BUSINESS
FINLAND

PROGRAMMES CHANGING PRACTICES FOR INNOVATION

EVALUATION OF SMART PROCUREMENT, BUILT ENVIRONMENT AND WITTY CITY PROGRAMMES

EVALUATION REPORT

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FOREWORD

Promoting demand- and user-driven innovation as well as co-creation were some of the key rationales behind several Tekes programmes at the early 2010s. Promoting changes of practices regarding co-creation, end-user involvement, public-private collaborations, innovative procurements and partnership formations were typical features of those programmes.

From this perspective, three programmes of former Tekes were evaluated. The evaluation was commissioned by Business Finland that was formed as a merger between Tekes and Finpro in 2018. Smart Procurement programme (Huippuostajat, 2013–2016) was activating public sector to learn and implement practices of innovative procurements. Built Environment programme (Rakennettu ympäristö, 2009–2014) aimed to develop and renew practices and processes concerning built environment, especially regarding real estate and construction sectors. Witty City programme (Fiksu kaupunki, 2013–2017) was addressing challenges related to urbanization.

The objective of this evaluation was to produce a review of results, impacts and relevance of the evaluated programmes and to produce forward-looking recommendations for further development. A special emphasis was put into understanding how programmes helped in changing practices within their respective fields.

As a result, the evaluation produced solid findings and forward-looking recommendations for future Business Finland programmes and activities. Some key recommendations from this evaluation include that the evaluated programmes have been beneficial for the participants but at the same time, programmes as instruments could be somewhat redesigned to achieve greater systemic impact on behavioral change and ecosystem development.

This impact study was carried out by Technopolis Ltd. Tekes wishes to thank the evaluators for their thorough and systematic approach and expresses its gratitude to steering group and all the others that have contributed to the evaluation.

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Business Finland

EXECUTIVE SUMMARY

AIMS, SCOPE AND METHOD OF THE EVALUATION

Evaluation of programmes changing practices for innovation by means of public procurements, collaboration and co-creation covered the following three programmes: Smart Procurement, Built Environment and Witty City. The evaluation aimed to provide insight on the how the programmes were aligned with strategies, to what extent synergies with other initiatives were captured, what the impact of the programmes was on changing practices within programme target groups, what the economic impact of the programmes was, and how functional programme governance was.

The overall methodological approach of the evaluation was to assess the impact and added value of the programmes, impact mechanisms and synergies between the programmes. The methodology consisted of document analysis, survey and interviews with beneficiaries, econometric analysis of project data and benchmark study.

STRATEGY ALIGNMENT, SYNERGIES AND RATIONALE

The overall conclusion regarding strategy alignment was that the original programme plans were well aligned with demand and user-driven innovation policy as well as Tekes and Business Finland strategies. The programmes were successful in promoting these issues in individual companies and other beneficiaries. However, the programmes were less successful in promoting progress towards wider ecosystem level objectives. This was realised in all programmes during the mid-way change of programme manager, but the remaining time and resources were not enough to achieve significant results, nor were the instruments used sufficient for this purpose.

Similarities and complementarities in strategic objectives, targeted stakeholders and activities was evident from material produced by INKA, 6aika and the evaluated programmes. Not surprisingly, interactions at the level of cities, companies and projects were numerous. Cities participated in programme services and several

collaborative consortium projects were launched. However, the link between these initiatives at a more strategic level was not developed. Hence, the potential for positive synergies was capitalised only to a limited extent. Very little of the potential positive synergies were also utilised in the case of Smart Procurement programme. While there were interactions, they were mostly ad-hoc rather than well-coordinated.

Both Smart Procurement and Witty city programmes were clearly linked to identified innovation policy objectives. Given their original rationale and focus especially related to ecosystem level objectives and the innovation needs and opportunities within the targeted actors, it can be well argued that these programmes, their focus as well as timing were well justified. However, during programme implementation the focus shifted and ended up being more limited than originally planned. Insufficient resourcing, lack of ecosystem level strategies, less than optimal strategic governance, insufficient target group readiness to engage in ecosystem level activities, failure to capitalise synergies between initiatives, etc. were among the several reasons explaining why this happened. Whether these two programmes would have been equally justified to launch as they eventually ended up being implemented as opposed to how they were originally planned, can therefore be argued. While there is evidence that the programmes had impact on participating beneficiaries and therefore the use of public funds as such can be justified, the impact along the lines of the programmes' original orientation could potentially have been much more significant.

Justification for launching the Built Environment programme can be related to adopting new methods and practices. However, the main beneficiary sector construction has shown limited international growth orientation, nor has it been very innovative in the global context. Furthermore, the sector is characteristically oriented to domestic markets or at most countries in the region. Questions could therefore be raised as to whether innovation promotion in this sector shows any significant potential compared to innovation in other sectors when assessed against Business Finland strategy. However, it is also possible to argue that the sector has linkages to more relevant themes such as smart city infrastructures, physical innovation platforms, and societal challenges like safety, health, etc.

GOVERNANCE AND PROGRAMMES AS A POLICY INSTRUMENT

Changes made during the implementation of the programmes, raises questions such as whether the re-design of the programmes should have been discussed and decided at the Tekes board, especially in the case of Smart Procurement given the eventual mismatch between the ecosystem ambition and available time and resources.

Despite the name "steering group", the role of this governance body was mainly informative. Key decisions related to the programme implementation and orien-

tation were discussed at the steering group, but apart from thematic orientation it seemed to have little influence on any major decisions regarding programme implementation. Steering group had no role in selecting individual projects or beneficiaries, no role in selecting key internal or external personnel, and little if any role related to the mid-way refocusing of the programmes. It could be argued to have a communicative role towards beneficiaries, but there is no indication that the steering group members would have been employed in this role nor any specific measures to support them in this role. It should be noted that Witty City programme didn't even have a steering group, which indicates that it typically had a weak role in Tekes and Business Finland programme governance.

Change of programme managers mid-way into the implementation raised several concerns. First, it takes time for programme manager to familiarize with the target groups and beneficiaries and go through rather lengthy learning process. Second, even if the learning delays related to the target groups would be limited, hand-over situations also include potential delays related to programme management practices. Third, refocusing or shifting the focus of the programme mid-way in a smaller degree can typically be managed without the need to revise the instrumentation (programme services, funding, etc.).

As the Witty City mid-way change was to a direction which was already mainstream at the Business Finland context (internationalisation), and the new instrumentation relied on activities in which the organisation and new programme manager was familiar with, the instrumentation appropriate for the second half of the programme was easy to adopt. This was also the case with the consortia projects, which were built around existing Tekes practice of research projects funded in parallel with individual company projects and linked to city projects funded from INKA and 6aika. Even though Built Environment and Smart Procurement programmes both included ecosystem level objectives, the original programme design was based mostly on earlier practice and providing funding for individual beneficiaries and services to support learning, networking, etc. However, designing and launching new instruments during the remainder of the programme would not have been realistic given that only two years of the programme remained.

Using external entities to do activation, i.e. communicate programme and funding criteria, and encourage potential beneficiaries and beneficiary consortia to launch projects relevant for programme objectives, can extend programme governance and services resources and thereby ensure programme impact. However, external activation may also cause problems, if the understanding of the programme or funding criteria doesn't fully match with how criteria are eventually interpreted in making funding decisions. This problem materialised in some cases in the Smart Procurement programme. Activation created an expectation of funding, which eventually ended in disappointment when funding was not granted.

The evaluation of three programmes raises concerns related to programmes as policy instruments in the cur-

rent context of innovation policy and Business Finland strategy. The instrumentation (selection of programme services, project funding) was not sufficient for achieving ecosystem level objectives. Supporting ecosystem development requires a coherent mix of many types of policy interventions, which must be designed specifically in relation to the key target groups, key development barriers and ecosystem maturity.

Combining ecosystem objectives with individual beneficiary level objectives makes sense in cases where at least some beneficiaries are mature enough, willing and able to take leadership. Otherwise, there is a danger that the programme impact remains at the level of individual beneficiaries, as did happen with all three evaluated programmes.

Most of the programme services and practically all funding was relevant for individual beneficiaries. However, the instrumentation was not sufficient for reaching ecosystem level objectives. While instrumentation had some ecosystem facilitating features, these focused on earlier levels of behavioural change, i.e. awareness building, knowledge transfer and learning. None of the three programmes offered any services specifically targeted towards later stages of ecosystem facilitation.

Survey and interviews conducted during this evaluation clearly indicate, that the role of programmes compared to project funding was less important for the beneficiaries. Some beneficiaries weren't even aware that they participated in a programme, even if their project was funded and they participated in programme services.

IMPACT

There is clear evidence that the evaluated programmes had the intended incentive effect on programme participants. Majority of participants indicated that they would not have engaged in projects with the same level of attention to new methods and practices such as co-creation, end-user engagement and innovation procurement as they did with the support from the evaluated programmes.

Similarly, there were indications that the evaluated programmes have facilitated behavioural change among programme participants. While the original ambition might have extended to support behavioural change throughout the whole process, the focus in programme activities and services was clearly more in facilitating and supporting the earlier stages of behavioural change, i.e. awareness, knowledge acquisition and to some extent understanding and experimenting how new methods and practices can and should be implemented in the participants' own specific context.

Ecosystem development requires actors that are further along the steps of behavioural change in new methods, practices and processes highly relevant for the ecosystem. None of the programmes had any. Built Environment participants included some, but these were consultants and thus not the main business actors in the sector. Smart Procurement and Witty city programmes were targeting large public sector organisations such as cities with the potential to act as ecosystem leaders, but their maturity in view of new methods and practices

was clearly not sufficient. This was also evidenced by the very positive experience of the programme coordinator from mentored strategy processes they implemented with some of the bigger cities in parallel but separate from the evaluated programmes.

More hands-on strategy level support would have been needed from the very beginning in all evaluated programmes, but specifically in Smart Procurement and Witty City programmes. Experience from international benchmarks indicate the importance of coaching and mentoring support for larger consortia projects aimed at ecosystem level behavioural changes and socio-economic impacts.

Services provided by Tekes staff and programme coordinator/activator advice was appreciated in project design, identification of new partners, and consortia building. Events and trainings were appreciated by programme participants, especially in view of finding new partners and learning about new methods and practices. Internationalisation services were assessed positively by Witty City programme participants. However, programme services were not communicated effectively. Not all programme participants were aware of programme services.

The evaluated programmes failed to reach ecosystem level objectives and impact in this respect remained limited. Despite the ambitious original programme ecosystem level objectives, the practical implementation, governance and mix of programme services, failure to capitalise synergies with parallel policy initiatives, as well as lack of policy initiatives that would have been needed for an effective and impactful ecosystem policy mix made reaching ecosystem level objectives unrealistic.

However, behavioural impact at the level of individual beneficiaries and in the case of Witty City also consortia may in future support ecosystem level development as programme participants' maturity level has most likely increased because of the programmes and made then incrementally readier to engage in future ecosystem development activities. Hence, the impact of the evaluated programmes will eventually materialise in full scale in possible future ecosystem developments as the behavioural changes initiated and facilitated by the evaluated programmes progress further.

There were clear indications of economic-impact at the level of individual beneficiaries. Econometric analysis shows that companies participating in the Built Environment and Witty City programmes were able to grow faster than industry sector averages. While the economic impact varied across depending on industry sectors these companies are active on, they were able to grow their turnover faster than other companies.

In-depth interviews provide evidence that the observed economic impact had resulted at least partly from new products and services developed in projects implemented because of the programmes. These interviews further demonstrated that access to new markets and new contacts are among main benefits companies gained by participating in the programmes.

In summary, there were clear evidence and indications that the evaluated programmes did have an impact in the targeted participant groups and that these impacts can be attributed to the programmes, programme services and funding. This would indicate that in that respect, the use of public funds for these three programmes could be justified. However, there were strong indications, that had the design, implementation and governance of the programmes been better aligned with the maturity of the target groups with respect to both new methods and practices, and ecosystem level objectives, the impact could potentially have been much more significant.

