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Deliverable 1.1

Methodology for the Adoption of Design Thinking in Urban Security and Crime Prevention Initiatives



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Index of Contents

1. Introduction	6
2. An Introduction to Design Thinking Methodology.....	7
2.1 Strengths and weaknesses of Design Thinking.....	10
3. The Design Thinking approach in urban security and crime prevention	13
3.1 The First Principle: training can increase the success of adopted measures.....	14
3.2 The Second Principle: ensuring participation of security practitioners and citizens can lead to constructive solutions	15
3.3 The Third Principle: implementation can be boosted through social and cultural measures.....	17
3.4 An example of how Design Thinking approach can be applied in urban security: CPTED	18
4. Concluding Remarks.....	21
References.....	23

Index of Tables

Table 1.....	6
Table 2.....	8

Index of Figures

Figure 1.....	7
Figure 2.....	9

1. Introduction

This report focuses on the adoption of the Design Thinking approach related to urban security and crime prevention. This report aims at providing the theoretical ground on where to build the innovative methodology addressing urban security and crime prevention initiatives. The spotlight in this report is upon the theoretical path to follow for devising effective solutions: the aim of this proposed framework is not to provide practical assistance for urban security instruments.

First, the following section provides an introductory overview of Design Thinking methodology, how to describe it and how it has developed in both the private and public sector. The report proceeds by highlighting the strengths of this methodology as well as hurdles to be considered while adopting this approach. In the second part of this report, the focus shifts towards the application in urban security and crime prevention initiatives. Hence, the report proposes a framework of general theoretical principles that public policy makers and other local authorities can rely upon. Three principles considered for the adoption of Design Thinking approach in urban security are discussed. Thus, the proposed framework encompasses three principles to be conceived as general recommendations for a successful Design Thinking implementation in urban security. Hence, the first principle takes into consideration the importance of training public officers and those directly concerned with the implementation of measures. The second principle, instead, emphasizes the role of public participation of citizens and security officers not only in measures implementation, but also within the whole process of the Design Thinking approach. While the second principle envisions end-users' input as paramount for successful achievements, the third one highlights the relevance of shifting the focus towards social and cultural measures accompanying the strategy. Ergo, the last principle suggests implementations for a bottom-up approach to urban security that still envisages end-users at the core of the process. Finally, this report also shows an example of how Design Thinking can be implemented in urban security, by adopting an environmental approach.

2. An Introduction to Design Thinking Methodology

The adoption of a new approach for improving public policy by relevant stakeholders can be challenging and can represent a demanding process for policymakers. This might result in a slow and deficient transition to innovation and thus poorly addressing social issues. Hence, in order to define and construe a practical and understandable approach to urban security, it is paramount for relevant stakeholders to be well introduced to the methodology.

This proposed innovative method to tackle urban security and crime prevention is envisioned through the Design Thinking approach. Design Thinking is a methodology that permeates the whole spectrum of innovation activities with a philosophy of design, centered on people (Brown, 2008). There are several characteristics that can be defined as cardinal elements of the design thinking, as well as a sort of flexible process that exemplifies a Design Thinking method. As Brown, chair of a global design company, pointed out, there are five main components of this approach (see Table 1).

The aspects of Design Thinking mainly include empathy, integrative thinking, optimism, experimentalism and collaboration (Brown, 2008). Designers should first be able to imagine the world from multiple perspectives while seeing what others don't: in this sense, they are empathic. The integrative thinking is crucial for the success of this process for it envisions solutions that are not only 'black or white' but also the result of a constant fishing in unexplored waters. Designers shall also be optimistic: there is always a solution better than another and within the reach of the designers that delve into creativity and experimentation. In addition, a spirit of collaboration shall frame the whole process: a team of designers can better be conceived as experts of different areas in order to tackle the complexity and diversity of the services or experiences addressed. It is relevant to have a diverse group of specialists involved in the design thinking process: multidisciplinary people forming a team of professionals with the capacity to collaborate across disciplines (Brown & Wyatt, 2010).

Empathy (end-user inclusion)	To be able to conceive the world from a variety of viewpoints.
Integrative Thinking (think outside the box)	To not rely solely upon analytical processes for implementing measures that go far beyond conventional solutions. To break out thinking patterns, to reframe issues and to construct different thinking paths for generating an idea.
Optimism	To always assume that there is at least one solution better than existing options.
Experimentalism	To understand that great achievements are not met through small changes, but through a process leading to totally new directions. In light of the iterative process of the approach, to experiment means also to test ideas and evaluate their implementation, adapt them and eventually start over.
Collaboration	To understand that the complexity of plights can be untangled only via an interdisciplinary approach, thus including cooperation with diverse designers.

