomes vital due to current terrorist risks (with use of cars) all over the world.
Limits:	▪ May create inconveniences for disabled passengers and passengers with large luggage.
Practices & Samples: (non-exhaustive enumeration):	▪ Network Rail – UK experience after Glasgow airport attack in 2007 ▪ Almost all other European companies
Combination with other measures:	▪ Passenger and luggage screening ▪ Transparent materials
Related tools for further analysis within this study:	▪ Car barriers before entrance to stations
Studies / Projects:	▪ Building security : handbook for architectural planning and design. / Barbara A. Nadel. New York: McGraw - Hill, 2004. ISBN 978-0-07-141171-4 ▪ Project SECURESTATION (2011-2014): http://www.telegraph.co.uk/news/worldnews/asia/japan/6578256/Blue-lights-installed-in-Tokyo-train-stations-to-stop-suicides.html

Picture source: http://www.acotec.de/bildergalerie-poller.php

A3. Transparent materials

Description:	▪ Use of transparent materials within station building for different areas. ▪ Also include transparent rubbish bins. ▪ Simplify the work of security staff and create a pleasant environment for customers. 
Purpose:	☒ Prevention ☐ Detection ☒ Response ☐ Recovery
Benefits:	▪ Perception of security. ▪ Visibility of station for both customers and staff. ▪ Quicker response in case of emergency. ▪ Especially useful at larger stations and at very small stations with minimum staff as well.
Limits:	▪ Materials should be explosion-proof. ▪ Costs of materials (including exploitation).
Practices & Samples: (non-exhaustive enumeration):	▪ Most railways
Combination with other measures:	▪ Calming ambience ▪ Car barriers ▪ Pre-designed signage for evacuation
Related tools for further analysis within this study:	▪ Transparent materials
Studies / Projects:	▪ Building security : handbook for architectural planning and design / Barbara A. Nadel. New York: McGraw - Hill, 2004. ISBN 978-0-07-141171-4 ▪ Project SECURESTATION (2011-2014): http://www.telegraph.co.uk/news/worldnews/asia/japan/6578256/Blue-lights-installed-in-Tokyo-train-stations-to-stop-suicides.html

Picture source: http://www.andalucia.org/fr/comment-arriver/train-station/malaga/estacion-de-tren-malaga-maria-zambrano/

FORMALIZED DESCRIPTION AND ANALYSIS OF TOOLS

Among the variety of examined station security tools the main part corresponds to prevention, which is quite logical. Both prevention and detection tools have a share of more than 70%.

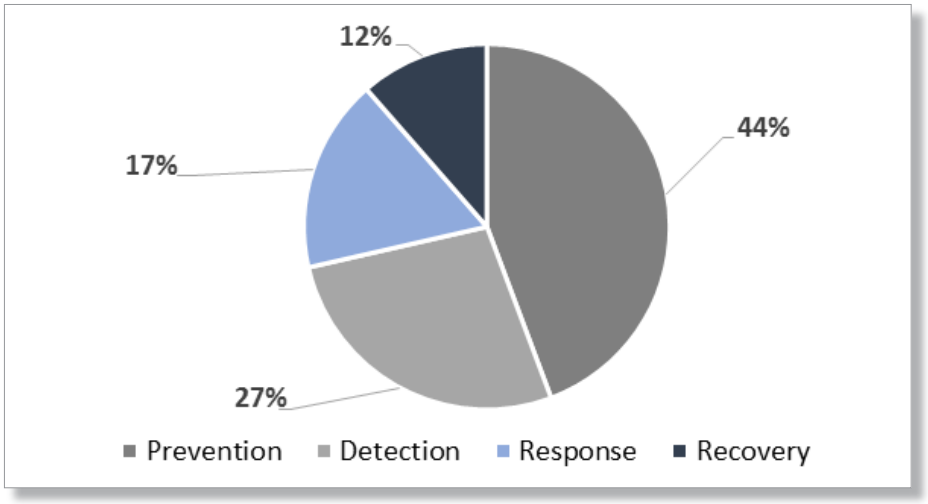


Fig. 1. Tools distribution by objectives

Most part of tools corresponds to technical means. But, despite the expectations about the growing percentage of digital tools, digital information transfer principle is still less popular than human factor. This is caused by the fact that traditional technical measures with use of special equipment like X-Ray machines, manual metal detectors or analyzers are mainly subject to special staff competences rather than to digitalization processes.

This observation leaves a field for discussion for security managers. Being more technical, thus, does not always mean being more technological, and even less – more digitalized. Most heavy (in a technical sense) measures are far from being most modern from technical point of view.

Human factor's input into security assurance seems still to be a leading one, forming up to 40% of information transfer. That means that even if measures or tools used for security assurance are technical, they are subject to the quality of of staff work.

This leads to the idea that **station security is currently defined by the role of employees by more than 50%** (human factor tools + technical tools with human factor information transfer principle).

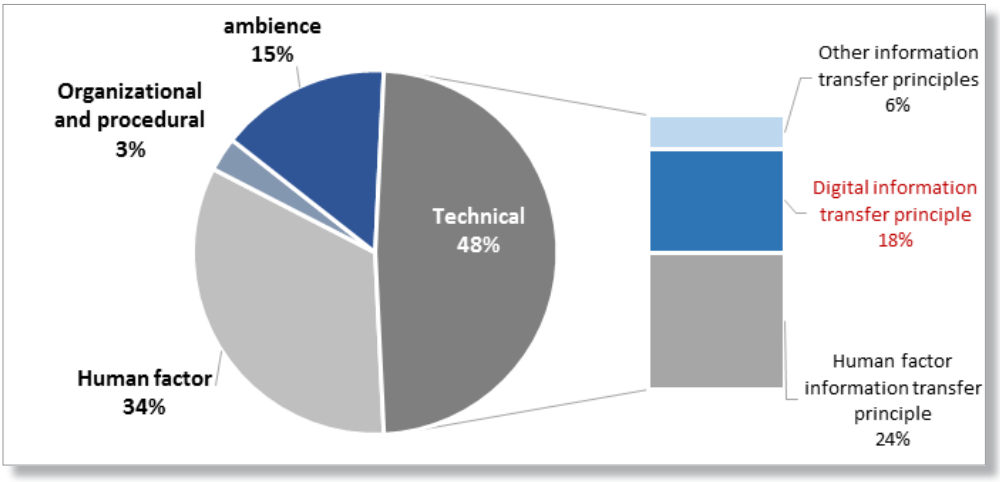


Fig. 1.2. Tools distribution by groups

For the **first stage of formalized analysis**, all tools have been matched with (1) groups described in the beginning of this chapter and (2) threats against which these tools can be used:

1) Terrorism (different forms);
2) Non-terroristic crimes with use of weapons;
3) Pickpocketing and similar crimes without use of weapons;
4) Disruptive behavior and aggressions;
5) Threats related to crowds and mass events;
6) Vandalism;
7) Fraud and unauthorized access.

This analysis allowed to create a **map of station security tools**. The more "useful" is the tool, the larger is the size of the corresponding bubble. The higher is the bubble, the more objectives (among prevention, detection, response and recovery) has the tool. Tools are from left to right in the following order:

Technical tools ▶ Human factor tools ▶ Organizational and procedural tools ▶ Tools related to design, construction and ambience of stations

Thus, the higher is located the tool and the larger is the bubble, the more multi-functional is the related tool.

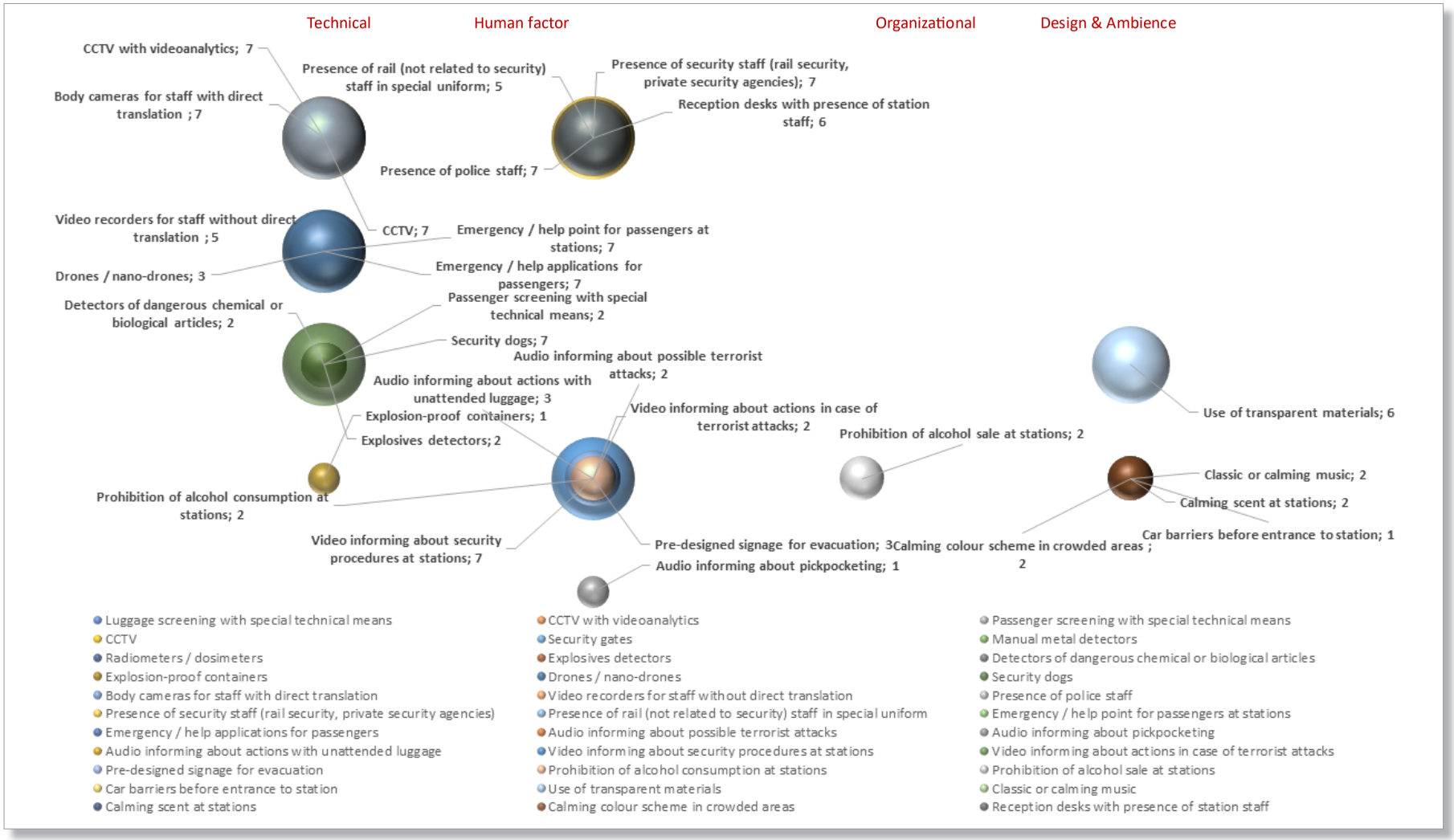
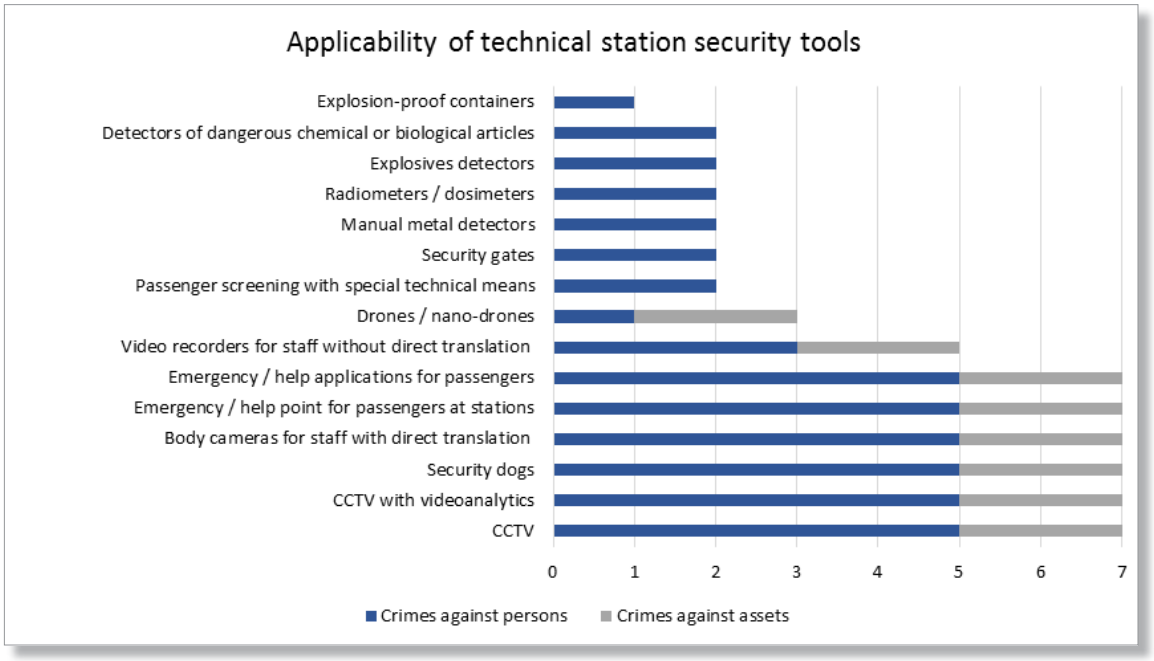
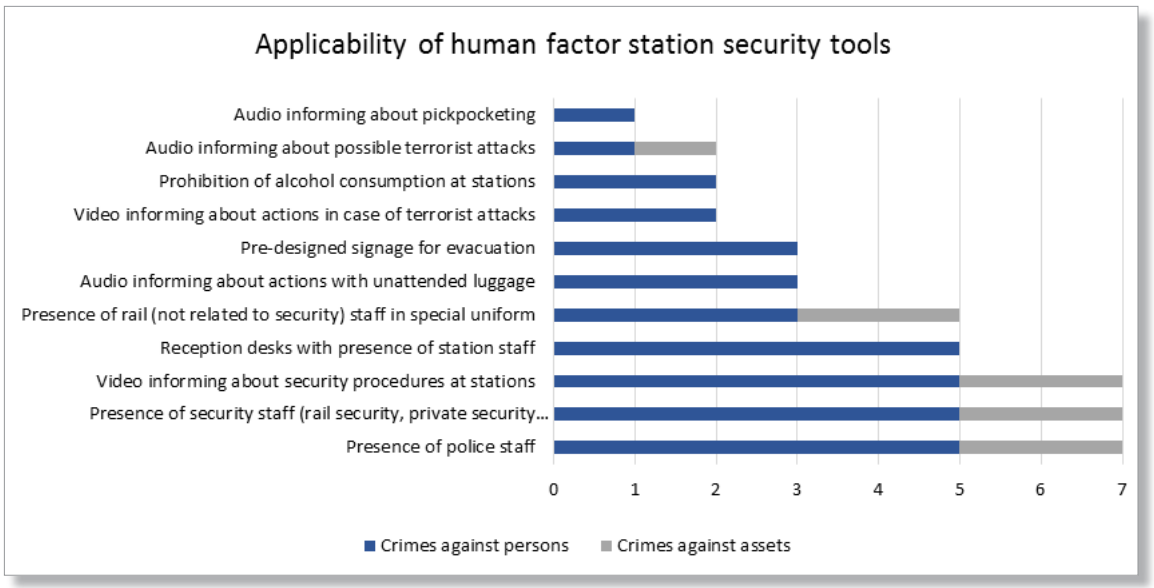


Fig. 1.3. Map of station security tools

To provide deeper description of tools applicability they were as well analyzed against crimes or illegal actions aimed at persons (points 1-5 from the list above) and illegal actions aimed at assets (points 6-7 from the list above).





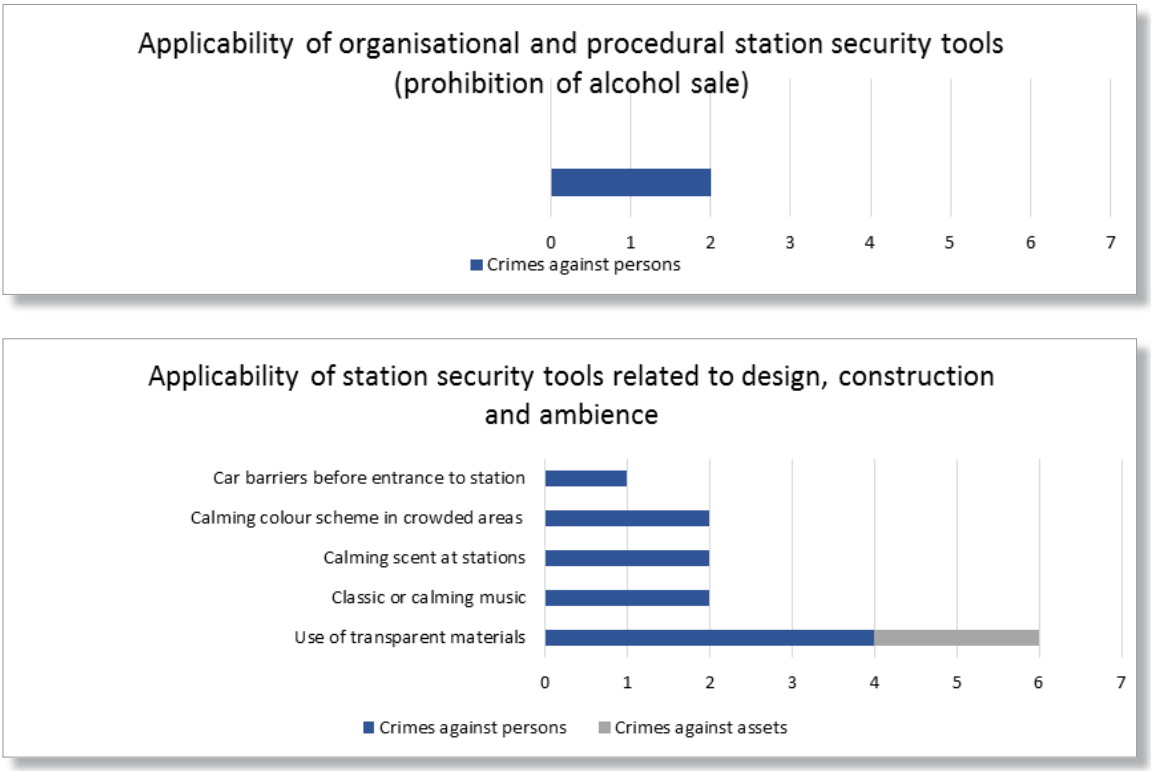


Fig. 1.4. Station security tools applicability

For the **second stage of formalized analysis**, all tools have been matched with clients' routes at stations.

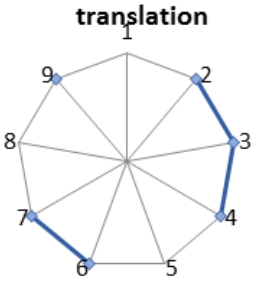
A typical route includes:

1) Journey planning, including the decision about transportation means;
2) Arrival at railway station;
3) Staying at station of departure;
4) Boarding;
5) On board journey (not examined within this study);
6) Alighting;
7) Staying at station of arrival;
8) Departure;
9) Feedback and impressions.

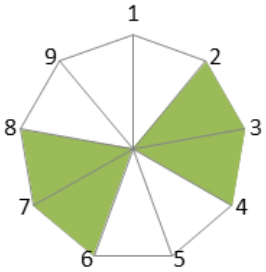
Each tool has been examined against each element of this route. This stage of the analysis shows that tools differ greatly by its presence at different phases of the route. Some of the tools accompany clients throughout their railway journey, while some of them appear only at some phases. In case security tools accompany clients at several consequent phases, it may be supposed, that clients get a **stronger perception** of this security tool (negative or positive regarding the specific tool, situation or country).

In an ideal situation station security assurance should be wraparound for all phases. It can be reached either by use of tools with maximum range for all route phases, or by combination of different tools for different phases.

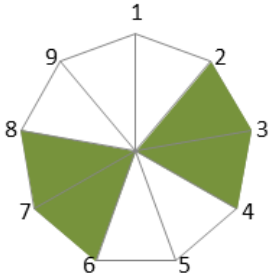
Body cameras for staff with direct translation



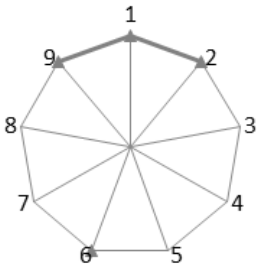
CCTV



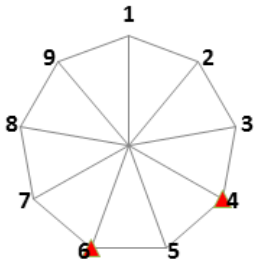
CCTV with videoanalytics



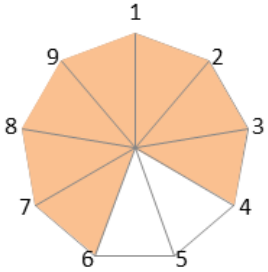
Detectors of dangerous chemical or biological articles



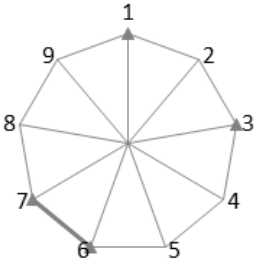
Drones / nano-drones



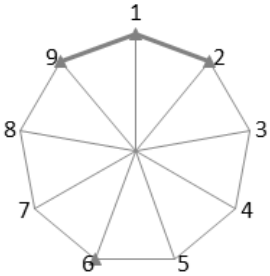
Emergency / help applications for passengers



Explosion-proof containers



Explosives detectors



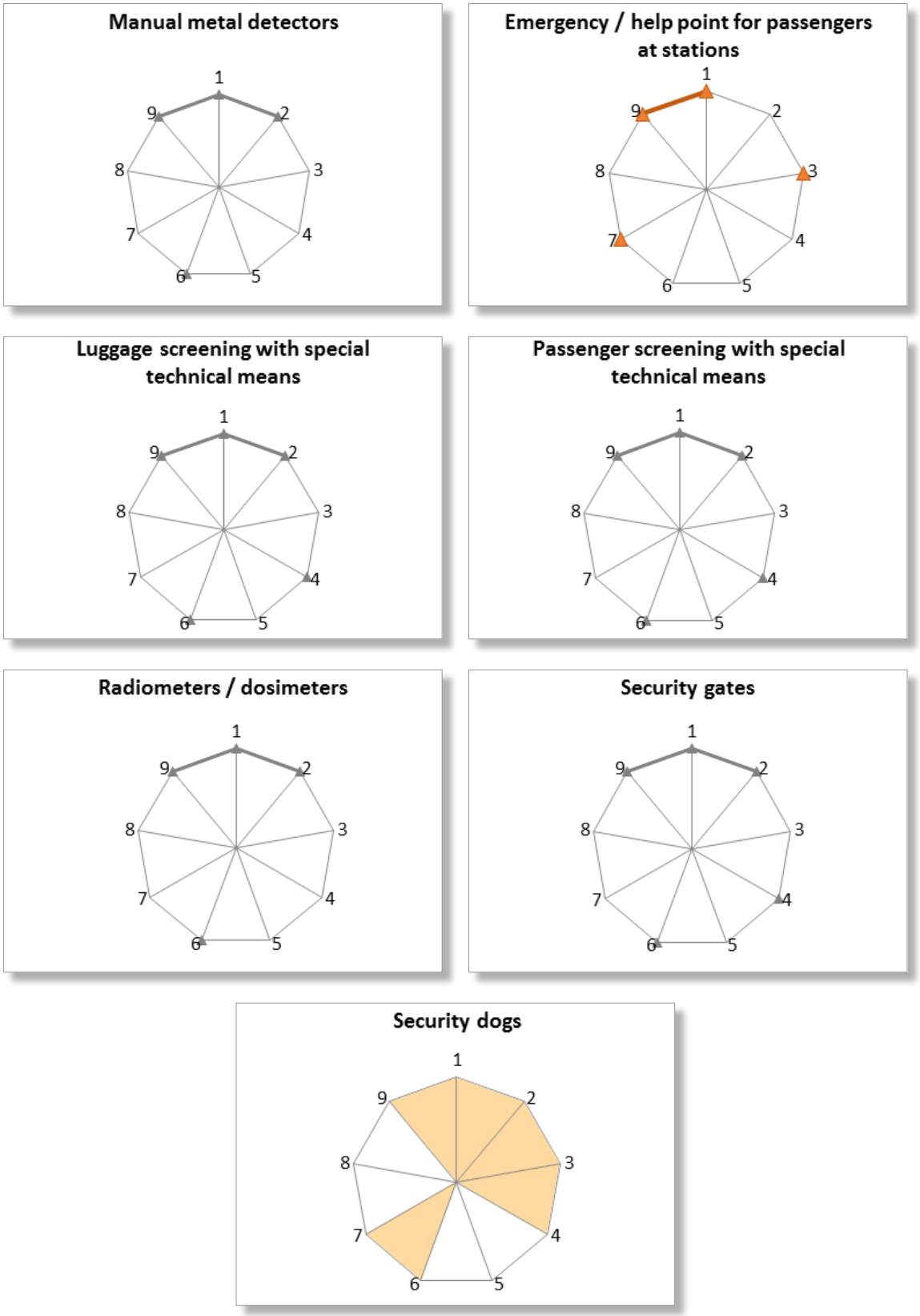
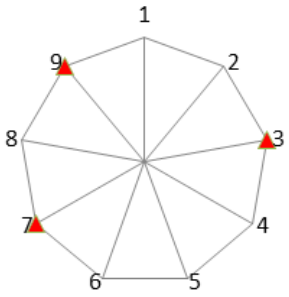
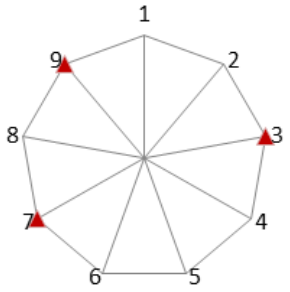


Fig. 1.5. Localisation of technical security tools by clients' route

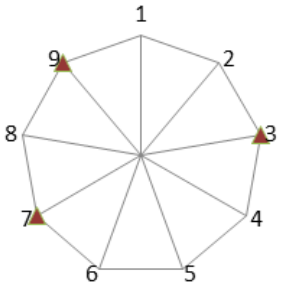
Audio informing about actions with unattended luggage



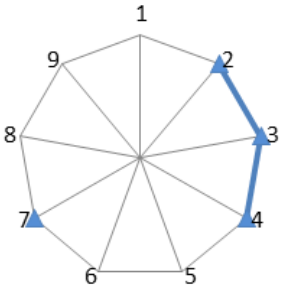
Audio informing about pickpocketing



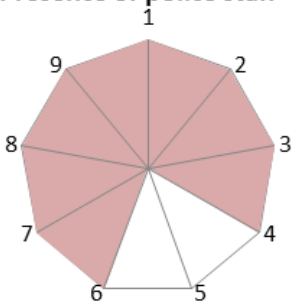
Audio informing about possible terrorist attacks



Pre-designed signage for evacuation



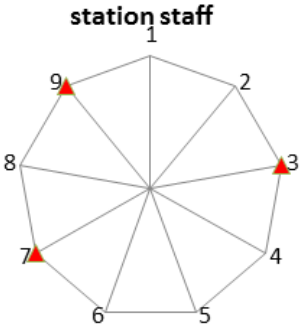
Presence of police staff



Presence of rail (not related to security) staff in special uniform

Presence of security staff (rail security, private security agencies)

Reception desks with presence of station staff



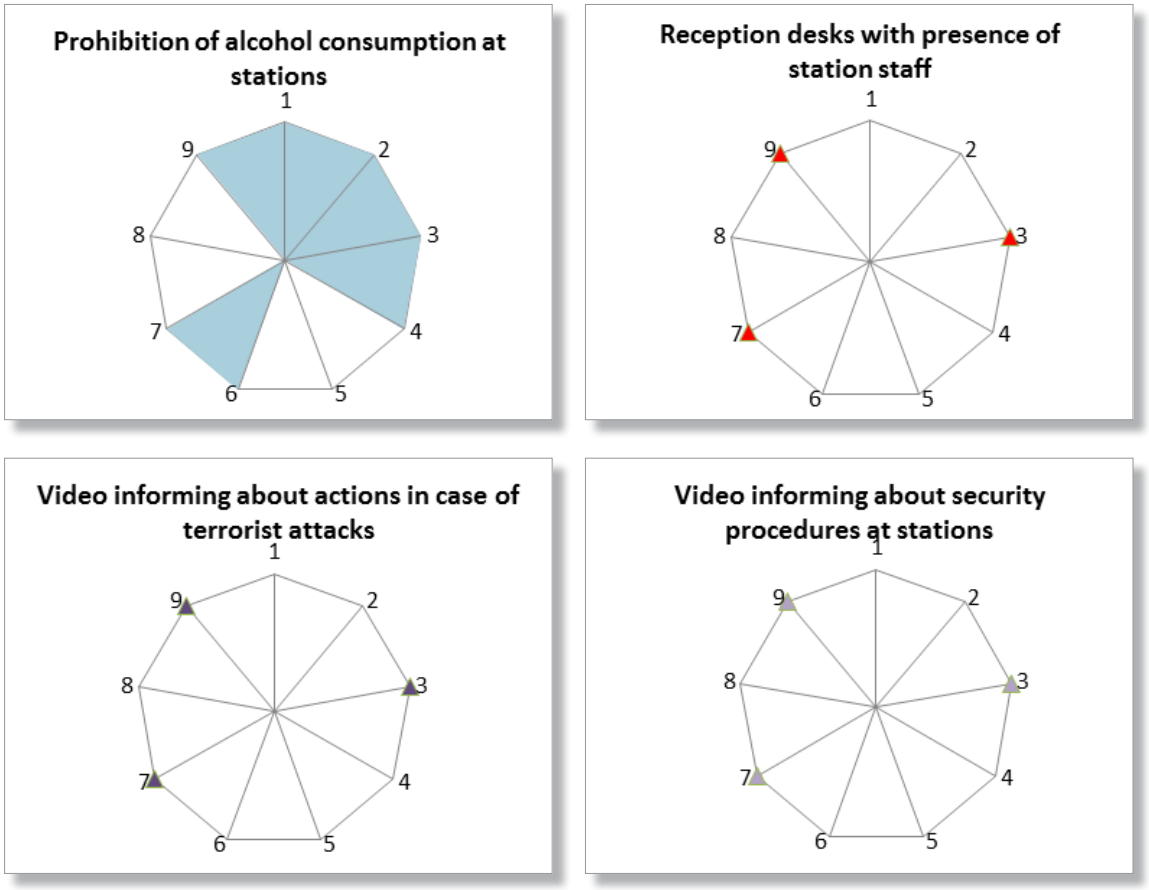


Fig. 1.6. Localisation of human factor security tools by clients' route

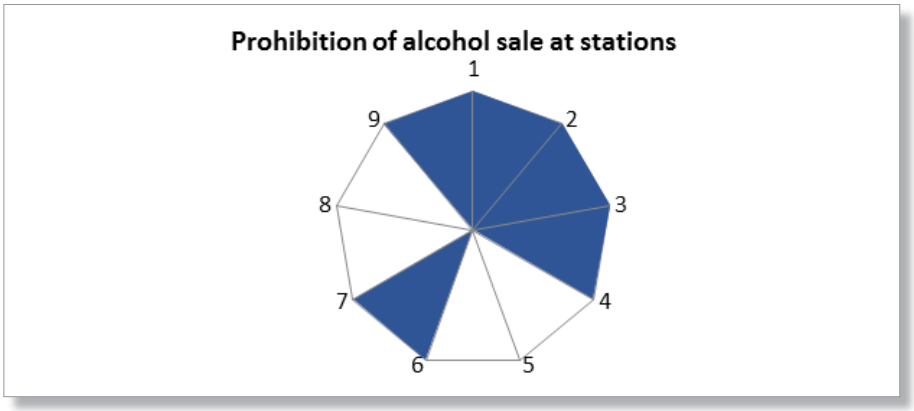


Fig. 1. 7. Localisation of organizational and procedural security tools by clients' route