RECOMMENDATIONS

Programme rationale and design should be strengthened to answer questions like why programmes are implemented, what for and what are the alternatives, what is their role in the policy mix, what are the synergies, impact mechanisms and how can impact be identified?

Stronger governance should be established for policy mixes aimed at capitalising on societal challenges and significant international business opportunities.

Programme instrument should be redesigned considering four conceptual models: 1. Ecosystem programmes based on international business opportunities and driven by companies that have reached behavioural change maturity; 2. Societal challenge programmes led by societal actors and based on their long-term vision; 3. International business opportunity programmes driven by strongly motivated industry interested in specific international market opportunities; 4. Knowledge building programmes that support increasing industry awareness and ability to adopt new scientific and technological developments.

New ecosystem services and funding should be developed, for example, coaching/mentoring for needs analysis and strategy, coaching/mentoring and consultancy to support implementation, organised forms of dialogue with end-users, challenge and other competitions, hackathons, etc. and orchestration and platform funding.

Service design should be based on target group behavioural change maturity and aligned with programme and policy mix objectives. Funding and programme services should be better integrated.

Programme governance should be strengthened, and monitoring should cover both funding and services.

1 WHAT WAS EVALUATED AND WHY?

1.1 RATIONALE OF THE EVALUATION

Business Finland (former Tekes) is the main public research and development and innovation (RDI) funder and implementer of innovation policy in Finland. The agency provides RDI funding and designs programs as platforms, facilitators and networking tools in order to promote cooperation between businesses, research and public organizations[1]. Programmes for this evaluation represent this holistic approach. Public authorities in Finland spend approximately €35b each year on public procurement[2]. With the help of innovation public procurement can deliver better services and support businesses in development of new technologies. National Innovation Strategy puts emphasis on demand and user driven innovation[3]. Among others Tekes strategy has defined natural resources and sustainable economy and intelligent environments as strategic research areas.

According to the vision and road map of the Research and Innovation Council Finland, the country aims to be the most attractive and competent environment for experimentation and innovation by year 2030. To this end cross-sectoral cooperation and innovative public procurements that enable emergence and development of lead market is defined as one of the objectives[4]. This illustrates the broader policy context and origin of the programmes for this evaluation.

The evaluation aimed to provide detailed information on what results these three Tekes programmes supporting co-creation, end-user engagement and collaboration have created, how well have the objectives set for the programmes been achieved, what impacts they have had, and how relevant, efficient and effective have the programmes been. As requested by Business Finland, the evaluation pays specific attention to the added value of services provided in the scope of the programmes.

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[1] OECD. System Innovation: Case studies. Finland – transition to smart transport systems in a city context. https://www.innovationpolicyplatform.org/system/files/FINLAND%20-%20Transition%20to%20smart%20transport%20systems%20in%20a%20city%20context-%20IPP_0.pdf

[2] Innovation seeds. Innovation in Public Procurements – Funding Scheme of TEKES in Finland. http://www.innovationseeds.eu/policy-library/core-articles/innovation-in-public-procurements-funding-scheme-of-tekes-in-finland.kl

[3] OECD. OECD Reviews of Innovation Policy: Finland 2017. http://www.oecd.org/finland/oecd-reviews-of-innovation-policy-finland-2017-9789264276369-en.htm

1.2 EVALUATED PROGRAMMES

Evaluation consists of three Tekes programmes: Smart Procurement, Built Environment and Witty City. Brief description of the programmes is provided below.

Smart Procurement programme[5] (2013–2016) was activating public sector to learn and implement practices of innovative procurement to enable creation of new lead markets for innovative solutions. The rationale for this was the considerable volume of public procurements (in the range of €30–35b euro annually), providing a potentially significant additional resource for funding innovation activities. This would create solutions for societal challenges and improve competitiveness of Finnish companies. To achieve this, supply and demand needed to discuss and collaborate. The programme aimed to identify and encourage front runners to implement public innovative procurement. Goals of the programme were to:

- influence the creation of thematic or geographical networks where supply and demand of innovation can meet;
- create first commercial references for innovative small and medium-sized enterprises through (public) procurement of innovation;
- build a toolbox for demand side innovation activities at Tekes.

Demand driven innovation was the focus, especially regarding public procurements.

Built Environment programme[6] (2009–2014) aimed to develop and renew practices and processes in real estate and construction sectors with focus on renovation and refurbishment activities and on construction supporting wellbeing. The programme was based on user needs, emphasis was put into supporting establishment of customer-driven practices and into activating the industry to innovate and produce added value to the end customer. The programme aimed for improved productivity, competitiveness, new business models, and making Finland a good environment not only for citizens but also for business and investments. A central focus of the programme was to improve collaboration between public and private sector by developing practices related to procurement in construction sector. In the early stages of the programme, the main themes of the program were infrastructure, repair and welfare building and productivity improvement. In the last two years, the program focused in particular on the development of the renovation market.

Witty City programme[7] (2013–2017) aimed to target challenges related to urbanization to support the formation and success of Finnish businesses and to provide funding for innovative investments. Collaboration across industries, networked operations and improved collabo-

5 http://docplayer.net/52338506-Eu-and-tekes-support-to-innovative-procurement-program-manager-sampsa-nissinen-tekes-finnish-funding-agency-for-innovation-smart-procurement-program.html
6 https://www.slideserve.com/jamese/rakennettu-ymp-rist-2009-2014
7 More information about the programme is available here: https://www.businessfinland.fi/en/for-finnish-customers/services/build-your-network/ended-programs/witty-city/

ration between public and private sector were promoted. As with the Smart Procurement programme, Witty City was aiming for utilizing public investments made by cities as innovation platforms and for developing new markets by means of clever demand. User centric view, collaboration, and networked operations were features that the programme wanted to advance. The programme also piloted several new programmatic actions. Cities played a key role in the programme as central players in areas

such as planning, procurement and energy. From 2016 the program was focused into three main themes (Energy, Transport, Building + Design). With this breakdown, the financial investments have been of the same volume in all selected thematic areas. In the Energy theme fewer, but bigger entities have been financed while in the Transport theme there have been many small start-up projects. Design theme mainly featured research projects.

Figure 1 summarizes the common thematic features of the programmes and specific characteristics. The number of supported projects and funding volumes are summarized in Figure 2.

The evaluation took into account related programmes/activities. Related to Witty City programme, the INKA programme was considered and the 6aika-activity of the Ministry of Economic Affairs and Employment. INKA Innovative Cities programme organized challenge calls for biggest cities and established thematic networks focusing on new businesses for global markets. In the scope of 6aika activity, six largest cities in Finland joined forces to tackle common urban challenges. The activity was implemented with cooperative projects that enabled the cities to experiment larger context than one city[8]. Both initiatives were related to the topic of innovation in cities and therefore were considered in the context of Witty City programme. Related to Smart Procurement programme KEINO, the networked Competence Centre founded to increase sustainable and innovative public procurement was considered. These programmes/activities were not evaluated, but as the implementation of these coincided

FIGURE 1. Overview of the programmes. Source: Business Finland and Technopolis Group

	SMART PROCUREMENT	BUILT ENVIRONMENT	WITTY CITY
Common thematic features	• Innovative procurement • Co-creation • End-user involvement • Demand-driven innovation • Public-private collaboration • Partnership formation		
Specific characteristics of programmes	Horizontal focus on several fields	Real estate and construction sectors	Focus on challenges related to urbanization Cities as central players

FIGURE 2. Supported projects and funding volumes. Source: Business Finland

	SMART PROCUREMENT	WITTY CITY	BUILT ENVIRONMENT	TOTAL
Number of supported projects	55	200	223	478
Total funding volume	€16,7m	€113,8m	€84,6m	€215,1m

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[8]   Further information can be found here:
      https://forumvirium.fi/en/six-finnish-cities-join-forces-to-become-better-and-smarter/

with the implementation of evaluated programmes and they shared similar objectives, interaction and synergies between these programmes and evaluated programmes were assessed.

1.3 EVALUATION QUESTIONS

The key evaluation questions were:
- How successful have the programmes been in **changing practices of operation within programme target groups**, especially regarding co-creation and end-user involvement, demand driven innovation, collaboration and collaboration platforms, innovative public procurement and public-private collaboration;
- Which **programme services** have worked well/ been outstanding and which have not? **Reasons, why they have been successful? What have been the mechanisms of impact of these services?**

- **What has been the economic impact of the programmes? Quantitative analysis regarding results and impacts** of the programmes, including an analysis on the attribution and contribution;
- How well the evaluated programmes are **in line with the current strategy** and the current programme design concept of Business Finland?
- What significant challenges were identified regarding **programme administration** and how well were those challenges solved?
- What have been the **synergies** between the programmes?

2 METHODOLOGICAL APPROACH

2.1 CONCEPTUAL APPROACH TO THE EVALUATION

The methodological approach of the evaluation was to assess the impact and added value of the programmes, impact mechanisms and synergies between the programmes. The methodology consisted of:
- Document analysis of programmes documentation;
- Survey and interviews with beneficiaries;
- Econometric analysis of project data;
- Benchmark study.

Methodology is summarized in the Figure 3 below. The Figure illustrates that the main data source in this evaluation was the beneficiaries. Since the number of beneficiaries was relatively high (478 funded projects) survey was used to collect the data. However, as some

of the evaluation questions required more in-depth understanding of types of specific impacts, impact mechanisms and synergies, the survey needed to be complemented with selected interviews.

In addition to the survey and interviews with beneficiaries, desk research was performed to assess alignment of the programmes with other strategies and programmes. Econometric analysis of project data was performed to assess the impact of the programmes in terms of turnover, jobs, export and acquired investments. Benchmark study of Sweden and the Netherlands was performed to assess how did the programmes support public sector engagement into innovation activities (through procurement and/or co-creation) compared to similar programmes and policy initiatives in benchmark countries. Each method is introduced in following section and more details are available in Appendix A.

FIGURE 3. Overview of the methodology.
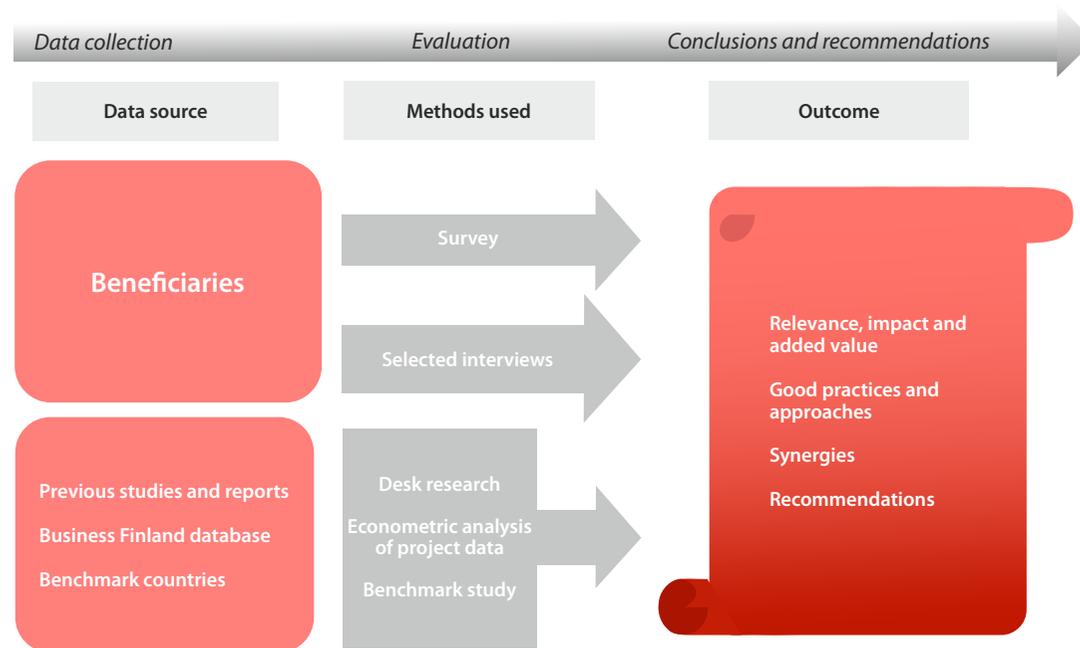
2.2 METHODS USED

Document analysis of programme documents provided by Business Finland was performed in the beginning of the evaluation. It provided general insight in programmes rules and operational context. Documents on 6aika, KEINO and INKA were also included in the analysis. Additional material was collected from programmes managers and coordinators during the evaluation. Based on document analysis, initial list of programmes services (including several events) was drafted and

later coordinated with programme managers. Analysis of current Business Finland strategy and programmes documentation was performed to evaluate alignment of the two.