Table 1: The five aspects of the profile of a designer as envisaged by Brown (2008)

Major deployments of the Design Thinking process can be observed within the business/private sector. Businesses were in fact the first to embrace this new approach (Brown & Wyatt, 2010). Indeed, such a methodology can represent a successful tool for economic growth: discovering what end-users need, listening to them and fabricating unconventional solutions to their issues. This can be the key reasoning for the birth of a new innovative product in the market. Design Thinking is an approach that is frequently adopted by industries to come up with new devices or products that best smooth the edge of consumers' problems. Also, industries rarely consulting with designers for innovative solutions have a tendency to expect a 'Design Thinking based input' when they do (Morinaga, 2019). In business, Design Thinking is a discipline that uses the sensitivity and the methods of the designer to make people's needs align with what is technologically doable and with what a viable market strategy can convert in value for the client and the business (Brown, 2008). This implies a strong inclusion of end-users in the process of generating ideas: this encourages the ability of thinking outside the box by breaking the fences of classical linear thinking. Also, the first solution may not be optimal, and it is paramount to be reminded of the iterative approach that envisions designers prototyping, adapting and testing their solutions. Hence, flexibility represents a significant feature of the approach and should be highly valued for delivering solutions that best meet users' needs.

How can Design Thinking be produced then? Brown imagines a system of ‘spaces’, rather than defined steps (see figure 1). These spaces devise certain types of activities that together shape innovation. Brown lists three such spaces: inspiration, ideation and implementation. In other words, what motivates you to find solutions, what innovative ideas you can generate to achieve alternative solutions, and how you intend to deploy these ideas in practical terms.

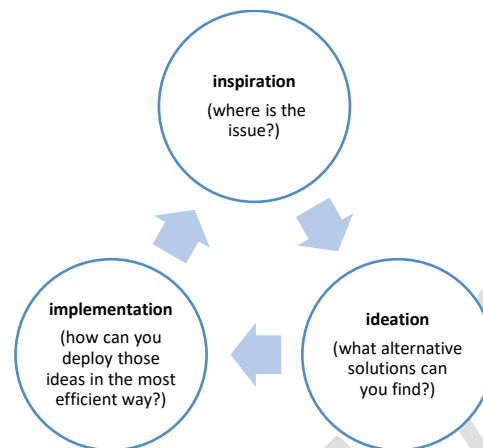


Figure 1: The three spaces conceived by Brown (2008) and their interdependency

Inclusiveness of the Design Thinking process is a significant aspect to keep in mind. The paradigm of Design Thinking involves two perspectives: that of the designer and that of the decision makers (Georgiev, 2012). Including end-users, *humans*, at the heart of the process can be challenging. Human behavior is context dependent and the formulation of solutions is therefore tough (Leifer & Meinel, 2016). The human-centered problem-solving viewpoint marks the very own nature of design thinking, shifting the focus of the whole process towards end-users, stakeholders and those truly affected by a specific problem. Design Thinking, as it can easily be perceived, is a fluid, flexible and evolving strategy and it is hard to provide a strict definition or a conclusive description of its scope (Georgiev, 2012). There may be no unique meaning to attribute to this process but, accordingly, we should not focus on looking for one (Johansson-Sköldberg *et al.*, 2013). In general terms, Design Thinking methodology can be summed with a five-step process that unfolds the three spaces envisioned by Brown. These five steps are: empathize, define, ideate, prototype and test. Designers are supposed to empathize as much as they can with end-users, getting in touch with them, exchanging and welcoming perspectives while understanding the problem and getting at the heart social issues. The engagement of designers with end-users is crucial in this phase to subsequently reach remarkable outcomes. By unpacking the results of this first stage, it is time for designers to define what needs to be changed or fixed. In the defining stage, designers are asked to state what is exactly the problem they are trying to find solutions to. by now, designers should have already well understood where the problem lies and how it affects end-users. It is exactly by grasping what the issue is that designers can start thinking about eventual solutions. Here, in the ideation phase, designers should explore the pool of ideas generated within the group. By gathering input from all the participants, it will be up to them to draw few solutions can better

fit the issue. Here, designers are asked to effectively choose ideas to bring to life. Hence, in the prototyping phase, designers should transform theoretical ideas into practical and tangible products. After that, in the final phase of testing, feedback from end-users has an important role: the true testing of the solution inside the end-user's world determines feasibility and success of the chosen solution. To exemplify the iterativity of the approach, it is important to grasp the flexibility of these steps, that do not compose a solid and rigid process to follow: for instance, designers might come back to empathizing with end-users after testing the intended measure (see figure 2 for a better description).

