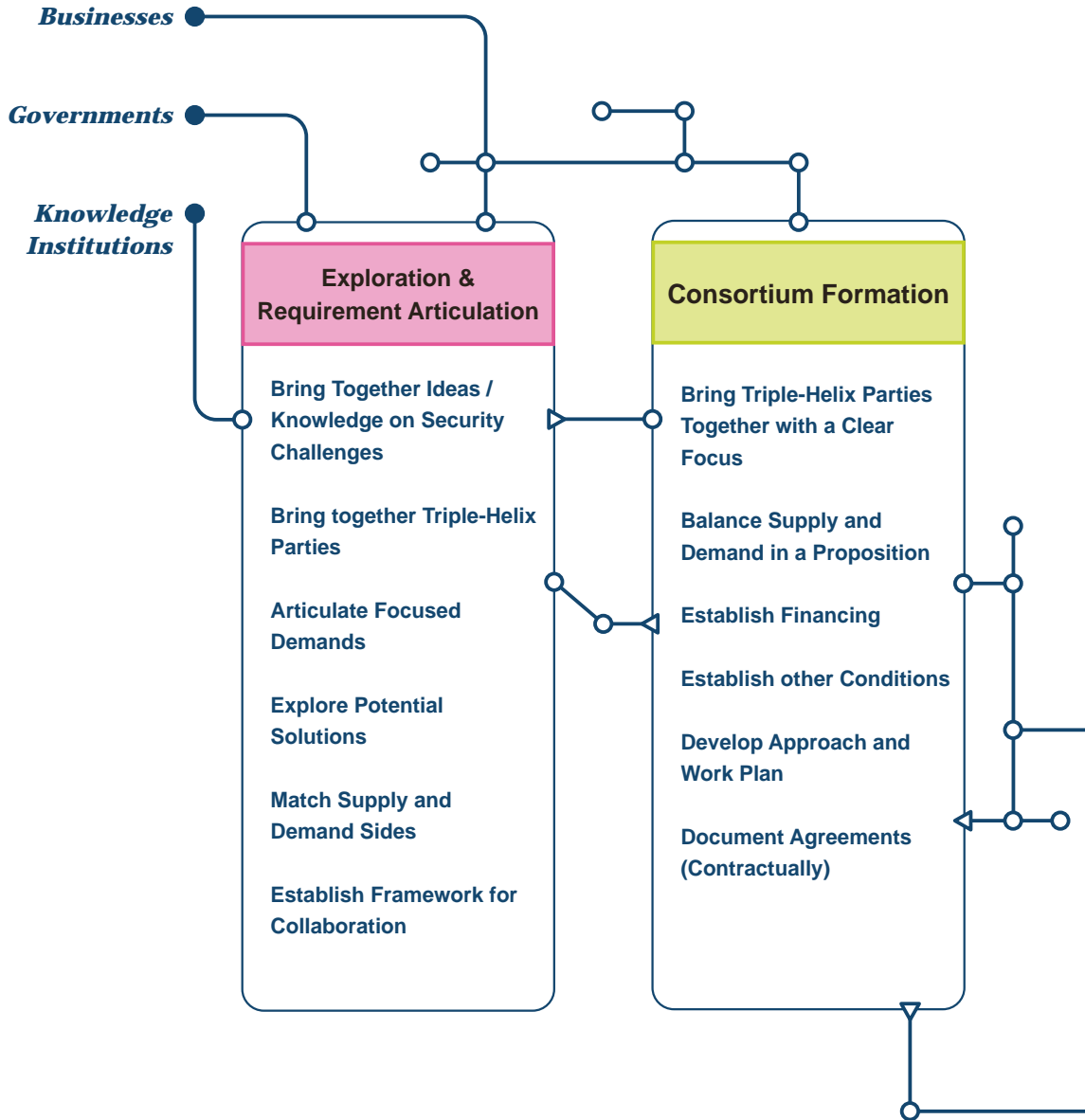# HSD Collaboration Model for Security Innovations
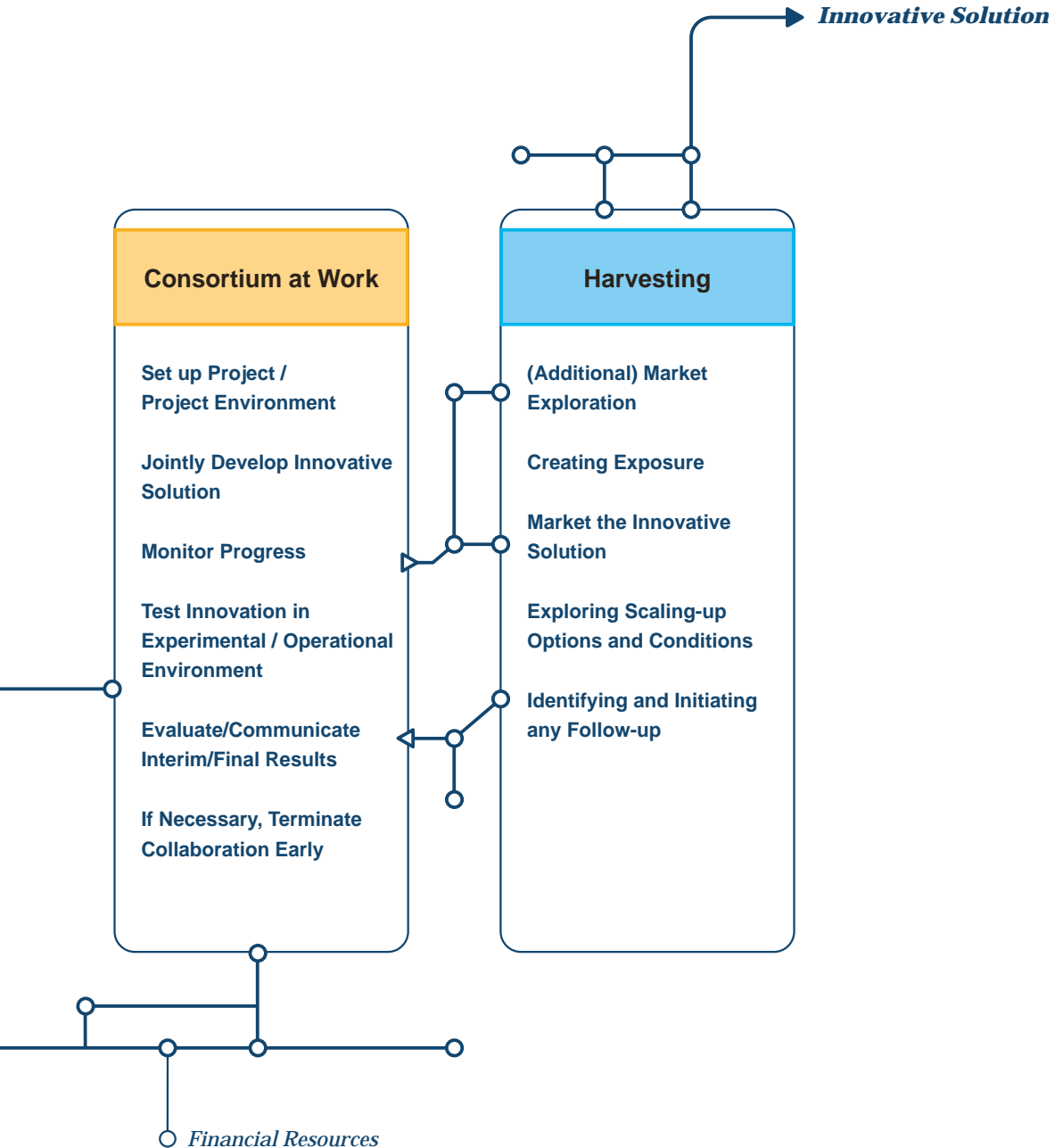
About this Brochure