Web-based survey was designed for each programme. Beneficiary companies for Witty City and Built Environment programmes and companies and public institutions from Smart Procurement programmes were identified from Business Finland data base. All surveys had similar questions, but question on programme services was designed according to respective programme. To address the low response rate of surveys, telephone interviews were performed to complement the survey in order to reach a sample size of at least 20%[9] of participants for each programme. Analysed survey results are therefore based on responses collected both via e-mail invitation and via phone interviewing.

To gain more detailed insight in relevance of the programmes to the beneficiaries, added value of the programmes, impacts and results, behavioural changes of beneficiaries and synergies between programmes, interviews with beneficiaries were performed. Compared to the survey, interviews tried to explore the wider context of the programmes. Questions on legal barriers, missing competences, participation in EU programmes and other relevant developments were explored. Interviews with Business Finland stakeholders were also performed. Interviews were held with beneficiaries that have bene-

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[9]   20% of participants reasonably represent the whole sample of beneficiaries.

fited from more than one programme and beneficiaries that could provide deeper insight into programme success factors and impact mechanisms. The total number of beneficiaries interviewed was 10 (4 for Witty City, 3 for Built Environment and 3 for Smart Procurement). 4 interviews with programme managers and coordinators were performed.

Econometric analysis of company data was performed to assess what was the impact of the programmes in terms of turnover, jobs, export and acquired investments. The company data was received from Business Finland. Changes in turnover, export and number of employees between 2012 and 2017 were analysed. In total 120 companies were analysed, of which 55 companies participated in Witty City programme, 65 participated in the Built Environment programme. 7 of the analysed companies participated in both programmes.

Benchmark study of comparable programmes in Sweden and The Netherlands was performed. The purpose of the benchmark study was to assess how similar programmes supported public sector engagement into innovation activities (through procurement and/or co-creation) in the two countries, and what lessons and/or good practices Business Finland could learn from them. From the Netherlands two programmes were analysed: City Deals programme and SBIR programme. In Sweden benchmark was based on Smart Built Environment programme and Smart Housing Smaland (SHS) programme. Full benchmark studies are available in Appendix D.

2.3 OBSERVATION RELATED TO ACCESS AND QUALITY OF DATA

This evaluation faced several problems related to access and quality of the data. First, web-based survey suffered from low response rate. To reach sufficient response rate it was decided to perform telephone survey with the same questionnaire. Direct approach to beneficiaries helped to collect the minimum response rate (20% sample). According to the feedback received from beneficiaries (mainly during the telephone interviews) low response rates can be explained by change of personnel, inability of beneficiaries to recall the details of participation, change of Tekes name to Business Finland, change of programme nature during implementation and inability of beneficiaries to recognize the programmes and general survey fatigue. Several beneficiaries couldn't recall participation when referred to programme name, but indication of project name helped. This indicates some problems with recognition of the programmes. The project contact data was often out-dated. People had changed companies or their role in company and this made it challenging to reach out to the correct contact persons. In case of Built Environment programme, which has ended several years ago, many beneficiaries had problems in recalling the programme events and other particularities.

Second, evaluation was asked to focus on assessing the added value of programme services. Yet, the data provided by Business Finland for the evaluation was only about funded projects. Data did not include any information on what if any programme services were used by the funded companies. Monitoring of the clients that benefited only from services was done more systematically only in the Witty City programme (mid-term review and final report). However, combining this data collected by the programme to funding data provide by Business Finland was not possible. Hence, assessing the added value of programme services had to be limited to survey and interview data, and in the feedback collected in the Witty City programme.

Business Finland needs to develop a systematic method for collecting data related to the delivery and use of its services to allow proper monitoring and management of service products as well as any impact measurement in the future.

3 CONTEXT AND STRATEGIC ALIGNMENT

3.1 OVERALL CONTEXT IN WHICH THE PROGRAMMES WERE IMPLEMENTED

NATIONAL INNOVATION POLICY

During 2000s, earlier science and technology policy started to orient increasingly towards innovation in Finland. Non-technological innovations started to be recognised and appreciated as much as technological ones. Besides being important for service industries, it became obvious that service businesses were increasingly important also for manufacturing and ICT industries.

Throughout 2000s, Tekes was actively launching and implementing initiatives focused on service innovation and later also business model innovation. Today, both are entirely integrated into all funding activities without the need for specific targeted programmes or funding criteria. At the same time, Finland was active in developing service innovation policies at the OECD and EU.

The role of the science and technology policy council as key driver of innovation policy started to diminish during 2000s. This role was taken over by the Ministry of Economic Affairs and Employment, especially through the national innovation strategy process implemented during 2008–2009 and resulting in the national innovation strategy Demand and User-driven innovation policy in 2010. In 2014, this strategy was further elaborated in a publication Inspiring Innovation[10].

The various policy dimensions of the demand and user-driven innovation policy depicted in Figure 4 explain in the national innovation policy context why the evaluated programmes featured public procurement, user-engagement and co-creation.

Figure 4 also indicates the increasing importance of societal challenges, the need for more systemic product and service innovation as well as widening markets, opening public sector data, and smart and conducive framework conditions for innovation, such as regulations. These have all been important in further development of national innovation policy. For example, widening markets has been important in two dimensions: accessing and growing further international markets, and creating

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[10]   https://tem.fi/documents/1410877/2132258/Inspiring+Innovation/678be0a8-d2d2-4abb-8123-275e98d95b0d/Inspiring+Innovation.pdf

FIGURE 4. Various dimensions of demand and user-driven innovation policy. Source: Ministry of Economic Affairs and Employment publication Inspiring Innovation from 2014.
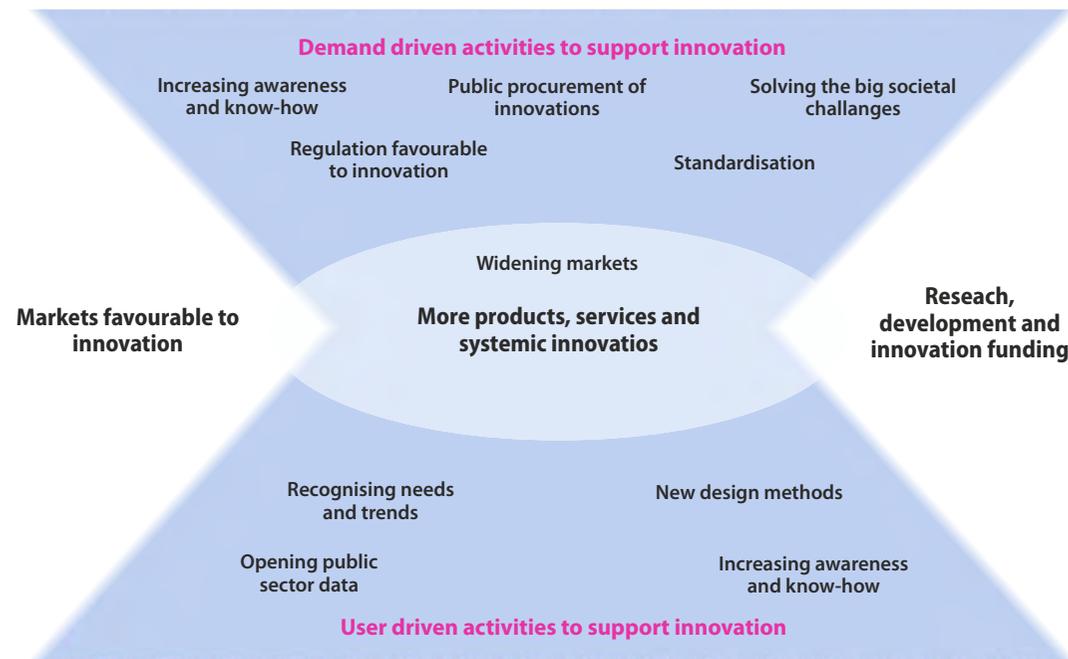
new markets. The later has been closely linked with e.g. opening public sector data, renewing public services (e.g. by using innovation procurement), and striving for more systemic innovations through platforms. This has led to increasing policy recognition of business ecosystems and platform economy as key innovation policy drivers.

The 2010s have been strongly influenced by the global economic downturn following the sub-prime crisis and more locally the strong downscaling of Nokia corpora-

tion. While Nokia still exists and is one of the leading ones in its field globally, it is much smaller than it used to be during its peak in 2000s.

However, downscaling of Nokia has left Finland with relatively large numbers of skilled, competent and experienced ICT and telecom experts. Given that the cost of an experienced skilled engineer is quite competitive internationally compared, this has made Finland an attractive location for foreign direct investments. As a result, several multinational corporations have established research and innovation activities in Finland.

INSTITUTIONAL STRUCTURES

In 2013, part of research funds managed by Tekes as well as some other public research funds were reallocated to support societally motivated research. Funds were allocated to the newly established Strategic Research Council, operating under the auspices of the Academy of Finland. Strategic Research Council requires participation of societal actors in each funded project. While this aligned with the aims to address societal needs, enhance innovativeness of the societal actors, and encourage public sector innovation as well as co-creation with societal actors, most of the projects are primarily motivated and driven by academic researchers.

At the same time, reducing Tekes' research funding has had a significant impact on Tekes' ability to support and foster new forms of industry-academia collaboration. It was possible to seek new approaches and instruments, especially in supporting the development

of large-scale experimentation, piloting and demonstration platforms, e.g. using virtual or physical joint entities funded with soft loans or equity arrangements. However, the previously very effective ability to use a flexible combinations of different funding instruments to fund various constellations of joint and parallel activities was not possible due to very limited research funding available at Tekes and limited possibilities to properly consolidate and align funding from different agencies.

To coordinate and strengthen business internationalisation support, the government organised Team Finland in 2011. It is a network of actors providing internationalisation services, including Business Finland, Ministry of Economic Affairs and Employment, Ministry of Foreign Affairs, Ministry of Education and Culture, Finnvera, Industry Investment Ltd, regional Employment and Economic Development Centres, several international Chambers of Commerce, VTT, Finfund, Finnpartnership and several Finnish Culture and Science institutes.

In 2014, Invest in Finland and Visit Finland were merged with Finnish Foreign Trade Association and in 2015 the then called Finpro became a fully government owned company. At the beginning of 2018, Finpro was further merged with the Innovation agency Tekes, resulting in the current organisation called Business Finland. Business Finland houses tourism, export, FDI and innovation promotion and consists of a public funding agency which manages two companies, one focusing on business and innovation services and another on early stage venture capital.

PARALLEL POLICY INITIATIVES

In 2014, two policy initiatives targeted to same areas as the three evaluated programmes were launched. INKA programme focus was on developing cities as innovation platforms. Programme provided funding for public sector actors, mostly cities. The idea was to develop experimental platforms, regional innovation clusters and use public innovation procurement for developing new services and solutions. INKA programme was discontinued in 2017. 6aika is a joint strategy and action plan for 2014-2020, defined and implemented in collaboration between 6 largest cities in Finland. It is funded by the government, the cities and from EU Structural Funds. The focus of 6aika is on open and smart services and sustainable development of urban environments. Funding is available for public sector organisations, research and education organisations, and intermediaries providing innovation and business development services.