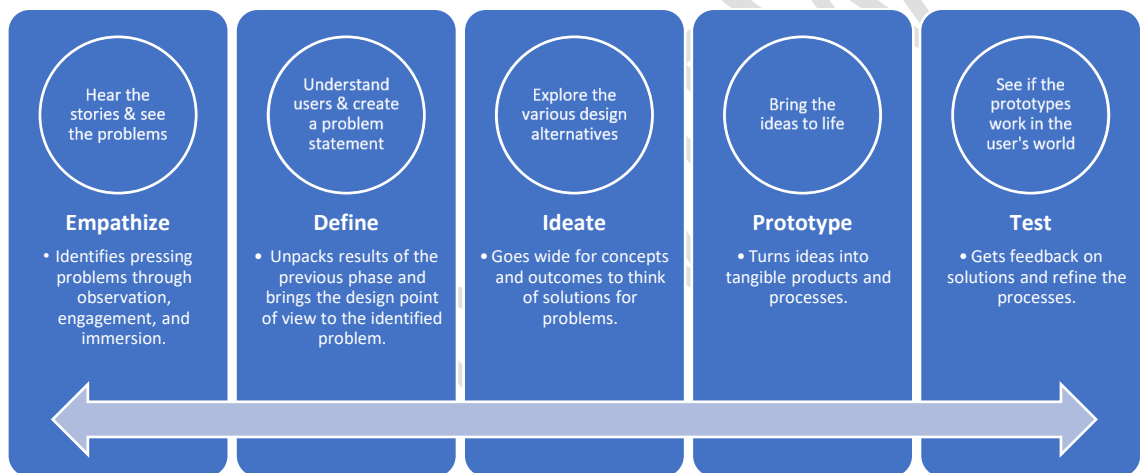


Figure 2: The five steps of Design Thinking. Note: more details are from the Stanford d. school. (n.d.). Design thinking bootcamp bootleg. <https://static1.squarespace.com/static/57c6b79629687fde090a0fdd/t/58890239db29d6cc6c3338f7/1485374014340/METHODCARDS-v3-slim>

2.1 Strengths and weaknesses of Design Thinking

Design Thinking can be understood as a strategic way of approaching issues and of devising alternative unconventional solutions that better improve end-users' experience. However, it is important to adopt a critical perspective and to analyze both advantages and drawbacks of Design Thinking methodology.

This iterative approach produces constructive divergent thinking but at the same time it has an ambiguous and non-specified understanding, fluctuating between being a theory, a methodology, a method and an approach (Greenwood *et al.*, 2019).

A threefold orientation of Design thinking can be explored when discussing its strengths and weaknesses: the good, the bad and the ugly of Design Thinking methodology (Greenwood *et al.*, 2019). This intriguing classification is helpful to fully grasp the Design approach (see Table 2).

Empathy	Multidisciplinary approach that allows implementation in a wide array of contexts.
Integrative Thinking	Eventual consideration of the approach as a loophole for complex situations or a guidebook for creative solutions.
Optimism	Ambiguity and disorder within the process given by the flexibility of the process itself.

Table 2: the three aspects of the Design Thinking approach envisioned by Greenwood *et al.* (2019)

Essentially, the good lies in the interdisciplinary functionality of the methodology, and especially in the adaptability of Design Thinking to a variety of audiences, situations and contexts. In addition, Design Thinking allows for a better and in-depth analysis and understanding of the problem by getting at the core of the social plight. The bad, on the other hand, is to be found in the argument considering Design Thinking as a quick and easy fix to complicated plights. Also, this approach shall not be conceived as a manual for creativity (in the sense of a general guide to be strictly followed to generate alternative solutions). If this is the case, faults in the process can occur. One, for instance, happens when a team member or two have the loudest voice and no dissensus is shown among others, who follow suit (Greenwood *et al.*, 2019). These ‘glitches in the system’ are to be considered beforehand, recognized and addressed by designers in the advancement of the approach. The ugly, finally, is what the disorganization surrounding the process is called. While multiple voices of diverse experts have to be heard, ambiguity can be generated and shall be embraced, as well as dissensus (Greenwood *et al.*, 2019). In other words, in the ideation phase, opinions of experts, and non-experts, can contrast and generate conflict: this needs to be turned into a factor for growth. Diversity of opinions, ideas, and perspectives shall pave the way for even better and inclusive solutions.

The ‘bad habits’ that can arise during the Design Thinking approach have to be accommodated, accepted, and, in a certain way, turned into advantages. In addition, although largely debated and developed in literature, Design Thinking could be conceived as ignored and taken for granted (Johansson-Sköldberg *et al.*, 2013). However, ensuring adoption of this strategic approach can facilitate and ease the achievement of significant solutions not only for the private sector but also for public policy development.