The Netherlands is an attractive country to live, work and invest in. Security here creates the conditions for social stability and economic development. Security is an important social and economic sector; innovation and job creation constitute two sides of the same coin in this respect. A condition for success is that the business community, knowledge institutes and government must collectively and continuously devote effort to this in ambitious and versatile ways, and with conviction.

This so-called *triple-helix collaboration* is necessary but not self-evident. Cooperation must grow and cooperation must be learned. The objective of this brochure is to clarify what organisations can expect if they are going to work in and together with *The Hague Security Delta (HSD)* for specific innovation projects and over the long-term. This brochure describes the vision, method and specific instruments used by HSD in creating, promoting and supporting triple-helix collaborations for innovative security solutions. The model on the next page summarises the process.

This brochure starts off with a brief description of the definition of a triple-helix collaboration in the security domain. On the basis of this concept we describe how partners in the HSD network can form and activate such collaborations. We do this on the basis of the HSD Collaboration Model for Security Innovations. This model describes four stages in the development of triple-helix collaborations. In four chapters we explore the support available from HSD during each stage. We do this as specifically as possible by describing the instruments available to or made available by HSD, and by citing examples of how these instruments already have been or will be deployed.

Businesses

Governments

**Knowledge
Institutions**

Exploration &
Requirement Articulation

**Bring Together Ideas /
Knowledge on Security
Challenges**

**Bring together Triple-Helix
Parties**

**Articulate Focused
Demands**

**Explore Potential
Solutions**

**Match Supply and
Demand Sides**

**Establish Framework for
Collaboration**

Consortium Formation

**Bring Triple-Helix Parties
Together with a Clear
Focus**

**Balance Supply and
Demand in a Proposition**

Establish Financing

Establish other Conditions

**Develop Approach and
Work Plan**

**Document Agreements
(Contractually)**

HSD Collaboration Model for Security Innovations

Innovative Solution

Consortium at Work

**Set up Project /
Project Environment**

**Jointly Develop Innovative
Solution**

Monitor Progress

**Test Innovation in
Experimental / Operational
Environment**

**Evaluate/Communicate
Interim/Final Results**

**If Necessary, Terminate
Collaboration Early**

Harvesting

**(Additional) Market
Exploration**

Creating Exposure

**Market the Innovative
Solution**

**Exploring Scaling-up
Options and Conditions**

**Identifying and Initiating
any Follow-up**

Financial Resources

Triple Helix Collaboration for Security Innovations

Why Work Together?

Our society is becoming increasingly inter-twined. From healthcare and education to transportation and security: increasingly more sectors in our economy can only be effectively organised and regulated, and adjust to the dynamic demands of our age, at the 'network' level. In its influential report, *De Lerende Economie [The Learning Economy]* (2013), the Scientific Council for Government Policy (WRR) observes that 'Innovation is increasingly taking place in networks: internal connections within companies are being replaced by external connections. Innovation is increasingly becoming the result of combined action.' Instead of devoting an important part of their time to internal processes, many professionals are now focusing on consultation and cooperation with other parties. Many of these collaborations are in the form of a triple helix, most certainly when innovation is a key factor.

The Triple-Helix Collaboration Focused on Innovation

concerns a temporary collaboration among three or more organisations, with participation of at least one public, one private and one knowledge partner (hence: 'triple'). It is the interplay of the perspectives of these different types of organisations that generates the necessary innovation. Each partner contributes certain resources – money, manpower, expertise, technology, machines, facilities, networks, reputation and/or knowledge – in order to jointly carry out a delineated set of activities. The 'helix' (spiral) points to a joint, iterative process in which a purposeful collabo-ration takes shape, although the parties do act as autonomous entities, each with its own motives and organisational objectives within the collaboration. Each partner must derive direct or indirect benefits from the collaboration.

By developing and exploiting knowledge-intensive, innovative applications in the interaction between government, the business community and knowledge infrastructure, social, as well as economic value is created.

The Value of a Triple-Helix Collaboration

is broadly endorsed because a future-oriented match between 'supply' and 'demand' can best take shape within this constellation. Yet, such collaborations do not always succeed. The question is, why not? Under contract to BrabantKennis, social psychologist Ger Jonkergouw put this question to the parties directly involved in the Province of Noord-Brabant's triple-helix collaborations.[1] 'What struck me is that I barely needed to explain the usefulness and the need for the discussion. Everyone quickly agreed that the potential of their collaborations was not fully exploited. My follow-up question each time was the same: did you discuss this together then at some point? This seldom proved to be the case. I did not come across any real mistrust, but mutual commitment is still primarily viewed as a nice-to-have; the project's substance is often given priority. But in my view, mutual commitment is an essential condition for creating a learning ecosystem – and consequently achieving success – it is a need-to-have. That fact proved to be a blind spot.' Jonkergouw's conclusion: people 'practice' far too little with each other.

[1] See http://brabantkennis.nl/van-ego-naar-eco/

The Longer-term

Participating in a triple-helix collaboration takes time and effort. Parties have to devote a great deal of attention to processes for creating personal and collective awareness. Investing in this requires a long-term perspective that transcends the separate collaboration projects. As more experience is gained with partners and different forms of collaboration, it becomes clear who can best contribute what and how people can learn and benefit from and together with each other. The level of trust and mutual credibility among the partners increases. When this happens the transaction costs decrease and the benefits of working together gain the upper hand. Although separate collaboration projects often have a limited time horizon, investing in triple-helix collaborations primarily pays off over longer periods of time.