Both of these parallel initiatives are relevant for the evaluated programmes, especially so for Witty City because of highly overlapping objectives and target groups. The relevance of these initiatives for Smart Procurement programme relates to innovation procurement as a key instrument for achieving strategic objectives related to city and urban development. The relevance for Built Environment is only indirect through public construction and real-estate.

All the above described changes at innovation policy and institutional levels during 2009 and 2017 had an

impact on the evaluated programmes. In addition, the programmes were influenced by internal changes.

INTERNAL CHANGES

In 2012 in search for internal process productivity and allocation flexibility, Tekes decided to detach funding from programmes. Before that, each programme had a funding allocation which was used to launch calls for new projects. This allocation was fixed for collaborative research projects in which the funding was received by research organisations. Company funding was more flexible. While there was a planned allocation, this was not fixed. Programme funding volumes for companies depended eventually on demand, i.e. fundable project submitted by companies. Despite this flexibility, both research projects and company projects were activated using specific programme funding calls.

Following the decision to replace fixed programme specific funding allocations with mere plans, Tekes decided to move from programme specific funding calls to thematic funding calls in 2014. While companies were able to submit project funding applications at any time, the activation effect of programme specific calls and dead-lines was lost. Instead, activation relied mainly on programme services and to a lesser extent interaction along the customer resource management processes.

The change from programme specific to wider thematic funding calls was connected to an internal organisational change, where the focus was shifted from the programme process to wider thematic areas. Internal governance was built around thematic areas and funding. The role of the programme process was no longer strategic and individual programmes were seen more as activation tools, less as strategic initiatives. This meant that the support for individual programmes was increasingly dependent on individual programme owners and top management personnel.

In 2014 Tekes adopted a practice to change programme managers mid-way into the programme implementation. The rationale for doing so was to allow programmes to be revitalised, thus ensuring programme relevance for potential participants and eventual impact. Programme manager changes had visible impact in all evaluated programmes. The impact at the operational level of programme governance and implementation is discussed in Chapter 4, while the impact at the strategic level of programme focus and alignment with Tekes strategy and innovation policy is discussed in Chapter 3.2.

The eventual merger into current Business Finland was preceded by the above described earlier mergers and collaborative arrangements motivated by changes in innovation policy. This was particularly visible in objectives related to internationalisation. Increased collaboration within Team Finland network and particularly with Finpro at the time started to shift Tekes' focus increasingly from competitiveness and innovation towards supporting growth in international markets.

Launch of the Strategic Research Council and subsequent reduction of Tekes' research funding meant that less funds were available for funding research. Tekes' programmes used to be funding programmes

FIGURE 5. Timeline of key external and internal events.
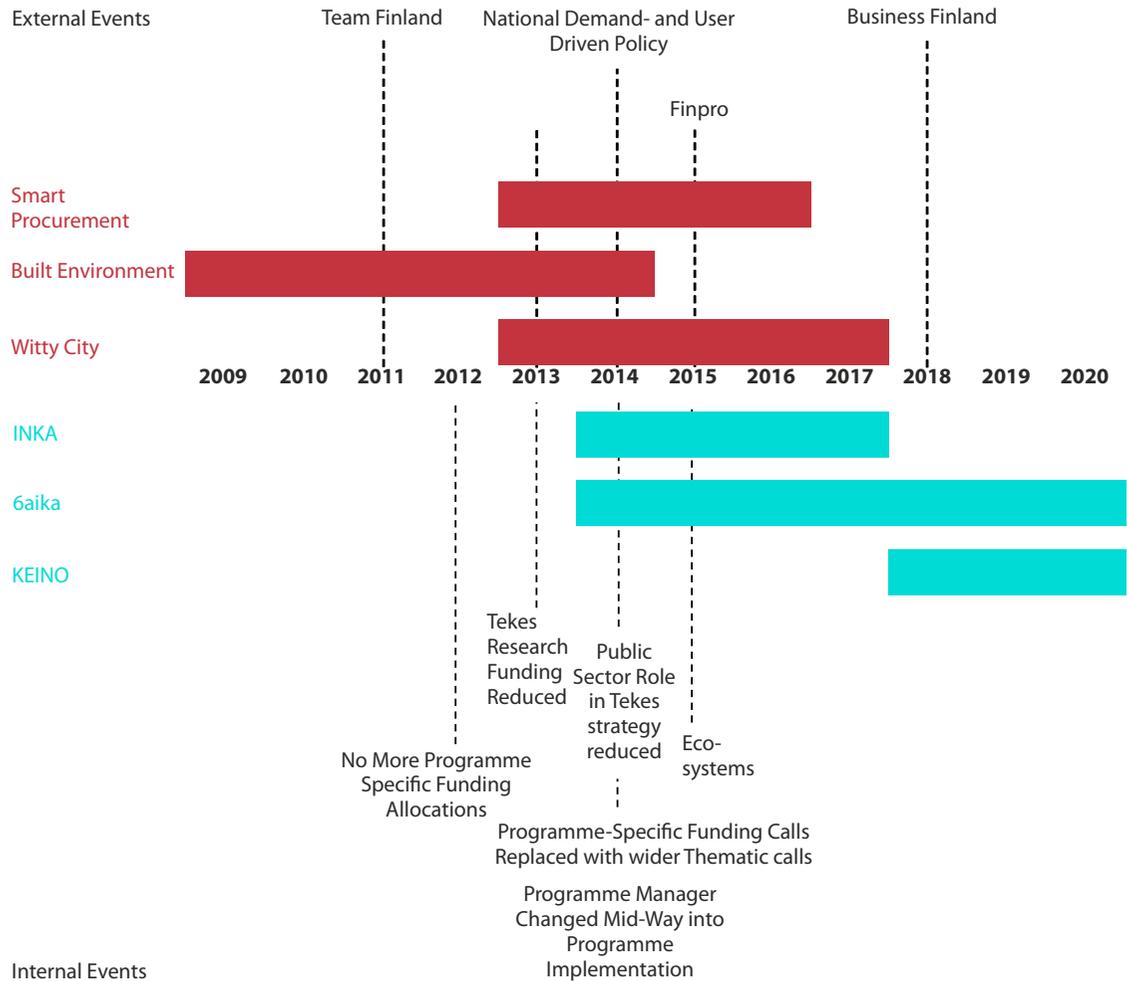
for collaborative industry-academia research and innovation. With less research funding available, focus naturally shifted towards innovation and growth. Strategic Research Council mandate to focus on societal challenges also meant, that Tekes' role towards public sector actors and public sector innovation begun to be more limited and focused on supporting mainly companies in their efforts to develop innovations relevant for public sector and addressing societal challenges. While funding for innovation procurement remained in Tekes' instrument selection, this limitation meant in practice, that it was more of an outlier rather than core strategic instrument. This seems to have been also the practical reality even though at the national level policy highlighted innovation procurement being at the core of demand and user-driven innovation policy, and even government programme promoted the use of 5% of all public procurement funds to innovation procurement.

Internal shifts in priorities and organisational reforms were also complemented by some key people from management level leaving Tekes to pursue careers at the Ministry of Economic Affairs and Employment or elsewhere in the national innovation system. Some of these people had been influencing the design and supporting the implementation of the evaluated programmes. Subsequently, with these people leaving Tekes had an impact on the management level support of two of the evaluated programmes: Witty City and Smart Procurement.

Figure 5 summarises relevant external and internal events that influenced the original design of the programmes as well as their implementation. The impact

of these events on the alignment between the evaluated programmes and Tekes' strategy (and innovation policy) is discussed in Chapter 3.2, whereas the impact on programme governance and implementation as well as programmes as policy instruments is discussed in Chapter 4.

3.2 STRATEGIC ALIGNMENT OF PROGRAMMES

Tekes' strategy has been updated several times during the 2009–2017 period. However, the fundamental basics of the core strategy have not materially changed. At the beginning of the period, strategies emphasised competitiveness and innovation, attractiveness of Finland as an innovation environment. Later, the terminology shifted from competitiveness and innovation towards growth and internationalisation on one hand, and from attractiveness towards ecosystems.

The noticeable differences to earlier strategies are related to two areas. One is that earlier strategies had identified research and innovation competences (knowledge base) separately rather than as one feature of the attractive innovation environment or ecosystems. The other was the role of societal challenges, which was visible in earlier strategies, but less so in later and current ones. This can be explained by the shift in Tekes' mandate towards public sector, and stronger focus on company growth and internationalisation towards and after

the merger into Business Finland.

The shift in strategies was accompanied by changes in instrument selection with respect to competitiveness, innovation and international growth through introduction of new internationalisation services and programmes with specific focus on growth and internationalisation. Apart from some experimentation with ecosystem-oriented approaches, the instrument selection remained the same with respect to attractiveness and ecosystems.

Alignment between the evaluated programmes and Tekes's strategy can therefore be analysed using latest Tekes and Business Finland strategies. These strategies are two-folded; they are enabling companies to grow internationally and at the same time creating a world-class business ecosystem and competitive environment in Finland. According to its strategy the most important target group is companies that aspire to expand on the international market but with a special focus on start-ups and SMEs. Encouraging market export and internationalisation by international activities as networks are other important elements of its strategy. Additional areas relevant to this evaluation are Well-being and Health, PPP (public private partnership) and Digitalisation (implementation of digital services and development of digital practices).

As a part of their strategies, Tekes (and later Business Finland) has formulated missions and visions. When comparing these, Tekes for 2017–2020 and Business Finland for 2017–2021, the biggest differences are that Business Finland emphasises internationalisation and focuses on the growth of companies and competition.

FIGURE 6. Tekes and Business Finland mission and vision compared.

	TEKES 2017–2020[11]	BUSINESS FINLAND 2017–2021[12]
Mission:	Increase growth in innovation and create wealth in Finland	Increase growth and renewal through innovation and internationalisation
Vision:	To make Tekes to one of the world-leading public innovation funders.	To make Business Finland to one of the world-leading desirable partners for Finnish companies to grow and accelerate internationally by developing an innovative and competitive environment.

Looking at the objectives of the Smart Procurement, Built Environment and Witty City (INKA, 6aika) the following three characteristics can be identified:
- Demand-driven, customer-oriented, user involvement, demand and supply side cooperation
- Focus on companies (SMEs, larger companies)
- Making Finland internationally attractive and competitive

The first characteristic is found in all three programmes; Smart Procurement focuses on demand-driven innovation, Built Environment on user-involvement and Witty City aims to bring the supply and demand side together. This characteristic is not explicitly mentioned in the strategy of Business Finland; however, many formulations of Business Finland's strategy are vague and wide. Depending on how "innovative environment" or "new business eco-system" can be defined, demand-driven

innovation can be a part of an "innovative environment", hence they are compatible.

"Internationalisation" is a term that appears several times in the strategy of Business Finland, in the case of Witty City, internationalisation is made through networks. In Built Environment there is little focus on internationalisation although in its long-term vision there is a global focus (to make Finland one of the world-leading attractive investments environment). The same applies to Smart Procurement. Looking at the long-term vision of Smart Procurement, it aspires for an international demand for Finnish export. In sum, the objectives of the three programmes have an international focus, into different extents, and are in line with Business Finland's strategy. Besides internationalisation the transition from Tekes to Business Finland has added emphasis on companies. All three programmes are focused on companies, either SMEs, start-ups or large companies. The focus on SMEs appears in the objectives of Smart Procurement and Witty City where SMEs are supported by commercial references and/or networks. This is in line with Business Finland's strategy where SMEs are pointed out as an important target group. However, there are no indications of supporting SMEs in the objectives of Built Environment.

Furthermore, Health and Well-being is in focus in the Built Environment programme, but not very central in the other programmes' objectives.

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[11] https://www.businessfinland.fi/globalassets/finnish-customers/about-us/tulosohjaus/tulossop17-20.pdf
[12] Tulostavoiteasiakirja BF 2018-2021

Again, the formulations of Business Finland's strategy are very wide which make them compatible with many of the programmes' objectives. There are no contradictions, however there is a lack of focus on SMEs in Built Environment which can be understood as misalignment. In conclusion, the main points of Business Finland's strategy are aligned with the objectives of the evaluated programmes.