Problems with Design Thinking can be described as wicked (Buchanan, 1992), suggesting a fundamental indeterminacy inherent to this methodology. However, it is important to remain practical in the understanding of this approach and of eventual faults to avoid in its implementation. The production of biases during the Design Thinking process can seem quite inevitable at some point. Flaws need to be identified and consequently addressed. Several faults, or procedural bugs, can be determined (Liedtka, 2015). For instance, decision-makers might be influenced by current personal/external situations in the assessment of their ideas. As well, an overoptimism can be disruptive for the process for it generates overcommitment to inferior ideas and hinders innovation. Also, the endowment effect can prevent from considering valuable solutions other than the first ones, resulting in a reduction of options envisioned. Another example is the ‘availability bias’, where a preference is shown for what can be effortlessly contemplated, and so options harder to imagine are undervalued or overlooked. Such biases shall then be recognized in the process and addressed accordingly – for example, by insisting on data collection and on empathizing with end-users. Faults can be corrected also by improving decision makers’ capacity to *put themselves in others’ shoes*, or by ensuring a truly diverse and multidisciplinary team of experts (Liedtka, 2015).

Hence, if eventual flaws are addressed properly and in time, Design Thinking can be a constructive strategic approach leading to innovative solutions. In policymaking, this methodology can be truly innovational and helpful for obtaining meaningful achievements. Traditionally, stakeholders are consulted late in the process of policymaking, after all options are revised and solutions explored. Design Thinking, on the contrary, envisions the early engagement of stakeholders as key element of value in the whole process and puts them at the table of the discussions (Mintrom & Luetjens, 2016). It is possible for the adoption of Design Thinking in public policy to drag decision makers outside their comfort zone. This, however, is exactly the reason why the achievable results can be innovative and unconventional, capable of addressing a problem from an unexpected viewpoint.

In terms of Design Thinking implementation in public policy, a growing number of administrations are already making use of this approach to innovate their policies and ensure a co-creation process in the public agenda. Here, stakeholders do not cover the mere role of passive receivers, instead they are involved in shaping decisions. In this new responsible, active and constructive role, end-users are at the very core of policymaking (Allio, 2014). Examples of Design Thinking methodology applied in public policy can be found in several Countries, such as in Nicaragua or Mozambique (Bakic *et al.*, 2015). An interesting case, that involves crime-reduction initiatives, is that of Nigeria. The Prison Project developed in Agadez, a Nigerian city, was a project intended to reduce criminality and favor reintegration of inmates. Given the poverty of people in the area, relapse into crime after conviction was estimated around very high percentages. The gathering of several actors, among which the Danish Center for Culture and Development, a private actor, prison administrators, and community leaders, furthered the success of the project.

The latter envisioned concrete short-term and long-term measures that involved prisoners in learning carpentry or tailoring, teaching them new skills, and also receiving support on HIV/AIDS, drugs consumption, smoking, and drinking. Together with other recreational activities, these workshops and training sessions were of true assistance in achieving the goal of reducing criminality and relapse into crime, and most of all in changing the mentality towards the prison system in Nigeria (Allio, 2014).

3. The Design Thinking approach in urban security and crime prevention

The application of Design Thinking methodology to issues of urban security and crime prevention is widely examined in the literature. The main goal of urban crime prevention is that of precluding, or in any way inhibiting, criminal acts in urban settings. Addressing the causes of crime is much tougher on crime than traditional approaches (Hicks, 1998), especially for organized crime, where specific group capabilities and dynamics come into play (Ratcliffe *et al.*, 2013). The strengthening of urban security and the enhancement of urban safety, together with the improvement of crime prevention initiatives, can represent a hurdle for many cities' administrations. The Design Thinking approach can be seen as exemplifying and easing a common – and successful – methodology stakeholders can use to specifically tackle these issues.

Municipalities, law enforcement agencies and public authorities addressing these problems can adopt a Design Thinking approach to boost the effectiveness of intended measures. This means that instead of adopting conventional measures (such as more police patrolling for an increased crime-rate in an area), authorities are encouraged to consider a broader range of innovative solutions.

What follows below is a description of theoretical principles local authorities can rely upon when applying Design Thinking methodology for urban security issues. The subsequent principles stem out of successful previous applications and of constructive debate within the literature. Authorities are therefore encouraged to follow this framework of principles when addressing urban security concerns via a Design Thinking approach.

3.1 The First Principle: training can increase the success of adopted measures

The adoption of Design Thinking methodology in the context of urban security and crime prevention should better be envisioned with a multidisciplinary team of experts. This team shall define the training and preparation of stakeholders as one of the primary focuses. In other words, individuals such as police officers or public officials shall receive proper training and shall be thoroughly instructed. This is essential for they practically implement urban security and crime prevention initiatives.

In the experience of Vilnius, in Lithuania, the implementation of CPTED measures was hindered by a passive, alienated community and by lack of knowledge of public officers (Saraiva *et al.*, 2016). In this specific case, police officers lacked CPTED knowledge and experience: they never received formal training and thus mainly relied on their skills developed while working in the police department. Not only were they given no training but also no guidelines for conducting due assessments.