Innovation in the Security Domain

What are the specific characteristics of a triple-helix collaboration focused on innovation in the security domain? Adjacent we identify four characteristics and describe how to anticipate these characteristics in a triple-helix collaboration.

Multiple Roles for Government

In the security domain, especially public parties, such as the police, fire service and the armed forces, are authorised to take action. This gives the government a double role as a party that jointly specifies the needs at the front-end and as the most important, sometimes only, user at the back-end of innovation initiatives. This can result in a limited market and, as such, to limited earning options for the private sector and a reduced appetite on the part of companies to invest upfront. It is important to align the earning potential of and the desired investments by the private sector. This requires understanding on the part of the public sector for the purpose of creating effective collaboration. Moreover, within the government the parties identifying the needs, the budget holders and the procuring parties are not the same persons and entities as the end users of (innovative) security solutions. This means that it is necessary to involve all these parties in innovation initiatives. The consciously organised input of the end-users is important to ensure that the results are consistent with actual practice and to enhance their acceptance.

Security is a Complex 'Product'

The security concept is very broad, not least because security creates the conditions for social stability and economic development. Tackling crime stands next to fighting terrorism, cyber security next to event security, and fighting human trafficking next to security in neighbourhoods. Various threats have become intertwined; security no longer starts and ends at country borders. 'Measured' and 'experienced' security differ. This complexity is reflected in a growing need for the horizontal and vertical integration of the activities performed by the parties involved in the security

domain. Innovation and security products and services cannot be viewed independently from this system context. Domain knowledge is important. Triple-helix collaboration can bring parties together with a clear focus on thematic innovation – whereby organisational and process innovation focused on integration also forms part of the agenda.

Classification
Open innovation offers a great deal of benefits in the security domain as well. At the same time, various tasks, capacities and information are classified. Triple-helix collaboration as a strategy establishes a foundation for reliable and trusted partners that enables them to tackle also sensitive matters together.

Fragmented Demand
The security domain is highly fragmented: horizontally into operational services, vertically into administrative layers and in the security chain between proactive, preventive, repressive, aftercare and evaluation tasks. Traditionally, many security tasks are assigned to municipalities. Although there is some organisational grouping in security regions, provinces or at the national level – with the national police as the most visible example – the silo effect, institutional barriers and too little incentive for operating beyond one's own sphere of activity continue to be present. On the supply side a certain movement towards increased scale is evident, for example through spin-offs from the defence market in areas such as observation and detection, communication and information processing, (personal) protection and simulation. On the demand side there is still a lot be gained. The net result is that innovative activity in this market is relatively limited and small-scale, with little attention focused on scaling up and synergy. By combining demand in a triple-helix context it is possible to generate greater mass and increasingly reduce the threshold for system innovation. This would enable government to more efficiently and effectively invest and this increases the earning potential of companies.

The Role of HSD

What is HSD?

The Dutch security cluster 'The Hague Security Delta' (HSD) is a network of businesses, governments and knowledge institutions that work together on innovative security solutions and knowledge development. In this network, security issues are discussed and knowledge is shared on cyber security, national and urban security, protection of critical infrastructures, and forensics. The HSD partners have a common goal: a more secure world, more business activity and more jobs. The core of the security cluster is the HSD Campus, the national innovation centre for security in The Hague.

The Dutch security cluster HSD is supported by HSD Office. As an independent foundation, the HSD Office stimulates and accelerates collaboration in the Dutch security cluster, connects businesses, governments and knowledge institutions and facilitate knowledge sharing between them (as illustrated in the diagram below). Innovation programmes are jointly developed in which parties from the entire security domain are allowed to participate. This occurs on the basis of the HSD collaboration model: demand-driven, targeted and on the basis of trust.

In addition, the HSD Office builds national and international knowledge and trade bridges. It also offers partners access to knowledge, innovation, market, talent and capital. It creates insight into all this for the community. HSD's strength attracts national and international talent, investors, conferences and organisations.

Who is HSD?

More than 280 organisations are affiliated with the Dutch security cluster HSD. These partners participate in HSD because they would like to meet the other participants in order to explore potential forms of collaboration. HSD has a small staff, HSD Owffice, which is involved in various ways in promoting and supporting triple-helix collaboration among the participating parties and to make them successful. HSD Office is the oil that starts up and lubricates triple-helix collaboration and keeps it running. The task of HSD Office is to realise the ambitions jointly formulated by the partners, but at the same time actively manages the choices and ways in which subject areas are dealt with within the cluster.

As HSD Office, we play different roles. Generally as facilitator, broker, network coordinator, promoter and communicator and in some cases also as policy advisor, initiator, programme manager or quartermaster. In this brochure, whenever we speak about the way in which HSD helps organisations establish triple-helix collaborations, by 'HSD' we sometimes mean the network/platform as a whole, sometimes partners affiliated with the network and sometimes the HSD Office. However, often it concerns all three – which is why we generally do not make the distinction explicit. The flexibility and versatility of the connections is one of HSD's characteristic strengths.

HSD Positioning

HSD has a connecting function. HSD brings supply and demand together. In the areas of knowledge, innovation, market, financing and talent development. HSD offers an open and at the same time trusted environment in which innovation and the associated new forms of collaboration and business models that are of importance for realising security solutions can actually get off the ground. HSD adheres to the idea that investing in triple-helix collaboration primarily pays off over a longer period of time. HSD creates a growth model in which an increasingly tight-knit network emerges consisting of parties that learn to get to know and trust each other increasingly better in the areas of knowledge and innovation, and in a national and international market development context. In this 'network' different experts and committed parties constantly emerge to get initiatives off the ground as broker or connecting party. HSD Office often constitutes the lubricant in this respect. This way HSD fulfils the following four key roles in programming innovation projects in the security domain.

Examples of HSD Partners are:
- larger companies such as Fox-IT, KPN, Siemens and Thales;
- SMEs such as EclecticIQ, ENAI and Redsocks;
- government organisations such as the Ministry of Justice and Security and the Ministry of Defence, the National Police, the National Cyber Security Centre, the Netherlands Forensic Institute and the Municipality of The Hague;
- international institutions such as Eurojust, Europol European Cyber Crime Centre, NATO Communications and Information Agency and OPCW;
- and knowledge institutions such as TNO, HCSS, Cyber Security Academy, Delft University of Technology and Leiden University.