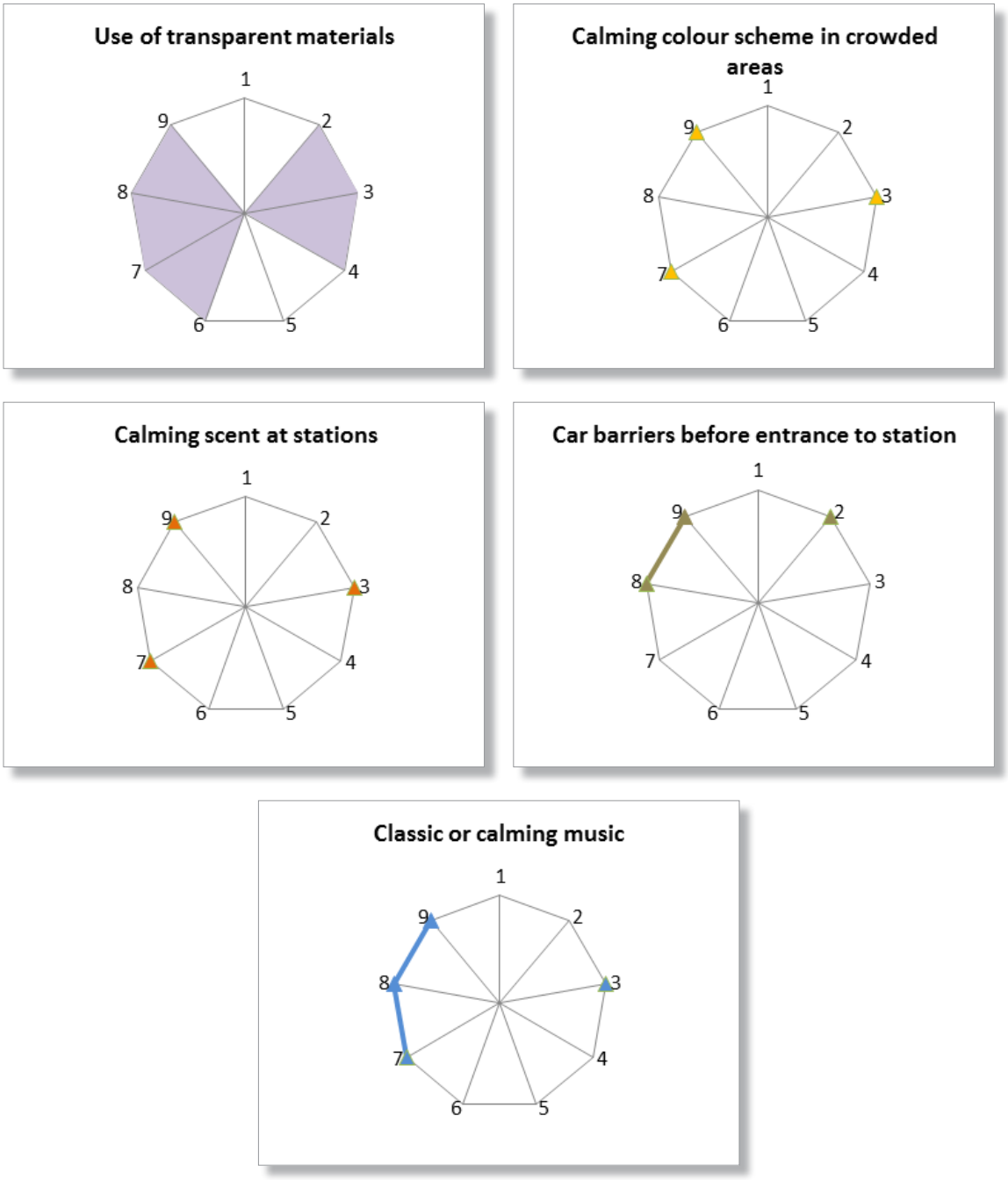


Fig. 1.8. Localisation of security tools related to design, construction and ambience by clients' route

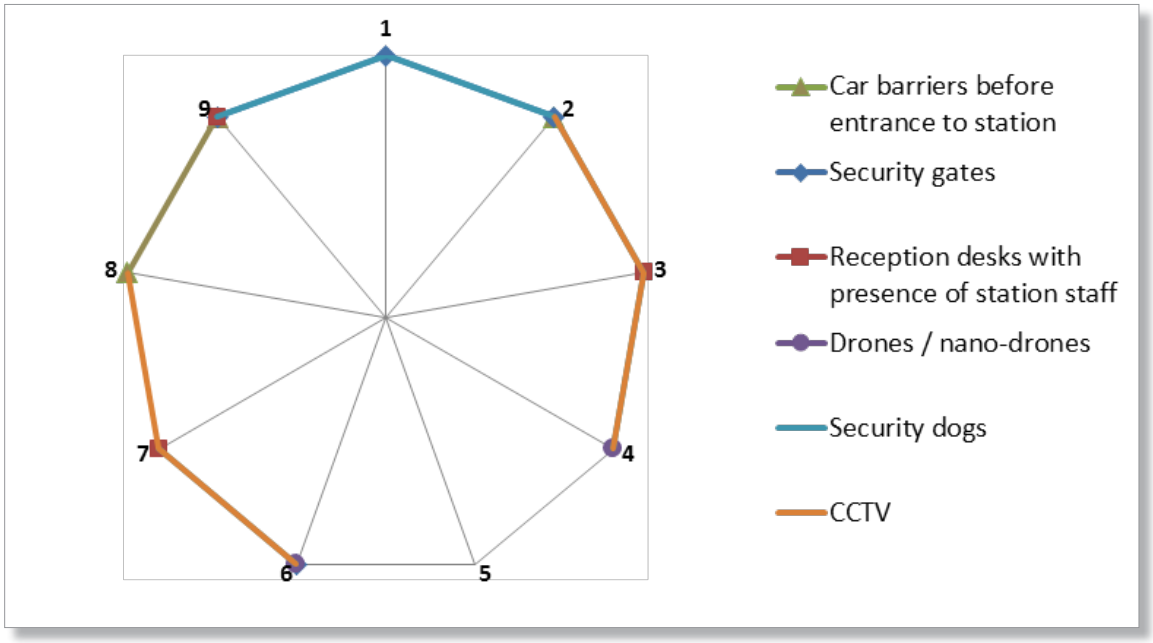


Fig. 1.9. Example of security tools combination

The figure above is an example. The combination of security tools differs from country to country and also takes into account station type and the environment.

For the **third stage of formalized analysis**, all tools have divided into groups according to the following features:

1) Necessity of technical means;
2) Necessity of special staff (being presented directly at stations);
3) Visibility to clients;
4) Perceptibility for clients.

4 groups were forms based on combination of these features:

1) **Super hard station security tools** – requiring both special equipment and presence of specially trained staff, visible and perceptible for clients.
2) **Hard station security tools** – requiring either special equipment or special staff, visible for clients, but not always perceptible for them.
3) **Soft station security tools** – not requiring special technical means or staff, but visible for clients[2].
4) **Super soft security tools** - not requiring special technical means or staff and not visible for clients, by precepted by them. The name of this group – super soft – does not mean that these tools are always accepted by the clients. For example, there are discussions about necessity of audio informing about possible terrorist attacks. But as this kind information is transferred in a such a light way (invisible one), its influence is not so strong to be precepted in a completely negative way. On the other hand, in case this or similar information is vital and must reach the customers, such soft solution may not be enough.

Group 1. Super hard station security tools		Tool type	Spectrum of objectives	Necessity of special technical means	Necessity of special / additional staff (at stations)	Visibility for clients	Perceptibility by clients
1	Luggage screening with special technical means	technical	2	+	+	+	+
2	Manual metal detectors	technical	2	+	+	+	+
3	Passenger screening with special technical means	technical	2	+	+	+	+
4	Security dogs	technical	2	+	+	+	+
5	Security gates	technical	2	+	+	+	+

Table 1.1. Group 1. Super hard station security tools

2. As video information transfer principle usually attracts more auditorium, rather than just audio or other.

Group 2. Hard station security tools		Tool type	Spectrum of objectives	Necessity of special technical means	Necessity of special / additional staff (at stations)	Visibility for clients	Perceptibility by clients
1	Body cameras for staff with direct translation	technical	4	+	-	+	-
2	CCTV	technical	4	+	-	+	-
3	CCTV with videoanalytics	technical	4	+	-	+	-
4	Detectors of dangerous chemical or biological articles	technical	2	+	+	+	-
5	Drones / nano-drones	technical	2	+	+	+	-
6	Emergency / help applications for passengers	technical	3	+	-	+	+
7	Emergency / help point for passengers at stations	technical	3	+	-	+	+
8	Explosion-proof containers	technical	1	+	-	+	-
9	Explosives detectors	technical	2	+	+	+	-
10	Presence of police staff	human factor	4	-	+	+	+
11	Presence of rail (not related to security) staff in special uniform	human factor	4	-	+	+	+
12	Presence of security staff (rail security, private security agencies)	human factor	4	-	+	+	+
13	Radiometers / dosimeters	technical	2	+	+	+	-
14	Reception desks with presence of station staff	human factor	4	-	+	+	+
15	Video recorders for staff without direct translation	technical	3	+	-	+	-

Table 1.2. Group 2. Hard station security tools

Group 3. Soft station security tools		Tool type	Spectrum of objectives	Necessity of special technical means	Necessity of special / additional staff (at stations)	Visibility for clients	Perceptibility by clients
1	Calming colour scheme in crowded areas	design, construction and ambience	1	-	-	+	+
2	Car barriers before entrance to station	design, construction and ambience	1	-	-	+	-
3	Pre-designed signage for evacuation	human factor	1	-	-	+	+
4	Use of transparent materials	design, construction and ambience	2	-	-	+	+
5	Video informing about actions in case of terrorist attacks	human factor	1	-	-	+	+
6	Video informing about security procedures at stations	human factor	1	-	-	+	+

Table 1.3. Group 3. Soft station security tools

Group 4. Super soft station security tools		Tool type	Spectrum of objectives	Necessity of special technical means	Necessity of special / additional staff (at stations)	Visibility for clients	Perceptibility by clients
1	**Audio informing about actions with unattended luggage**	human factor	1	-	-	-	+
2	**Audio informing about pickpocketing**	human factor	1	-	-	-	+
3	**Audio informing about possible terrorist attacks**	human factor	1	-	-	-	+
4	**Calming scent at stations**	design, construction and ambience	1	-	-	-	+
5	**Classic or calming music**	design, construction and ambience	1	-	-	-	+
6	**Prohibition of alcohol consumption at stations**	human factor	1	-	-	-	+
7	**Prohibition of alcohol sale at stations**	organisational and procedural	1	-	-	-	+

Table 1.4. Group 4. Super soft station security tools

A brief examination of this typology shows that hard and super hard security tools are usually “multi-functional”. Meanwhile, soft security is mainly limited by 1 or maximum 2 functions. This observation is important for both planning of security assurance (in terms of costs – benefits analysis) and for the future studies in the field of station security (regarding the development of new tools).

An interesting fact is that super hard security tools seem to have similar limitations. Expensive and complicated equipment with a limited life-cycle, like X-Ray machines, are used only for prevention and detection and, besides have limited localization at stations either in the entrance or in the boarding zones.

TYPOLOGY OF STATIONS BY COMBINATION OF TOOLS

Each company chooses different measures and related tools for further analysis within this study: to assure security at stations and on railway transport in general. Not only stations of different countries or companies differ by tool sets, but also stations of the same company or country may have different tool sets according to their sizes or roles.

The overview of existing cases leads to the following typology.

1) Stations with use of super hard security tools:
- These stations have localized areas of higher security (located at entrances or in the areas before boarding) being simultaneously areas of passenger concentration;
- Tool set with super hard tools divides stations into different zones, at least one of them being a “clean” or “checked” one[3];
- Super hard security tool set needs additional tools to cover all clients’ route;
- This type is usually organized when security measures should be perceived by clients.

2) Stations with privileged use of soft or super soft security tools:
- Normally super soft and soft station security tools cover only selected areas of stations, a preliminary analysis of the most suitable localization and combination is necessary;
- This type is usually organized when security measures should not be visible to clients or when use of expensive technical means or additional staff is not possible.

3) Stations with mix of hard and soft security tools:
- This type includes station with different combinations of soft and hard tools without extremums, that is to say without super hard tools and not focused only at soft security.

3 With some specifics for security dogs tool.

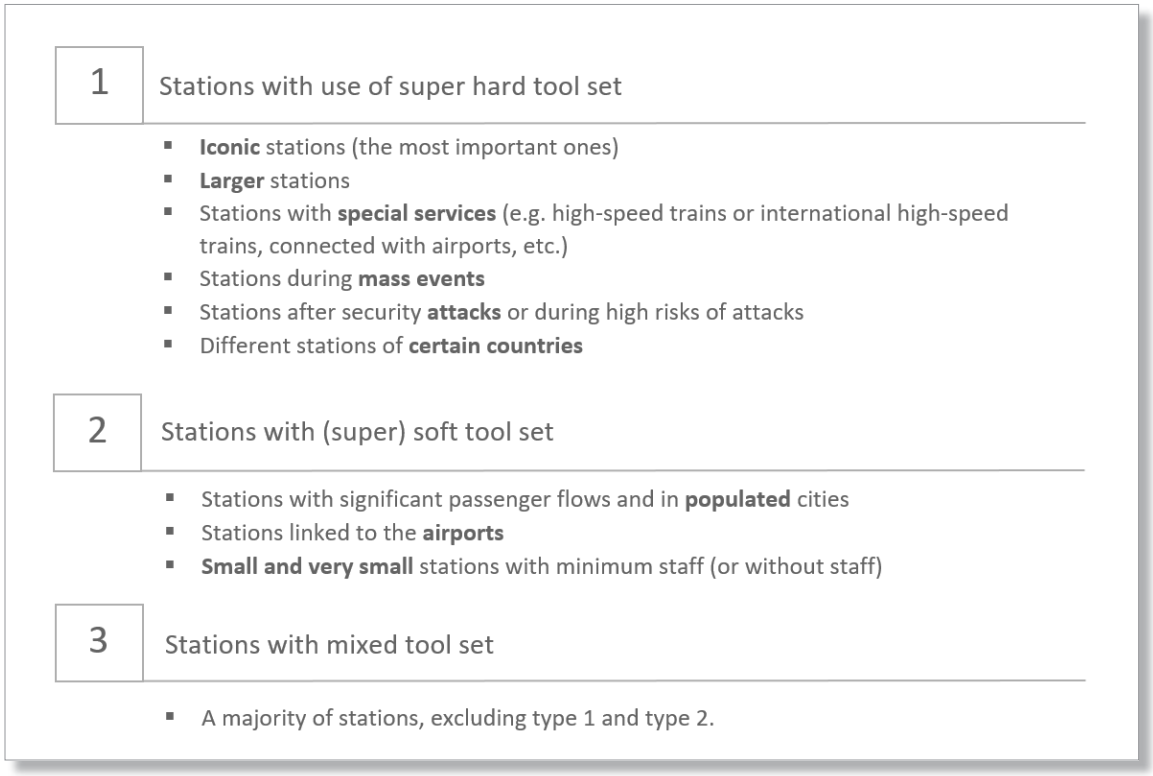


Fig. 1.10. Typology of stations by combination of tools

The first type is the easiest to define, as it is the yet the rarest one and it can be attributed to specific countries or regions. Of course, a mixed type of 1 and 2 (super hard + super soft) can exist, especially at larger stations, but for the purposes of this study types are studied in a separate way.

CHAPTER 2.
ANALYSIS OF SECURITY TOOLS' IMPACT ON STATION MANAGEMENT

1. Definition of areas of station management for analysis.

Within the framework of station operations and tendencies of stations integration into the city environment several main station management areas may be defined:

- Passenger flows (changes, slow down, etc.);
- Commerce at station;
- Connection to the surroundings or urban environment (station link to the city);
- Perception of security;
- General satisfaction of clients.

These areas cover in the most full and structured way both operational (connected to the transport function) and commercial spheres, as well as both inner processes and outer integration to the surroundings.

2. Analysis of impact by tools (tools profiles and measures to change the profiles).

A dedicated survey has been carried out to examine different practices in the field of security provision and security tools' influence on different areas of station management.

Experts from such companies as IEC, Israel Railways, Azerbaijan Railways, NMBS-SNCB, Slovenian Railways Slovenske Železnice, Czech Railways ČD, SNCF, KORAIL, ProRail, HŽ Cargo, PKP S.A. - Polish State Railways, SBB CFF FFS, DB Station&Service AG, MÁV, FS Italiane, RZD Passenger Stations Directorate took part in the survey. Experience of the following countries is thus presented: Azerbaijan, Belgium, Croatia, Czech Republic, France, Germany, Hungary, the Netherlands, Poland, Russia, Slovenia, South Korea, Switzerland and Italy. Such geographical cover allowed to consider both European and Asian experience.

53% of respondents are specialists in the sphere of security, other 47% are specialists in the sphere of station management and consultancy. Such proportion allows reaching a balance of positions regarding the subject.

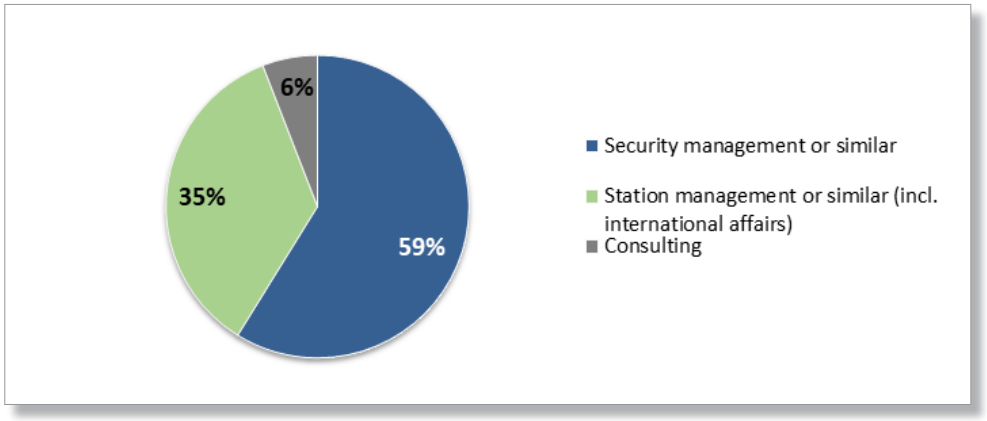


Fig. 2.1. Q3. Responsibilities within the company

The most part of respondents distinguished the difference of security tools for larger and smaller stations, and that is a justificative element for station typology presented in Chapter 1.

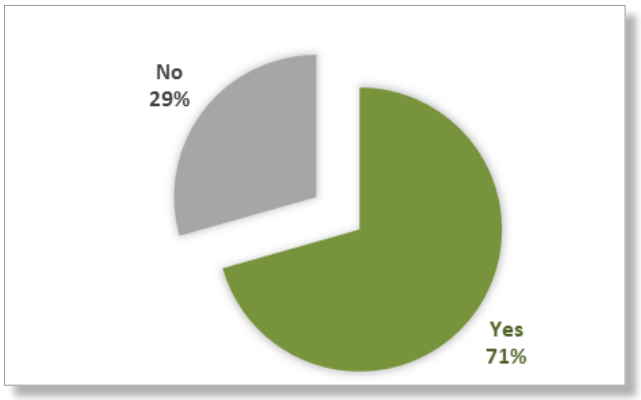


Fig. 2.2. Q4. Are there differences in security tools set for larger and smaller stations in your country?

The majority of respondents noted as well the use of additional measures and tools during certain periods related to the augmentation of passenger flows or to the raise of security risks.

That means that station types are not permanent and they may change according to the periods. This fact is also included in the typology in Chapter 1.

In many cases security measures are raised during mass events (in such situations growing passenger flows and number of station visitors are considered as an attractive objective for terrorist attacks and as an opportunity for unauthorized activities).

Security upgrade for certain periods means that during all other lifecycle the set of measures is not fully used, while only a reduced spectrum of tools is available. This may be caused by economic reasons, as well as by the further development of focus-on-client and societal approaches (stations as parts of the cities) demanding certain reduce of security measures which has an impact on comfort of clients or station business.

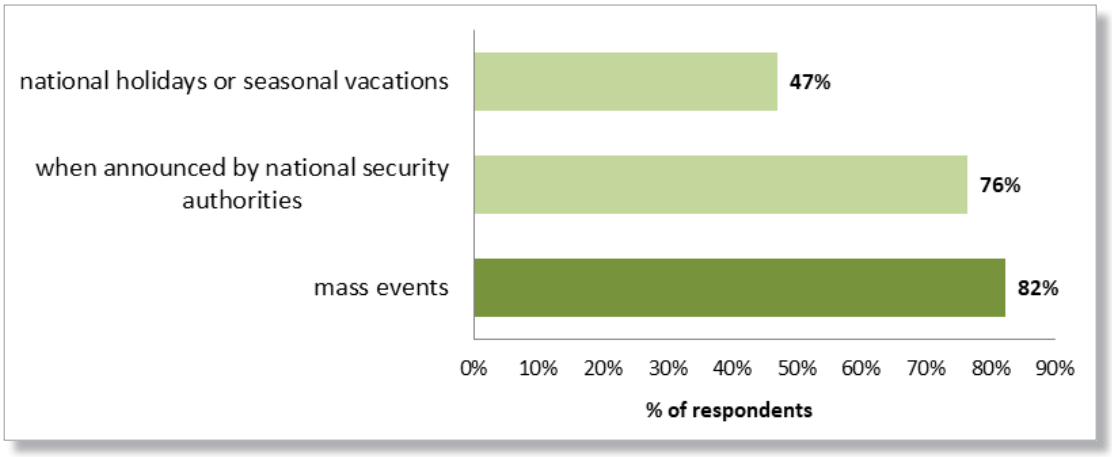


Fig. 2.3. Q5. Are there additional security tools used or measures taken at stations during special periods?

Most of respondents suppose that either security measures should be visible to clients, or a balance of visible and invisible tools should be found. On the one hand, a fact of visibility is a prevention and, on the other hand, it creates a right perception of security.

It is interesting that most **experts in station security** consider that measures should be definitely **visible**, whilst **experts in station management** vote mainly **for balanced solutions**.

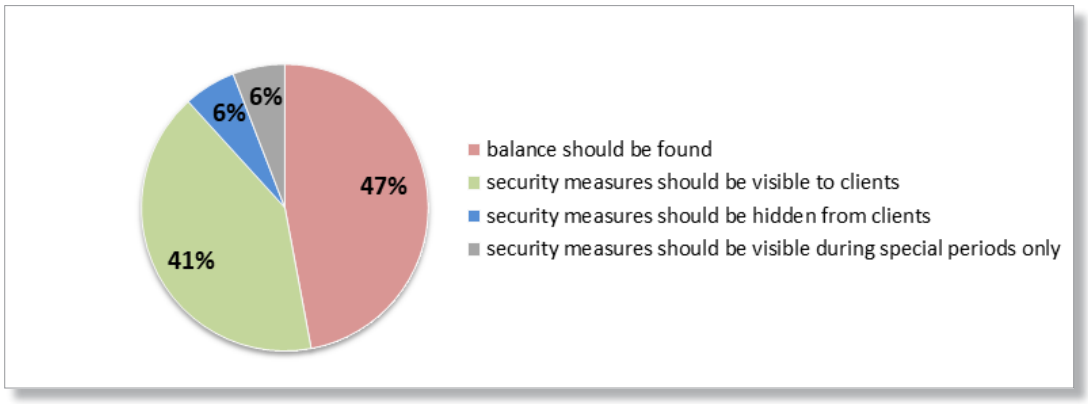


Fig. 2.4. Q6. What is the attitude of your company or your security regulating bodies to the perception of clients?

About 80% of respondents know that “right” colours, lightning, music and navigation signs from behaviouristic point of view may also be considered as security tools, or so called soft security tools. Whereas 56% of respondents say they are never used.

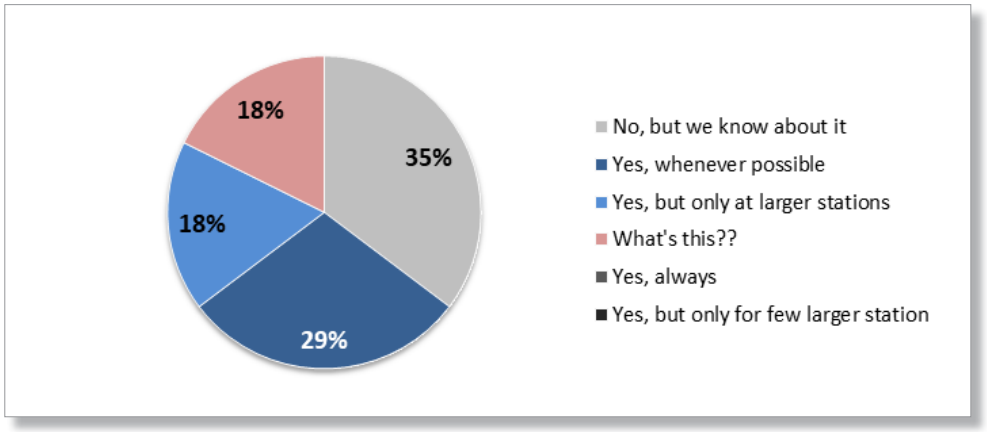


Fig. 2.5. Q7. Do you use soft security tools like colours, light, music, navigation?

Regarding the plans for future development of security measures and tools, almost 100% of respondents chose the focus on prevention. Also, attention is paid to the development of **digital technologies against current human factor** data transfer principle.

38% votes have got development of analytics and closure (or protection) of station perimeter. On the one hand, such position regarding the perimeter diminish the risks of unauthorized access inside the station and, thus, lessens the necessity of measures used within the station, on the other hand, such measures should be very well planned and organically applied to avoid discomfort for customers and negative impact on station integration into urban environment.

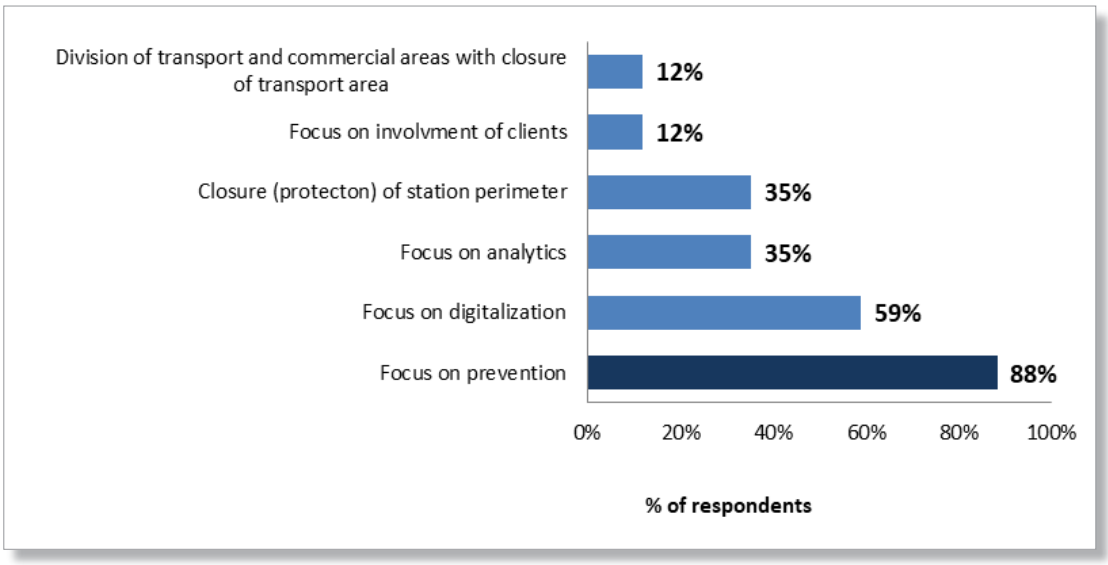


Fig. 2.6. Q8. What are you plans concerning the future of station security (even if imposed by security authorities)?

Following the tradition, the most of respondents (62%) have more confidence in “hard” security tools, which suppose either the use of special equipment, or the use of additional human resources. Only 25% vote for the necessity of new, more technological tools. These results are contradictory to the plans declared by the majority of respondents for Q8 – active implementation of digital technologies. The minimum attention is paid to soft security tools.