It is therefore paramount for a proper Design Thinking implementation in the urban security context to actively engage with those 'on the field'. Training of who will practically carry out the devised measures is essential. This can be performed, for instance, through workshops and seminars where public officers, security technicians, members of the municipality administration, dedicated teams and all other urban security actors are presented with the issue(s), the identified solutions and eventual problems that can arise during the implementation. Public authorities shall then ensure the efficient training of professionals practically carrying out the intended measures. Training should be formal and carried on by academic and non-academic experts.

For the implementation of this first principle, it is advisable to include several elements in the proper training. For instance, on-field agents should be thoroughly informed of the assessments carried on in the designated urban area. Also, they should be trained in the Design Thinking process surrounding the urban security improvement. In addition, and most importantly, they should be included in the stages of the process while being informed of the eventual issues they might face in the practical implementation.

In practical terms, officers directly implementing the designated measures should receive guidelines and checklists for properly assessing the correct procedure. In terms of Design Thinking procedure, an idea could be that of organizing tailored training sessions for each of the steps of the Design Thinking process, in relation to the urban security issues. For instance, public officials can undergo professional training on how correctly ‘empathize’ with the selected urban spaces in light of the contextual social issues present within the area. This can be organized for all the required steps of the methodology: involving public officials and officers from the very beginning can enhance chances of success. They shall not only rely on their previous experiences in public security, instead should receive formal specialized training. This implies public officials should also be actively engaged with local neighborhood groups, so to build (or re-build) major trust between public and authorities. A more engaged staff of officers can prove to better respond to training and then better address challenges in measures implementation.

3.2 The Second Principle: ensuring participation of security practitioners and citizens can lead to constructive solutions

While it is paramount to train officials for ensuring effectiveness of Design Thinking-led solutions in urban security, it is important to look at the public as well. The contact with end-users is relevant for the process of ideas-generation and vital for a successful Design Thinking process. Listening to the citizens is indeed highly recommended. When this step cannot be met, it should properly be justified. For instance, the implementation of CPTED measures in an area of Budapest was carried on without taking public views into account (Benkó & Germán, 2016). However, this was not possible for the specific characteristics of the site and for the challenging design process. It should be noted that public participation shall be encouraged and taking into consideration public wishes and perspectives helps placing end-users at the center of the Design process. This is the reason why not only residents should be encouraged to take part in the design process, but also members of NGOs, representatives of civil society organizations, and other urban actors active in the area.

These measures of participation can take the form of workshops for residents or meetings that increase the contact with the local police. A successful implementation of people’s involvement can be seen in Denmark, where the contact with residents stimulated perspectives and uncovered concerns police officers were unaware of (Degnegaard *et al.*, 2015). The specifics of public involvement can mainly be left to the local authorities for they best know how to engage with people. As an example, the utilization of e-tools for public participation (such as online surveys or other virtual interactions) can be an option. The widespread e-participation facilitates the implementation of safer cities (Chiodi, 2016). However, it is important to see where these e-tools can better be of assistance, given the disparity in computer literacy among populations and countries.

In order to provide for a practical example of how to properly involve the public in this methodology, what follows is a description of the co-creation initiative organized by the Danish police. The authorities set up a day-long workshop for which strategic visualization was highly important: in designing the process of the summit, visualizations helped designers to make ideas adhere to a coherent path and to analyze what was missing. By visualization, it is practically meant the use of images, posters, sketches and schemes; all this can in fact assist in better grasping the process flow and eventual gaps within. At the event, participants learned about police's vision to maintain safety and security with support of society. Also, they were made aware of pre-existing policies and initiatives already implemented by authorities. Subsequently, the workshop continued with a storytelling phase: participants were allowed to share personal stories regarding their own experiences with police challenges. In small groups, participants were asked to share these real-life stories. Main issues such as trust, engagement, control and transparency came up. The headlines of those stories were then recorded on post-its, so that visualization could again play an active role during the process. While entering the phase of 'ideation', brainstorming was applied: participants were divided into teams and each one was given twenty minutes to generate ideas. They were now in a divergent state (creating many ideas), but they were consequently asked to converge (choose and focus on few ideas). Groups were then given time to think about how to prototype an idea and they were given the floor to present it. This clearly was an easy way to get the public closer to public officials, even by getting their voices – and ideas – heard. In this win-win situation, the Danish police was then able to see patterns of citizens needs that were not taken into consideration. In sum, this workshop worked as a true dialogue between institutions and people. Most importantly, this workshop organized by the police allowed for solutions and ideas to come exactly from end-users: something the Design Thinking approach places at the center of the discourse.