Agenda Setting and Providing Perspective for Action

HSD initiates the substantive, future-oriented exploration of security themes. These explorations are focused on providing a cohesive perspective for action for the triple-helix parties in the security domain. This makes it possible to strengthen existing ideas and initiatives and make them known to a broader audience, or place new initiatives and themes on the agenda. HSD furthermore strengthens the opportunities for collaboration, for example by creating test environments or developing focused regulations.

Connecting

HSD makes it easy for parties to meet each other and provides physical and virtual meeting places for this purpose. HSD organises events around specific substantive themes, such that target groups – and therefore the contacts – acquire focus and insight. HSD is furthermore engaged in active matchmaking. With its overview of the participating parties in the HSD network, HSD Office can link parties together or can link them to ongoing or new collaborative initiatives. Furthermore, HSD develops learning and talent development programmes designed to train the specialists and decision-makers of the future and to bring talented young people in contact with attractive work environments and potential employers.

Facilitating

A key role of HSD is to provide a centre for the consolidation of acquired knowledge and lessons learned. HSD performs research into the success and failure factors of collaborative projects. The accrued experience is documented and maintained in checklists, methodologies, 'how to' folders and

the like. Examples from the past help in formulating successful new initiatives. In addition, HSD has (growing) insight into and an overview of procedures, innovation and acquisition agendas and financing instruments. This way, HSD not only functions as an accessible and relevant Support Desk, but it also actively brings participating organisations from the demand side and suppliers together and points them to opportunities and possibilities. HSD does this in various ways, for example by publishing a financing reference guide with an overview of relevant funds, grants, business-to-business financing and other financing sources provided by the government, external knowledge programmes and private investors. A number of concrete examples of this include the Small Business Innovation Research Programme (SBIR), the Security Innovation Competition (VIC), the SME Innovation Fund of the Ministry of Economic Affairs and Climate, the Horizon 2020 Fund of the European Commission for Research and Innovation and the UNIIQ Investment Fund designed to bring innovation to the market faster. Finally, the HSD Campus serves as a meeting place for meetings with the collaboration partners.

Intermediation

HSD Office, or another neutral party, can act as an impartial broker during consultations among parties. This impartial, but committed and expert, position can, for example, also be used in an evaluating or in a 'moderate' coordinating role, focused on substance as well as process.

Example: Satellite Applications
The innovation programme 'Satellite Applications for the Ministry of Justice and Security (JenV)' in a triple-helix context explores whether and how innovative products and services – to be developed and acquired – based on satellite technology can contribute to the issues faced by the Ministry of Justice and Security. A parallel objective is to acquire experience for the Ministry on how to deploy new technology to address its issues and to gain further experience with innovation-oriented procurement.

The innovation programme is supported by the programme team (JenV Innovation Team and HSD), in close collaboration with JenV departments for specific themes (e.g. privacy, procurement, etc), different knowledge institutions (KNMI, TNO, NLR), government organisations (NSO, PIANO) and companies.

The approach adopted by the Innovation Team comprises various phases. The first phase was initiated in 2015 with a 'Satellite Applications Technology Café', organised at the HSD Campus. Four themes were identified:
1 Investigation and Prosecution
2 Crisis Control and Emergency Response
3 Migration
4 Horizontal Theme: Access to Satellite Information

To deepen these themes, various government consortiums identified ten specific issues. Within the government consortiums, the demands of different governmental organisations, including the National Police, IFV, NFI, FIOD, Rijksrecherche, IND and the Fire Service, were bundled. In the first half of 2016, these issues were worked out on the basis of an initial structured brainstorming session into well-formulated statements of needs and requirements from the demand side.

These statements of needs and requirements were presented for consultation during a 'technical dialogue' to experts of knowledge institutions such as Delft University of Technology, TNO, KNMI and NSO. The statements of needs and requirements were further refined on the basis of the feedback received from the experts.

In October 2016, the Programme Team organised a market consultation at the HSD Campus for four statements of needs and requirements. The goal here was to explore the possibilities of the technology available on the market. This interaction with the market was instructive for both sides. The market parties acquired insight into the needs of the government and the government acquired insight into the current state of technology.

This demonstrated that, while at the same time providing due consideration to formal tendering rules, it is possible to refine needs and requirements in a triple-helix context through means of technical dialogue and market consultation.

During the innovation conference hosted by the Ministry of Justice and Security (JenV), three concrete follow-up projects were announced. Two Small Business Innovation Research Programmes (SBIRs) for the 'large-scale earth movement' and 'wildfires' issues, which offer the opportunity for a financed innovation project. The third follow-up project is the use of TUDelft students for a so-called 'Design Synthesis Exercise' (10 students who work out an issue over a period of 10 weeks) to work on the 'smoke cloud/gas detection' and 'tagging of objects/subjects' issues. In addition, work is also underway on a number of potential follow-up projects, such as the start of a direct procurement process and the involvement with the National Technology Project (NTP) – research conducted by NLR for the Ministry of Defence, among others.

The HSD Collaboration Model for Security Innovations

In the following chapters we describe the above-referenced roles in more detail, especially in relation to the ways in which HSD contributes to the development and implementation of innovation projects and programmes in the security domain. We use a model for this purpose that describes the progress of a triple-helix innovation project within HSD: the HSD Collaboration Model for Security Innovations. The model has four stages. During the *Exploration & Requirement Articulation* stage, the demand for an innovative security solution and the opportunities for developing that solution in a triple-helix context are clarified. During the *Consortium Formation* stage, the triple-helix parties come together and formulate agreements about how they will work together. During the *Working* stage, the collaborating parties develop and test the innovation, so that in the *Harvesting* stage they can actually present the new solution and can potentially market it nationally or internationally. These stages overlap each other, whereby at times the consortium will revert back to a previous stage. This means, for example, that the 'Consortium Formation' stage may reappear on the agenda if during the implementation of an innovation project there is a need for an additional partner.

The following sections explain how HSD supports the participating organisations – that is the network as a whole, specific partners in the network and HSD Office – during these stages.

Areas for Support

| Bring Together Ideas/ |
| Knowledge on Security Challenges |

Bring Together Triple-Helix Parties

Articulate Focused Demands

Explore Potential Solutions

Match Supply and Demand Sides

Establish Framework for Collaboration

Instruments

Open Innovation Sessions

HSD Cafés

Explorations, Studies, Issue Briefs

Stakeholder and Network Analysis

Needs and Requirements
identification and Pooling

Q&A Sessions Involving Supply
and Demand Sides

Development of Innovation Agenda

Support Desk

Exploration & Requirement Articulation

How are latent demands or issues made explicit? How do we formulate specific demand-related questions as a starting point for an innovation project? It all starts with a diffuse process of exchanging ideas and deliberations around an opportunity or a threat. For example, think of a changing threat, new technological possibilities looking for an application, changed regulations or other structures. A process of this nature revolves around combining different perspectives of different parties. In the interaction among the different points of view, areas of consolidation emerge that could converge into specific innovation-oriented demands; we refer to this as 'Requirement Articulation'. In parallel to this, greater clarity is developed about the possible problem-solving approaches, the required parties and the collaboration frameworks needed to work out these problem-solving approaches in further detail.