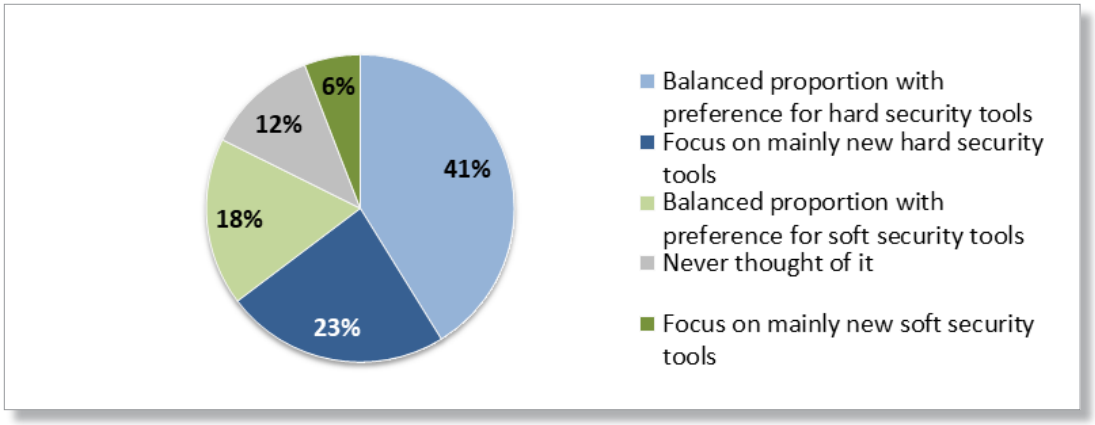


Fig. 2.7. Q9. What are your plans concerning new hard (traditional, with technical means, visible and perceptible for clients) and soft (without technical means, not disturbing clients) security tools?

Within this survey more than a half of respondents (62%) chose the image of the station as a secure area, the others suppose it to be a protected or specially protected area. Within the framework of modern integration into urban space it is no more considered to be closed.

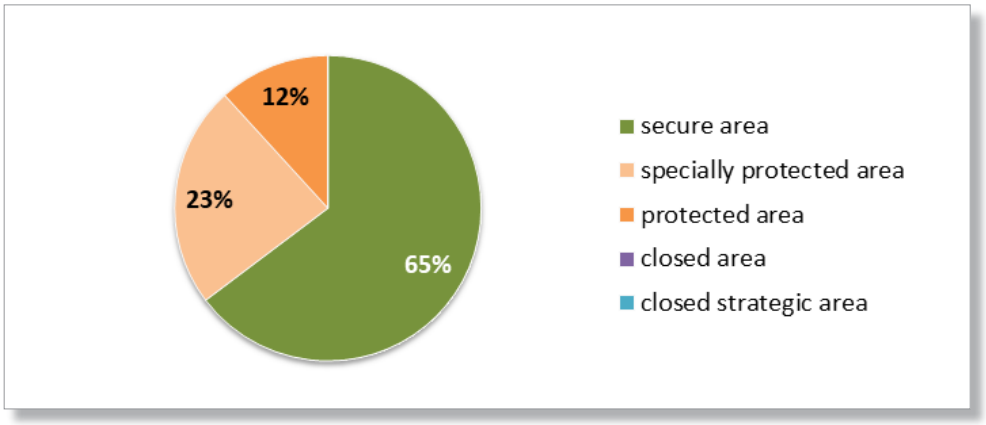


Fig. 2.8. Q10. Which expression fits the best your image of stations from security point of view?

Normally, all decisions regarding station security are taken in interaction with station managers. Still the opinion of security authorities has got dominant influence. And still there is a tendency of decision making without or even despite the position of clients. Decision-makers should thus pay more attention to the dialogue with customers which could lead to better understating of different measures for clients or to new compromise solutions.

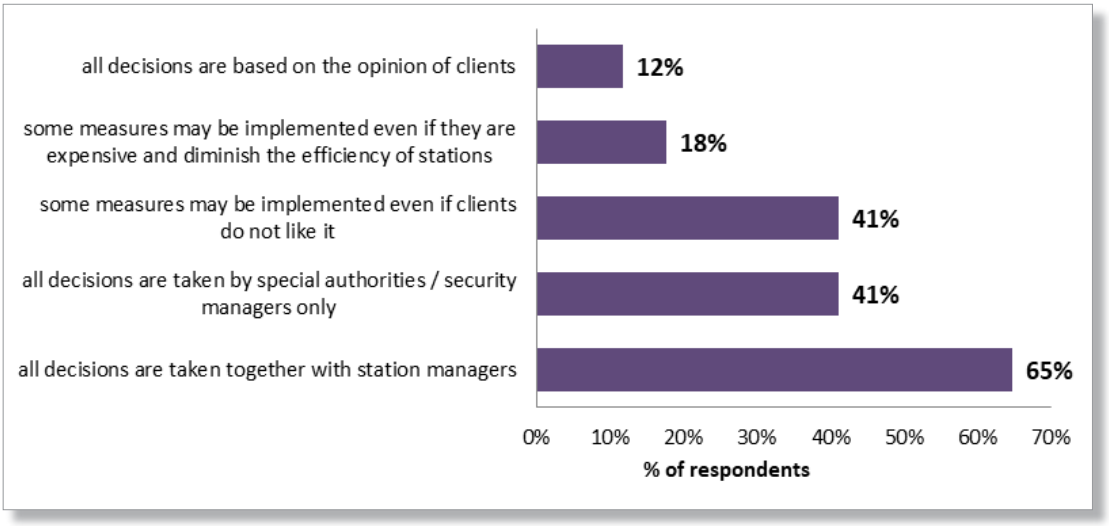
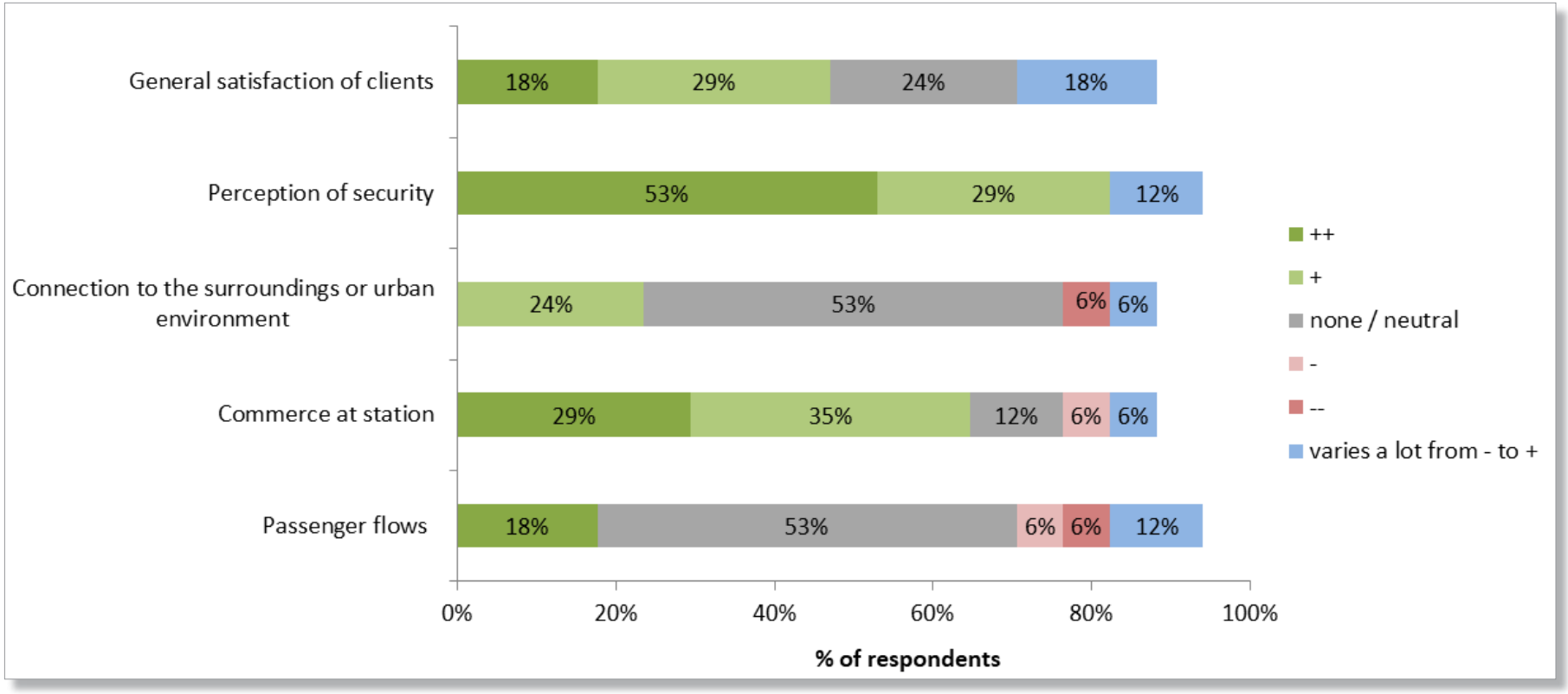


Fig. 2.9. Q11. What are the criteria for station security tools choice?

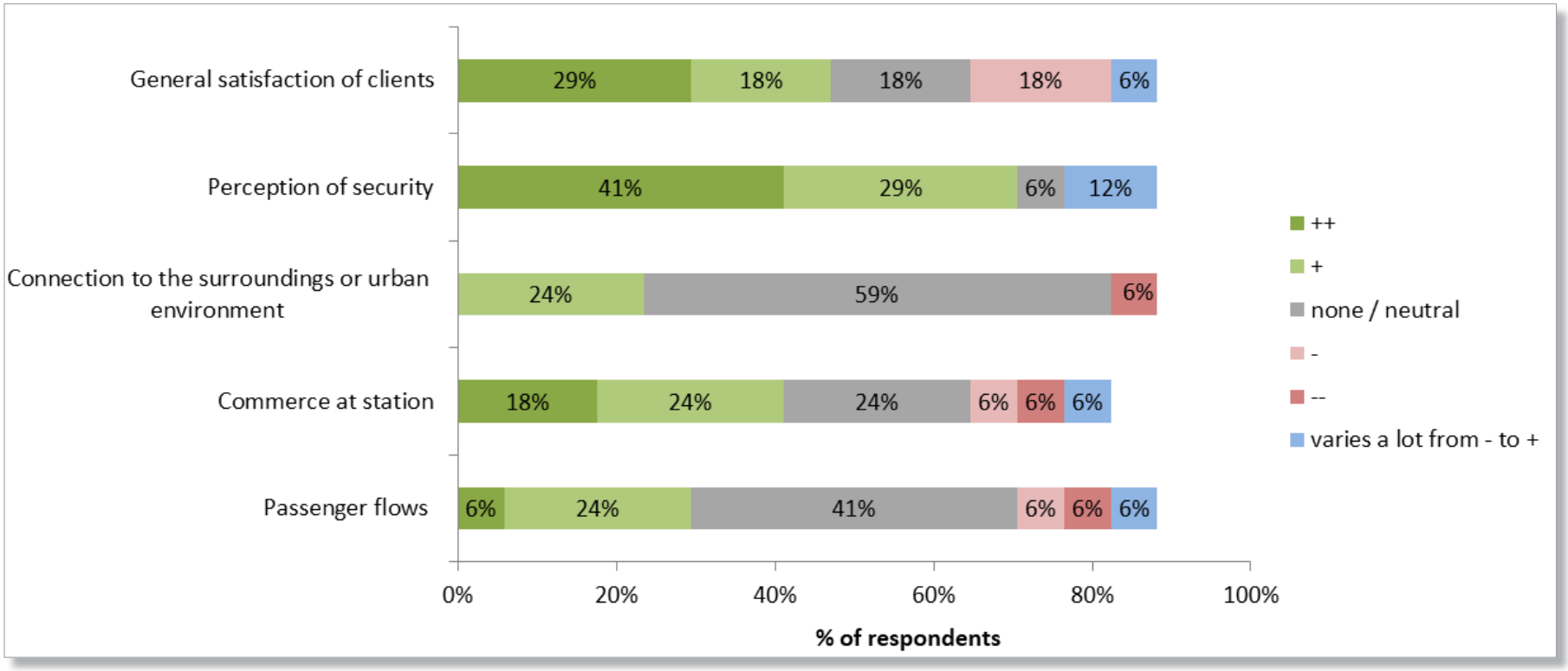
Following the results of the survey an evaluation of each tool's impact (positive or negative and the degree of impact) on main areas of station management was carried out.

Fig. 2.10. Q12-44. How would you estimate the general impact of the security tool?

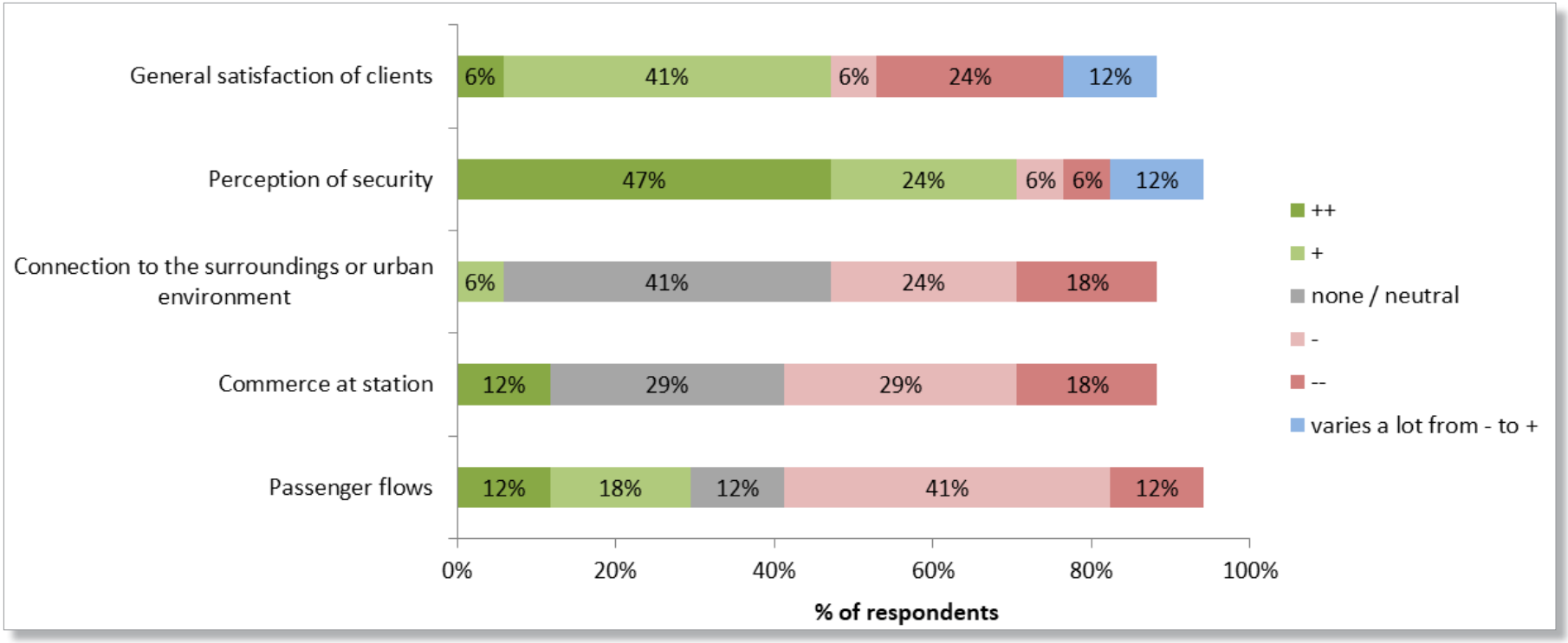
CCTV



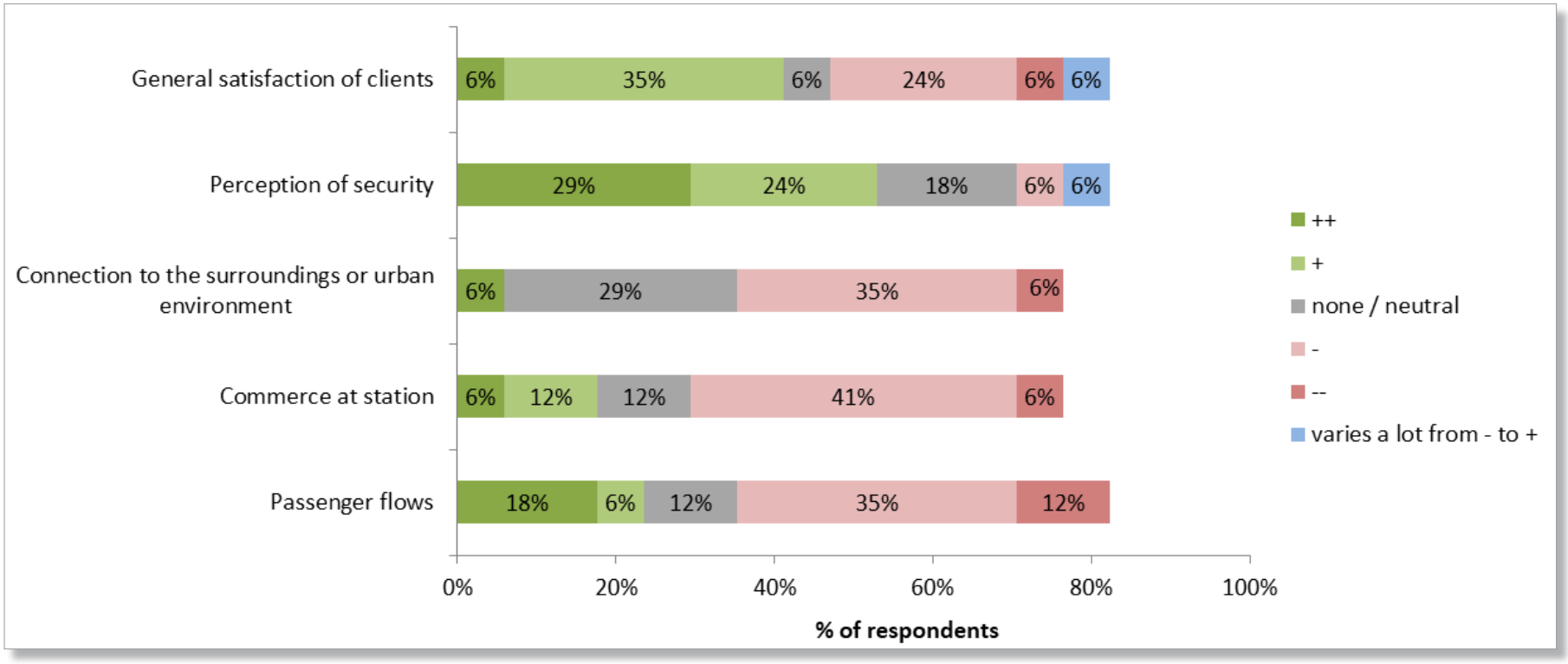
CCTV with videoanalytics



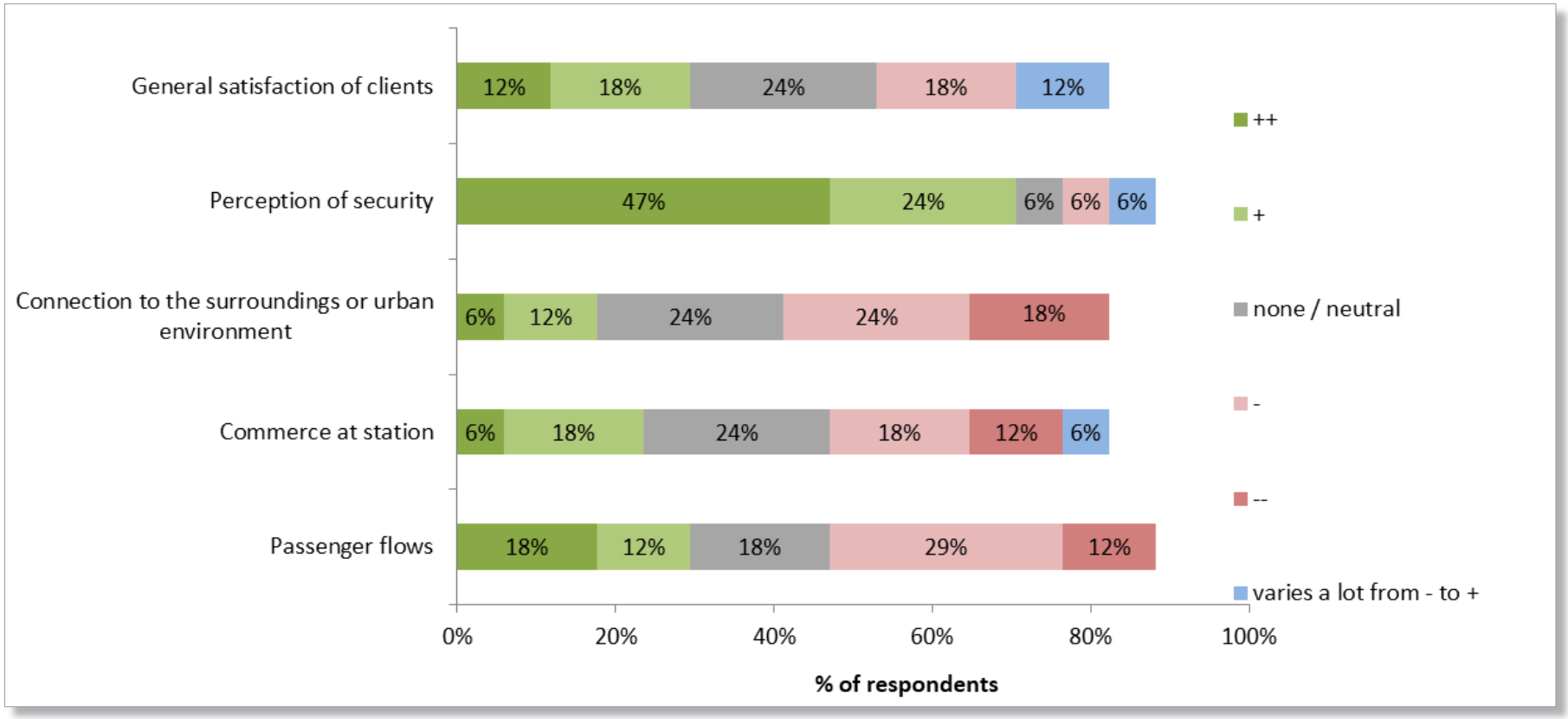
Luggage screening with special technical means



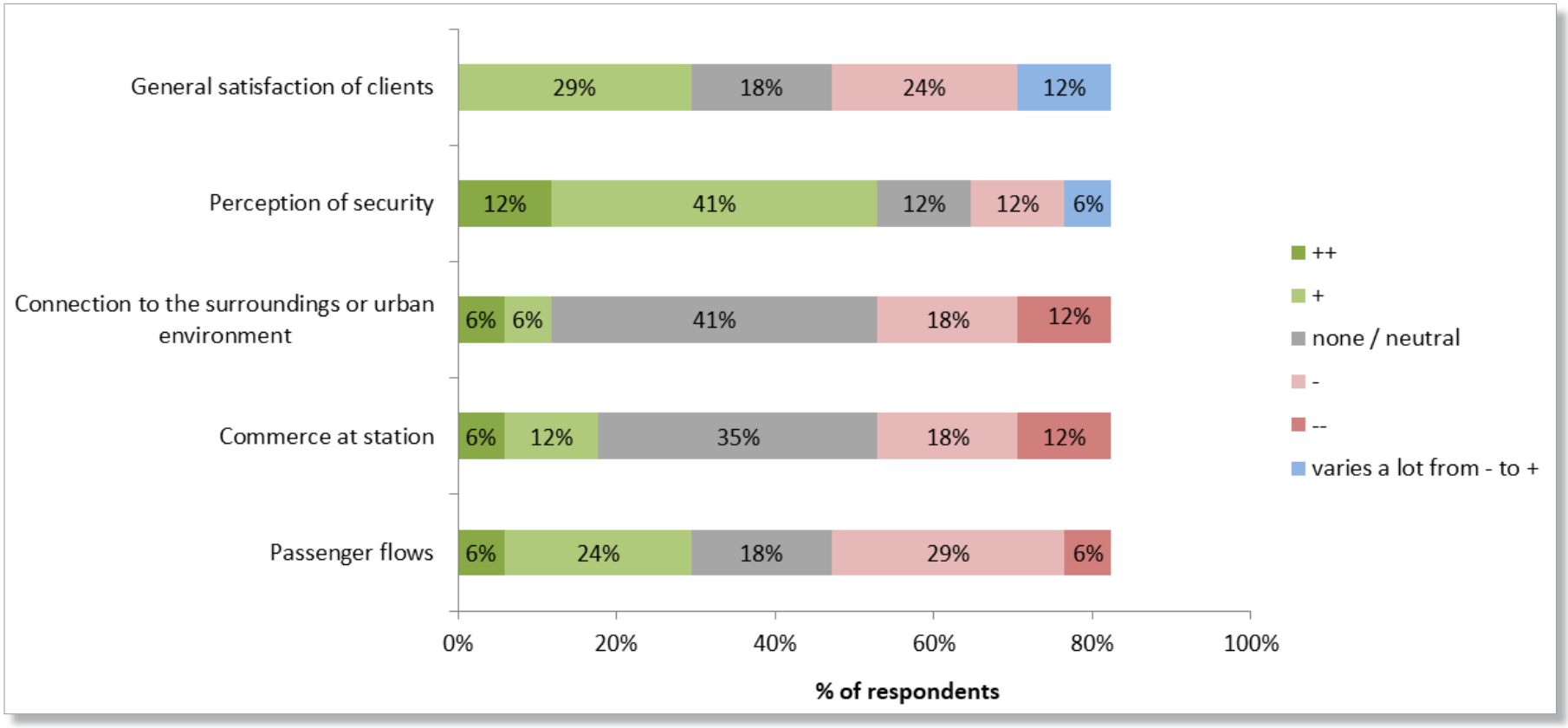
Passengers / visitors screening with special technical means



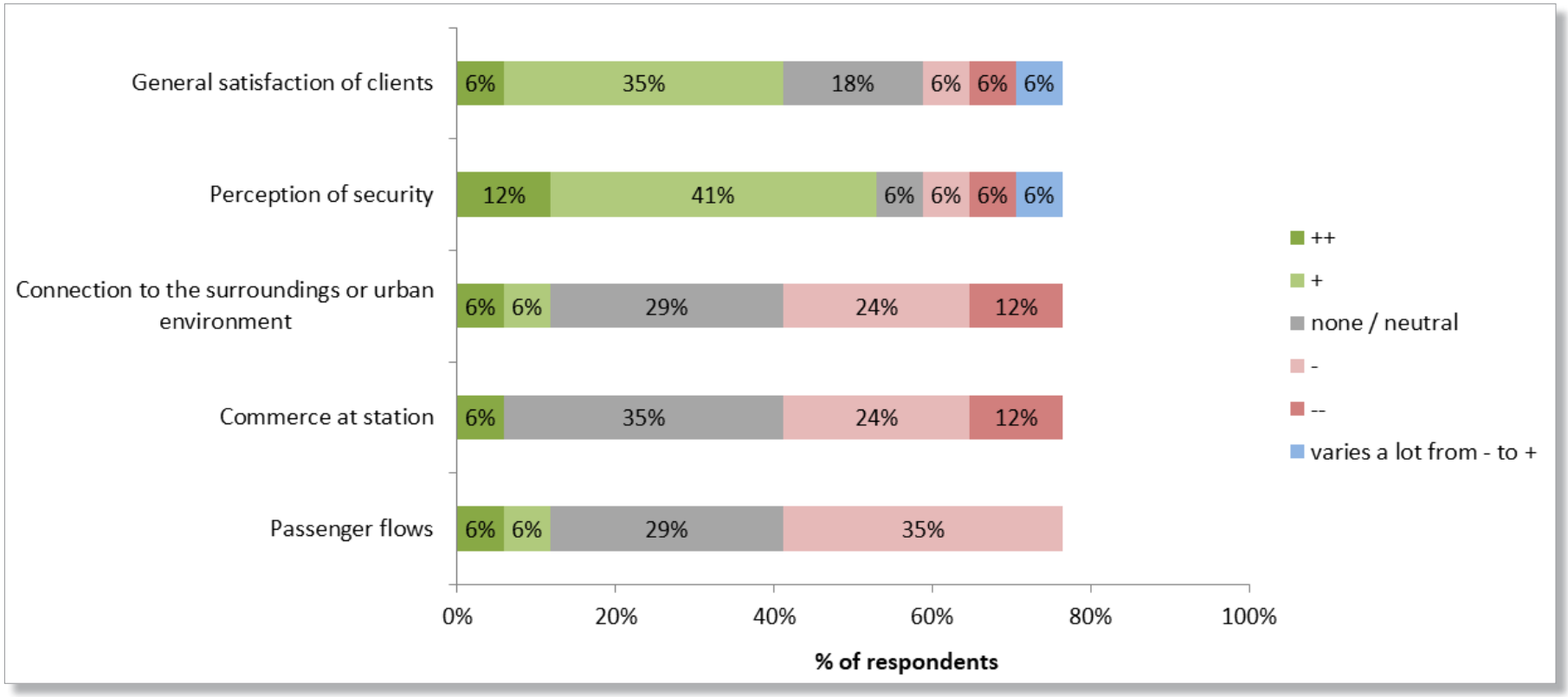
Security gates (stationary metal detectors)