In order for public authorities to better follow this third principle, it is advisable to involve the public opinion as much as possible not only for identifying urban concerns but also in the stage of developing ideas for innovative solutions. In practical terms, involvement might be conceived as physical or virtual. Residents of a neighborhood, for instance, can be invited for an informal gathering where a seminar is carried on and where much time is given for an interactive exchange of information and ideas. Co-creation is a substantial aspect in the Design Thinking process, and this can be hereby achieved through the facilitation of an interface with residents. For example, the Q&A section at the end of a seminar can be removed and fragmented throughout the meeting so to create, more than a lecture, a conversation. Virtually, for instance, the public can be reached via email with surveys or, in case people have low computer literacy or are not used to communicate online with public authorities, also via post. For the lack of immediate feedback, the latter can mainly be useful for an informative goal: the public can be made aware of what the law enforcement agencies are working on, their approach, their ideas and how to contact them. However, it should be noticed that online tools, such as surveys, or informal gatherings, such as seminars or workshops, may be much more of assistance in placing end-users at the core of the process and in understanding their viewpoints.

3.3 The Third Principle: implementation can be boosted through social and cultural measures

In light of the 'second generation' CPTED approach (Cozens & Love, 2015) mentioned above, it is important to understand that communal measures are truly effective for reducing crime. Hence, the deployment of cultural and social actions should be seen as part of the methodology. It is important to look at neighborhoods as communities, with their own values and concerns. For instance, neighbors with shared values look after children playing in public spaces and are ready to intervene when necessary. Neighbors might share same expectations and build a cohesive trust that can be the base for creating urban crime solutions (Schubert, 2015). The ultimate goal is that of preventing the isolation of the neighborhood from the urban environment.

Connection, as well, is a relevant term in this regard. It is crucial to foster contacts with organizations, groups and institutions outside the neighborhood itself. This can allow an appreciation of the diversity within the neighborhood while also revitalizing traditions by supporting a 'community culture' (Schubert, 2015).

From a practical perspective, authorities are encouraged to follow this principle through context-dependent solutions. For instance, once a given area or neighborhood is selected, social cohesion shall be furthered. Promoting social cohesion in an urban area means strengthening the social bond among residents. This can also result in neighbors looking after each other or more attention paid by residents to eventual suspected activities. Therefore, authorities could practically promote the use of public spaces while taking into consideration the public they attract. For instance, if a library is opened in a neighborhood, this can bring young educated persons to the area, while also increasing the traffic of people in the said zone. Opening hours of the library can determine the flow of people in the street. Urban designers might also consider the creation of community centers: these places where people of all ages come together can indeed further civic pride, engagement and build community relationships. In addition, holding cultural events in the selected area can be another idea aimed at enhancing urban security through social bond. It is always important to look at the public these events will attract, which not only implies the audience, but also people who are willing to start a restaurant, a bar or a shop in that area now that cultural events are scheduled there regularly. For creating community development initiatives, creative placemaking can play a significant role too. For example, designers might think of creating new arts centers, galleries or cultural areas: it is relevant to understand how artists formally and informally inform public spaces and contribute to the creation of interventions towards social community outcomes. Art can in fact promote empathy, provide career opportunities, stimulate creativity, and advance the quality of the environment.

What is really stressed with this last principle is the relevance of the contact with end-users, favoring a bottom-up approach for the advancement of urban security. This implies not only the ensuring of public participation, but also the deployment of specific measures aimed at improving social cohesion and cultural diversity in a specific urban area. Hence, how should public authorities implement social and cultural measures? After careful assessment of specific areas where urban security improvement is most needed, it is recommended to carry out measures addressing ethnic diversity, eventual discrimination, cultural cohesion, educational support or employment rate. The exact way of deploying such measures is indeed left to local authorities for every situation may require different modes of implementation. For instance, these measures can translate into regular seminars offered to residents, specific educational sessions, the opening of employment agencies in the area, the creation of centers for drug-rehabilitation, centers for counseling services, foster homes or halfway houses.

3.4 An example of how Design Thinking approach can be applied in urban security: CPTED

Crime Prevention through Environmental Design – henceforth CPTED – is an alternative way of addressing urban security issues while preventing the occurrence of crime. CPTED mainly consists in changing the urban setting in specific neighborhoods to create safer environments. This method relies in the effect the built environment has on minds of criminals: it draws on environmental and behavioral psychology (Cozens & Love, 2015). CPTED appears to be one of the most effective proven methods for addressing urban security, especially in the area of public disorder prevention, graffiti, fights or robberies. This principle seems to find more debate in the literature than the others, and therefore this report gives CPTED more space than other principles.