3.3 OBSERVATIONS RELATED TO STRATEGY ALIGNMENT, SYNERGIES AND RATIONALE

STRATEGY ALIGNMENT

Figure 7 illustrates how programme objectives align with Business Finland strategy. Each programme had a clear innovation policy motivated rationale, which focused on the specific target group. Smart Procurement primarily focused on the public sector organisations and innovation procurement, which was directly aligned with the demand and user-driven innovation policy. Witty City focused on cities and developing them into innovation platforms. Cities and their need to address societal challenges represented demand, which drives innovation. Furthermore, the use of innovation procurement as one of the main instruments as well as co-creation and user-engagement meant that the programme was also very much aligned with the demand and user-driven innovation policy. Built Environment was aligned with the demand and user-driven innovation policy through emphasis on user needs and enhanced collaboration with users.

The alignment with Business Finland strategy was visible in programme objectives. All evaluated programmes had objectives related to both key dimensions of Business Finland strategy. The impact mechanism in all programmes was based on enhancing the demand for innovation, which would encourage companies to engage in innovation, which would enable them to grow internationally – or be international more competitive as it was referred to in earlier Tekes strategies.

The objective of enhancing the demand for innovation was closely linked to adopting new methods and practices. In Smart Procurement programme, new methods and practices referred to innovation procurement. Innovation platforms acting as test-beds and co-creative innovation environments engaging users as well as innovation procurement were the new methods and practices employed in the Witty City programme. In Built Environment programme, new methods and practices referred to enhanced collaboration with users and real-estate owners.

Because of the impact mechanism focusing on demand driven innovation, one would assume that the Business Finland strategic objective to develop world-class business and innovation ecosystems would have been the primary focus of the programmes. However, as Figure 8 shows, despite efforts to this direction, the focus during the implementation of the evaluated pro-

FIGURE 7. Objectives of evaluated programmes and how they align with Business Finland strategy.

STRATEGY	SMART PROCUREMENT	WITTY CITY	BUILT ENVIRONMENT
	Encourage public sector to engage in innovation procurement	Encourage cities to become sophisticated innovation platforms	User need driven and service oriented construction
Enabling companies to grow internationally	Increase the demand for innovation	Provide test-beds for developing innovations	Increase the demand for innovation
	Help innovative SMEs to access international markets by providing commercial references	Provide commercial references to help companies access international markets	Help companies access international markets
World-class business and innovation ecosystems	Enhance public-private collaboration and user engagement	Demand driven platforms for cities to develop smart services	Enhanced collaboration with users and real-estate owners
	Create attractive innovation ecosystems around public sector	Cities as internationally attractive innovation platforms	World leading attractive investment environment

FIGURE 8. Implementation of the evaluated programmes and how that aligns with Business Finland strategy.

STRATEGY	SMART PROCUREMENT	WITTY CITY (+ INKA + 6AIKA)	BUILT ENVIRONMENT
Enabling companies to grow internationally	Focus on public sector procurements with no specific measures to ensure international market relevance.	Internationalisation (of companies) main focus during 2ⁿᵈ half of the programme.	Focus on isolated company projects mainly aimed at domestic markets.
World-class business and innovation ecosystems	Isolated procurement projects. **Ecosystems attempted** seriously only during the 2ⁿᵈ half of the programme, **but with too limited resources**.	Division of labour with INKA and 6aika. Several **cosortia projects** with potential **impact** on **future ecosystem development**.	**No ecosystem level projects**, despite attempts in the area of renovations.

grammes geared more towards enabling companies to grow internationally or initiating behavioural change within the primary target group.

Smart Procurement programme ended up focusing mainly on individual public sector innovation procurement projects. Ecosystem level procurement consortia and large innovation procurement projects were promoted during the second half of the programme, but with much too limited resources. As a result, very little progress was achieved during the programme. An illustrative example was the Reboot School challenge competition[13], which Tekes managed to launch at the very end of the Smart Procurement programme in 2016. With respect to enabling companies to grow internationally, the programme funded public sector innovation procurement projects which could potentially facilitate this. However, apart from using international market potential as one funding criterion, no specific measures were taken to further ensure this. Furthermore, most funded projects were focusing on exploring the feasibility of innovation procurement to address the participating public sector organisation's needs. While public sector organisations were required to ensure, that the solution they were seeking needed to be innovative and not already available in the international markets, or available ones were too expensive or unfeasible for their specific needs, they weren't required to analyse the demand to illustrate the international market potential of the innovative solution they were seeking. Therefore, understanding the further

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[13]   https://tapahtumat.tekes.fi/tapahtuma/reboot_school

international market potential for the innovative solution was left to the companies potentially interested in developing it. This meant that the innovation procurement projects funded in the Smart Procurement programme were seen by companies as individual public procurements with little or no further business prospects.

Witty City programme was originally aimed at both cities and companies. However, after the launch of INKA and 6aika initiatives, companies became the main target group as these two other initiatives were agreed to target cities. Despite this division of labour, Witty City was active towards cities throughout the programme implementation, even though funding was provided only for companies and research organisations. While the formal coordination between Witty City, INKA and 6aika at the programme level was limited, interactions at the level of cities, companies and projects were numerous. Cities participated in programme events and other services. Several collaborative consortium projects were launched around research projects where the funding for companies and research organisations was granted from the Witty City programme, while partnering cities received their funding from INKA and 6aika.

The Witty City consortium projects represent collaboration between key ecosystem actors and can therefore be argued to support ecosystem developments and objectives. However, the projects implemented during the Witty City programme were more like precursors to real and much wider ecosystem initiatives, which may emerge later. Programme services allowed companies

and cities gather knowledge about Smart City initiatives and solutions globally (awareness) and learn from each other. Consortium projects facilitated further understanding and experimentation. The knowledge and experiences gained during the Witty City programme and projects may support cities into developing demand driven innovation platforms. While the impact of Witty City programme on ecosystem development was limited, there are indications that further progress in this direction is very likely. For example, some of these 23 consortium projects launched during the Witty City programme have later been continued as Business Finland Growth Engine projects.

Despite efforts especially during the second half of the Built Environment programme to initiate and launch ecosystem level larger consortia projects, the focus and funding remained allocated to funding isolated company projects. Most of these projects were aimed mainly at domestic markets while adopting new methods and practices. Hence, the programme alignment with enabling companies to grow internationally during implementation was indirect at best, resulting from using new methods and practices to increase competitiveness in international markets. To what extent this was successful, is discussed in Chapter 5.

The overall conclusion regarding strategy alignment is that while the original programme plans were well aligned with demand and user-driven innovation policy as well as Tekes and Business Finland strategies, the programmes were eventually implemented in a way, which

did not allow ecosystem level objectives to be reached to a significant degree. This was realised in all programmes during the mid-way change of programme manager, but the remaining time and resources were not enough to achieve any significant results, nor were the instruments used sufficient for this purpose.

The changes in programme focus due to the realisation of not addressing or reaching any of the ecosystem level objectives during the first half of the programme was different in each programme. Smart Procurement programme made serious efforts to address the ecosystem level objectives by attempting to activate larger innovation procurement consortia. However, due to slowness of public sector decision making, lack of almost any collaboration culture as such practical level between public sector organisations, and lack of programme resources and unrealistic timeline, the efforts did not result in any ecosystem level consortia projects. Instead, the impact of the programme was left mostly at earlier stages of behavioural change as discussed in Chapter 5.1.

Witty City programme mid-way refocusing was clearly influenced by the division of labour between it and the INKA and 6aika initiatives early into the programme implementation. The second half of the programme focused on providing internationalisation services for companies and helping cities to gather knowledge about international experiences and innovative solutions related to smart cities, and on supporting the initiation and launch of collaborative consortium projects in selected Smart City thematic areas. Programme services and funding for companies were well aligned with the strategic objective of enabling companies to grow internationally, while the consortium projects represent efforts which are aligned with ecosystem objectives.

The underlying motivation for the consortium projects was to develop Smart City solutions to international markets. While these projects may indirectly and in longer-term also support ecosystem development, their role in strengthening demand as a driver for innovation was very limited at the time. The potential to develop Smart City related business ecosystems was clearly identified. While there were and still are several companies and consortiums developing and offering Smart City solutions, they remain isolated services and products, or at best small-scale experiments and pilots[14]. These may later develop into real large-scale ecosystem initiatives, but the impact of Witty City programme on Smart City related ecosystem developments at the time was limited and focused mostly on earlier stages of behavioural change.

Mid-way changes in the focus of the Built Environment programme geared it towards larger consortium projects in the area of renovations. Despite the efforts, no such projects were launched during the programme. It is possible that larger consortia renovation projects have been launched after the programme ended.

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[14]   See e.g. https://www.businessfinland.fi/globalassets/julkaisut/Smart-City-Solutions-from-Finland.pdf

SYNERGIES

Overlaps between policy initiatives can be problematic and lead into ineffective competition between public funded initiatives or they can be a source of positive synergies. The latter indicates policy coherence at implementation level and possibly also at strategic level. Former, on the other hand, clearly indicates lack of implementation level policy coherence, but not necessarily strategic level inconsistencies. Co-existence without competition or identifiable synergies typically indicates non-coordinated division of labour, whereas co-existence with positive synergies often implies some level of coordination.

Similarities and complementarities in strategic objectives, targeted stakeholders and activities is evident from material produced by INKA, 6aika and the evaluated programmes. Despite the obvious potential for positive synergies, the link between these initiatives remained mainly at the level of non-coordinated co-existence. No formal or systematic coordination was established between these initiatives at programme level. However, informal interaction between actors – companies, cities, research organisations and funding organisations – was active throughout the Witty City programme. Hence, synergies were capitalised at the operational level as indicated e.g. by the 23 consortium projects. However, the lack of strategic coordination at programme level clearly limited the possibility of capitalising more strategic synergies, as evidenced by the limited progress towards cities becoming or acting as ecosystem platforms.

Very little of the potential positive synergies were also utilised in the case of Smart Procurement programme. While there were interactions, they were mostly ad-hoc rather than well-coordinated. A further challenge with the Smart Procurement programme related to activation and how later funding decisions did not always meet with the expectations created by activation. This issue is discussed more in Chapter 4, but suffice to say, it had an impact on failure to capitalise potential positive synergies.

RATIONALE

Was launching these programmes at the time they were launched with the specific objectives and target groups justified? Both Smart Procurement and Witty City programmes were clearly linked to identified innovation policy objectives. Given their original focus especially related to ecosystem level objectives and the innovation needs and opportunities within the targeted actors, it can be well argued that these programmes, their focus as well as timing were well justified.

However, during programme implementation the focus shifted and ended up being much more limited than originally planned. Insufficient resourcing, lack of ecosystem level strategies, less than optimal strategic governance, insufficient target group readiness to engage in ecosystem level activities, failure to capitalise synergies

between initiatives, etc. were among the several reasons explaining why this happened. Whether these two programmes would have been equally justified to launch as they eventually ended up being implemented as opposed to how they were originally planned, can therefore be argued. While there is evidence (see Chapter 6) that the programmes had impact on participating beneficiaries and therefore the use of public funds as such can be justified, the impact along the lines of the programmes' original orientation could potentially have been much more significant.

Justification for launching the Built Environment programme can be related to adopting new methods and practices. However, the main beneficiary sector construction has shown limited international growth orientation, nor has it been very innovative in the global context. Furthermore, the sector is characteristically oriented to domestic markets or at most countries in the region. Questions could therefore be raised as to whether innovation promotion in this sector shows any significant potential compared to innovation in other sectors when assessed against Business Finland strategy. However, it is also possible to argue that the sector has linkages to more relevant themes such as smart city infrastructures, physical innovation platforms, and societal challenges like safety, health, etc. Built Environment is a valuable national asset and often directly or indirectly linked to societal challenges. To justify future innovation promotion in construction could potentially have much bigger impact if oriented more selectively to specific types of innovations and companies with high potential for international growth and integrating Built Environment as a supporting dimension into initiatives targeted to high-potential business ecosystems.