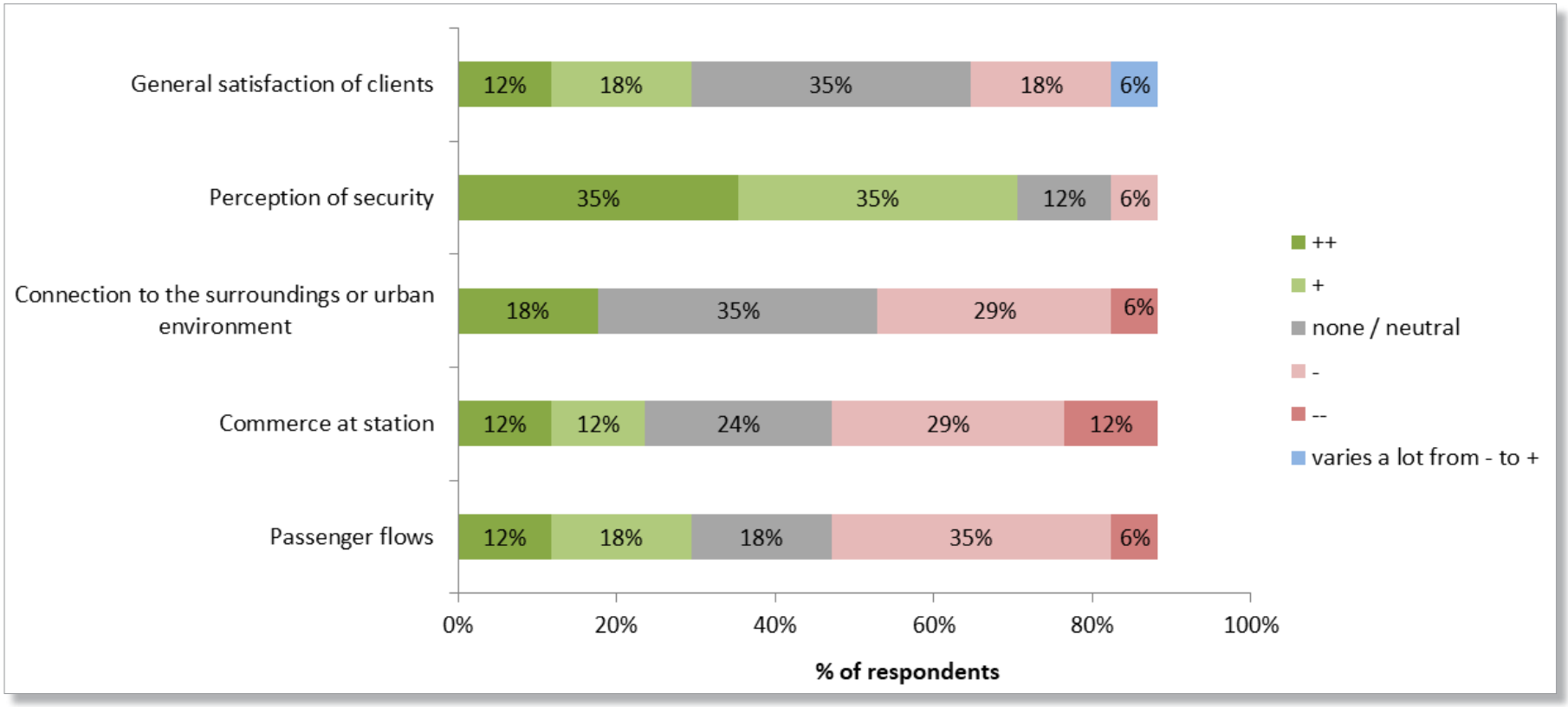
Manual metal detectors



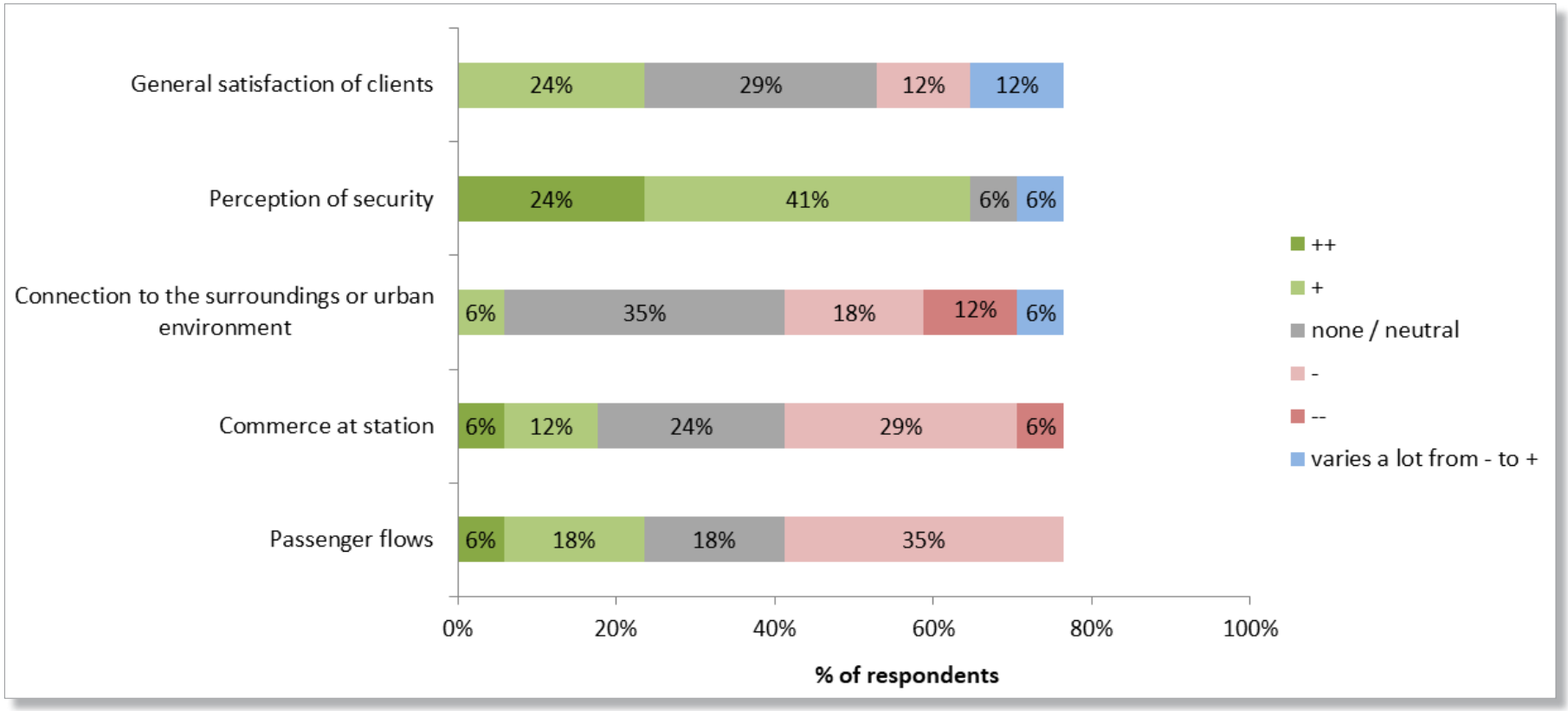
Radiometers and dosimeters



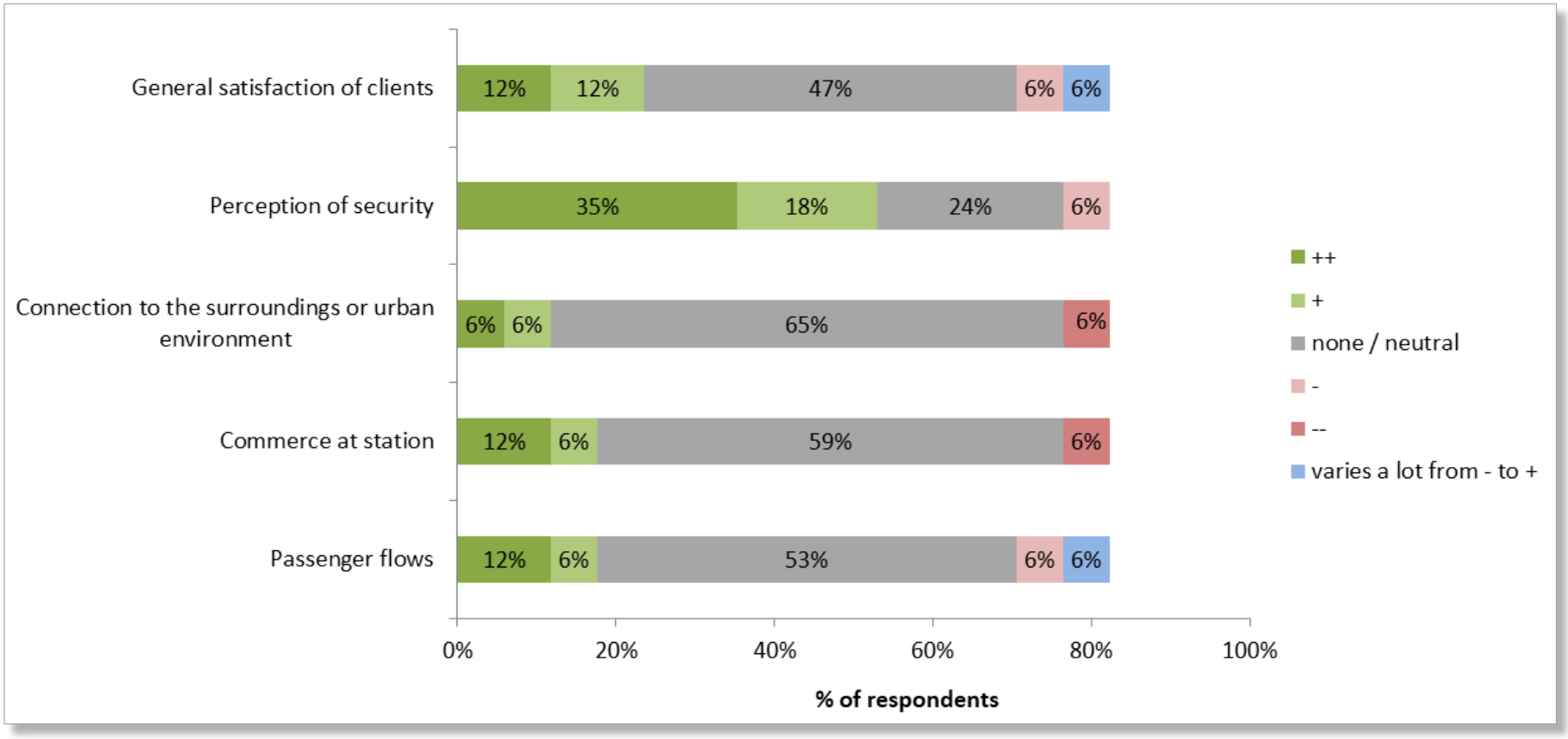
Explosives detectors



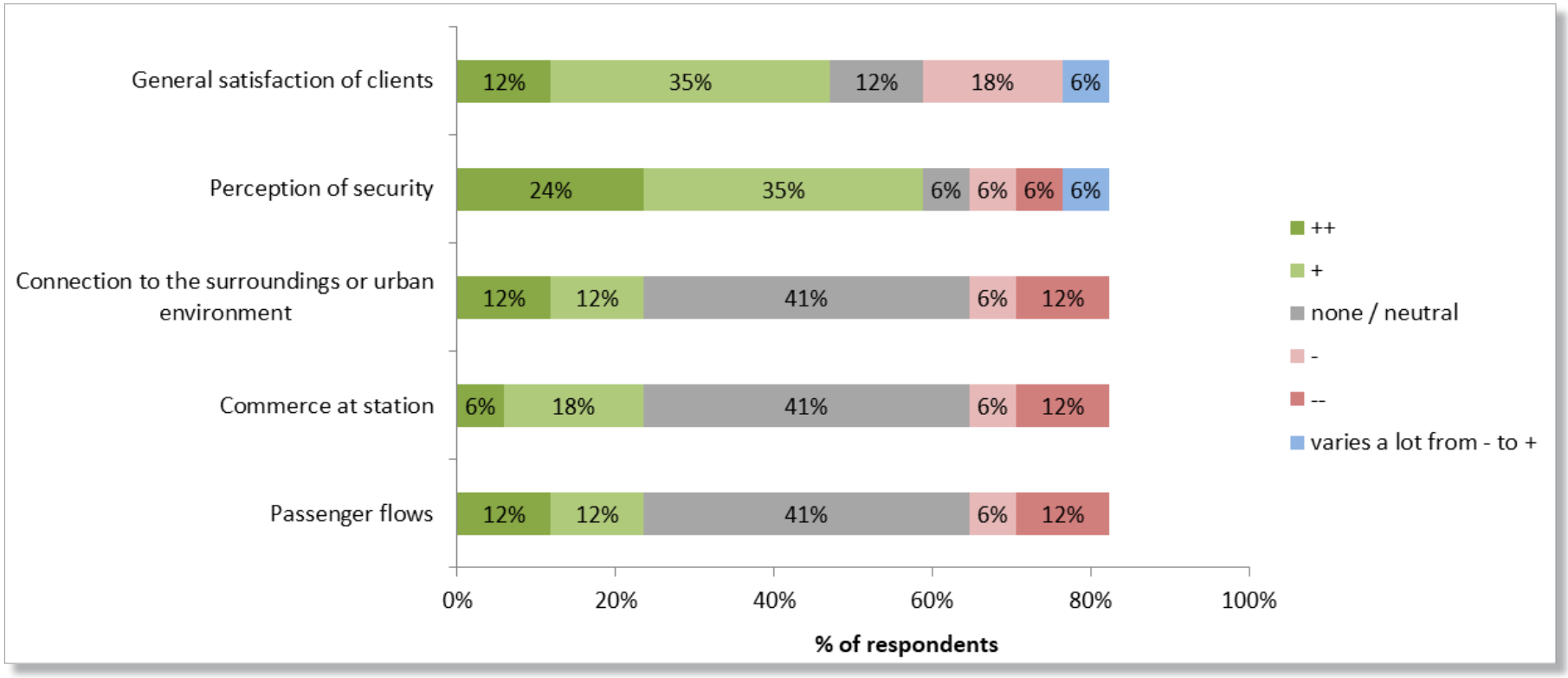
Detectors of dangerous chemical or biological articles



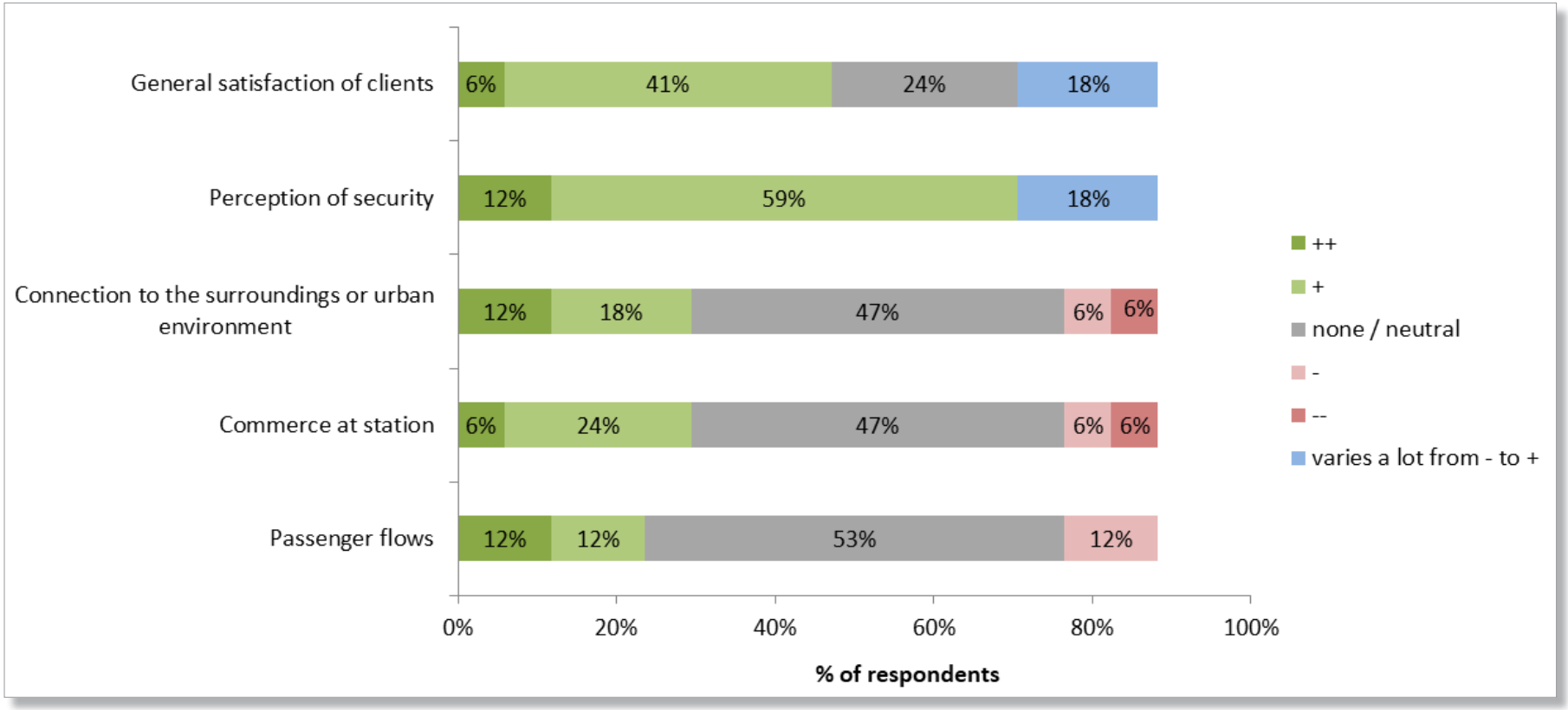
Explosition-proof containers



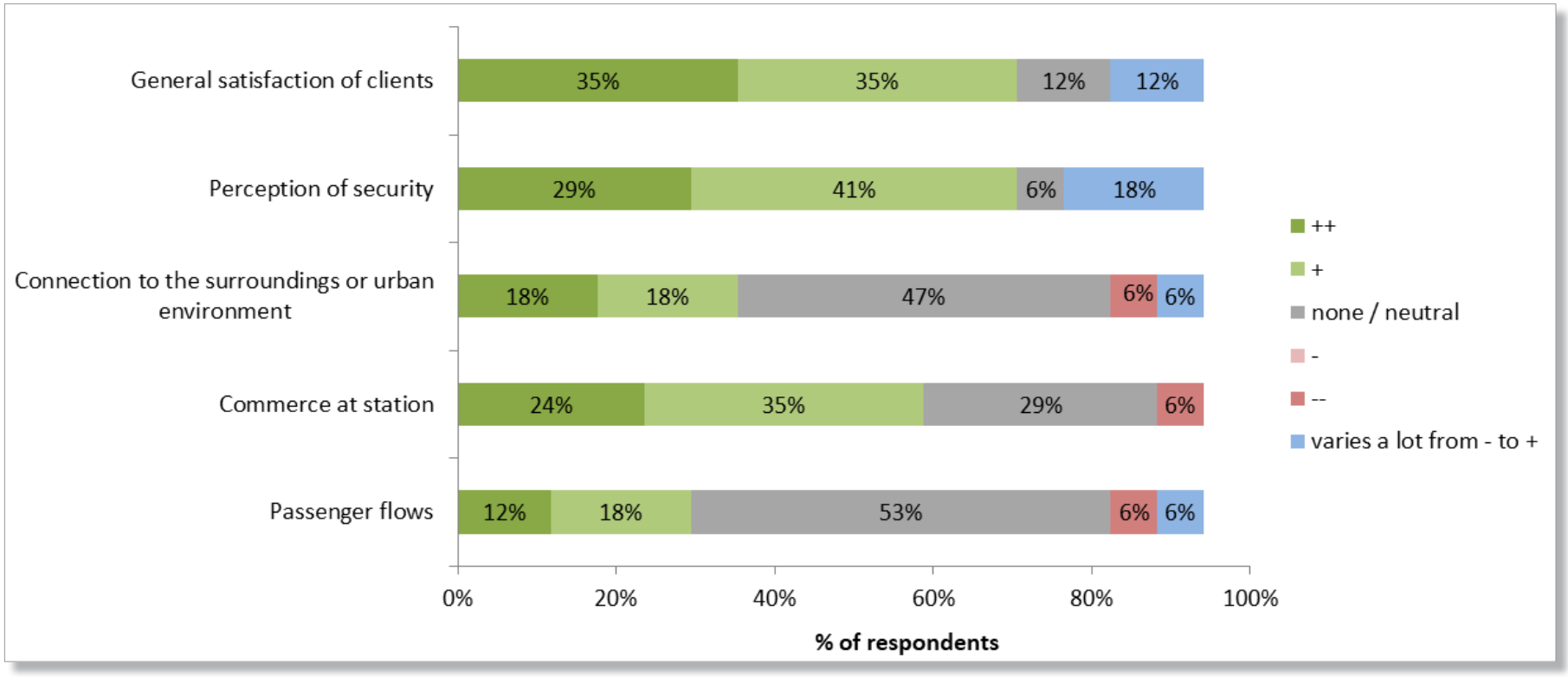
Drones / nano-drones to observe station facilities and platforms



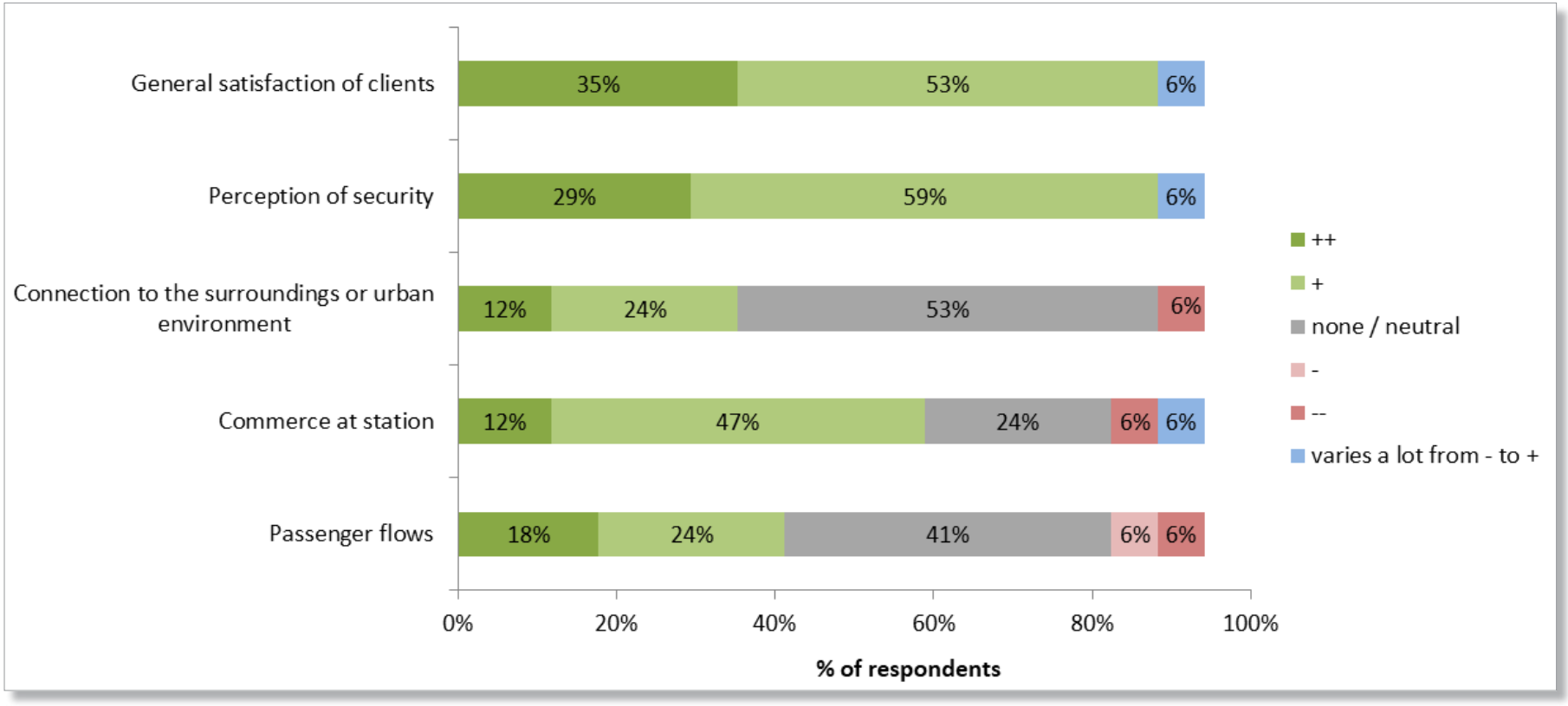
Security dogs



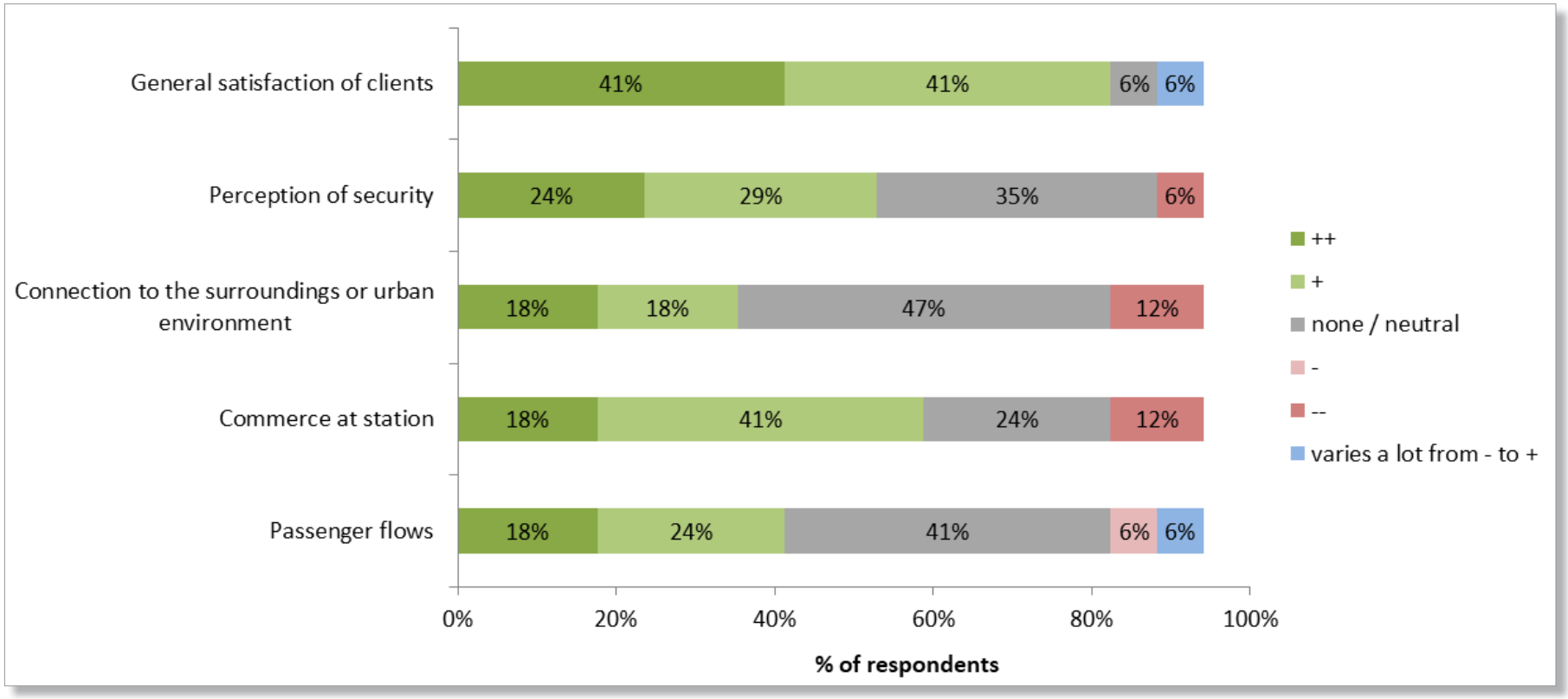
Presence of police staff



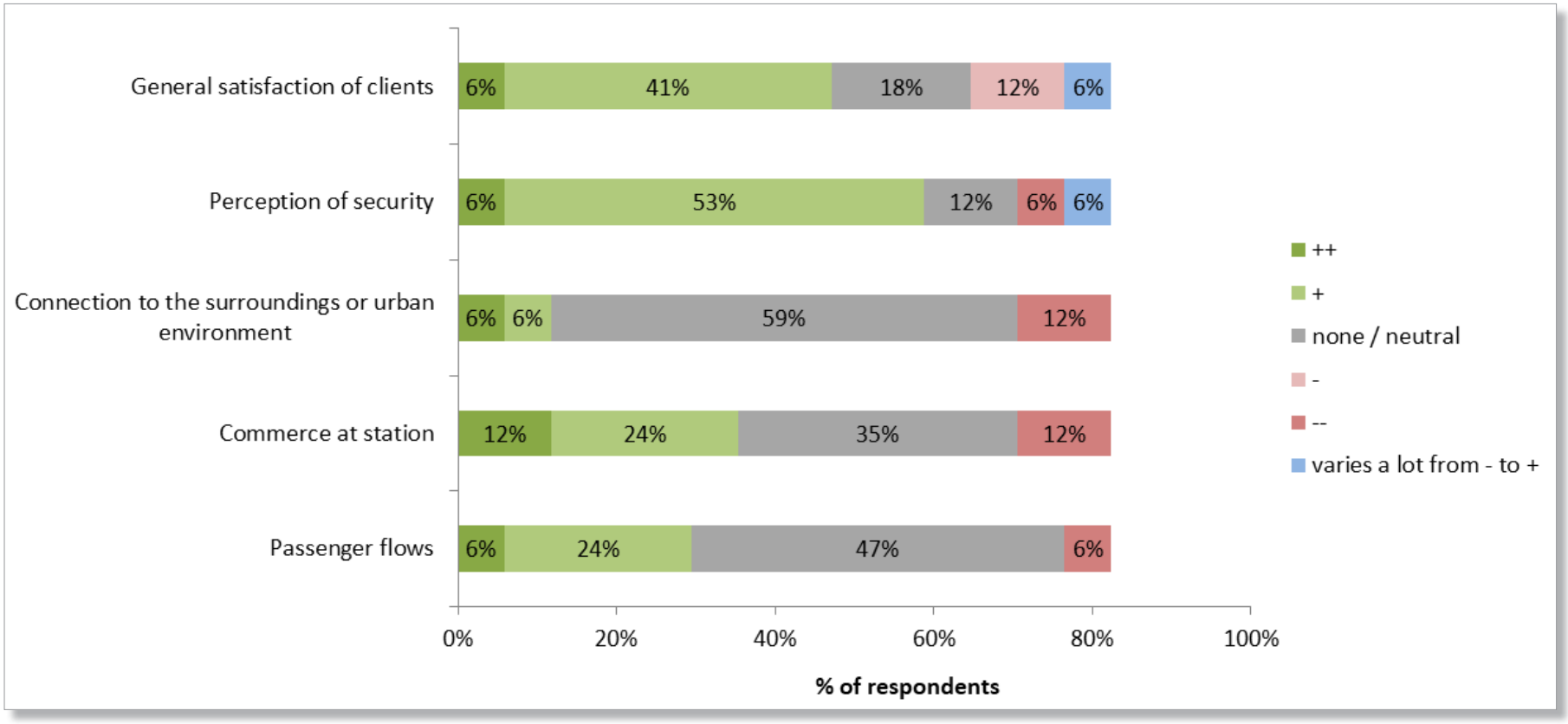
Presence of security (rail security, private security agencies) staff