The adjacent diagram summarises on the left the elements in this process of exploration and requirement articulation. HSD can support this process through its role in *agenda setting*, in *providing a perspective for action* and in *connecting* supply and demand. The instruments that HSD has at its disposal are listed on the right.

elements of such sessions include: jointly exploring security issues; formulating specific issues for investigation; pitching innovative problem-solving approaches (matching supply and demand); and developing an initial action plan.

HSD Cafés

Informal meetings regularly take place at the HSD Campus for HSD partners and their invitees. Each time the focus is on a security theme, contributed and explained by one or more HSD partners. In addition, interesting parties outside of HSD are invited to present their ideas. During the first hour of an HSD Café, the selected topic will be outlined from different directions in three or four pitches, after which the attendees enter into discussion with the speakers. After this, there is an opportunity to stay and talk together and to network. The purpose of the HSD cafés is to become acquainted with and to engage in discussion on the most important current and future security issues and to meet (potential) collaboration partners in an informal way. An HSD Café is the perfect platform for checking whether new ideas or initiatives are catching on or have the potential to do so.

Instruments

Open Innovation Sessions

These are sessions related to a security theme, initiated by HSD and to which a mix of triple-helix parties are invited. Exploring the challenge is the central theme of the sessions. The objective is to jointly reflect on innovative problem-solving approaches and to make a start on the collaboration among triple-helix parties. Typical

Example of Themes for HSD Cafés
Digital Forensics
Quantum Computing
Automotive Security Solutions
Cloud Security
Secure Information Sharing
Securing National Events
Space and Security
High-Impact Crime
Cyber Security Critical Infrastructure

Explorations, Studies and Issue Briefs

HSD explores key trends, developments and themes in the security environment and clarifies the implications relating to policy. The analyses range from board horizon scans to focused studies and are partly founded on the contributions of the HSD community itself. An example is the report *A Blessing in the Skies? Challenges and Opportunities for Creating Space for UAVs in the Netherlands*. In addition, HSD regularly publishes brief thematic notes or issue briefs on topics at the intersection of security, technology and innovation. These are related to issues that are taking centre stage and this way signal innovative developments that are relevant to the HSD community. The objective of these manifestations is to stimulate the debate about security, place security challenges in their proper context and to evaluate the pros and cons of potential solutions. This helps shape HSD's strategic agenda and provides perspective for action to the HSD partners.

Stakeholder and Network Analysis

As part of the articulation of requirements and the exploration of potential problem-solving approaches, HSD supports the identification of stakeholders and their respective interests. This is of importance in deciding who must be involved in an innovation project to be initiated and who is to be reached in a different way. HSD Office plays a role in this analysis on the basis of its overview of the broader network of HSD partners, the various innovation agendas and development plans, and through a multitude of contacts.

Needs and Requirements Identification and Pooling

HSD actively collects security issues from the demand side. This is done on the basis of a broad assessment of required future capacities,

related projects and the different innovation agendas. Various of the activities mentioned here can also contribute to the articulation of requirements. Another task of HSD is to gain insight into available innovation and acquisition budgets (as well as to assist in gaining access to these budgets). The ultimate goal is to end up with a broad, administratively supported demand and/or acquisition agenda. HSD's programming is as much as possible related to this.

Q&A Sessions Involving Supply and Demand Sides

HSD invites demand side parties to present their issues and needs for innovation to parties that are in a position to supply possible solutions. An example is a session in which representatives of the NATO Communications and Information Agency presented their major challenges to a community of HSD partners (particularly SMEs). Together these parties discussed possible solutions. Another example is the 'Rembrandt Square Approach'. See text box.

Rembrandt Square Approach
HSD initiated and guided the process for involving partners in contributing to innovative solutions to limit nightlife violence around the Rembrandt Square in Amsterdam. HSD fulfilled a bridging function between the Municipality of Amsterdam and local entrepreneurs. Companies were asked to submit innovation proposals for implementing pilots. Several pilots were initiated in 2016.

Development of Innovation Agenda

HSD, in consultation with the owners, consoli-dates individual agendas into a collective innovation agenda. As a result, governments, companies and knowledge institutions are better able to coordinate their knowledge development, innovation efforts and acquisition needs. For the parties identifying the needs and the clients in the security domain, this provides them with additional value for their money; for the suppliers this creates a robust and predictable market.

A good example is the National Security Innovation Agenda (NIAV) developed by HSD. This agenda defines a number of innovation spearheads that simultaneously provide direction and room for achieving a growth process. This agenda is a source of inspiration for parties willing to commit to innovation and economic development in the security domain. The agenda is consistent with the innovation goals of the European Commission as formulated in the Horizon 2020 research programme. This national agenda therefore projects an international identity.

Support Desk

One of HSD's most important tasks is to function as a practical Support Desk. If HSD parties know what they want and with whom they want to collaborate, how do they make the specific arrangements? HSD, on the basis of its oversight and insight into how matters were approached elsewhere in the HSD community, can broker and engage parties. HSD Office develops formal as well as informal checklists and information sheets that incorporate previous examples and lessons learned. Naturally, the HSD partners can support each other in this respect as well, with or without the intervention of HSD Office.

Example of a checklist: when to deploy a joint innovation initiative in an HSD context

1 There must exist a **material and current shortcoming or need**: the social value.
2 This shortcoming or need demands a **broadly applicable and deployable solution** at the system level, often in combination with technological, social and process innovation.
3 A **joint approach** together with parties that identified the needs, end-users, innovators and suppliers of products and services – the so-called triple-helix approach – is necessary or at least desirable in this respect.
4 The approach leads to innovation projects with the potential for **significant or substantial market revenue**, economic value and export potential.
5 A compelling aspect is that there must exist demonstrable **support and commit-ment** among a 'coalition of the willing and able' in a triple-helix context that wants to develop the innovation, apply it and bring it to market and wants to link to the investment agendas or strategy visions.
6 The results of the innovation projects must be able to **result in applications over the coming three to five years**.