4 PROGRAMME GOVERNANCE AND IMPLEMENTATION

4.1 OBSERVATIONS RELATED TO PROGRAMME GOVERNANCE AND IMPLEMENTATION

This evaluation focuses only on programme governance during implementation and the appropriateness of the evaluated programmes as instruments against their original objectives. Evaluation doesn't extend to processes for identification and detailed design of the programmes, which was done according to the normal Tekes programme process steps. As described in the previous chapter, the rationale for launching the programmes with original objectives can be justified by demand and user-driven innovation policy as well as Tekes and Business Finland strategies.

The governance model of programmes is based on a structure of programme steering group consisting of representatives of main programme beneficiary groups, internal programme management, and external coordination and activation support.

Tekes board makes decisions to launch new programmes as they did with these three evaluated ones.

However, the board seems to have had no role during implementation. While the shifts in focus and implementation of the evaluated programmes remained within the original programme objectives, the changes were significant especially in cases of Smart Procurement and Witty City. It may therefore be questioned whether the re-design of these programmes should have been discussed and decided at the board, especially in the case of Smart Procurement given the apparent mismatch between the ecosystem ambition and available time and resources.

The original design of a new programme is typically an interactive process with key stakeholders and last for months, sometimes more than a year. The re-design of these evaluated programmes mid-way into implementation seems to have been much less systematic and interactive. This might explain to a large degree why ecosystem level objectives were attempted with unrealistic resources, time and less than optimal instrumentation during the second half of the programme.

Despite the name "steering group", the role of this body was mainly informative. Key decisions related to the programme implementation and orientation were discussed at the steering group, but apart from themat-

ic orientation it seemed to have little influence on any major decisions regarding programme implementation. Steering group had no role in selecting individual projects or beneficiaries, no role in selecting key internal or external personnel, and little if any role related to the mid-way refocusing of the programmes. It could be argued to have a communicative role towards beneficiaries, but there is no indication that the steering group members would have been employed in this role nor any specific measures to support them in this role. It should be noted that Witty City programme didn't even have a steering group, which indicates that it typically had a weak role in Tekes programme governance.

Internal programme management consisted of a programme manager, team of other experts supporting the programme manager and a director responsible for the programme to whom the programme manager was accountable. Programmes could also be supported by additional directors with specific competences and/or interests in a programme.

According to an earlier adopted practice, the programme manager was changed mid-way into the implementation in each of the evaluated programmes. The purpose for this was to revitalise and if deemed necessary, also refocus the programme to improve its impact. While the rationale for the change can be defended, the way it was done in practice raises several concerns.

First, it takes time for any programme manager to get to know and understand the target groups and key beneficiaries, gain their trust and capture their attention, and build the relevant networks needed in managing the programme. If the programme aims to strengthen existing networks and already adopted practices, this doesn't necessarily take much time. However, if the aim is to initiate and support major behavioural changes – like in the evaluated programmes – the time needed is much longer, typically several months, even more than a year. Changing the programme manager mid-way into the programme means that the new programme manager needs to go through much of this same learning process, unless the new manager has already been an active member of the programme team from the launch, or the new manager has already existing networks and understanding because of other earlier engagement with the target groups.

Built Environment programme target group remained the same after the mid-way change and the new programme manager was a member of the programme team. Thus, the hand-over didn't suffer from serious learning delays. The new Smart Procurement programme manager was also a member of the programme team. However, the need to gain recognition and build stronger personal network connections in a situation where the objective was to identify, encourage and fund completely new types of projects – large procurement consortia instead of individual procurement projects – among a target group clearly not ready for them caused delays and would have required more time than was available during the second half of the programme. The new programme manager of Witty City programme was not a member of the programme team, but familiar with the thematic area and experienced in internationalisation. As the launch of INKA and 6aika had already taken place

during the first half of the programme, the second half of the programme could be relaunched in a relatively stable context with little delays.

Second, even if the learning delays related to the target groups would be limited, hand-over situations also include potential delays related to programme management practices. While external coordination and activation support, internal programme director, and programme team members as well as possible other directors supporting the programme could have helped, it would appear that the support for the new programme managers was less than optimal. The new programme manager could have been better supported in trying to figure out how the programme implementation should continue, which activities needed to be strengthened, which reduced or stopped, and which new activities should be launched, and how all this could be managed. In Built Environment programme, the hand-over seems to have been implemented without any serious problems. In Witty City programme, the hand-over problems remained limited as the new programme manager earlier experience matched well with the new focus of the programme. Smart Procurement programme hand-over was done to an original member of the programme team with good knowledge of the programme. However, stronger support would have been needed as the hand-over was done at the time directors supporting or responsible for the programme had changed or had left the organisation, the strategic positioning of the programme was weakened within Team Finland and coming Business Finland context, and the programme was aimed more strongly towards ecosystem level objectives.

Third, refocusing or shifting the focus of the programme mid-way in a smaller degree can typically be managed without the need to revise the instrumentation (programme services, funding, etc.). As the Witty City mid-way change was to a direction which was already mainstream at the Business Finland context (internationalisation), and the new instrumentation relied on activities in which the organisation and new programme manager was familiar with, the instrumentation appropriate for the second half of the programme was easy to adopt. This was also the case with the consortia projects, which were built around existing Tekes practice of research projects funded in parallel with individual company projects and linked to city projects funded from INKA and 6aika. Even though Built Environment and Smart Procurement programmes both included ecosystem level objectives, the original programme design was based mostly on earlier practice and providing funding for individual beneficiaries and services to support learning, networking, etc. This presented a problem at the mid-way change. Except for the challenge competition (Reboot school) at the very end of the Smart Procurement programme and the Smart Energy idea competition supported by the Witty City programme, no new instruments were developed or adopted specifically aimed at supporting the attainment of ecosystem level objectives. Designing them and launching them during the remainder of the programme would not have been realistic given that only two years of the programme remained. New programme managers were therefore left

attempting to address ecosystem level objectives with instrumentation not designed for it. While some of the instruments could be used to promote ecosystem level objectives, better ones would have been available (see e.g. international benchmarks and recommendations).

External support for Tekes programmes used to be organised in the form of full-time coordinator and included programme communications until early 2000s. Communications were then detached from individual programmes to a unified communications function serving all programmes. Later the role of full-time coordinator was further reduced, and programmes started to employ part-time activators acting on requests of the programme manager. This latest change happened during the period when the evaluated programmes were implemented.

Built Environment programme had a coordinator throughout the programme implementation. The role of the coordinator was closest to the earlier role of coordinator. Witty City and Smart Procurement programmes both had coordinators, but their role was more in activation and in implementing the program activities. Funding was handled by Tekes internal team. Smart Procurement coordinator was involved in implementation much more hands-on during the first half of the programme, focusing on activation. Later, during the second half of the programme the coordinator's support to the programme was limited to specific assignments received from the programme manager. Despite the fact that one of these assignments was to actively identify potential new innovation procurement projects, the coordinators ability to grasp the full extent of the programme implemen-

tation was more limited. The coordinator was working with potential programme participant cities during the programme, but within other funded non-programme projects. However, there are no signs that this potential synergy would have been explicitly utilised. Witty City coordinator participated actively in the delivery of programme services and activation.

Using external entities to do activation, i.e. communicate programme and funding criteria, and encourage potential beneficiaries and beneficiary consortia to launch projects relevant for programme objectives, can extend programme governance and services resources and thereby ensure programme impact. However, external activation may also cause problems, if the understanding of the programme or funding criteria doesn't fully match with how criteria are eventually interpreted in making funding decisions. This problem materialised in some cases in the Smart Procurement programme. Activation created an expectation of funding, which eventually ended in disappointment when funding was not granted.

The underlying reasons may be two-fold. First, the external activation may not have full understanding of the criteria and how they should be interpreted. Second, internal experts assessing the application may not have sufficient understanding of the specific features of innovation procurement projects. Assessing these using more traditional innovation project assessment criteria may lead in rejections of many projects, which would receive funding if assessed using innovation procurement specific criteria or interpretations of more generic funding criteria specific for these types of projects.

Regardless of the underlying reason, the outcome is the same. Disappointed applicants who often represent new clients to Business Finland, will associate the rejection to Business Finland funding in general and Business Finland's interest in funding innovation procurement projects. These experiences have a tendency to travel among potential new clients, which may make further activation much more challenging in future.

4.2 OBSERVATIONS RELATED TO PROGRAMMES AS A POLICY INSTRUMENT

The role of programmes as instruments targeted to achieving strategic innovation policy objectives has remained strong in Finland, even though their nature has evolved over the years. Earlier technology or industry sector-oriented programmes were gradually replaced by thematic programmes, which have increasingly focused on specific challenges or innovation and international business opportunities. Recent Tekes and Business Finland programmes often include features of several earlier programme generations, as is the case with the evaluated programmes.

As described in earlier chapter, the evaluated programmes included both system level and beneficiary level objectives. All evaluated programmes also included characteristics of learning and adoption, which were often the feature in programmes implemented in the 1980s and 1990s, with the difference that rather than being about technologies, these programmes focused on new methods and practices. Built Environment was clearly focused on specific business sector dealing with construction, real-estate and services around them, which means it was an industry specific in nature. Smart Procurement and Witty City were also "industry" specific in the sense the original primary beneficiaries were public sector organisation, like cities, municipalities and public service providers. However, the secondary beneficiaries i.e. companies represented a wider mix of industries with the common characteristic, that they all produce solutions to the public sector.

Demand and user driven innovation was a visible feature of Smart Procurement and Witty City programmes, where the role of cities and public service providers was central. Witty City changed into a programme primarily serving companies' efforts towards international markets. However, the link to INKA and 6aika and participation of cities and public service providers in programme services allowed the programme to remain demand and user-driven, although the demand and user-driven was more facilitated than directly supported, especially through the consortium projects. Additional interactions during the 2nd half of the programme towards relevant ministries and other agencies further facilitated demand driven e.g. through identification of legislative barriers. Built Environment featured demand and user-driven, but was in practice more about learning, experience and implementation of individual company or consortia innovation projects.

The evaluation of these three programmes raises questions related to programmes as policy instruments in the current context of innovation policy and Business Finland strategy.

The first question is, to what extent were these programmes the optimal instrument to address the policy and strategy objectives. The evaluation indicates that the answer is no. The instrumentation (selection of programme services, project funding) was clearly not sufficient for achieving ecosystem level objectives. Supporting ecosystem development requires a coherent mix of many types of policy interventions, which must be designed specifically in relation to the key target groups, key development barriers and ecosystem maturity.

For example, supporting the creation of active ecosystem level innovation procurement consortia requires that several of the potential ecosystem key actors have already awareness, understanding and experience of innovation procurement, that they have a longer-term vision and strategy of their future and how they can apply innovation procurement in achieving it, they understand the benefits of developing an ecosystem, and that they are willing and able to collaborate with other ecosystem actors. At the same time, key barriers related to regulatory regimes, public sector practices, institutional inertia, etc. must be addressed. Furthermore, ecosystem development often requires time for various reasons. A programme period of 4–5 years is typically not enough to reach significant progress, let alone 2 years, which was the case with the evaluated programmes in practice.

The evaluated programmes were implemented largely in isolation with little if any active collaboration and synergy with other policy initiatives. Furthermore, many policy initiatives that would have been needed, were mostly missing (e.g. no systematic analysis and reform of regulations, public sector practices or governance models; no mandatory budget allocations; etc.) or launched after the programme had already ended (e.g. KEINO network after Smart Procurement had already ended). A notable exception to this was the collaboration with the Ministry of Transport and Communications and its agencies in the Witty City programme. The collaboration supported the development of longer-term national Transport Sector Growth Programme[15], which further widened collaboration in the area of MaaS (Mobility as a Service) and led to several Growth Engine projects in this thematic area. The explanation for this was that work on MaaS had begun already before the Witty City programme, and key actors were already aware of the need to address regulatory barriers.