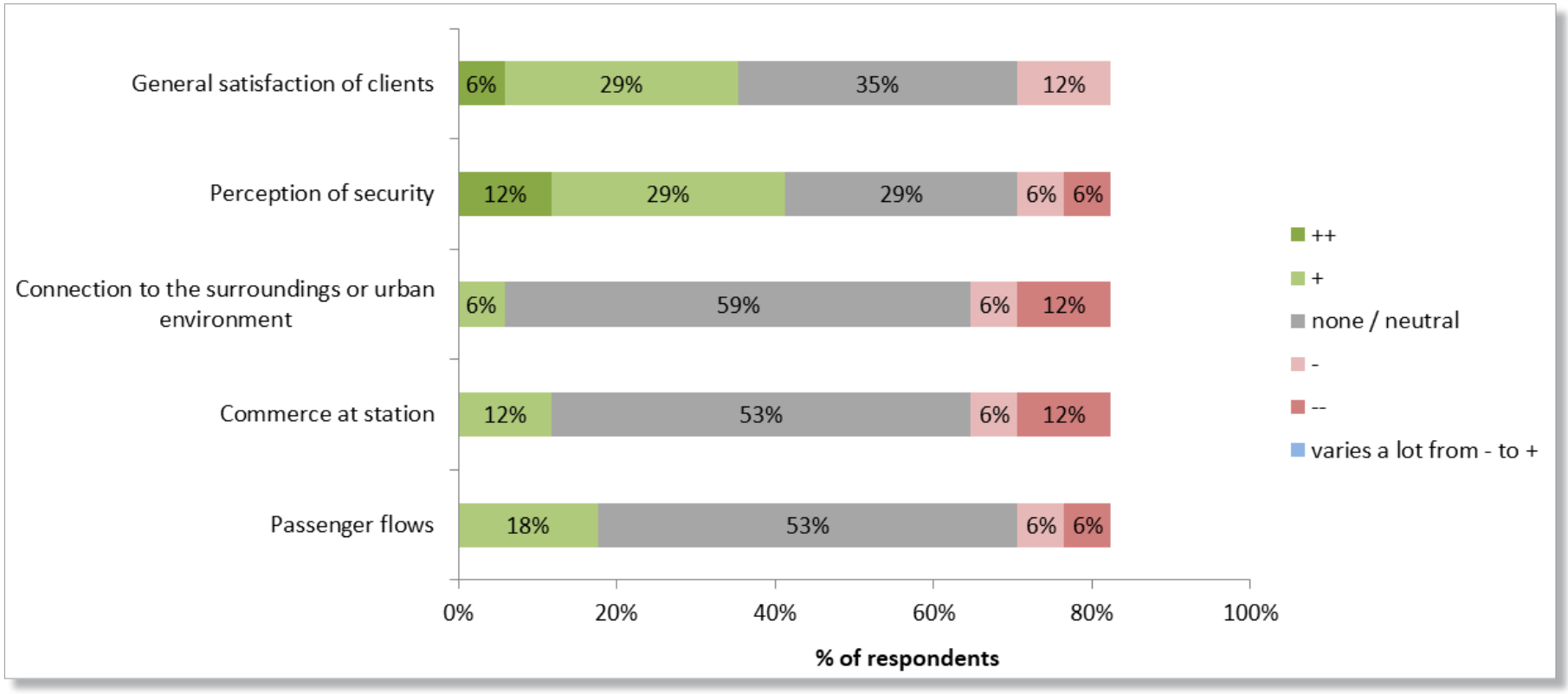
Presence of rail (not related to security) staff in special uniform



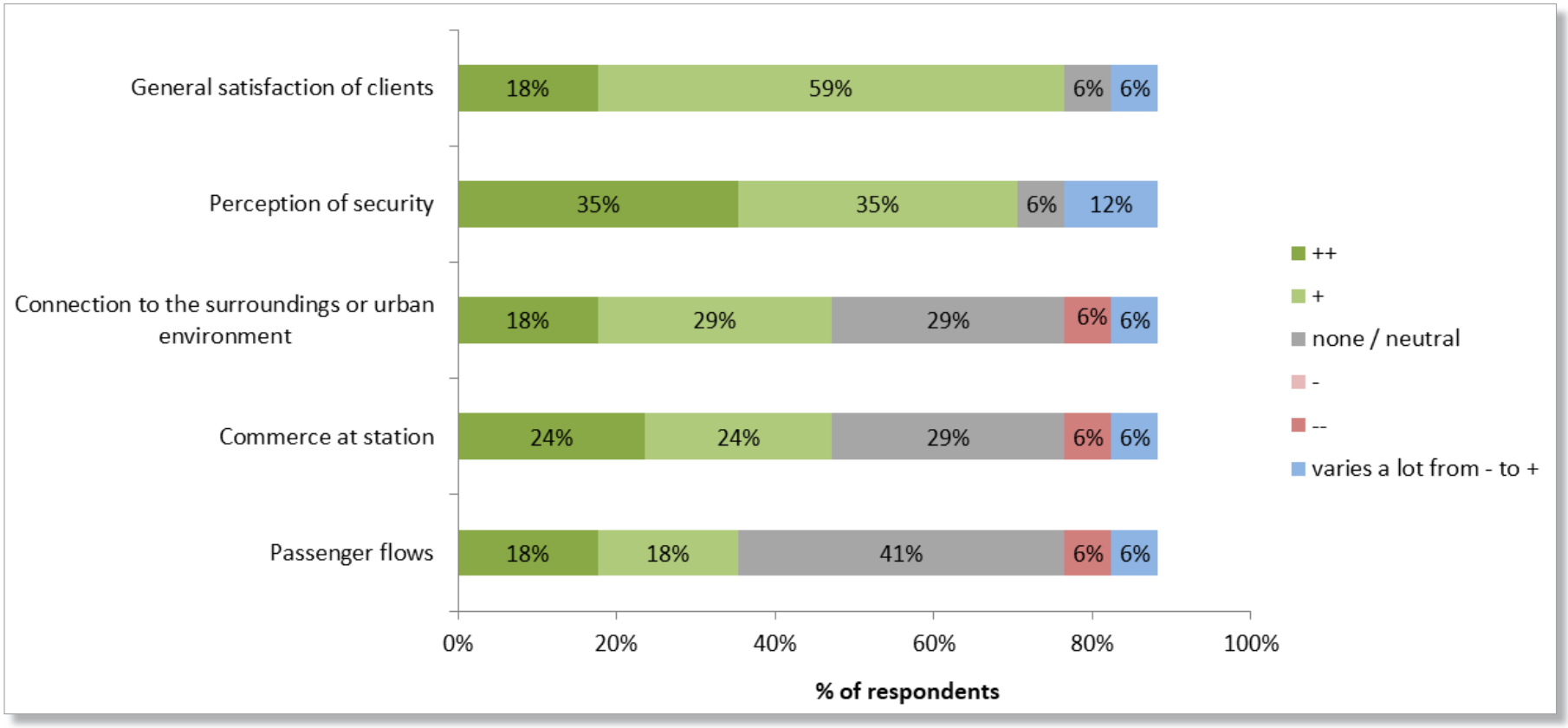
Body cameras for staff with direct translation



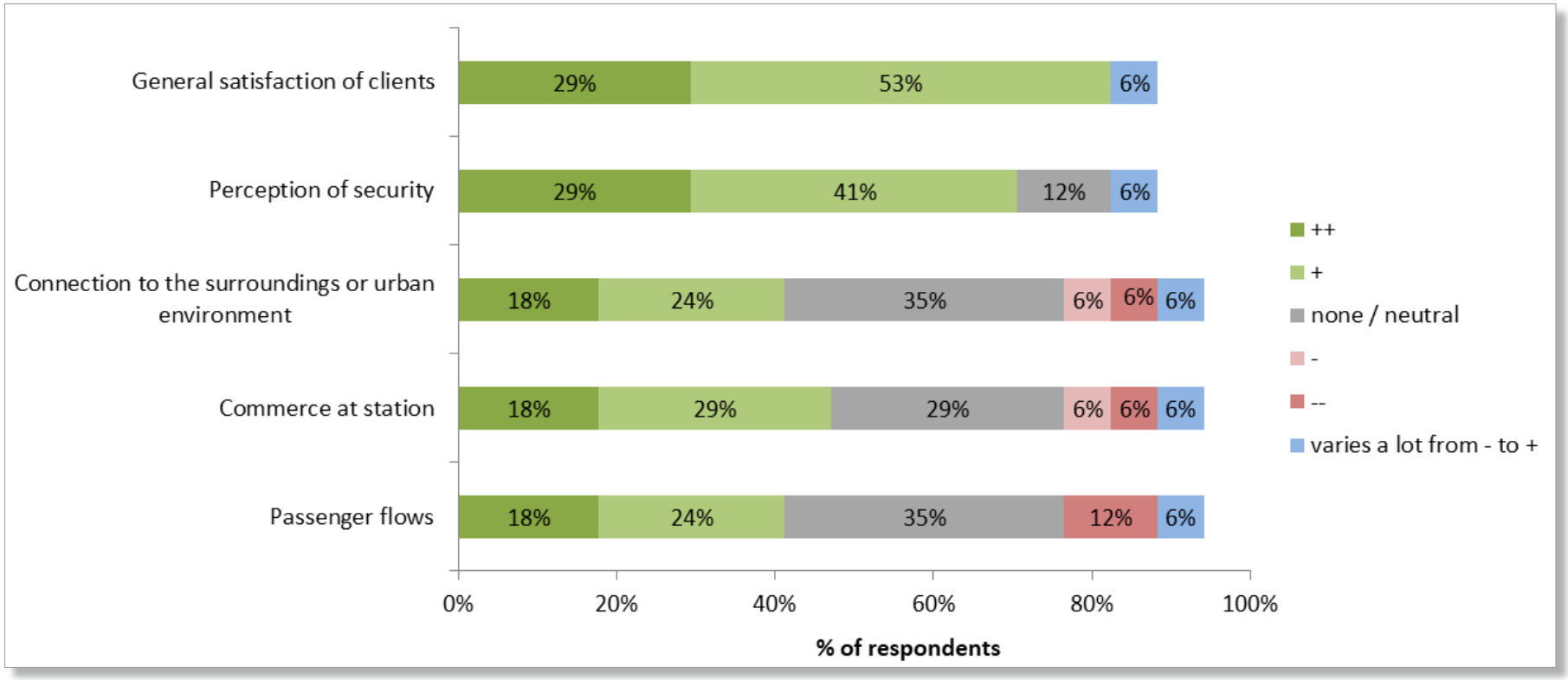
Audio and video recorders for staff without direct translation



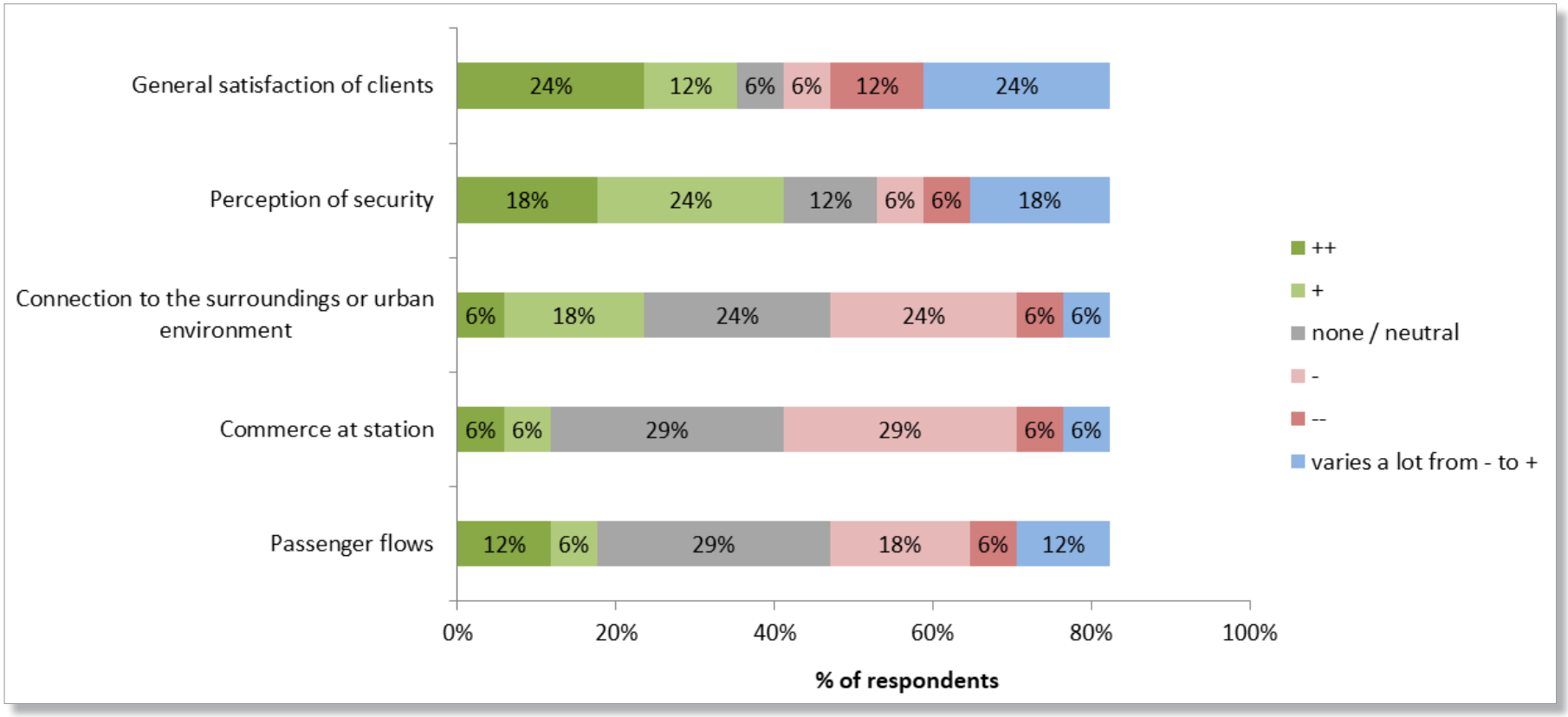
Emergency / help points for passengers at stations



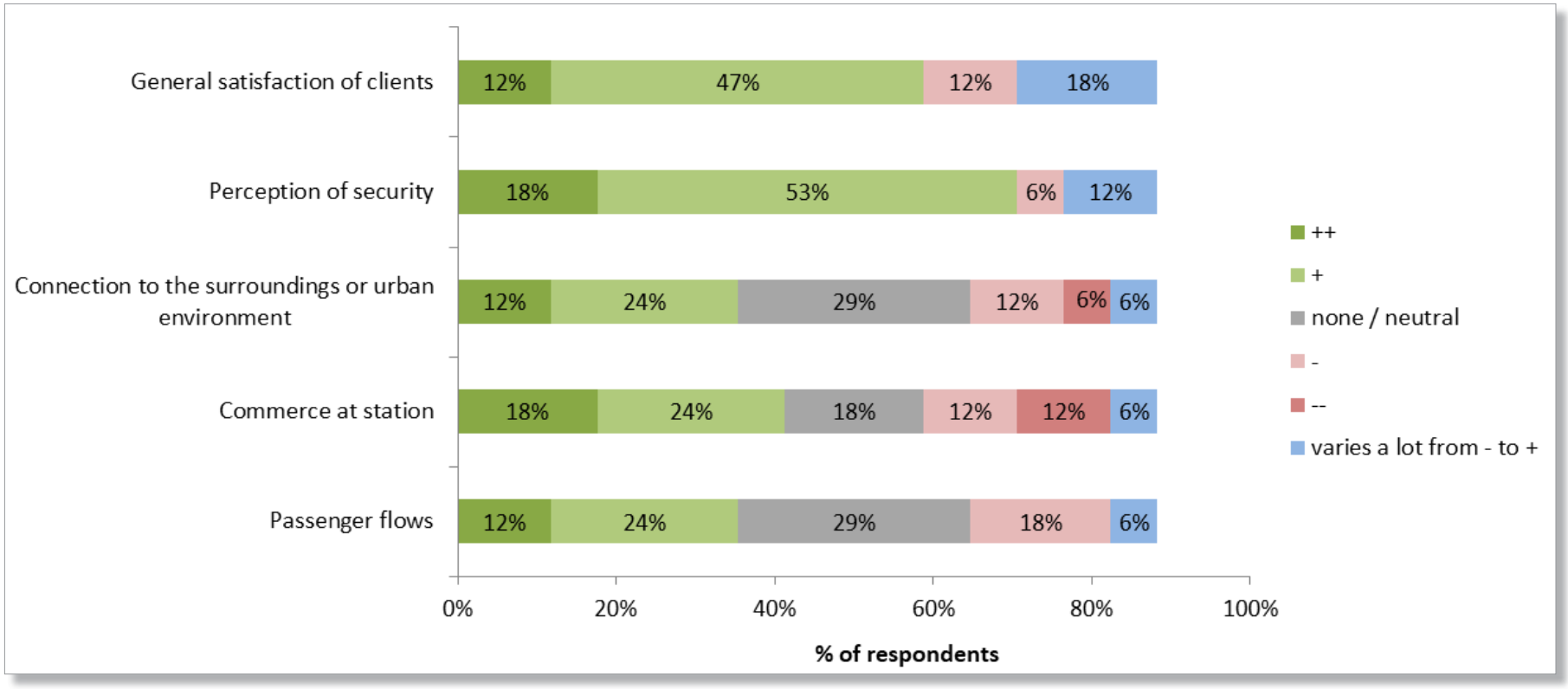
Emergency / help applications for passengers



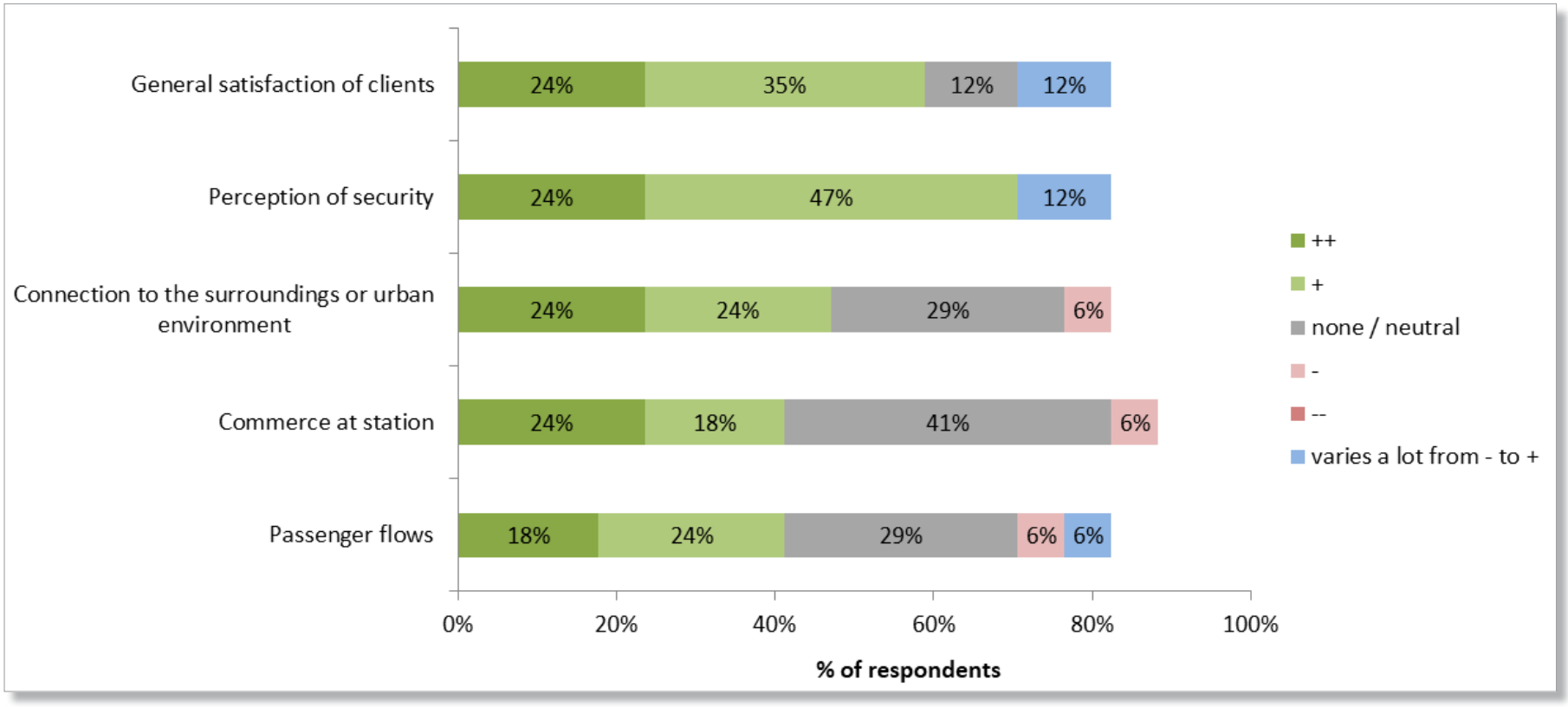
Audio informing about possible terrorist attacks



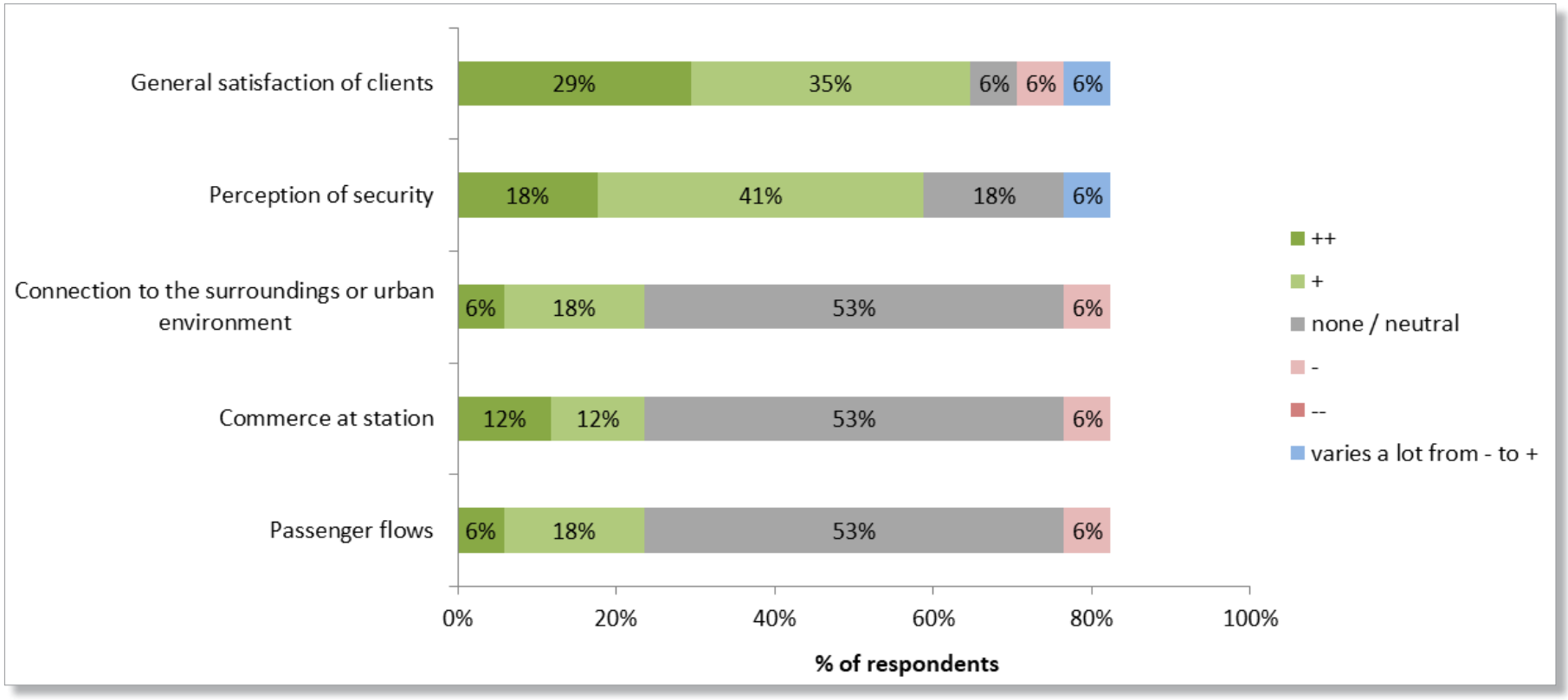
Audio informing about pickpocketing



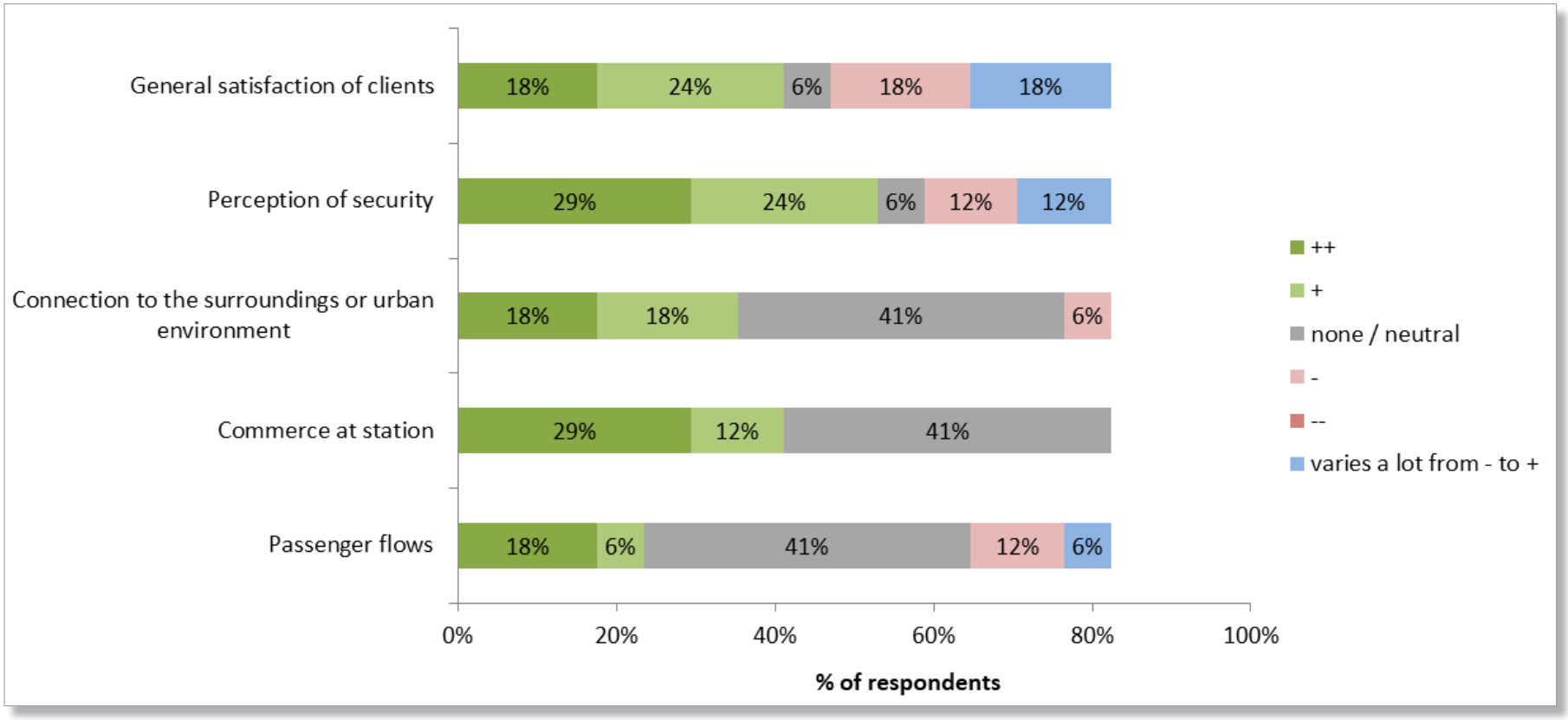
Audio informing about actions with unattended luggage



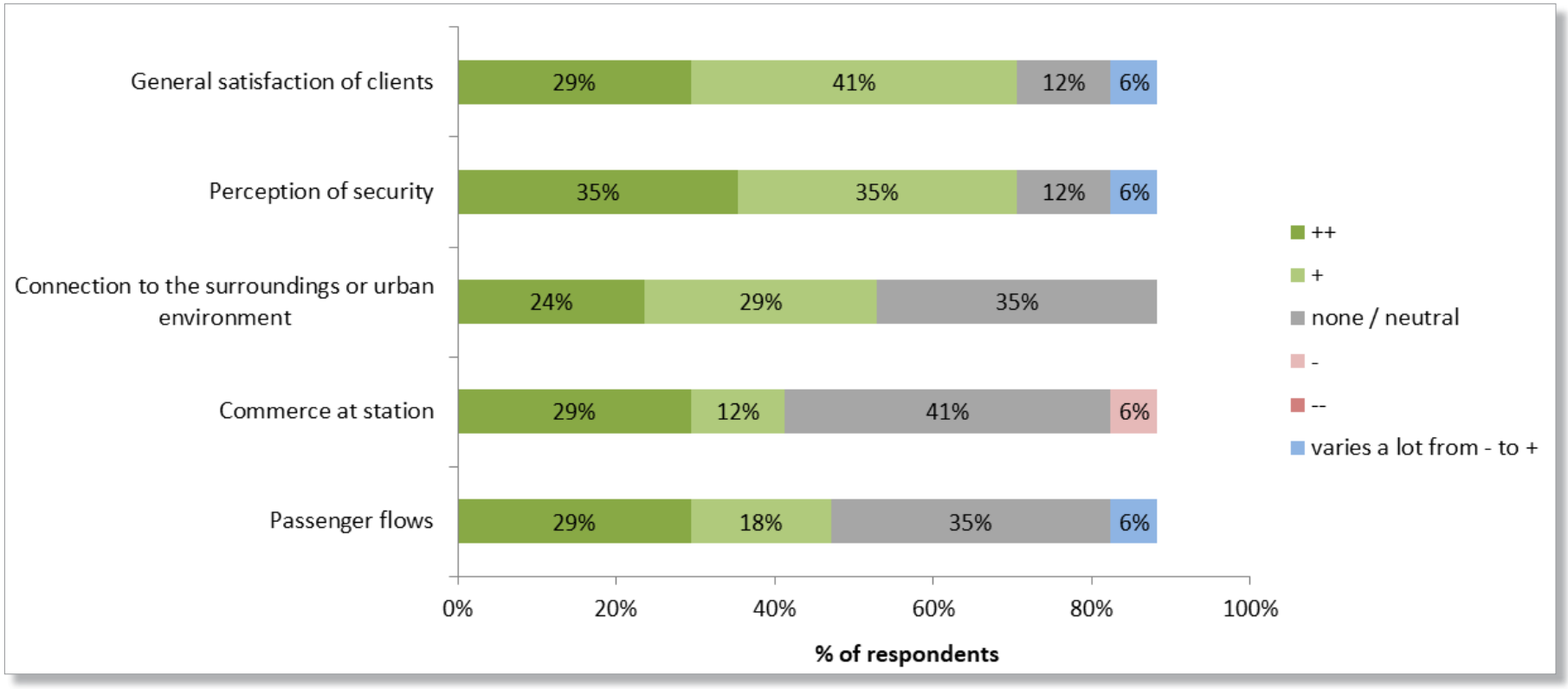
Video informing about security procedures at station