Accurate design and management of the built environment can reduce crime. Physical elements such as buildings or parks can be designed and positioned as to assume a ‘protective function’: they shield citizens from criminals by reducing the chances for crime to occur (Schubert, 2015). In other words, for instance, a well-lit park at night can drastically reduce the chances to be assaulted in its streets, or a well-positioned CCTV system around buildings or house complexes can demotivate criminals willing to commit, for example, burglary or car-theft. There may be several problems in an urban area that foster criminal activity, such as lack of maintenance or poor quality of public spaces. Assessment of the actual and perceived danger of the area can mainly be carried on via measuring visibility, accessibility, territoriality and attractiveness (Klima et al., 2016). CPTED, as a mostly local approach, addresses criminality by adjusting those parameters.

For instance, in the case of a park in Widzew, Poland, visibility was assessed by looking at trees obscuring streetlights, and by looking at the number of ‘eyes in the streets’ present (windows of buildings surrounding the area through which people can see the park). Here, accessibility was assessed by analyzing the asphalt (if smooth black asphalt, then car-friendly), anti-parking objects, and actual size of paths (cyclists and pedestrians may hurt each other in small passages). Territorial reinforcement was assessed by looking at pre-existing fences, illegal gardening, transformer boxes, and other objects that favor anyone with bad intentions to show up. Finally, attractiveness was measured by the level of maintenance of the environment, not only in terms of buildings but also in terms of green areas (poorly maintained bushes can generate feelings of discomfort or anxiety, especially for women walking at night).

Hence, the environmental design can be manipulated in order to reduce crime and enhance security. Sometimes, the capacity of a building or of an area to subtly indicate zones of defined ownership, or to provide surveillance opportunities by residents themselves, can prove to be successful in reducing crime. This does not mean delegating in any way to residents the patrolling or the surveillance police forces are usually in charge of. Instead, it has the function of indirectly communicating to potential criminals their visibility in such an environment. This generates the concept of ‘defensible space’: an environment whose characteristics allow its own residents to be key actors in ensuring their security (Newman, 1973).

In sum, CPTED seeks to optimize opportunities for surveillance while defining clear boundaries (Cozens & Love, 2015). The strategic positioning of natural elements and built establishments represents an alternative way of preventing crime and of enhancing security in urban contexts. CPTED can be considered as a form of ‘risk management’ (Parnaby, 2006) in the sense of reducing the foreseeable danger of a hypothetical criminal act by stripping it of its etiological complexity. In other words, it leaves no reason for the criminal-to-be for perpetrating the crime: CPTED reduces the chances of committing a crime. Thus, it reduces the *risk*.

Therefore, CPTED can have a dual positive implication. On the one hand, it can reduce crime. Additionally, it can help reducing the fear of crime (Minnery & Lim, 2005). Drawing from its psychological component, not only can it produce an effect on the perpetrator by demotivating the criminal intention, but also on the civilian by decreasing the concern about crime and the fear of an imminent felony.

As per the evolution of the method, CPTED can be envisioned as including more and more social components. This favors a bottom-up process of space redesign, in contrast to a top-down approach. Social cohesion and community engagement, for instance, shape what can be named ‘second generation’ CPTED (Cozens & Love, 2015). Residence participation, culture, connectivity and inclusion can increase the potential of this method not only by manipulating the built environment but also by strengthening residents’ feeling of community and their involvement in neighbor’s security.

CPTED has been implemented by various cities in the world and has brought to successful results. An example is given by the city of Budapest (Benkó & Germán, 2016). The renewal of two city-areas with a CPTED approach emphasized the importance of a community-based process and strategic architectural planning. The inclusion of CPTED in public policy can also be analyzed in Western Australia, where the government focused much on access to public space, surveillance options, constant human activity and on regular space-maintenance (Cozens *et al.*, 2008). Other examples of CPTED implementation can be found in Spain, in the municipality of L'Hospitalet de Llobregat near Barcelona (Chiodi, 2016), in Vilnius (Saraiva *et al.*, 2016), in Lisbon (Tulumello, 2017) or in Amsterdam (Van Somereen *et al.*, 2016).

In order to provide a practical example of how to deploy CPTED measures, what follows is the description of how this method has been implemented in the city of Budapest. The enactment involved two areas of the city: March 15th Square and Teleki László Square. Before the transformation, the former was a forgotten non-maintained and deprived central zone. Since the space of March 15th square was fragmented and not uniform, designers created a more unified and comfortable environment to improve the feeling of safety of pedestrians and cyclists. The site hosts Roman ruins that offered chances for underground shelter, now the ruins are accessible only visually for they are covered by glass and those dark hiding spots are now out of the picture. A transparent fence was built between a church and an under-bridge parking area in the square. This enhanced significantly the transparency of the environment, especially through other measures as a change in landscaping. In fact, the square is now greener than before and there are two levels of vegetation made of trees and lawn.