The best that can be achieved with a programme in isolation is progress at the level of individual beneficiaries, and even in that case, mostly at the earlier levels of behavioural change, i.e. awareness, learning, understanding, and possibly experimentation. It is therefore not surprising that reaching ecosystem level objectives proved challenging.

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[15] https://tem.fi/en/transport-sector-growth-programme

Ecosystem level initiatives require a coherent policy mix which should include:

- Long-term ecosystem level strategy and action plan. This should be designed in close collaboration with all relevant current and future ecosystem stakeholders and updated regularly according to ecosystem developments.
- Strong policy support, focusing on removing barriers and facilitation. Depending on the ecosystem, this might be established in the form of e.g. a clear commitment, strategy and action plan outlining regulatory reforms, public sector institutional reforms, reforms in public sector governance and/or practices, building platforms based on open public data, etc. While this may include earmarked budget allocations, the commitment and concrete action for removing barriers is often more important.
- Clear and sufficiently strong incentive structure. This needs to be designed and developed over time according to the maturity of the ecosystem. The key is to provide sufficient incentives for each stakeholder group, so that they are motivated to overcome any institutional inertia or barriers preventing ecosystem development. Governance of incentive structure over time is very much about governing ecosystem policy, i.e. leading, coordinating, implementing and monitoring a coherent mix of policy initiatives aimed at facilitating and supporting ecosystem development.
- Underlying ecosystem platform. This may be physical (e.g. city), but more commonly it is at least partly or fully virtual. The platform provides the common basis on which ecosystem actors can build on. It also acts as a common asset facilitating exchange and identification and capture of mutual benefits.
- Establishing sufficiently strong leadership. This refers to identifying potential leading companies and other actors and facilitating them to take the leadership in ecosystem development.

The evaluated programmes provided services (awareness, learning, networking, internationalisation, etc.) and funding (incentives) for specific innovation or related activities. However, most of the other necessary required elements of ecosystem policy were missing.

The second question is, to what extent does it make sense to try to combine both ecosystem and beneficiary level objectives into the same programme. This depends on the maturity levels of potential beneficiaries with respect to the objectives. The more mature they are, i.e. the more understanding and experience they have, the more they can be incentivised towards ecosystem level objectives. If the maturity is low, the focus should be on awareness, knowledge transfer and learning, possible with some experimentation. While this can also be done in consortia, each beneficiary also needs to build its own competence and experience.

Subsequently, combining ecosystem objectives with individual beneficiary level objectives makes sense in cases where at least some beneficiaries are mature enough, willing and able to take leadership. Otherwise, there is a danger that the programme impact remains at the level of individual beneficiaries, as did happen with all three evaluated programmes.

The third question is, to what extent was the instrumentation, i.e. designed and implemented programme services, and funding as well as links and collaboration with other policy initiatives appropriate with respect to programme objectives. Most of the programme services and practically all funding was relevant for individual beneficiaries. However, the instrumentation was not sufficient for reaching ecosystem level objectives.

Tekes had experimented with ecosystem-type instrumentation earlier adopting a model used in Sweden. However, despite ecosystem level objectives these three programmes were designed and implemented using mainstream programme instrumentation. While instrumentation had some ecosystem facilitating features, these focused on earlier levels of behavioural change, i.e. awareness building, knowledge transfer and learning. None of the three programmes offered any services specifically targeted towards later stages of ecosystem facilitation. Programmes supporting ecosystem development should be designed around activities and services which focus on facilitating and supporting the establishment of leadership and governance, formulation of joint longer-term strategies and action plans, as well as supporting joint experimentation and implementation much more actively than was done in the three evaluated programmes. Some of the international benchmarks described in Chapter 7 provide further insight as to what kinds of programme services are needed in programmes with ecosystem level objectives.

The fourth question is, should programmes be primarily about services and funding kept separate, or should programmes combine both. Until early 2000s, Tekes programmes were funding programmes. Programme services supported funding activities by facilitating awareness, learning and networking. Programmes were identifiable initiatives with targeted funding aimed at specific programme objectives. When the funding was detached from programmes, the identity changed. Programmes were primarily about value-added services, most of which followed the same tradition as before, i.e. awareness, activation, networking, and learning. Survey and interviews conducted during this evaluation clearly indicate, that the role of programmes compared to project funding was less important for the beneficiaries. Some beneficiaries weren't even aware that they participated in a programme, even if their project was funded and they participated in programme services.

It seems that programmes as policy instruments have at least some extent lost their visibility and their role as platforms facilitating collaboration. This means that their ability to activate beneficiaries, facilitate networking and support joint strategy formulation, action planning or implementation, let alone ensure wider distribution and adoption of programme results has reduced considerably.

Based on these observations, Business Finland should seriously consider how the programme instrument should be developed in future. What role should programmes have in the Business Finland portfolio? What services should programmes offer? Which types of programmes are appropriate for addressing which types of policy objectives? etc.

5 PROGRAMME IMPACT

5.1 INCENTIVE EFFECT

There are several positive indications of the overall positive impact of the evaluated programmes. According to the survey only 13,6% of Witty City and none of the Built Environment and Smart Procurement surveyed participants would have implemented the same project without Tekes funding (Figure 9, Appendix B). This means that activities undertaken during the project implementation most likely would not have occurred without the programmes. Most of the beneficiaries (57,6% Built Environment, 40,9% Witty City, 71,4% Smart Procurement)

indicate that the programme helped to implement bigger projects with bigger budgets or longer implementation periods.

For instance, interviewed beneficiary of Smart Procurement programme highlighted the role of the programme in increasing the scope of the project (see text box below).

> *Overall the project was a big push to develop the innovative procurement in the city. The project in one or another form would have been implemented anyway (without Tekes programme), but it would not gain such big scope and recognition.*
>
> Smart Procurement programme participant

According to the in-depth interviews, companies participating in Witty City and Built Environment programmes have managed to commercialize new products/services developed in the projects and are satisfied with the results (see text box below). Interviews also

FIGURE 9. Answers to survey question "Did you change your project plan because of the funding or programme requirements?" Source: Evaluation survey of programmes beneficiaries.

	WITTY CITY	BUILT ENVIRONMENT	SMART PROCUREMENT
No, we would have done the same project even without Tekes funding or the programme	13,6%	0%	0%
Yes, we implemented a bigger project (bigger budget, longer project, etc.)	40,9%	57,6%	71,4%

demonstrate that access to new markets and new contacts are main benefits for companies participating in these programmes.

> *Beside from the funding the company found the organisation of events as the VARPU seminar to be very good. Without Tekes, the company would not have done the project. However, it's not only about funding, but also gathering that consortium/group together, without this [Tekes help] it would be impossible. For the company, this was a new field of technology and without Tekes it would have been too risky for the company to go in this area.*
>
> Witty City and Built Environment programme participant

5.2 BEHAVIOURAL CHANGE

Behavioural changes typically take time and to achieve these changes institutional barriers must be overcome. Behavioural change is a gradual process starting with awareness of new possibilities, and continuing by acquiring knowledge of the new possibilities, understanding how this new knowledge can be applied in the specific organisational and business context, experimenting with the new methods and practices, and eventually embedding them into the institutional toolbox. Overcoming institutional barriers throughout this process requires

learning about new methods and practices, battling prejudices, and un-learning existing practices. Individual projects and programmes can support companies and other organisations to initiate and go through behavioural changes, but alone are seldom enough. Evidence of the impact of projects and programmes to behavioural change of programme participants is therefore always limited, both in terms of time and content.

The collected evidence indicates that the programmes have:

- **increased awareness** and knowledge on co-creation, end-user involvement and innovation procurement;
- **helped understand and experiment** with these methods;
- **helped implement**, collect further experience and **embed** these methods.

The need to **increase the awareness, understand** the use of co-creation methods and new partnerships and learn about innovation procurement is demonstrated by the motivations for participating in the programmes. Identification of new partners (65%) and knowledge of what others in this area were doing (56%) were the main motivations (after funding) of the surveyed Witty City beneficiaries. The same motivations were evident also for Built Environment participants (77% were motivated by new partners and 62% by new knowledge). Smart Procurement beneficiaries indicated that after funding the main motivations were gaining of knowledge what others in this area were doing (71%) and learning or experimenting with new procurement methods or practic-

es (64%). This illustrates that partnerships and understanding and experimenting are important motivations for beneficiaries.

Positive impact of Witty City programme on increased awareness can be identified regarding internationalization. In-depth interviews with Witty City programme participants indicate that services supporting internationalization have increased awareness of international markets and thereby the interest for international collaboration as well as networking with the aim to develop innovations into international markets. This is confirmed by the survey, which indicates that internationalization support offered by the programme has helped most on identification of new partners. Furthermore, Built Environment programme was instrumental in bringing in the alliance model for renovations to Finland. Companies can use experiences from this approach in developing their offerings for international markets.

The programmes were instrumental also in **helping understand and experiment** with the co-creation, partnership and innovation procurement methods. When participants of Smart Procurement programme were asked by survey if they changed project plan because of the funding of programme requirements, 50% of respondents indicated that they partnered with more partners some of which they had not collaborated before. Such answer choices as application of new procurement methods or co-creation methods were mentioned in 28,5% and 21,4% of cases respectively which is a rather positive trend considering the complexity of behavioural change. Similar trends characterize Built Environment programme –19,2% of participants included co-creation methods and 7,6% included end-users to the project. 13,6% of Witty City participants reported including of co-creation methods or practices and 13,6% included end-users.

Lower percentages could be explained by familiarity with the co-creation and end-user engagement among companies already before the project. Programmes might not have helped in adoption of new methods but have helped in understanding and implementing and strengthening the competencies. For instance, one of the interviewed Built Environment participants indicated that access to the construction sector end users participating in the project helped to develop better software that meets the needs of end-users. The developers have been cooperating with customers before, but the project

FIGURE 10. Answers to the survey question "Did you change your project plan because of the funding or programme requirements". Source: Evaluation survey of programmes beneficiaries.

	WITTY CITY	BUILT ENVIRONMENT	SMART PROCUREMENT
Yes, we collaborated with more partners some of which we had not collaborated before	36,3%	23%	50%
Yes, we included co-creation methods/practices	13,6%	19,2%	21,4%
Yes, we applied new procurement method/practice[16]			28,5%

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[16]   This survey answer choice was only displayed to Smart procurement beneficiaries.

allowed having more systemic approach to this (see text box below).

In our project we developed new construction management software and we were able to detect several conceptual and design flaws by involving the construction sector companies that would eventually use the software. The project and Tekes network brought access to these companies and we were able to minimize unnecessary development costs and ensure usability of the software.

Built Environment programme participant

The programmes also helped to **implement and embed** the co-creation methods and innovation procurement. For example, what regards Smart Procurement programme, according to the survey and interviews, without Tekes funding most of the projects would not have been implemented or would be implemented on a smaller scale. Interviews highlight the role that the programme and its services have played in extending and building new networks of beneficiaries. Improved understanding of company/supplier perspective was also highlighted as important result of the programme. Wider networks, learning from these networks and better understanding of innovative procurement has helped to develop more sophisticated procurement strategies (see example in text box below).

The most significant changes mostly come from additional monetary funds and access to the network of Tekes. Essentially, these two main measures enabled the city to proceed with its procurement strategies in a more complex manner ("if we had done these things by ourselves we would have done it in a more simplistic way").