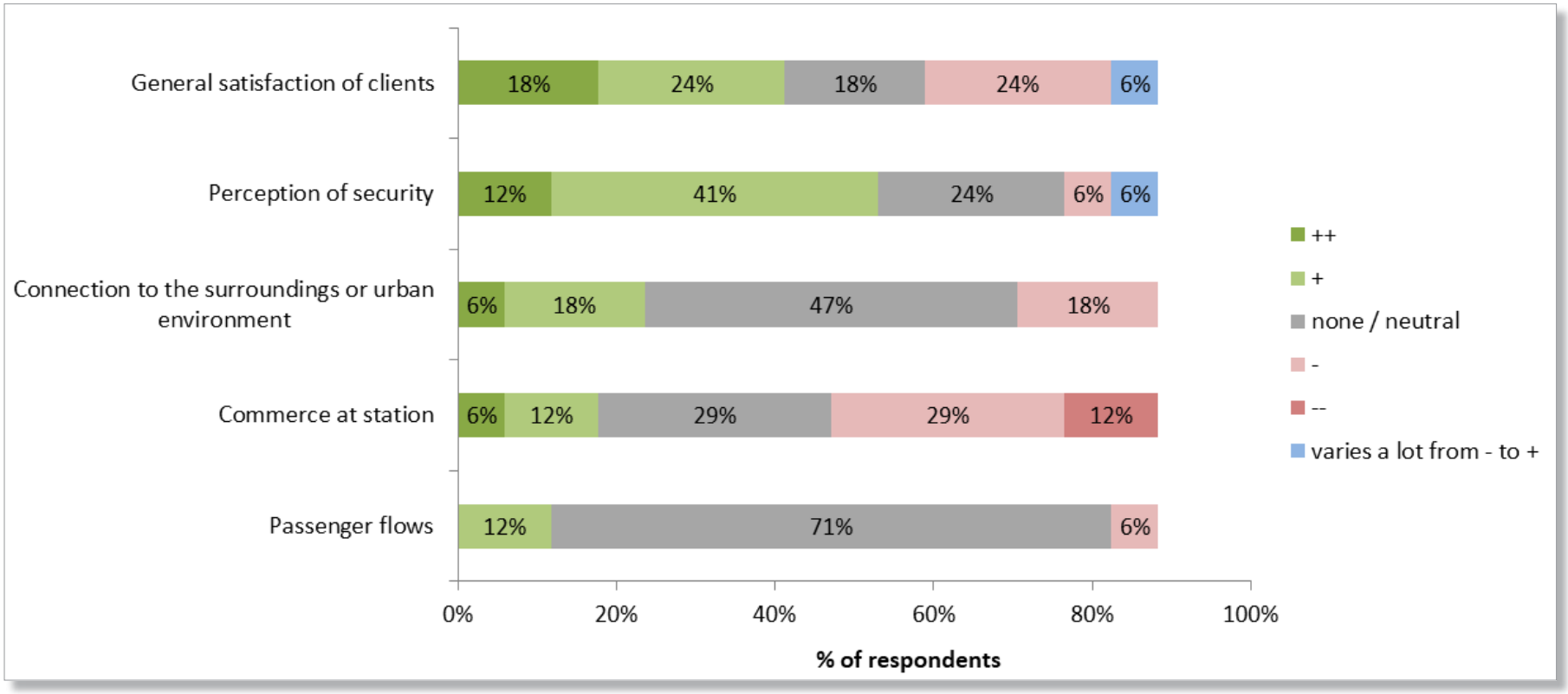
Video informing about actions in case of terrorist attacks



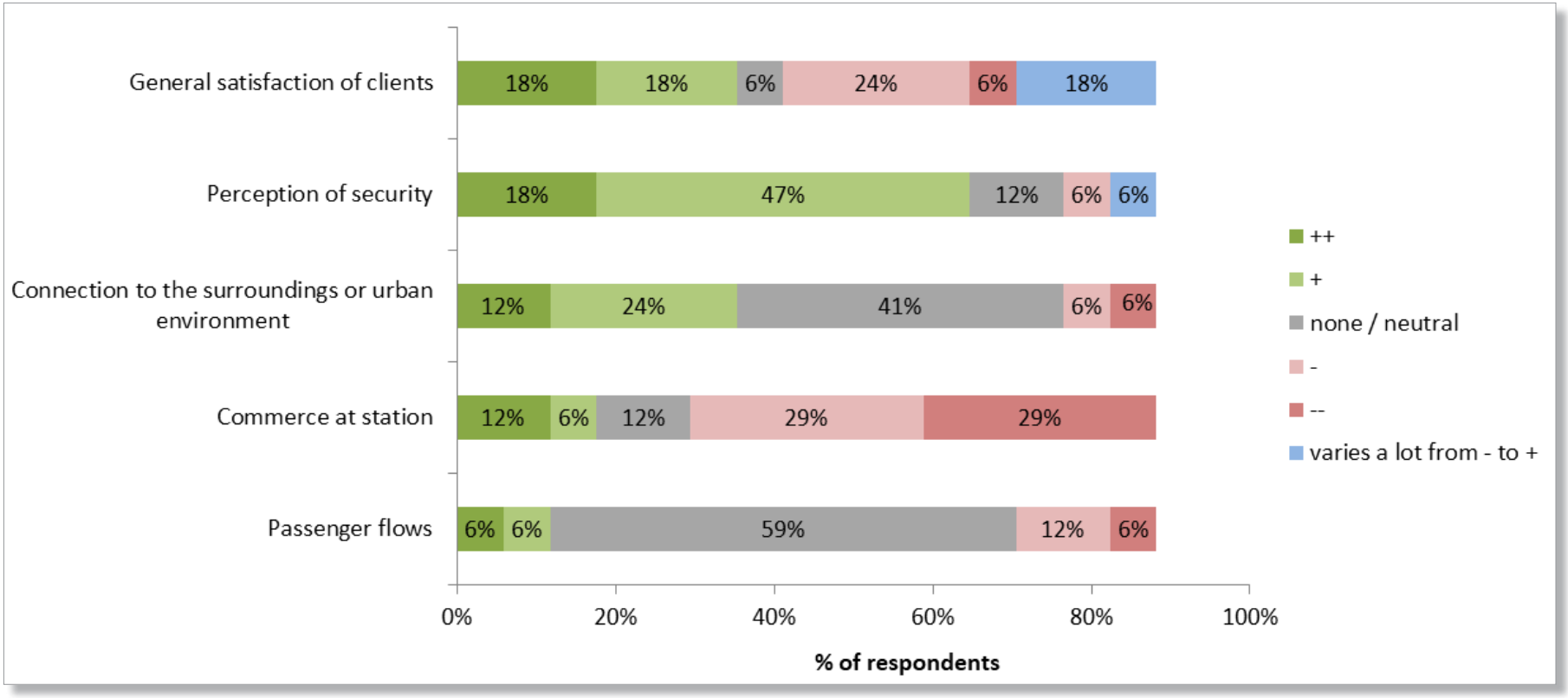
Pre-designed signage for evacuation



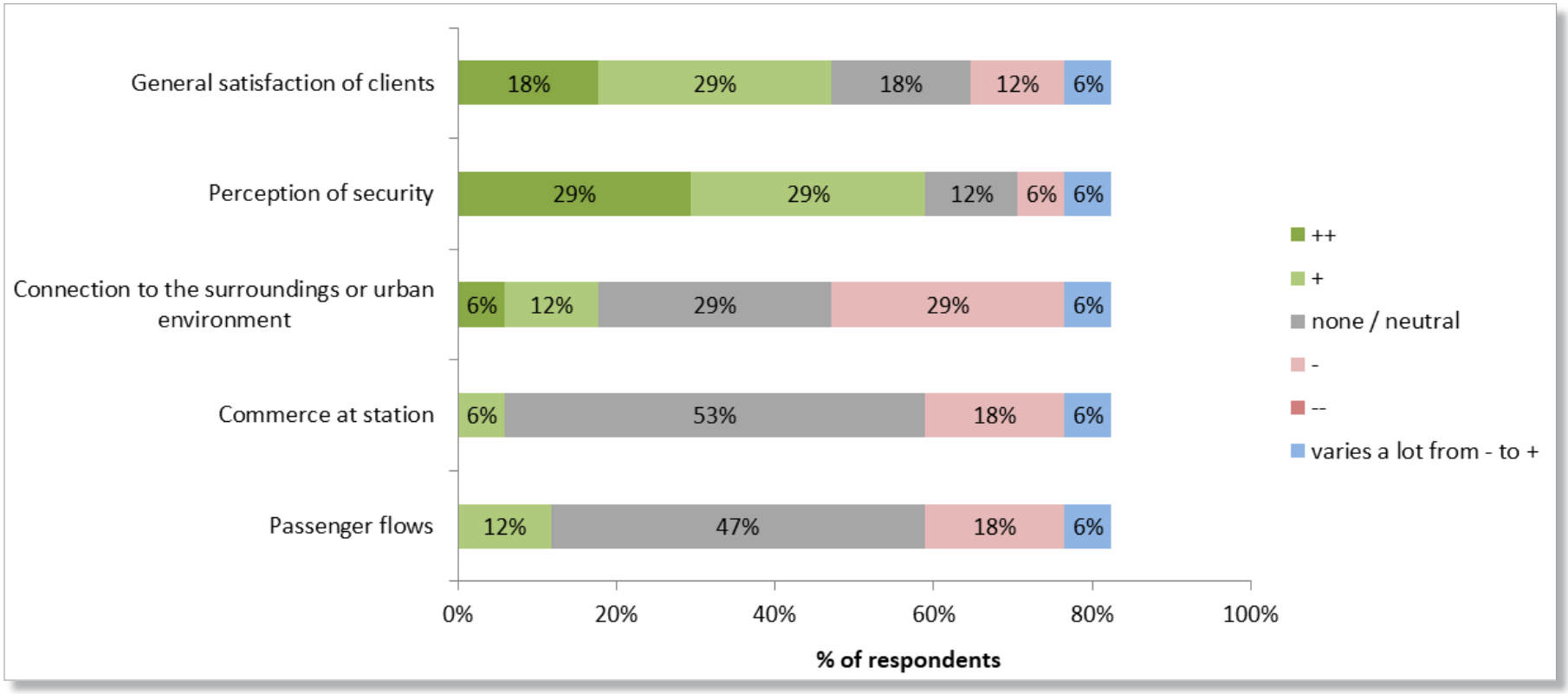
Prohibition of alcohol consumption at stations



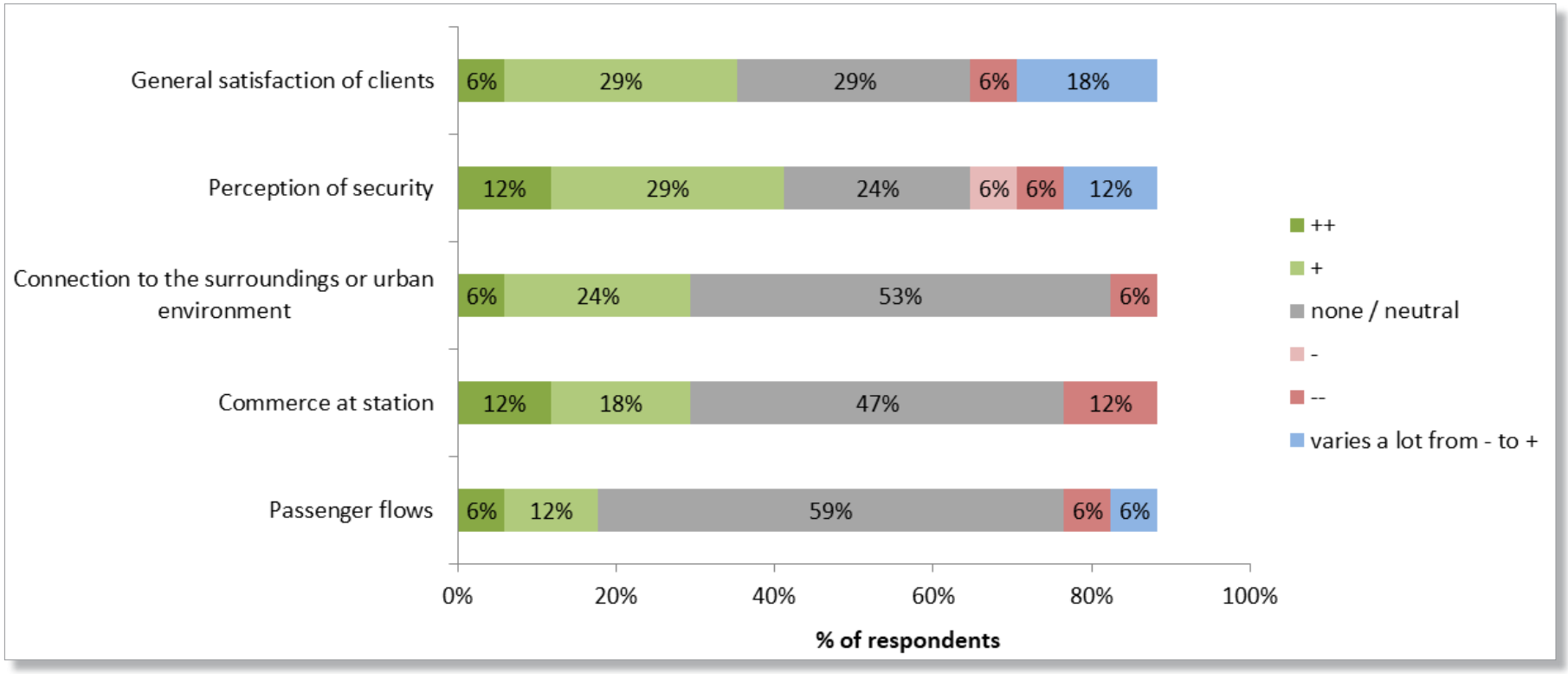
Prohibition of alcohol sale at stations



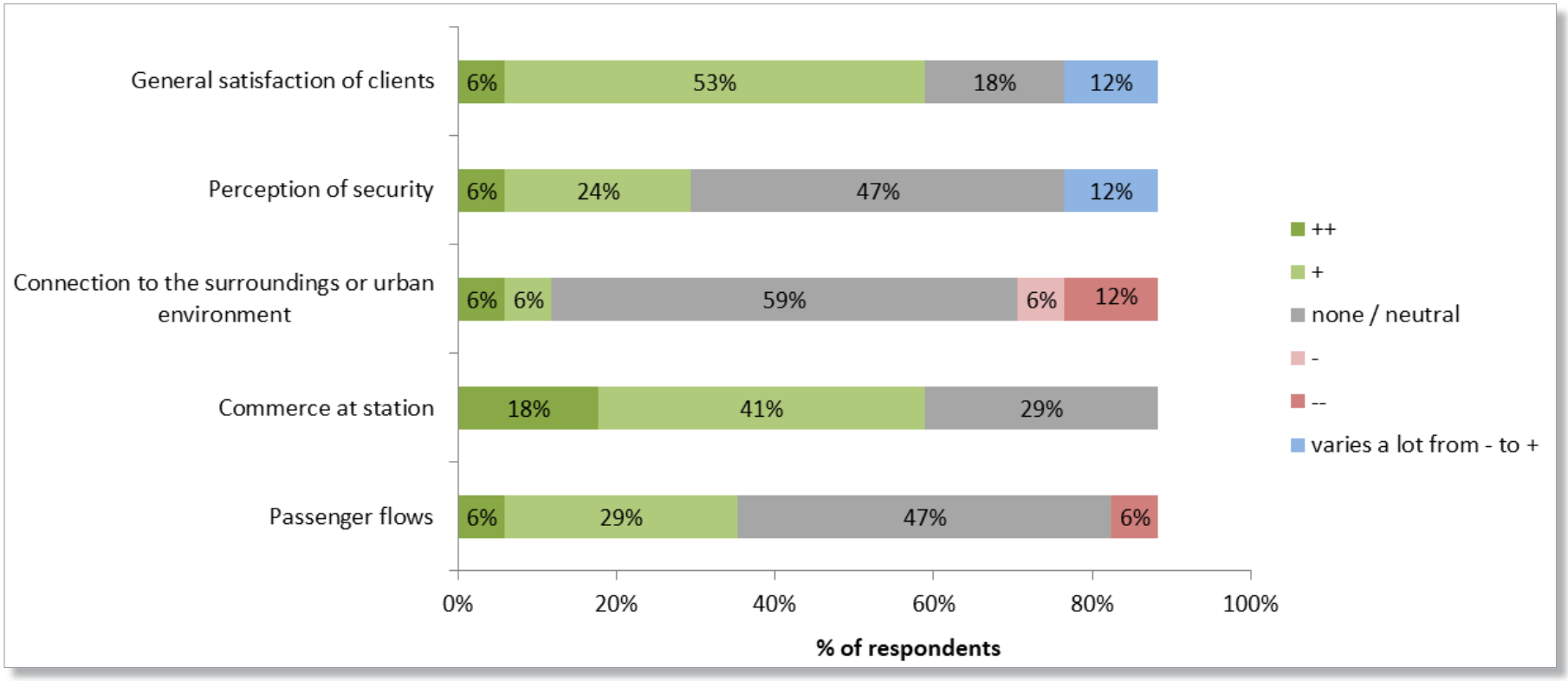
Car barriers before entrance to the station



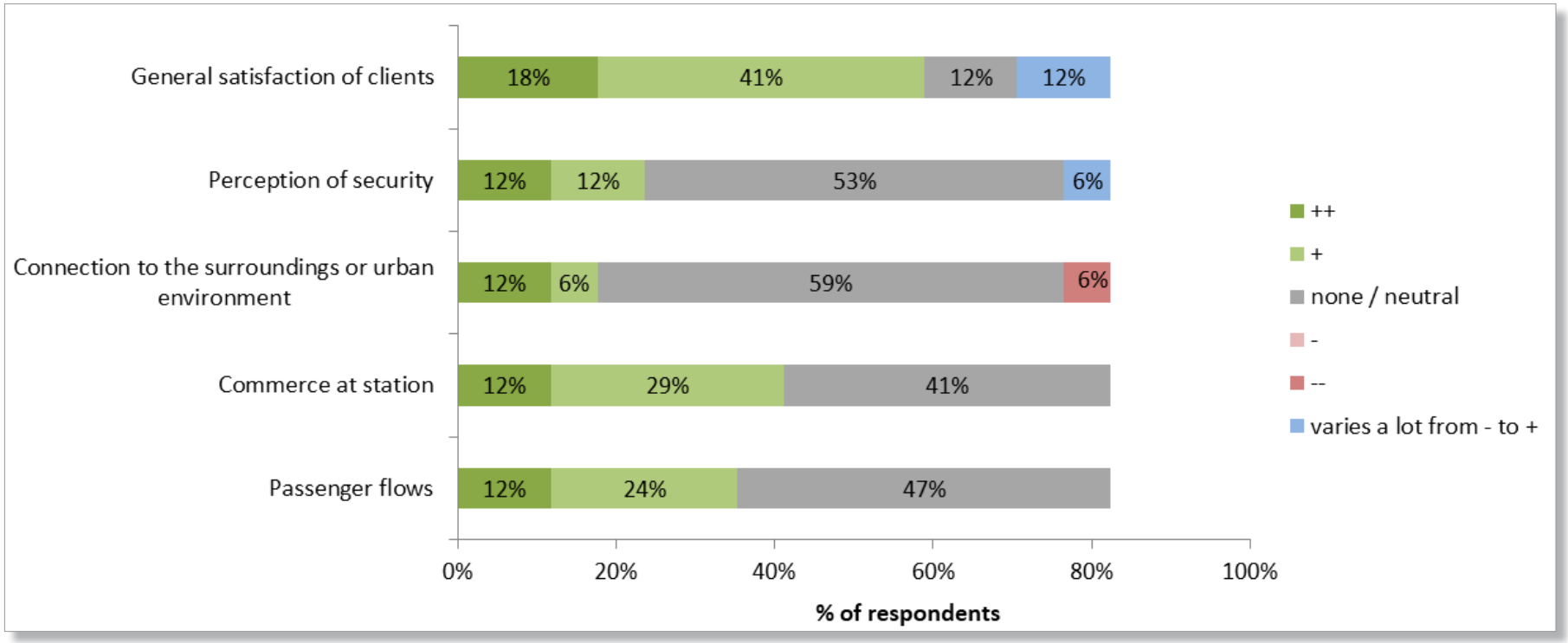
Use of transparent materials (like anti-vandal or anti-explosive glass)



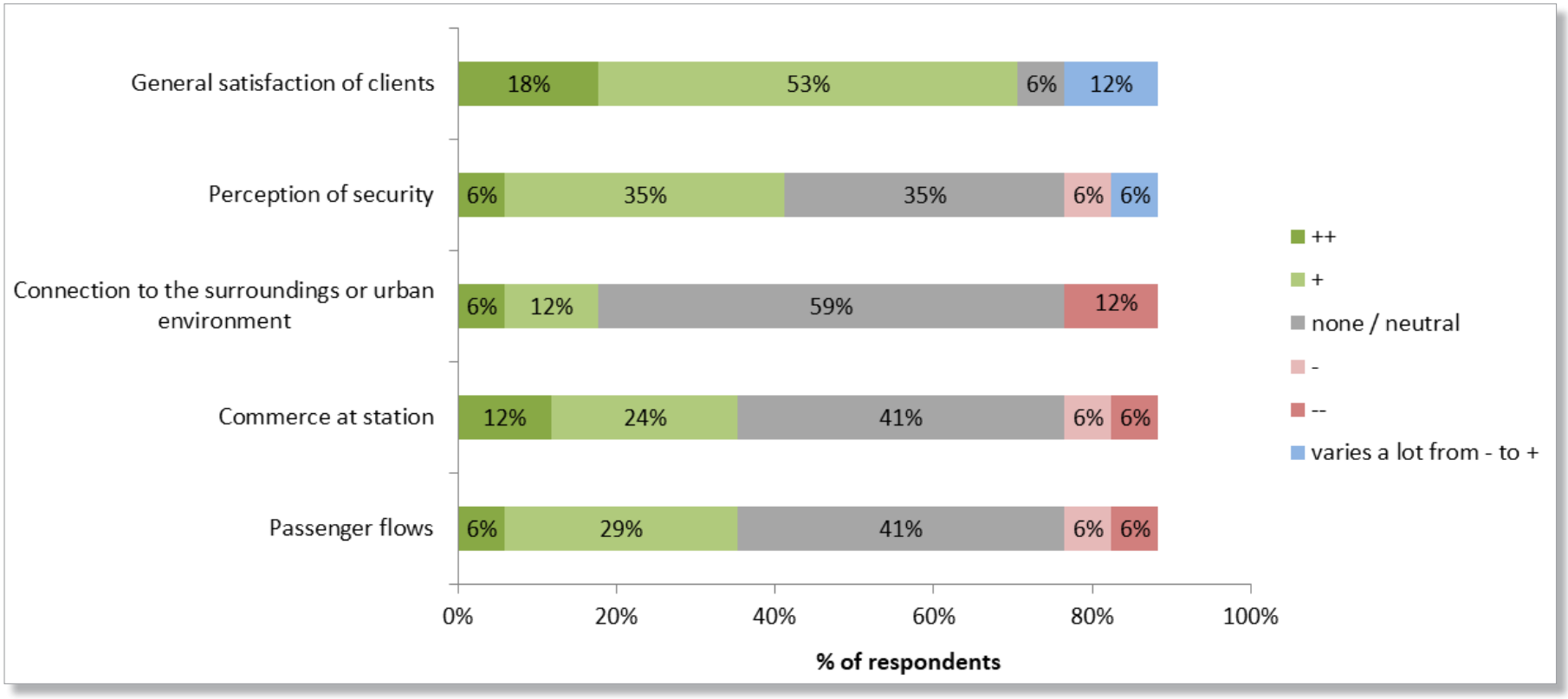
Classic or calming music at stations



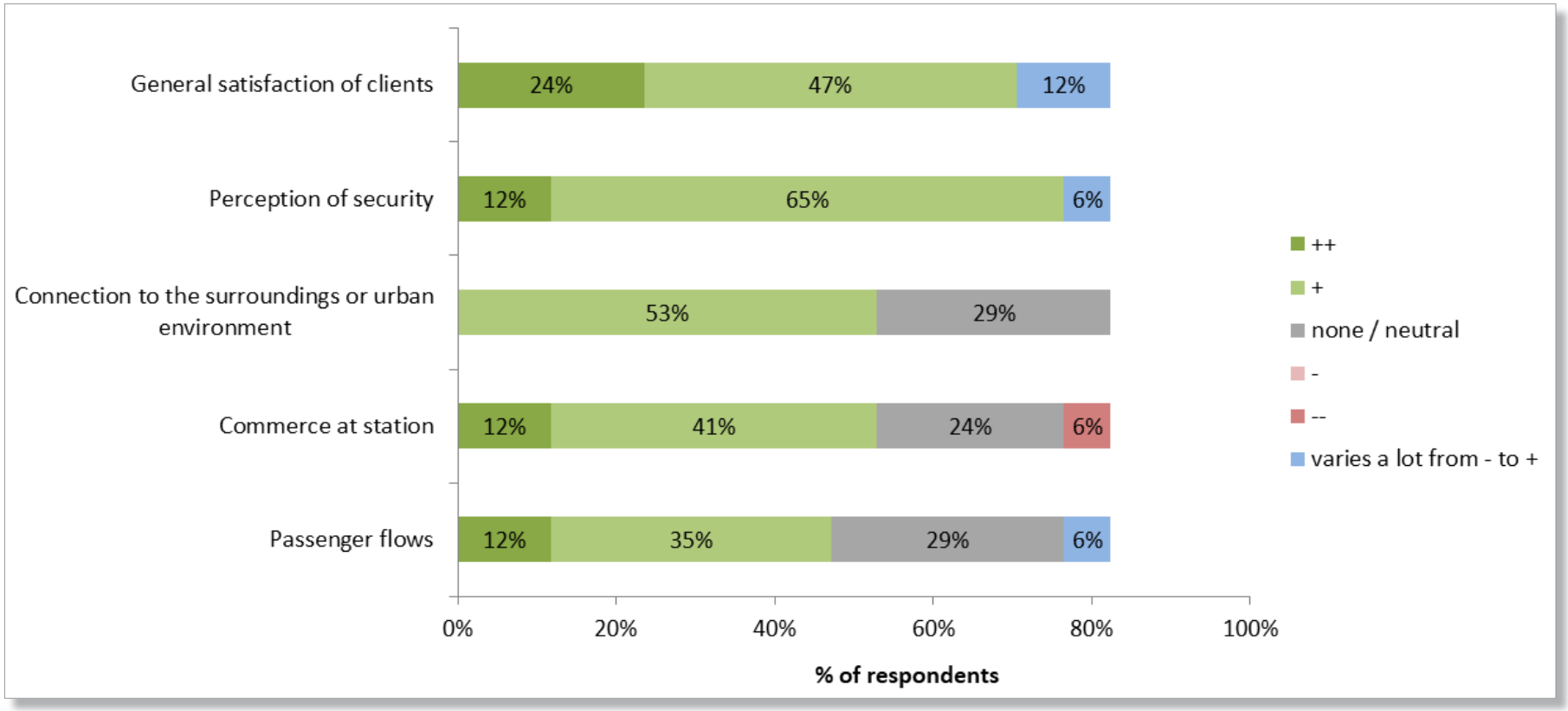
Calming scent at stations



Calming colour scheme in crowded areas at stations



Reception desks with presence of station staff



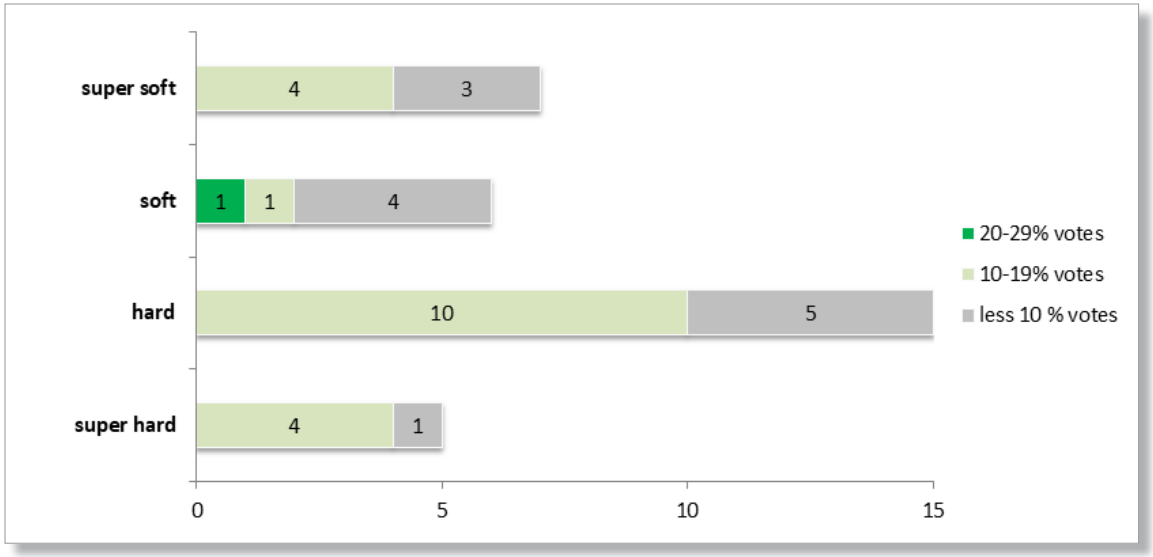
Expert evaluation shows that the choice of security tools has got minimal impact – positive or negative – on passenger flows.

More or less notable positive influence attributes to hard and super soft tools – reception desk with station representative, pre-designed signage for evacuation and calming music – which influence rather **on orderliness than on volume of flows**.