The strategic management of green and transparent elements increased visibility and eased maintenance. The main objective is a natural surveillance: the environment allows for less criminal opportunities. Lightening too was modified: for instance, an entire line of lights links two opposite points under the bridge and dark points have been drastically reduced. Given also the reconstruction of one of the main buildings in the area, new restaurants and bars opened their doors. The requalification of the area also involved a cycling path, water installations and large surfaces to sit on. When looking at Teleki Square instead, we can observe a strategic management of the security accesses to the area. The square was closed for the night and patrolled by two park keepers in the day. The square was actually fenced for the very first time and entrance provided by five gates. For visibility reasons, the fence is transparent. Good orientation is indeed another factor to take into account: the zone was split into six triangular areas and specific new paths determined functional areas within the square. Here as well vegetation was re-managed and played a relevant role for safety and security: more strategic vegetation increased natural surveillance.

For instance, there were formed mainly two gardens, one attracting the elderly and the other, a play-garden, attracting children and parents. Here, designers thought about dividing the garden sections per age: some parts for small children, some for older children. Also, it now has an area for dogs, divided again according to dog size: there are fenced areas for big and small dogs. All the measures implemented in these two areas of Budapest were accompanied by traditional methods, namely CCTV or police patrolling.

Authorities are herewith encouraged to make use of CPTED for improving urban security. As mentioned above, this method has proven to be successful especially at local level. Hence, how can public authorities successfully implement CPTED measures? In practice, for instance, the latter may translate into improving the lighting inside a public park, changing the natural elements in specific streets such as trees or hedges, adjusting public lights in parking spaces, deploying CCTV in pathways, ensuring maintenance of public spaces, eliminating barriers such as walls in parks and avoiding dark spots, using permeable fencing for visibility or removing urban graffiti.

In sum, plenty of options are available and they are context dependent. Importantly, urban planners and designers shall understand that all these measures affect the built environment and can have an opposite effect if a balance is not found. Design to prevent crime can even go too far and generate hostile environments (Cozens, 2018). Deployment of extreme CPTED measures can render the urban setting sterile and provoke fear or, paradoxically, increase crime. In other words, misapplication can reduce the quality of life in the area and lead to undesired effects. In order to avoid this fault in the implementation, authorities shall listen to end-users and include them in the process. Testing, indeed, is a relevant part of the approach, and, although it requires some time, is useful for understanding efficacy of implemented measures.

4. Concluding Remarks

Design Thinking represents an alternative method to reach innovative solutions and to ensure the inclusion of end-users at the heart of the process. Adopting a Design Thinking approach to urban security and crime prevention initiatives can lead to desired outcomes especially if some recommendations are followed. The framework of principles hereby proposed represents a sort of theoretical guide for a general successful implementation of Design Thinking in urban security issues. This framework of advice encompasses several significant aspects public authorities should consider when adopting this methodology. For instance, some cross-cutting themes that can be identified in the third principles are: inclusion, social development and trust.

The three principles are in fact very clear on including not only the people in the development of the approach but also public officials who will lead the deployment of the intended measures. In addition, the principles stress the relevance of social cohesion in the addressed urban areas and how it shall be promoted by local authorities in a variety of ways. Finally, one of the most important themes surrounding this framework is the trust that needs to be built, maintained and furthered between the general public and local authorities. Indeed, higher the trust between the two, better the feedback that authorities will receive. Undeniably, what should be pursued is a true dialogue with the public: continuous interactions can shape a better approach and can devise much more effective solutions to urban security. This of course is a matter of concern especially in those areas in which trust in public authorities, such as police forces, is low. Thus, although challenging in some situations, trust is the most essential aspect to be considered.

In sum, the suggested framework comprises three principles that mainly encompass officers' training, public participation and the deployment of sociocultural measures. The principles should be followed for a correct and fruitful implementation of Design Thinking in the urban security context. Ideally, adhering to these suggestions can be of assistance in achieving meaningful results. Following all the three principles in the Design Thinking implementation and including all the elements stressed in each of them, can be helpful for reaching best outcomes. In other words, including all the principles in the approach, instead of only some of them, is the best option. It is exactly in this sense that these principles shape a common methodology public authority can exploit for a successful Design Thinking approach in urban security. This method can be useful to better define public issues and to analyze them under unusual perspectives. Although this approach can be disruptive to the audience in the sense that it is meant to bring divergence among opinions and thoughts, unconventional solutions and effective measures are exactly the results of a good management of divergent and convergent thinking.

It is important to stress that this proposed framework is not comprised of purely innovative methods. Since this report aims at providing the theoretical grounds for effective approaches to urban security, all the principles have to rely upon proven past implementations. What is hereby proposed is the combined use of three methods, but the latter have been already deployed around the world by a variety of actors. It is therefore important to remind that the truly innovative aspect of this Design Thinking methodology is meant to be achieved in the entire course of the IcARUS project. This report, indeed, is the very first starting point and as such this deliverable is going to be updated and re-adapted, following its iterative process, at the end of the project.

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