Areas for Support

Bring Triple-Helix Parties Together With a Clear Focus

Balance Supply and Demand in a Proposition

Establish Financing

Establish Other Conditions

Develop Approach and Work Plan

Document Agreements (Contractually)

Instruments

Open Innovation Sessions

Link Innovation Agenda to Stakeholders

Focused Matchmaking

Action Plan

Provide Support/initiate Financing

Support Contract Formation

Support Desk

Consortium Formation

On the basis of an articulated requirement or need, there is the prospect of a promising innovation project with social value and market potential. Relevant triple-helix parties find each other and decide how they wish to collaborate. While this was still tentative in the previous stage, agreements must now be formulated: about the targeted result, the approach, 'who does what', funding, etc. Supply and demand must be balanced in a concrete proposition and the planned activities must be developed in the form of an action plan.

In the adjacent diagram the elements in this process are once again summarised on the left, while the instruments HSD has at its disposal are shown on the right. At this stage of consortium formation, HSD primarily focuses on the role of connecting parties and on facilitating the consortium formation.

Instruments

Open Innovations Sessions are also instrumental at this stage. In comparison to the exploratory and requirement articulation stages, these sessions are more focused and pointed at this stage. The frameworks become clear and this stage concerns specific activities and agreements. HSD's role at this stage is less initiating and more facilitating: the targeted parties/initiators of the anticipated innovation project are in the lead.

Link Innovation Agenda to Stakeholders
The National Security Innovation Agenda (NIAV) developed by HSD is an example of an agenda that makes this link explicit. The development of the agenda is not only about matching supply and demand, but it

Event Security
An example of a focused open innovation session was the event security session. By linking historical data (for example provided by Statistics Netherlands (CBS)) to (near) real-time data (for example provided by the police, organisers and by KPN communication networks), it becomes possible to better control public order and security. Events that come to mind include 'Life I Live', although a 'day at the beach' can also be viewed as an event. Furthermore, this can include areas where major manifestations and events take place, such as those in the World Forum and at the Malieveld. This session was further scaled up to include the possibility of using big data to deal with undermining crime in a certain area (in an overarching Big Data for Security programme).

is also about bringing the demand and supply parties together. Sometimes it is difficult to get parties to take a first step: why should I show everyone what I am working on and commit to a joint project when others have not yet done so? In such situations, HSD, as an independent broker, can explore the limits, convey intentions and act as an intermediary. As the HSD platform grows and trust within the HSD community increases, it will also become easier to take the 'first steps' in the trust that openness and commitment will not be misused. The development of mutual credibility is a key result for HSD.

Focused Matchmaking

A next step in HSD's role as matchmaker is to bring together the proper demand and supply parties. The issue at stake is delineated innovation projects in which well-known issues and concrete solutions are brought together. On the basis of its insight into and oversight of parties and their innovation agendas on the supply as well as the demand side, HSD Office as matchmaker can act as an intermediary between parties that otherwise would not easily have found each other.

Action Plan

On the basis of the oversight of and experience with previous and other innovation projects, HSD can facilitate the (prospective) consortium partners by developing an Action Plan for the targeted innovation project or it can support the partners in developing such a plan. Naturally, the scope and the level of detail can differ from one project to the next. For example, a detailed business plan may or may not form part of the Action Plan. HSD can act in an advisory capacity in this area.
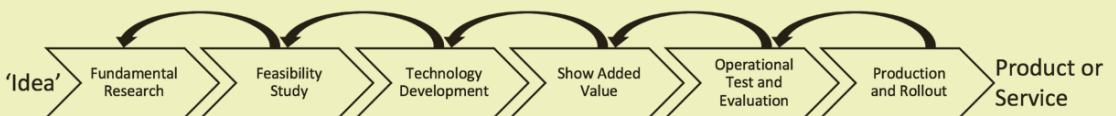
Provide Support/Initiate Financing

Investments in innovation are made with an eye to future social (from a government perspective) and economic (from a commercial perspective) benefits. There is always a risk in this: not all investments result in revenue. The government benefits from combining requirements as a means of sharing investments and from manageable innovation projects with the least possible risk. Companies are more likely prepared to carry risk if there is a concrete prospect of a market for their products and

Note that the 'Consortium Formation' stage and the following 'Consortium at Work' stage in actuality can be quite complex. It is well known that the transition from a proof-of-concept or a demonstrator to scaling up, production and a marketable product – also referred to as the Valley of Death – is difficult. Tests and trials must be conducted during this transition and financers have to be found. The diagram below provides an impression of the different iterative steps that must be followed in the innovation chain 'from idea to product'. The HSD financing guide provides an overview of the available forms of financing for the different steps in the innovation chain. In addition to financing for the exploration and application steps, this overview also contains an overview of the available forms of financing for the actual roll-out of the innovations on the market, as well as for the growth of start-ups and scale-ups.

For the purpose of this brochure it is not necessary to explore this innovation chain in further depth because HSD's role in the various links of the chain in essence is no different.

'Idea' → Fundamental Research → Feasibility Study → Technology Development → Show Added Value → Operational Test and Evaluation → Production and Rollout → Product or Service

services. This can be offset by an early match between supply and demand with due consideration for the financial aspects of the innovation projects and the intended roll-out afterwards. HSD devotes effort to making arrangements for financing innovation projects.

There are dozens of regulations designed to stimulate or finance innovation, both generic innovation and innovation specifically focused on the security domain. HSD ensures that partners find a match to existing regulations. A financing guideline has been developed for this purpose. In addition, HSD makes its partners aware of calls, tenders, innovation awards, etc.

Support for Contract Formation

The business side of innovation concerns a list with aspects that must be sorted out. What comes to mind is intellectual property (IP), how to use the results of innovation projects in product market combinations, and how to organise the process from innovation to tender. HSD has a growing list with examples that can help such matters to be addressed during the contract formation process. HSD partners can make use of this list.

Support Desk

At this stage, HSD Office is the central point of contact for questions concerning the practical formulation of an innovation project, for example the approach and the work plan. It is possible that HSD Office may have the answer readily available itself. It is also possible that HSD Office will refer the question to HSD partners able to share experiences and good practices. And sometimes a question is a reason for further investigation so that a next time the answer can be readily provided.

Broadening Real-Time Intelligence Collaboration

In its development plan, the Dutch National Police identified Real-Time Intelligence (RTI) as the underlying principle of the information process. Since 2015, the National Police, together with TNO, has pursued a Real-Time Intelligence research programme. In 2016, the programme was expanded into a broader triple-helix collaboration programme within HSD. HSD's role was to enable HSD partners to join in the activities of this research programme by creating a broader RTI network – for example, by establishing an RTI lab, developing and conducting experiments with the Police and developing an RTI road map.