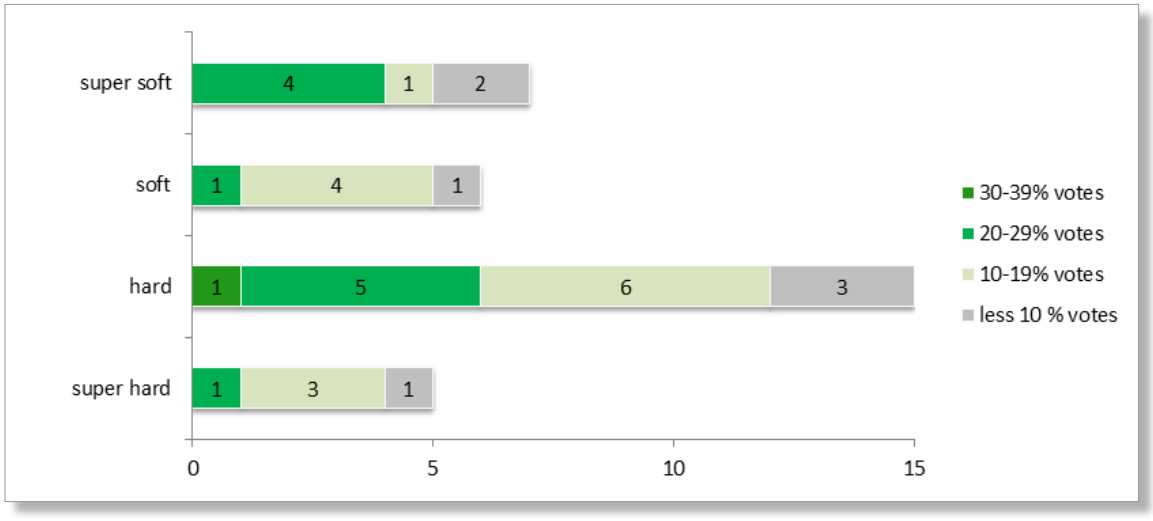
Super hard and hard tools mainly connected to passengers or luggage check at entrance to the station or to special areas have slightly negative impact.

Fig. 2.11. Passenger flows. Quantity distribution of tools by groups with percentage of votes.

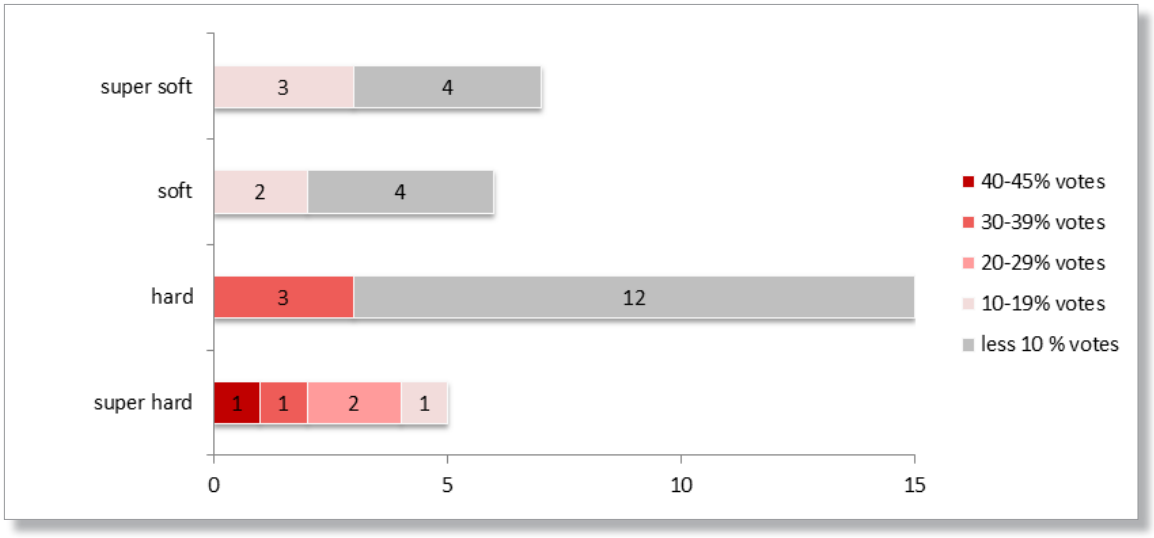
Passenger flows. Number of tools by groups with percentage of votes for"++".



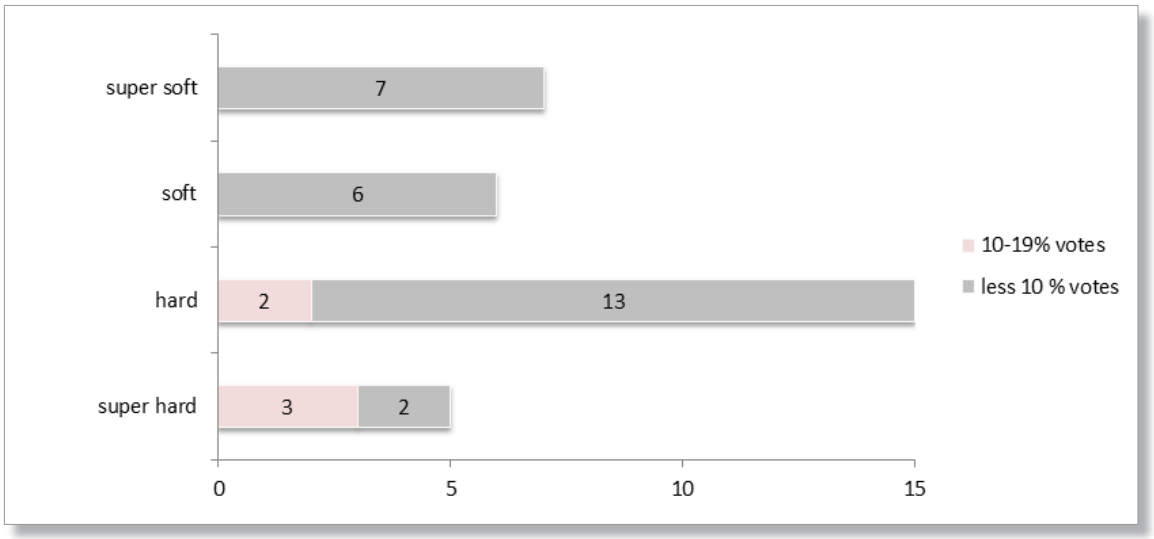
Passenger flows. Number of tools by groups with percentage of votes for «+».



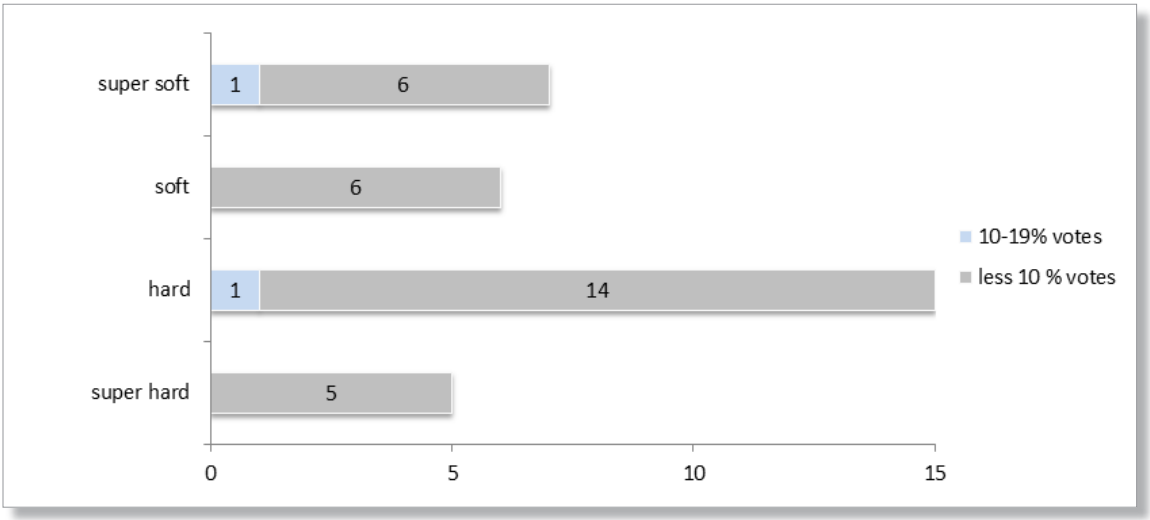
Passenger flows. Number of tools by groups with percentage of votes for «-».



Passenger flows. Number of tools by groups with percentage of votes for «--».



Passenger flows. Number of tools by groups with percentage of votes for «varies a lot from - to +».



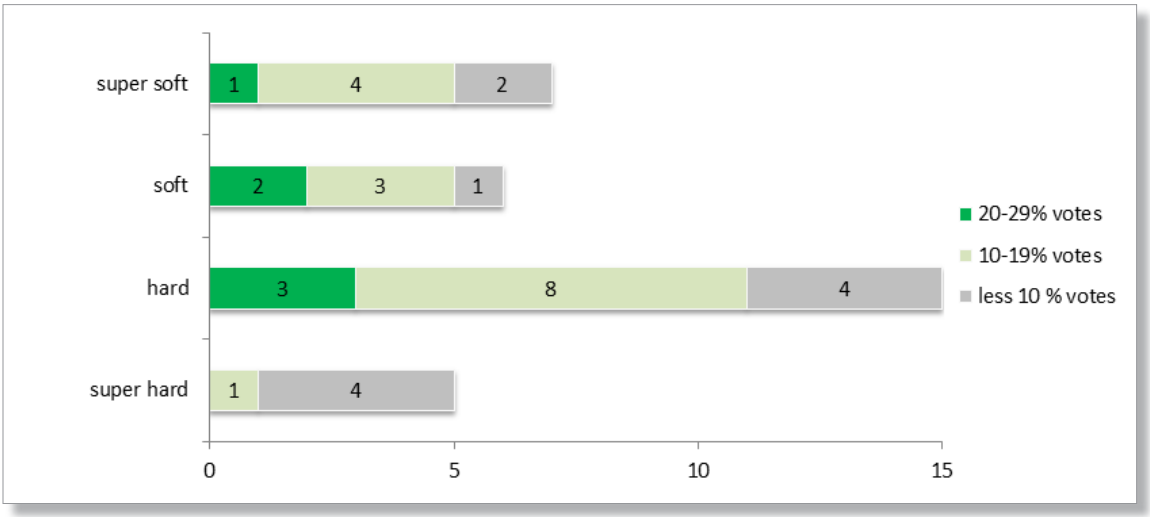
Commercial activities at stations are **subject to significant influence**, both positive and negative, of all security tools.

Though super soft security tools are not visible, they may as well have a negative impact. For example, audio informing about existing threats at stations may result in anxiety and unwillingness to visit commercial premises (shops, restaurants, etc.) in order to minimize the stay at station.

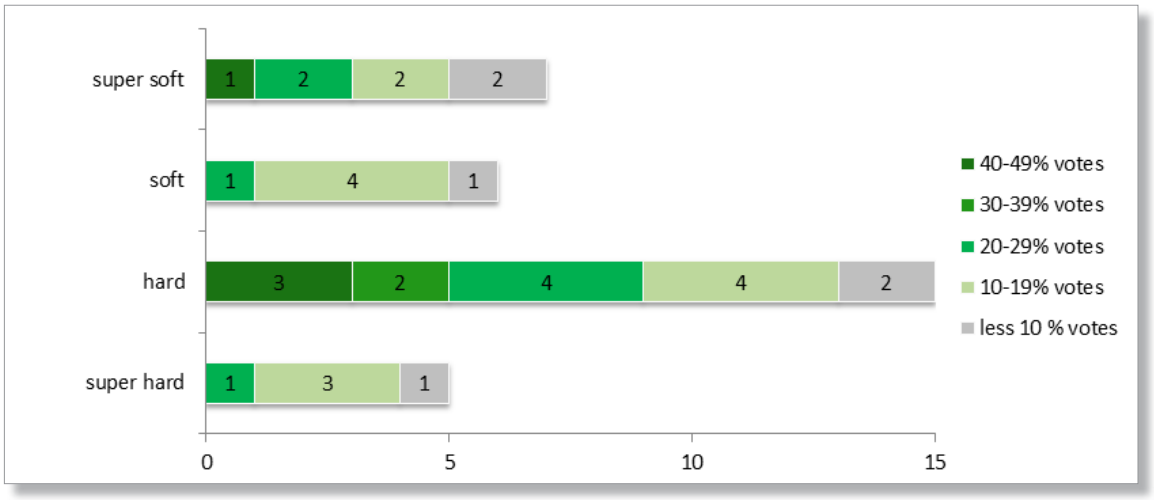
Percentage of «varies a lot from - to +» estimations between experts for commerce at station does not exceed 10 for all tools, and that means low variable-based influence.

Fig. 2.12. Commerce at station. Quantity distribution of tools by groups with percentage of votes.

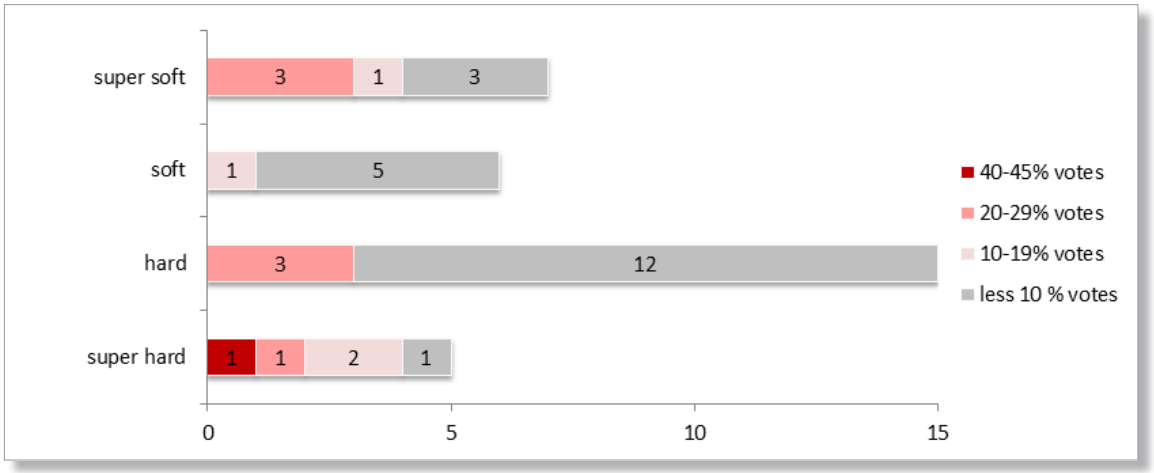
Commerce at station. Number of tools by groups with percentage of votes for "++".



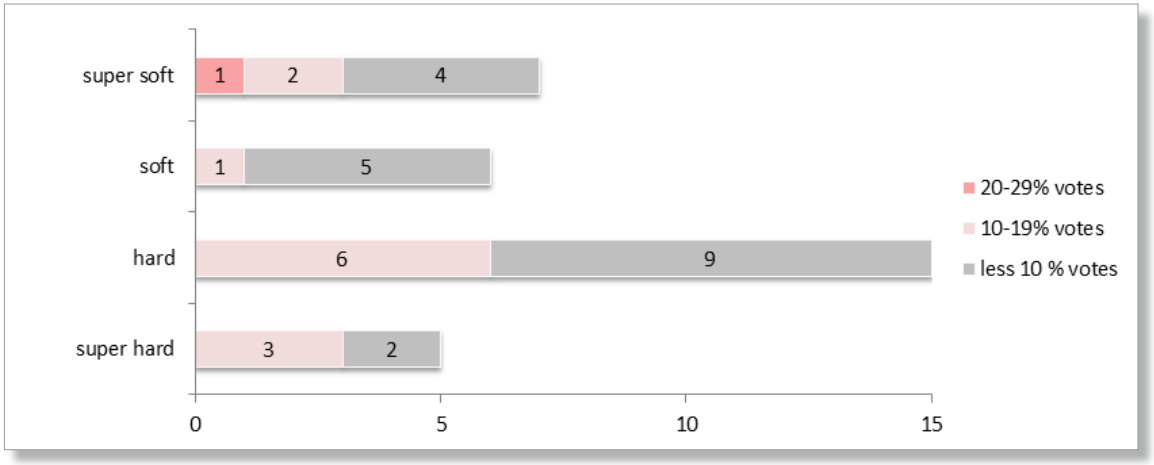
Commerce at station. Number of tools by groups with percentage of votes for «+».



Commerce at station. Number of tools by groups with percentage of votes for «-».



Commerce at station. Number of tools by groups with percentage of votes for «--».



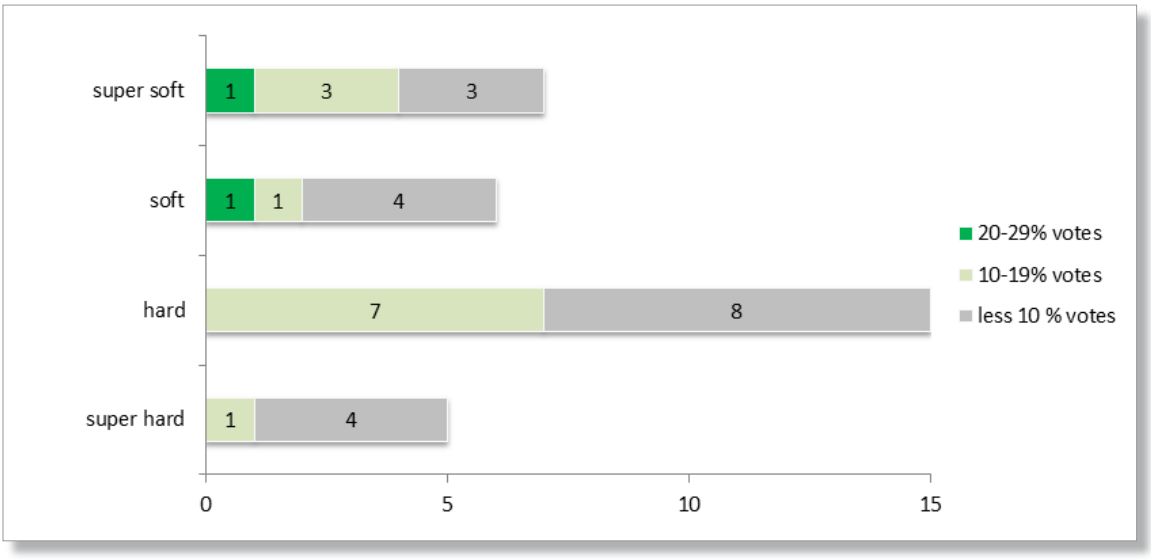
Relatively week positive influence on station connection with urban environment is defined according to the results of the survey. Reception desk with presence of rail (station) staff is the only exclusion, as this staff may not only be helpful for departing passengers, but may also inform arriving customers about the city and in some cases provide additional services (call for taxi, hotel reservation, sell of tickets for urban events, etc.).

There are no important negative impact factors. A large quantity of tools has insignificant influence. The impact comes mainly from tools located at entrances to the station and creating physical barriers.

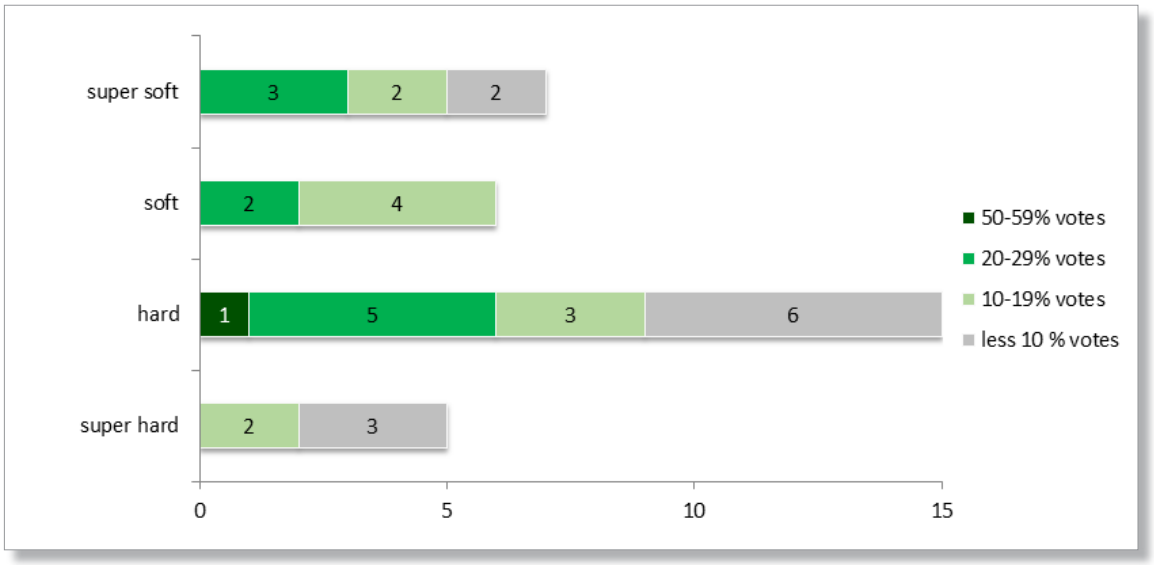
Percentage of «varies a lot from - to +» estimations between experts for connection to the surroundings or urban environment does not exceed 10 for all tools, and that means low variable-based influence.

Fig. 2.13. Connection to the surroundings or urban environment. Quantity distribution of tools by groups with percentage of votes.

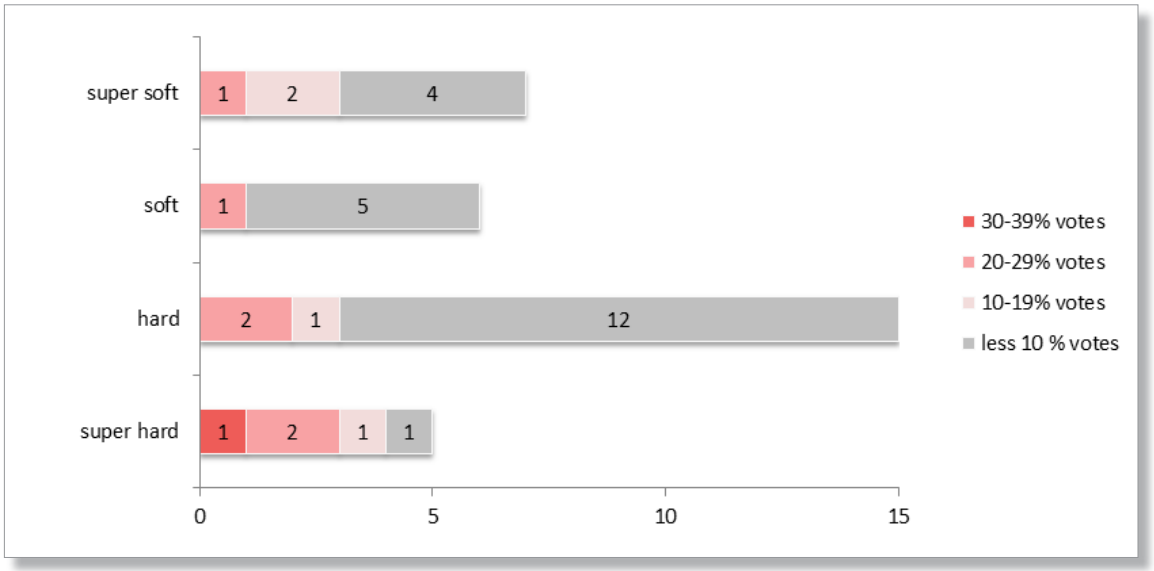
Connection to the surroundings or urban environment. Number of tools by groups with percentage of votes for "++".



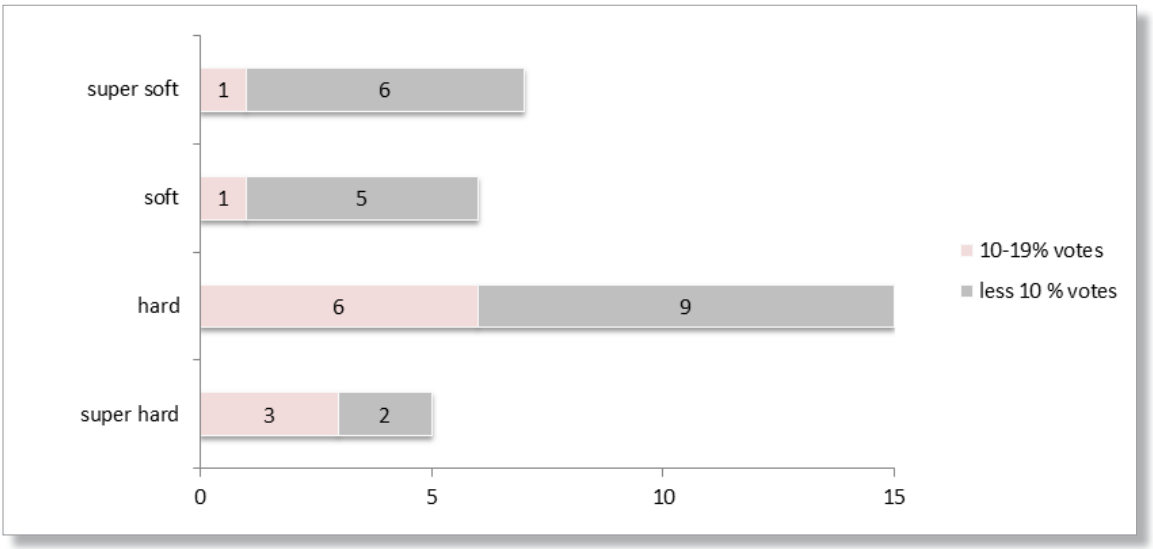
Connection to the surroundings or urban environment. Number of tools by groups with percentage of votes for «+».



Connection to the surroundings or urban environment. Number of tools by groups with percentage of votes for «-».



Connection to the surroundings or urban environment. Number of tools by groups with percentage of votes for «--».

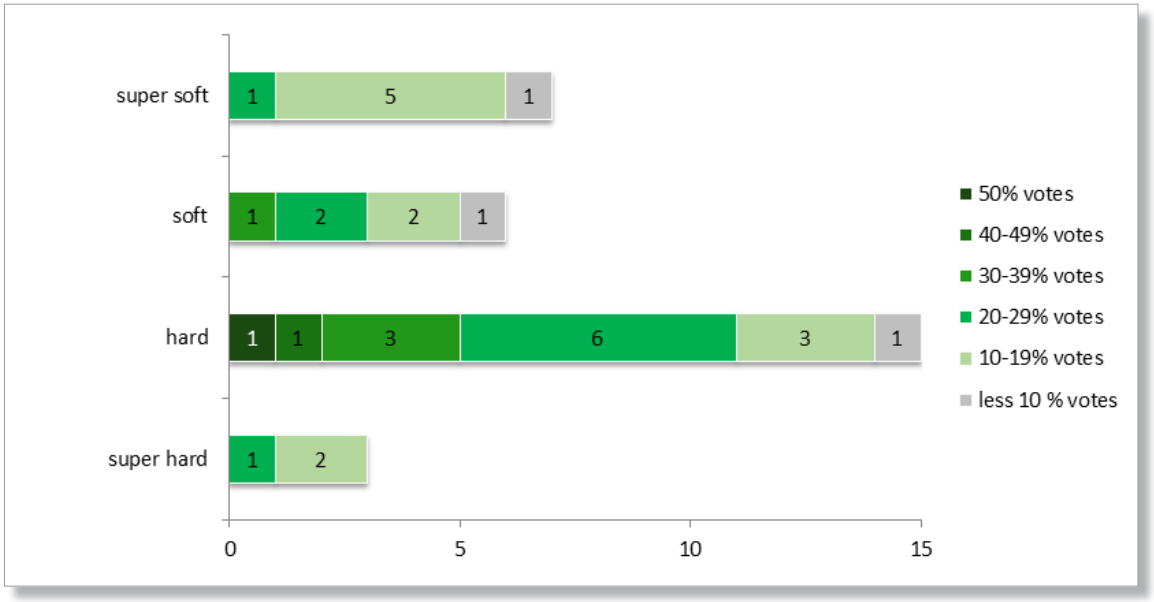


Concerning the perception of security, the whole entity of tools has maximal positive influence with almost no negative forms. The maximum influence comes from hard and super hard security tools which are fully visible and perceptible.

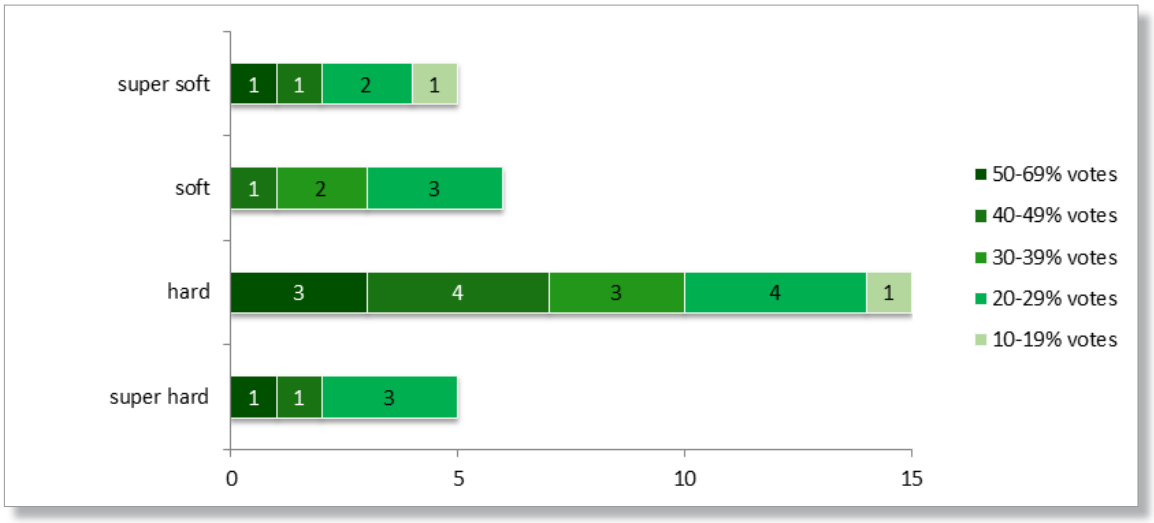
On the other hand, in this area of station management there is a larger number of «varies a lot from - to +» results in comparison to other areas. This means that the choice of a specific tool should **consider its relevance and compatibility with other tools for a specific station**. Thus, at larger stations lack of hard and super hard tools or insufficient cover of station area with them may cause anxiety (e.g. luggage or passenger screening facilities are located not at all entrances); at stations with lower passenger flows congestion of area with hard tools, especially in combination with super soft security tools (audio informing about threats) may cause anxiety.

Fig. 2.14. Perception of security. Quantity distribution of tools by groups with percentage of votes.

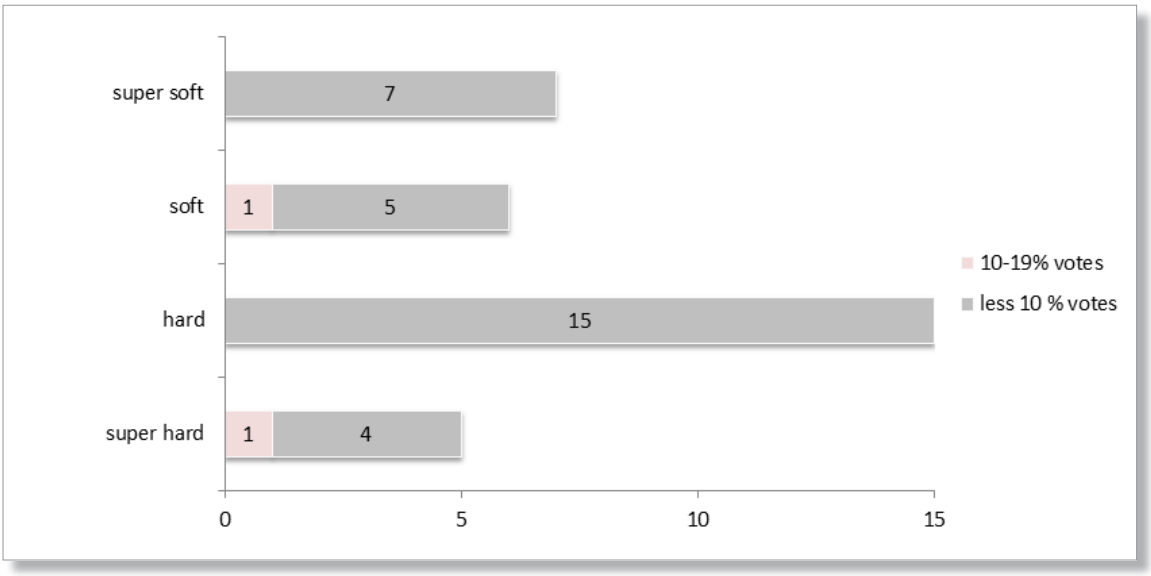
Perception of security. Number of tools by groups with percentage of votes for "++".



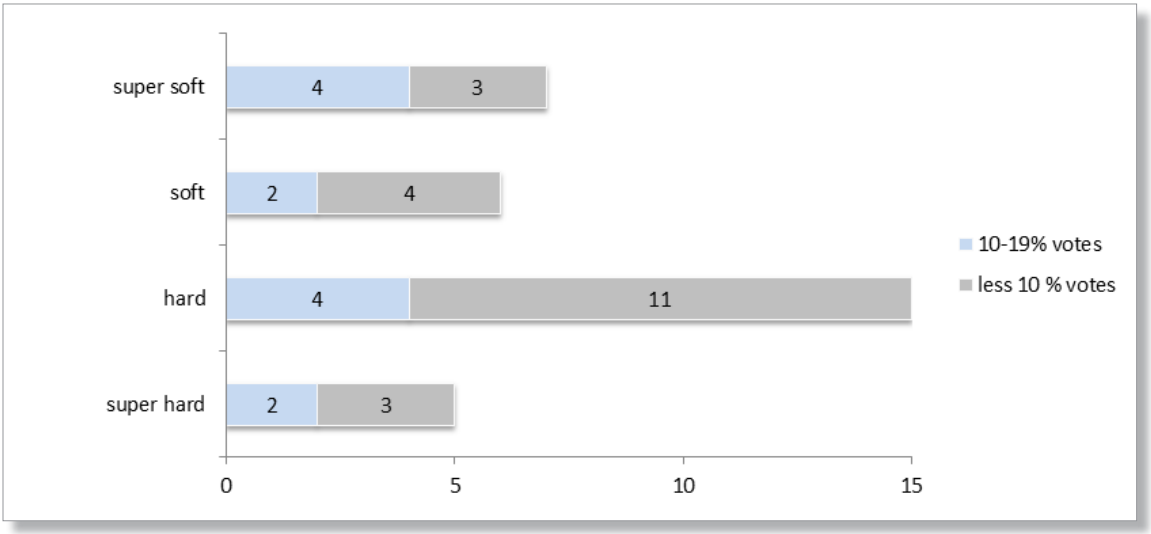
Perception of security. Number of tools by groups with percentage of votes for «+».



Perception of security. Number of tools by groups with percentage of votes for «-».



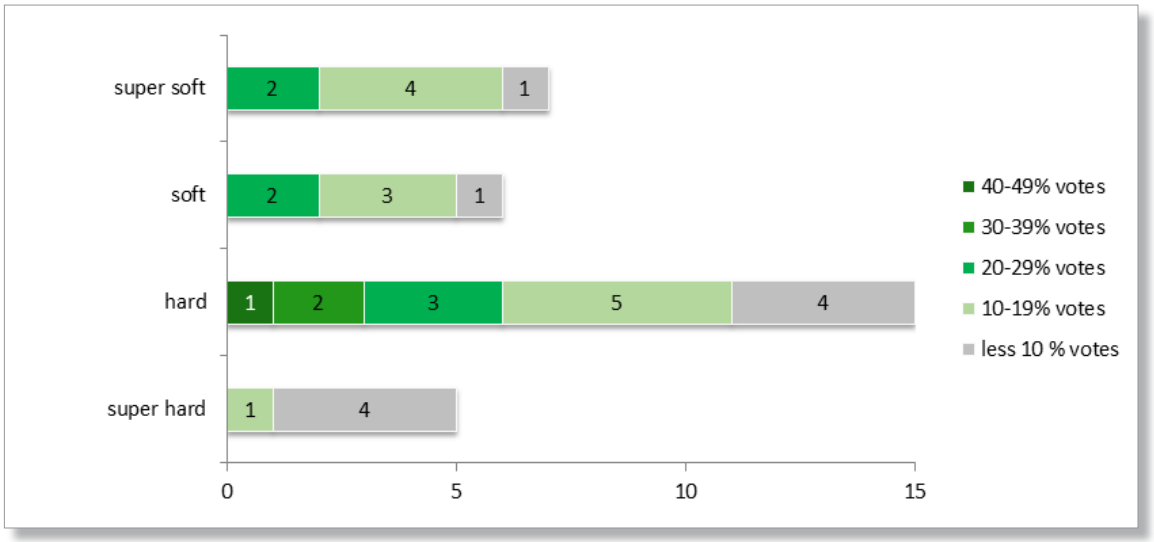
Perception of security. Number of tools by groups with percentage of votes for «varies a lot from - to +».



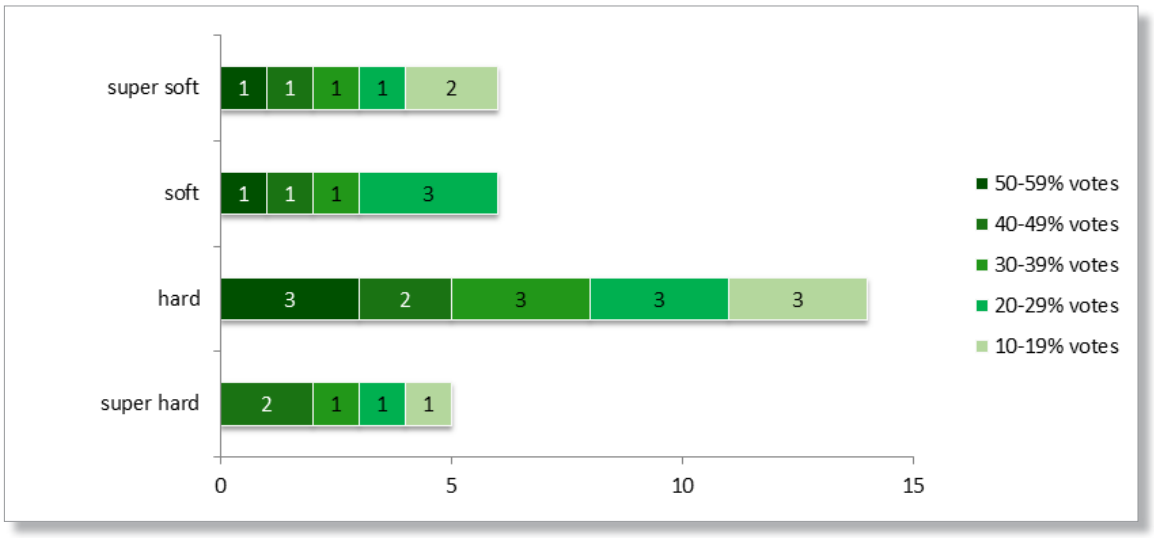
Response results concerning general satisfaction of clients are similar to the perception of security. Such correlation means that experts who took part in the survey consider security to be the main factor of comfort, all others having secondary importance.

Fig. 2.15. General satisfaction of clients. Quantity distribution of tools by groups with percentage of votes.

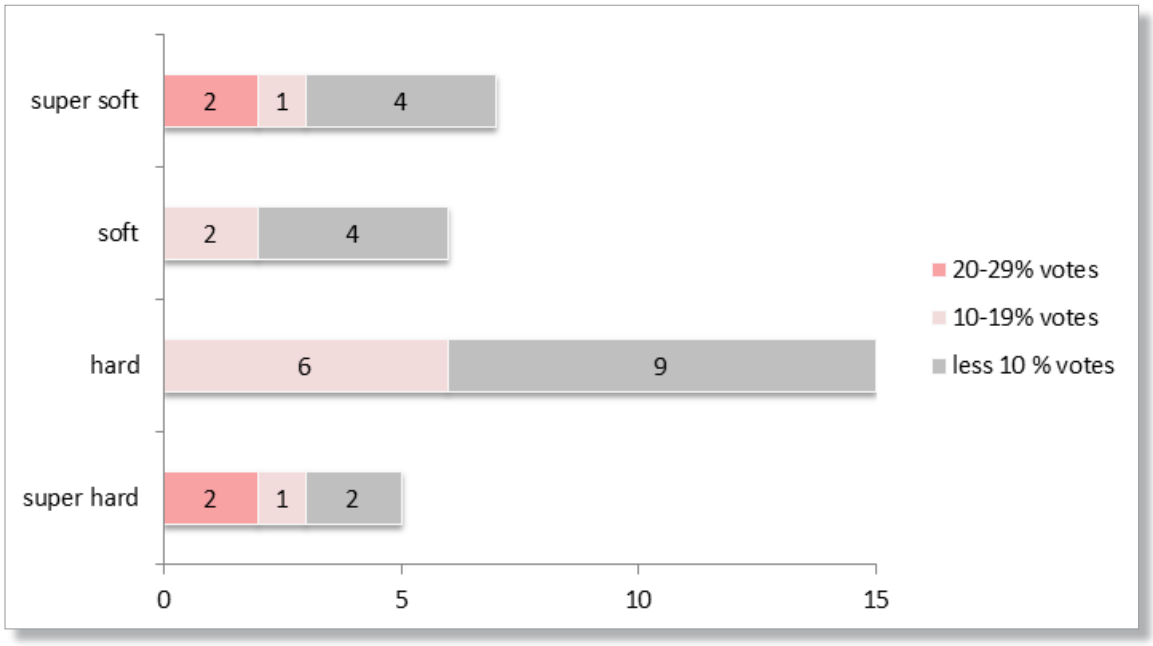
General satisfaction of clients. Number of tools by groups with percentage of votes for "++".



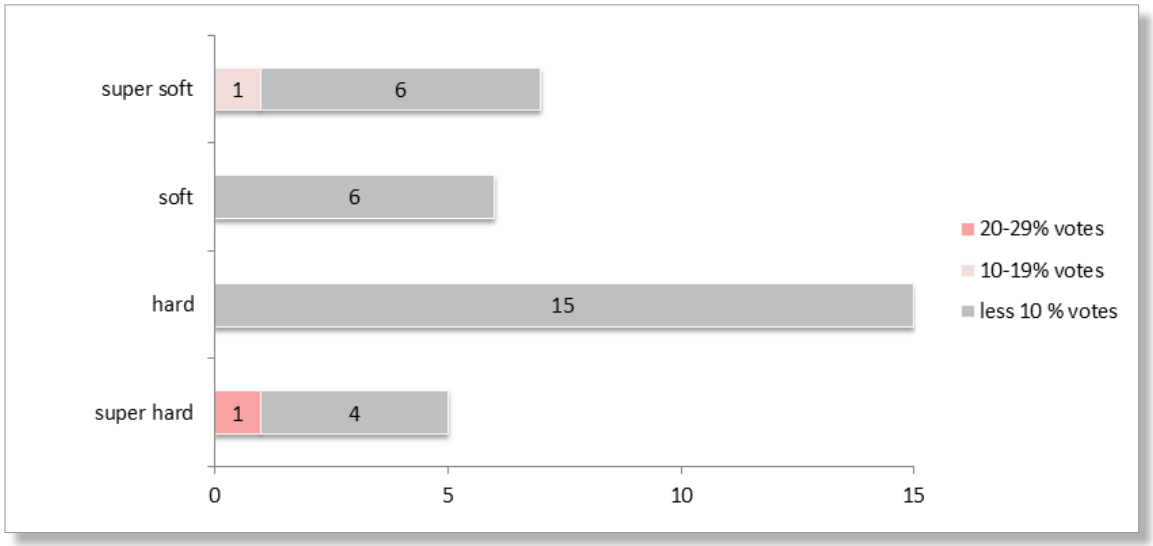
General satisfaction of clients. Number of tools by groups with percentage of votes for «+».



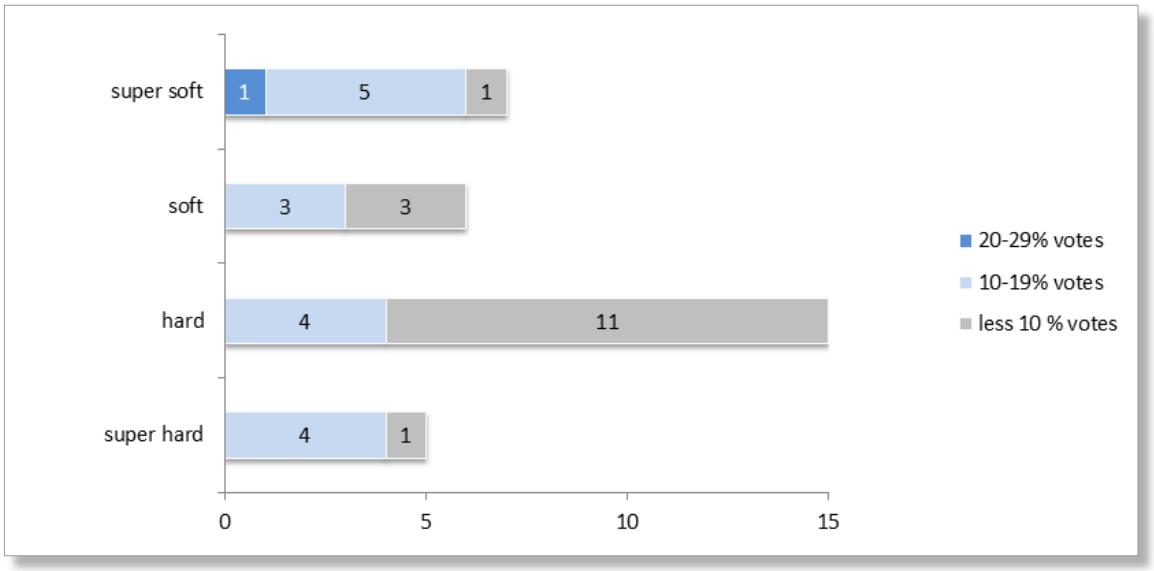
General satisfaction of clients. Number of tools by groups with percentage of votes for «-».



General satisfaction of clients. Number of tools by groups with percentage of votes for «--».



General satisfaction of clients. Number of tools by groups with percentage of votes for «varies a lot from - to +».



According to the results of the survey, changes in combination of security tools, forms of their application and quality of security activities influence least of all on passenger flows, that means, on station capacity in operations. But the choice of one or another option impacts on station as a part of urban environment, customers' feelings and satisfaction and, thus, **on station development**.

Expert estimations allow **variable influence** of each tool referring to station type, mainly **for general satisfaction and perception of security** of customers. Meanwhile, there is **no such variability for commercial or operational activities**.

The survey proves the idea presented in Chapter 1: the most influential are hard and super hard security tools, and they have the most negative impact on all areas of station management, excluding higher perception of security, which is maintained by their visibility.

Soft and super soft security tools more often have positive influence on all areas of stations management.

3. “If – then” analysis

The results of the survey show that the maximum number of negative impact was received by **almost all kinds of super hard tools: passengers and luggage examination with stationary and manual technical tools**. This refers to the connection to the surroundings, commerce and passenger flows.

Specific tools set should be defined according to the type of station. For example, if a large station should be equipped with stationary examination tools, at stations with lower passenger flows, manual means may be used (if allowed by law). During mass events, festive and vacation periods, at largest station combination of stationary and manual tools might be useful.

Equipment of station with stationary technical means should be preceded by the modelling of optimal quantity of such means, as queues at entrances to the station or to certain areas cause dissatisfaction related to loss of time and may be aims of terrorist attacks.

Special staff working with such means should be aware of actions algorithms in case of disputable situations. For example, persons with cardiac pacemakers and other electronic implants have a right to refuse passing through scanning systems after presentation of an appropriate document. They should have unrestricted access with other type of security examination.

Hand luggage may be checked with additional manual detectors, otherwise clean baskets should be provided.

In general, luggage and passenger screening is recommended for organization only at entrances to stations to specific areas of stations (like area of high-speed trains departures). It is recommended to avoid widespread use of such tools, including manual metal detectors.

The same recommendations are applicable for explosives detectors, detectors of dangerous chemical and biological items, which have similar profiles of impact.

Further analysis of negative aspects and factors and proposals on measures to mitigate them are presented in the table 2.5.

Appendices 2 – 11 present the **detailed results of tools’ impact evaluation by experts matched with areas of station management**. They may be used to choose the **most suitable** ones or to understand the **risks** of possible combinations for re-design of security systems.

Table 2.5. Factors of negative impact of station security tools and mitigation measures.

№	Tool	Group	Negative impact on station management areas (marked with "-")[4]					Negative factor(s)	Mitigation measures
			1	2	3	4	5		
1.1	**CCTV**	**hard**				-	-	Uncomfortable feeling of being traced.	Equipment with: a) fixed cameras with wide sweep (like bug eye) which do not require camera turns. b) hidden cameras if area is not too large and do not require wide sweep. Simultaneously clients should be informed about video surveillance.
2.1	**CCTV with videoanalytics**	**hard**						See p.1	
3.1.	**luggage screening with special technical means**	**super hard**	-	-			-	Obligation to put hand luggage (small bags, brief cases, etc.) on the tape.	Use of manual metal detectors for hand luggage or provision of clean baskets.

4 1 - Passenger flows
2 - Commerce at station
3 - Connection to the surroundings or urban environment
4 - Perception of security
5 - General satisfaction of clients

№	Tool	Group	Negative impact on station management areas (marked with "-")[4]					Negative factor(s)	Mitigation measures
			1	2	3	4	5		
3.2.			-	-	-		-	Diminish of capacity and consequent delays for passengers.	Multiplication of quantity of tools for larger stations, substitute of stationary equipment by portable equipment for smaller stations. Sufficient size of X-ray machines for large luggage.
3.3					-	-	-	Diminishing of capacity and consequent mass gathering being possible terrorist aim.	Additional equipment for larger stations. Sufficient size of X-ray machines for large luggage.
4.1	**passengers / visitors screening with special technical means**	**super hard**				-	-	Insufficient equipment of station with such tools, not full coverage of "clean" areas.	Full equipment of station according to necessities.
4.2						-	-	Insufficient equipment of station with such tools during mass events, festive or vacation periods, related to higher volume of passenger flows.	Use of additional not stationary tools (manual metal detectors and similar).
4.3								Diminish of capacity and consequent delays for passengers.	Multiplication of quantity of tools for larger stations, substitute of stationary equipment by portable equipment for smaller station.

№	Tool	Group	Negative impact on station management areas (marked with "-")[4]					Negative factor(s)	Mitigation measures
			1	2	3	4	5		
4.4			-	-	-		-	Diminish of capacity and consequent mass gathering being possible terrorist aim.	Additional equipment of larger stations.
4.5						-	-	Feeling of anxiety at smaller stations.	Substitute of stationary equipment by manual.
4.6						-	-	Feeling of anxiety at different stations caused by not optimal combination with similar tools. Overload with tools at entrances to station.	Choice of optimal combinations, duplication preclusion.
4.7					-	-	-	Impact on pacemakers and other technical implants.	Staff should be aware of actions in such situations. Unrestricted access for visitors with pacemakers and other implants should be provided after presentation of appropriate documents. Alternative ways of security check should be known to staff and explained to visitors. Special signs for persons with pacemakers should be placed in a well-seen mode before entrance to the area of security check.

№	Tool	Group	Negative impact on station management areas (marked with "-")[4]					Negative factor(s)	Mitigation measures
			1	2	3	4	5		
4.8			-	-			-	Access for wheelchair users and for persons with large baby carriages.	At least one security equipment at station should have technical features (size) allowing the access for wheelchair users or customers with large baby carriages. Alternative ways of security check should be known to staff and explained to visitors. Special signs for persons with wheelchairs or with large baby carriages should indicate the way to access the inner area.
5.1	**security gates (stationary metal detectors)**	**super hard**						See p. 4	
6.1	**manual metal detectors**	**super hard**		-		-	-	Insufficient level of security at larger stations equipped only with manual metal detectors.	Partly substitute of manual metal detectors with stationary detectors and additional scanning equipment.
7.1	**radiometers and dosimeters**	**hard**						See p. 3 and 4	
8.1	**explosives detectors**	**hard**						See p. 3 and 4	
9.1	**detectors of dangerous chemical or biological articles**	**hard**						See p. 3 and 4	

№	Tool	Group	Negative impact on station management areas (marked with "-")[4]					Negative factor(s)	Mitigation measures
			1	2	3	4	5		
10.1	**explosition-proof containers**	**hard**				-	-	Feeling of anxiety among customers.	Explosion-proof containers should be hidden from general public.
11.1	**drones / nano-drones to observe station facilities and platforms**	**hard**		-		-	-	Uncomfortable feeling of being traced.	Drones should not be used at rush hours.
12.1	**presence of police staff**	**hard**					-	Impolite behavior.	Trainings on interaction with clients. "Mystery visitor" check.
12.2			-	-	-	-	-	Non-fulfillment of actions algorithms in case of emergency situations.	Trainings according to profiles.
13.1	**presence of security (rail security, private security agencies) staff**	**hard**					-	Impolite behavior.	Trainings on interaction with clients. "Mystery visitor" check.
13.2			-			-	-	Non-fulfillment of actions algorithms in case of emergency situations.	Trainings according to profiles.
13.3			-	-	-	-	-	Unscrupulous fulfillment of obligations by private agencies staff.	Multi-factor-choice of partners, including prove of experience and licences (if applicable in specific country).

№	Tool	Group	Negative impact on station management areas (marked with "-")[4]					Negative factor(s)	Mitigation measures
			1	2	3	4	5		
14.1	**presence of rail (not related to security) staff in special uniform**	**hard**					-	Impolite behavior.	Trainings on interaction with clients. "Mystery visitor" check.
14.2			-	-	-	-	-	Non-fulfillment of actions algorithms in case of emergency situations.	Trainings according to profiles. Creation of road map of actions for emergency situations.
14.3			-			-	-	Technical impossibility to reach security agents in case of emergency.	Provision with technical communication means.
14.4			-	-	-	-	-	Non-fulfillment of actions algorithms in case of emergency situations.	Trainings according to profiles. Creation of road map of actions for emergency situations.
17.1	**body cameras for staff with direct translation**	**hard**	-	-	-	-	-	Uncomfortable feeling of being tracked by railway staff.	Staff using body cameras and other recording devices should not approach customers too close without reasons. Customers should be informed about translation.

№	Tool	Group	Negative impact on station management areas (marked with "-")[4]					Negative factor(s)	Mitigation measures
			1	2	3	4	5		
18.1	**audio and video recorders for staff without direct translation**	**hard**	-	-	-	-	-	Uncomfortable feeling of being tracked by railway staff.	Staff using body cameras and other recording devices should not approach customers too close without reasons. Customers should be informed about recording.
19.1	**emergency / help applications for passengers**	**hard**				-	-	Not all social segments use modern technologies. Application may be unavailable for them.	Use in addition to other tools (without IT software).
20.1	**audio informing about possible terrorist attacks**	**super soft**	-	-		-	-	Feeling of anxiety caused by format of information provided.	Audio informing should be done in a calm manner.
21.1	**audio informing about pickpocketing**	**super soft**						See p. 20	
22.1	**audio informing about actions with unattented luggage**	**super soft**						See p 20	
23.1	**video informing about security procedures at station**	**soft**	-	-		-	-	Feeling of anxiety caused by format of information provided	Video informing should be done in a calm manner, without terrifying or cruel shots.

№	Tool	Group	Negative impact on station management areas (marked with "-")[4]					Negative factor(s)	Mitigation measures
			1	2	3	4	5		
24.1	**video informing about actions in case of terrorist attacks**	**soft**						See p. 23	
25.1	**pre-designed signage for evacuation**	**soft**				-	-	Feeling of anxiety caused by light or blinking of navigation signs.	Highlighting option only in emergency situatons.
26.1	**prohibition of alcohol sale at stations**	**super soft**		-			-	Impossibility to buy alcohol.	Authorization of alcohol sale with limitation of volume or alcohol degree. Temporary authorization for special periods (festive time).

№	Tool	Group	Negative impact on station management areas (marked with "-")[4]					Negative factor(s)	Mitigation measures
			1	2	3	4	5		
27.1	**prohibition of alcohol consumption at stations**	**super soft**		-			-	Impossibility to consume alcohol.	Authorization of alcohol consumption with limitation of volume or alcohol degree. Temporary authorization for special periods (festive time).
28.1				-			-	Impossibility to consume alcohol when sale is allowed.	Exclusions for some non-transportation areas (e.g. cafes and restaurants) if sale is possible. Limitation of volume or alcohol degree.
29.1	**car barriers before entrance to the station**	**soft**				-	-	Nearness to entrances causing problems for persons with large luggage or disabled persons.	Placement of barriers aside from entrances and main clients' routes.

№	Tool	Group	Negative impact on station management areas (marked with "-")[4]					Negative factor(s)	Mitigation measures
			1	2	3	4	5		
30.1	reception desks with presence of station staff	hard	-	-	-		-	Impolite behavior.	Trainings on interaction with clients. "Mystery visitor" checking.
30.2			-			-	-	Non-fulfillment of actions algorithms in case of emergency situations.	Trainings according to profiles. Creation of road map of actions for emergency situations.
30.3						-	-	Technical impossibility to reach security agents in case of emergency.	Provision with technical communication means.
30.4			-	-	-		-	Non-fulfillment of actions algorithms in case of standard situations, lack of informational help to passengers.	Trainings on services to clients. Creation of road map of actions for different standard situations. Provision with technical communication means for informational and other additional services.

CHAPTER 3
STRATEGIES FOR DIFFERENT TYPES OF STATIONS

1. General strengths and weaknesses for different types of stations.

This part is confidential. The whole handbook is available at the UIC Extranet within the security workspace. If you are not registered yet, please register at http://extranet.uic.org/?tg=login&cmd=register and ask for the access to the security workspace.

2. Recommendations.

This part is confidential. The whole handbook is available at the UIC Extranet within the security workspace. If you are not registered yet, please register at http://extranet.uic.org/?tg=login&cmd=register and ask for the access to the security workspace.

CONCLUSION

This study puts together the approaches of station and security and clearly shows their difference, but also gives suggestions on how to cope with each other.

The results of this study lead to a few important ideas:

- Station security is currently mainly defined by human factor measures or is linked to human factor by information transfer principle;
- Despite existing practices, station security is still on the way to digitalization, and this might become one of the priorities for the upcoming years (considering as well the necessity to diminish the influence of human factors respectively using them for other tasks).
- Railway security managers are currently very favorable for hard and super hard tools which are visible and perceived by customers, and that does not correspond a lot to station managers' preferences.
- The most vulnerable station management areas are: connection to the surroundings and commercial activities. This result is a little bit contradictory with basic idea that the most influenced aspect is passenger flows management.

This study may serve as handbook or guidelines for both station and security managers as it provides:

- Information on the profiles of the most popular tools;
- Juxtaposition of each tool with station management areas and typical risks;
- General recommendations of decrease and prevention of negative influence for each tool;
- Lists of tools with most negative and most positive influence of different station management areas according to the results of the survey;
- Check lists for different types of stations (defined by the tool sets) and step-by-step recommendations for each type which can be used as is or in different combinations suitable for specific stations.

The sequence of this study might be:

- Cost evaluation of different security tools and measures in different countries for security managers and station managers;
- Examination of regional regulation regarding station security measures;
- Study of station security organization and cooperation with third parties in regional aspects.

REFERENCES

Useful links:

- UIC Security Activities: http://uic.org/security
- UIC Research Projects on Security: http://uic.org/Security-Reseach-Projects
- UITP: http://www.uitp.org/
- COLPOFER: http://www.colpofer.org/
- RAILPOL: https://www.railpol.eu
- ERNCIP: https://erncip-project.jrc.ec.europa.eu/networks/tgs

Related projects:

- CIPRENet (2013-2017) - https://www.ciprnet.eu/home.html
- COUNTERACT (2006 - 2009) - http://www.uitp.org/content/counteract-0
- PROTECTRAIL (2014): http://protectrail.eu/
- SECURESTATION (2011-2014): http://www.securestation.eu/documents/securestation.pdf

Articles and publications:

- UIC Leaflet New Technology – Protection measures for railway assets, 2013
- UIC Recommendations on Crisis Management, 2017
- A Cost-Benefit Analysis of Alternative Device Configurations for Aviation-Checked Baggage Security Screening / Risk Analysis, Vol. 26, No 2, 2006
- Building security : handbook for architectural planning and design / Barbara A. Nadel. New York: McGraw - Hill, 2004. ISBN 978-0-07-141171-4
- Leisure facilities in railway station areas / Tim van de Kruijs, Unviersiteit Twente, 2013 http://essay.utwente.nl/64251/1/KruijsTWvande_0112186_openbaar.pdf
- Protecting Public Surface Transportation Against Terrorism and Serious Crime: Continuing Research on Best Security Practices / Mineta Transport Institute, 2001 http://transweb.sjsu.edu/MTIportal/research/publications/documents/01-07.pdf
- The acceptability of counter-terrorismmeasures on urban mass transit in the UK / Urban transport XV, p. 627
- The benefit of positive passenger profiling on baggage screening requirements / Rand Corporation, 2004
- Threat detection: a framework for security architects and designers of metropolitan rail systems, Urban, Planning and Transport Research / Hervé Borrion, Kartikeya Tripathi, Peng Chen & Sungpill Moon (2014)

APPENDICES

This part is confidential. The whole handbook is available at the UIC Extranet within the security workspace. If you are not registered yet, please register at http://extranet.uic.org/?tg=login&cmd=register and ask for the access to the security workspace.

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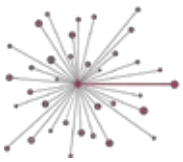

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