An RTI radar and an experimentation road map have been developed as part of this programme. In a triple-helix context – with the important participation of the procurement and legal affairs departments of the police – 'rules of play documents' have been developed that describe how third parties can participate in the Police/TNO programme and how the Police deals with tenders in the context of this programme. An RTI Café was organised in which the central focus was on the above-referenced documents combined with the experimentation road map. The purpose was to identify specific experiments together with interested parties.

Areas for Support

Set up Project / Project Environment

Jointly Develop Innovative Solution

Monitor Progress

Test Innovation in Experimental/Operational Environment

Evaluate/Communicate Interim/Final Results

If Necessary, Terminate Collaboration Early

Instruments

Quartermaster

Project Manager

Assist in Setting up Experimentation and Test Environment

Impartial Evaluator / Broker

Platform for Communicating Results / Involving Stakeholders

Support Desk

Consortium at Work

During this stage, the collaborating parties are going to develop and test the innovation. HSD's role can vary:

1   The consortium independently continues developing the solution – HSD provides the podium;

2   The consortium elects to do this under the supervision of a 'neutral' programme manager hired by HSD Office;

3   An HSD quartermaster investigates and creates the conditions for consortium formation.

The key activities during this stage essentially do not differ from the activities that apply to projects in general. The key is to set up the innovation project, to actually develop and test the innovation and to present the results. Naturally, progress must be monitored along the way. The HSD facilitation and intermediation roles are key during this stage. These roles are detailed in the adjacent diagram.

Instruments

Quartermaster/Project Manager

HSD Office, or another neutral party, as an independent, but yet committed party with subject matter expertise, can play an active role in shaping and managing the actual innovation project. This choice can be based on the experience of the quartermaster/project manager in similar projects, as well as on the need of the client or consortium partners for non-partisan project management. The quartermaster's role is limited to setting up the project, after which the consortium takes over. The project manager's role ranges from project initiation to project completion. One of the matters that a quartermaster/project manager can organise is the creation of an advisory group, consisting of parties with an interest in the projected innovation. This increases support for the innovation and the chance that it will respond to a real need.

Assisting in Setting up the Experimentation and Test Environment

Innovation projects strongly benefit from the hands-on try-out of concepts, demonstrators and prototypes to determine – often in collaboration with end-users – what works or could potentially work, and what does not work. We refer to this as concept development & experimentation processes in innovation houses, pilot environments, test beds and living labs in which security solutions are conceived, tested and/or further developed. This is sometimes done 'on-site' under (simulated) operational conditions. HSD is the platform where relevant parties can be brought together to shape these types of initiatives. HSD can provide access to existing test and demonstration facilities, test beds and living labs and can provide support in selecting and setting up new – experimental or more operational – environments for experimentation together with organisations from the demand side and suppliers.

The structural components of the development and test facilities requires specific attention. These facilities are expensive and, due to a low utilisation rate, difficult to make profitable. (Pre-competitive) collaboration is not only perfectly feasible in this area, but it is also essential from an economic perspective. Shared investment and management can go together with separate use. HSD can provide the environment to get collaboration of this nature off the ground.

Relationships Between Collaborating Parties

There are different types and sizes of triple-helix collaborative partnerships. Sometimes there is a clear coordinator or pioneer. A public party often is the problem owner and, on the basis of this position, can also assume the assigning and coordinator role for an innovation project. Management is provided on the basis of contractual agreements and after the contract is set up, interaction primarily takes place in relation to the extent to which results meet the specifications and requirements determined in advance (for example budget and quality). An alternative is a collaborative partnership set up in accordance with the alliance model. In such an arrangement, public and private partners work together as equals. The partners jointly take decisions, develop plans, share risks and are jointly responsible for realising the results. A balance between contract and trust characterises the alliance model.

Each collaboration model has unique characteristics, benefits/risks and challenges. They all have the potential of producing excellent results. However, experience demonstrates that an effective coalition focused on developing, applying and bringing innovations to market is often characterised by having a clear leading party.

Impartial Evaluator/Broker

HSD Office, or another expert and trusted and at the same time independent party, can be used as evaluator of the results of the innovation project. However, it is also possible – innovation always has a certain element of risk – that as the project progresses it is not producing what is expected and the parties want to wind down the initiative. In that case, HSD – once again as an independent party positioned above, but at the same time among the collaborating parties – can play a role in the termination process.
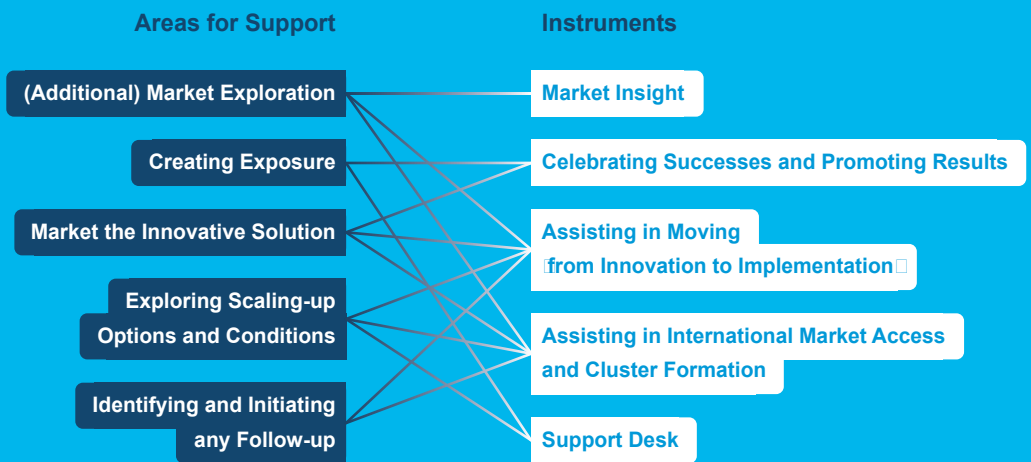
Platform for Communicating Results/ Involving Stakeholders

HSD is the perfect environment for reporting the interim and final results of innovation projects to a broader community. The structure can be informative and promotional, but can also be with the (joint) goal of testing the results and possible adjusting them.

Support Desk

At this stage the purpose of this function is primarily related to providing assistance in how to structure an innovation project. The broad knowledge and experience of the HSD community forms an important asset in this respect.

Areas for Support

Instruments

(Additional) Market Exploration

Creating Exposure

Market the Innovative Solution

Exploring Scaling-up
Options and Conditions

Identifying and Initiating
any Follow-up

Market Insight

Celebrating Successes and Promoting Results

Assisting in Moving
'from Innovation to Implementation'

Assisting in International Market Access
and Cluster Formation

Support Desk

Harvesting

This stage primarily concerns how to present and market the new solution. The triple-helix innovation projects referred to in this brochure can be focused on the actual implementation of an innovation, product or service. However, often they concern pre-competitive innovation projects whose end result is a new design or 'laboratory' solution that requires further development or market access. In the first instance, an important part of the 'harvesting' already forms an intrinsic part of the relevant innovation project. The next step is to scale up the implemented innovative solution and/or put it on the market nationally or internationally. In the second instance, the harvesting process has yet to be started. In that case, it is important to find a launching customer, if not already on board during the innovation project, for example, by linking up to the demand side's acquisition agenda. In all instances, it is key to inform the various stakeholders about the results achieved.

Similar to the Exploration and Requirement Articulation stage, HSD's involvement in agenda setting, providing perspective for action and connecting are important during this stage. Another area of focus here is to bring supply and demand together. However, different from the Exploration and Requirement Articulation stage, the starting point is not the demand but the offer: an innovative solution looking for national and international market potential. Note that, in terms of the nature of the possible HSD support and the associated instruments to be used, it barely makes any difference whether the project is a development project for the purpose of producing a design or prototype solution, or a combined development and implementation project.

## Instruments

Market Insight
HSD regularly contracts for market surveys of the national and international security market or for specific market segments, such as the cyber security market. In addition, HSD maintains an overview of the acquisition agendas of national parties and, in part, international parties as well.

Celebrating Successes and Promoting Results
Perhaps more than anywhere else, it is good to celebrate the successful outcome of innovation projects. After all, risks were taken and resistance has been overcome. Celebrating success radiates outward, builds togetherness and supports the long-term goals of triple-helix collaboration. Furthermore, it is a (first) step in disseminating and promoting the results. The HSD community can be the first target group to be informed about the newly developed opportunities and at the same time can contribute to disseminating this information through their

Exposure through the HSD Portal
The interactive portal website www.thehaguesecuritydelta.com provides information about the HSD partners, the subject areas they are working on and the activities within the cluster. This makes it easier to find new partners. The website also offers thematic entry points for national security, urban security, cyber security, critical infrastructures and forensics – and news feeds relating to security. HSD partners have the option of posting relevant news, events, projects and reports on the HSD portal as a means of attracting attention.
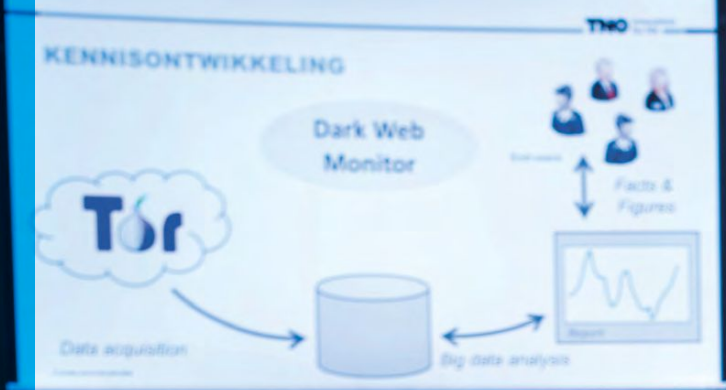
extensive contact network. With its communi-cation strategy, HSD Office contributes to the general positioning of HSD and the innovative products and services created here. It will promote successful innovation projects natio-nally and internationally.

Assisting in Moving 'from Innovation to Implementation'

The presence of at least one organisation from the demand side in a triple-helix collaboration guarantees insight into the requirement, which may or may not already have been clearly defined. However, at the end of most innovation projects there is still some way to go to move from a (pre-competitive) innovation design to a real acquisition and/or implementation process for the security solution that has been developed. Often the organisation from the demand side that is involved in the preliminary stage is also the first designate to act as launching customer. However, only seldom is this an automatism, not least because of the regulations concerning public tenders. If a launching customer is already on board, then the following step is to find the next customer.

The HSD environment offers many anchor points for picking up on and dealing with the various facets of moving from 'innovation to implementation'. The national demand side is for a key part represented in HSD; the acquisition agendas are kept up to date; the platform stimulates and facilitates the early convergence of supply and demand; there is good insight into the relevant regulations and their actual application; and the same applies to financing.

Assisting in International Market Access and Cluster Formation

A specific component of HSD's mission is the international positioning of the national security cluster and successful innovation projects. A key recommendation in this respect is to place innovation strength in a practical, operational

Security Innovations in the International Zone

The International Zone, the home base of international organisations such as Europol, the Organisation for the Prohibition of Chemical Weapons (OPCW) and Eurojust, is located in the heart of The Hague, the international city of Peace and Justice (and Security). The World Forum hosts conferences with government leaders from throughout the world. It is important to make this area as attractive as possible for international organisations. Up until now each building and event has its own fences, buffer zones and guards. By adopting an integrated approach and modern technology provided by HSD partners, better security is being achieved, with reduced inconvenience to employees, residents and visitors. The International Zone provides HSD with a unique test bed for testing triple-helix innovations in actual practice.

context. No art for art's sake, but innovation that matches the real security challenges of today and tomorrow – challenges that are being faced elsewhere in the world as well. Operational test beds and living labs, such as the International Zone in The Hague, constitute important showcases that also generate international attention. HSD has international contacts that make it possible to expand such showcases to address foreign market perspectives.

Support Desk

In this stage, HSD can primarily assist with issues relating to creating attention for successful innovation projects as a next step to marketing and other market activities. This stage also includes contributing further ideas relating to opportunities for focusing attention on, scaling up and rolling out innovations tested in a relatively small-scale environment.

Become a Parter of the Dutch Security Cluster

Based on in-depth knowledge of the Dutch and international security sectors, HSD provides access to the latest innovation programmes, insight into security issues and trends, and a community of highly talented security professionals. The ultimate goal is to achieve real security solutions with social value and economic returns. HSD brings together supply and demand for this purpose. In the areas of knowledge, innovation, market, financing and talent development. HSD offers an open and, at the same time, trusted environment in which innovation and the associated new forms of collaboration and business models – of importance for realising security solutions – can actually get off the ground. A growth model in which we build a network of parties that increasingly get to know and trust each other better.

If you too feel enthusiastic about this, become part of the Dutch security cluster and strengthen your access to knowledge, innovation, market, capital and talent. For additional information about the various possibilities and to make an appointment, please contact HSD Office:

The Hague Security Delta Foundation

Wilhelmina van Pruisenweg 104
2595 AN The Hague, the Netherlands
T +31 (0)70 2045180
info@thehaguesecuritydelta.com
www.thehaguesecuritydelta.com