Smart Procurement programme participant

According to beneficiary interviews, Smart Procurement programme has helped to promote the topic of innovative procurement particularly in cities and municipalities. The programme has provided a platform for peer learning, which has increased participants' expertise in innovation procurement. Due to exposure to networks of other cities, municipalities, companies and Business Finland, improved ways of thinking were established in terms of project management that helped in everyday work. Beneficiary interviews also indicate that the programme has helped to pilot and test new procurement methods, approaches, develop systems, but further (after project) application has not been as wide as desired. The programme has also helped municipalities to better understand the needs of companies and establish closer relations to the potential participants of public procurements (see illustration from interview in text box below). Increased awareness and interest in innovation procurement is likely to lead into further innovation procurements, thus increasing the demand for

innovation, and thereby encouraging companies to develop solutions which they can market internationally.

> *In addition to helping develop innovation public procurement, the project also helped the city to gain new partners and establish better communication with companies that are interested in participating in procurements. Before the project such communication was missing. Now the city has a better understanding of the company perspective.*
>
> Smart Procurement programme participant

Collected evidence indicates that there are several **obstacles to behavioural impact**. Beneficiaries indicated that due to lack of expertise and skills of the personnel involved in the procurement process, the long-term situation has not changed as much as expected. During the project implementation beneficiaries were able to benefit from external consultants, but the specific knowledge does not remain in the institution. Innovation procurement is not practiced as often as it could be. Therefore, further efforts to increase the capacity of the involved personnel are needed. Training and knowledge exchange are measures, that public institutions would like to utilize in the future.

Answers to the open-ended questions of the survey for Built Environment programme illustrate some of the external reasons why the change of practices was sometimes problematic. Regulation and application of that regulation was considered an obstacle in introducing

more innovation with the means of public procurement, see text box below.

> *Procurement law is a barrier to some extent, but even bigger barrier is the attitude of public sector functionaries, who are afraid to apply the law innovatively.*
>
> Built Environment programme participant

5.3 ECONOMIC IMPACT

In this section evidence of economic impact of the programmes is summarized. First, evidence from econometric analysis is presented. This is followed by examples of successful commercialisation of innovative solutions developed in funded programme projects.

EVIDENCE FROM ECONOMETRIC ANALYSIS

The analysed sample consists of 55 companies that participated in the Witty City programme. More than 50% of companies that participated in the programme increased their turnover. In 2016 this percentage was as high as 70% of all participating companies. Also, in terms of export more than 50% of companies managed to increase their export volumes. Only 4% of companies increase the number of employees in the period 2013–2017. In terms of personnel increase in period 2012–2017 compared to overall performance in Finland, the

programme participants achieved similar results (1.9 years on average). There is a large probability that Witty City participants will improve their results in 2018-2019 or later as significant part of their funding was received in 2017–2018. In the period 2012–2017 Witty City participants increased their sales in 3.1 years on average, which is more than industry average in Finland.

From Built Environment programme 65 companies were included in the sample of analysis. More than 60% of companies that participated in the programme increased their turnover. In 2015 and 2016 this percentage was as high as 70% of all participating companies. More than 60% of companies participating in the programme increased their export volumes. In period 2013–2017 approximately 15% of analysed Built Environment programme companies raised their number of employees each year. In terms of personnel increase in period 2012–2017 compared to overall performance in Finland, the programme participants achieved slightly better results (2.5 years on average). In the period 2012–2017 Built Environment participants increased their sales in 3.4 years on average, which is more than industry average in Finland.

The econometric analysis (full econometric analysis in Appendix C) of all companies participating in either or both programmes revealed that a quarter of selected companies that participated in at least one programme increased their turnover over each year from 2013 to 2017 and almost one-fifth of companies increased their turnover four years out of five. Only 2.5% of companies have been unable to increase their turnover for at least one year. Analysis also revealed that there was no single year of high

success or failure. The share of companies that increased their turnover in a particular year ranged from 63 to 69%.

The results of export development were not as satisfactory as turnover. Only 1% of companies participating in at least one programme managed to increase their exports for five years, while almost one fifth of companies did not increase their exports at all. However, it has to be considered that depending on the nature of their activities, some companies may not provide goods or services to international markets at all. Therefore, such circumstances could make an impact on the final results.

What regards number of employees, 10% of sampled companies that participated in at least one programme were able to increase their number of employees each year during 2013–2017 and 18% of companies had no significant changes or declined their personnel. In 2013–2017 approximately 15% of analysed Built Environment programme companies raised their personnel each year, while there were only 4% of such companies in the Witty City programme.

Four industry sectors dominate the sample, i.e. manufacturing, construction (including real estate development), information technologies (IT) and professional, scientific and technical activities (PSTA). All these sectors cover 29%, 23%, 21% and 13% of the sample respectively. Remaining industries are not representative. In 2013–2017, the best performers were IT companies. Almost one third of companies involved in this activity increased their turnover each year and more than half (60%) climbed up with turnover for at least four out of five years. The worst performer was PSTA sector which had no companies able

to generate growth in turnover each year. Moreover, during 2013–2017 about 17% of companies from other industries (excluding manufacturing, construction, IT and PSTA) were not able to generate growth at all.

IT companies have turned out to be the best also in terms of exports. More than three-quarters of such companies increased their exports for at least three years out of five. The worst performers were construction companies, i.e. only 21% of them were able to increase export in 2012–2017 by than two years. About 30% of construction companies were unable to increase export at all. However, sector specifics must be considered. Usually, construction companies (especially SME's) are not focused on export. Construction is not an export-oriented business by its nature.

The analysis of the whole 2012–2017 period revealed that the results are similar to those presented earlier. The most successful were IT companies. About 84% of them were able to increase turnover and 80% climbed up with export. The worst performers were construction (including real estate) companies. Only 58% of them increased turnover and 27% were able to improve export. However, as it was mentioned before, we need take into consideration that construction is not export oriented business. Moreover, it was noted that majority of companies (70%) which increased turnover were also able to rise the number of personnel. This means that program participants were focused on performance improvement rather than on growth with the market.

Further, an analysis of selected factors (turnover, export and personnel) was performed using distribution by customer segment. The main goal is to determine which changes in the selected factors were typical for programme participants with specific features. There are four types of companies that have been analysed, i.e. local, international, growth and large companies.

Turnover analysis revealed that the most successful companies were focused on large potential growth. Almost 90% of such companies were able to increase turnover for at least 3 years out of five in 2012–2017. The international companies were the least likely to increase turnover. Only 58% of them climbed up with turnover from 3 to 5 years. Companies focused on the local market and also large companies achieved 76% and 66% respectively.

The best export results were demonstrated by large entities. About 60% of large programme participants increased export from 3 to 5 years over 2012–2017. No surprise that the worst performers with export were local companies. About 30% of such companies were unable to increase export at all.

The next aim was to make a comparison between the performance of programme participants and overall economy. In 2012–2017 turnover of Finnish companies increased only twice, i.e. in 2016 and 2017. At the same time programme participants increased their sales 3.3 years on average. Built Environment programme participants had 3.4 and Witty City 3.1 of successful years. Moreover, market was outperformed by 70% of programme participants which were included in the sample of this research. Therefore, it is evident that programme participants increased their turnover more often than overall sector. There were no significant differences by changes in personnel. En-

terprises in Finland were able to increase personnel twice during 2012–2017 period, i.e. in 2016 and 2017. The same result was achieved by programme participants. Only 44% of programme participants increased personnel more frequently than total industry. This could be related with the earlier mentioned fact that not all companies are focused on the staff enlargement. On the contrary, they were investing with a purpose to increase efficiency reducing the number of employees.

During 2012–2017, program participants outperformed the market each year and their turnover per employee average was about 28% higher than overall industry's. However, only 32% of program participants were able to beat industry average. This can be explained by the fact that some companies participating in the programme outperformed the market significantly comparing with other participants and we have large standard deviation of analysed ratio. This observation combined with the fact that programme participants were able to growth their turnover per employee faster than industry average over the 2012–2017 period indicates that the results can't be explained by selection biases to any significant degree, and that the observed programme economic impact is real.

Manufacturing and construction companies which participated in at least one programme during 2012–2017 increased they turnover and personnel more often comparing with all companies from these industries. However, programme participants from IT and PSTA sectors achieved lower results than their segment. IT and manufacturing companies participating in the programme were less efficient than the market as their turnover per employ-ee ratio was lower every year over 2012–2017 period. On the contrary, construction and PSTA companies from the sample were much more efficient than their competitors.

An analysis of two different funding periods revealed that 2012–2014 funded projects already had an impact on the company performance, whereas 2015–2017 funded projects have ended more recently and have had little impact on company performance. This clearly indicates that companies need time to fully commercialise the results of their projects before the results are visible in their performance. Hence, it is highly likely that the eventual overall economic impact will be bigger than is possible to confirm at the time of this evaluation, especially with respect to Witty City programme. As it was more oriented towards growth in international markets, it is therefore likely that the economic impact on exports will especially increase.

Previously, we found some evidence that participation in the programmes have made positive impact on companies' business development. Trying to find out more solid evidence and to identify factors affecting good performance of programme participants, a panel model was proposed. Superiority of random effect model means that specific features of selected companies have no correlation with independent variables. Different ratios are explained by different factors. Project size is the most important explanator of turnover per employee ratio, while remaining ratios are more affected by dummy representing the period of funding. Other factors were not statistically significant, and this could be explained by the fact that most of them make an impact on company's performance only over long-term period.

EXAMPLES OF SUCCESSFUL COMPANY PROJECTS

The purpose of these examples is to illustrate how the evaluated programmes were able to support programme participants in developing and later commercialising new products and services. The examples indicate how both funding and programme services were important in achieving eventual commercial goals. They also confirm the importance of collaboration, networking and end-user engagement.

Granlund
Less energy gives more

Granlund Oy is a company specializing in software services, consultancy and design and has customers in more than 30 countries.

The company participated in Drumbeat project and developed new ways to utilize open format building information models also in facility management. According to the company the project was one of the best development projects for Granlund. The company was able to build their first prototype in facility management software and after the project the company released a commercialised version called Virtual Property which supports management of maintenance processes. The solution enables an effective facility management by introducing building information models to property maintenance. The Virtual Property is based on the digital twin of the building, linking together building information models of the building and real-time measurements from the building, that way helping to utilize and manage the data related to the property. The facility management software is now offered in international markets.

The project had very successful coordination group, which consisted of building owners, construction companies and people from the client side. This made it possible to understand the needs of the different groups. The company would not have implemented the project without Tekes funding. For Granlund other important benefits of project were finding other company partners (e.g. SMEs such as Visualynk) and partnership with research units, as the Aalto University and VTT. Without funding partnership with research units would have been almost impossible. Also, programme services, especially, events (e.g. seminar 100 Lasissa) helped to learn about what other projects in the same area have achieved.
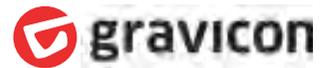
gravicon

Gravicon Oy provides information technology consultations and development in building industry and specializes in building information modeling consulting services and solutions. Company participated in Built environment programme and implemented a project Modelspace. In the scope of the project company developed construction project management software Modelspace. The outcome of the project, Modelspace cloud service, is today widely used and has been applied in major construction projects in Finland and beyond. The company is developing the concept further by adding new features and widening application.

Funding provided by the programme was the main motivation for participation in the programme and it helped to develop the new software. Without the funding the project would have been implemented on a smaller scale and it would take longer time to develop it. In project the company developed new construction management system and was able to identify several conceptual and design flaws by involving the construction sector companies that would eventually use the software. The project, programme events and Tekes network brought access to these companies and the company was able to minimize unnecessary development costs and ensure usability of the software. The project helped to test the new product with end-users thus ensuring better usability and meeting future clients' needs. Programme events helped to learn more about the latest sector developments, innovations and further explore market potential of the solution developed in the project.

Pilaster

Pilaster Oy is a Finnish company specialised in the provision of building systems, where building technology such as ventilation and heating are pivotal. The company has developed an advanced building technology system currently patented in 35 countries, which aims to internalise i) the sustainable building objectives set by the nation, states and municipalities (i.e. climate action, energy efficiency, reduction of emissions); ii) up-to-date building technologies; and iii) enhancing he efficiency and quality of modern property renovation. Pilaster is also involved in innovating new energy solutions for the future as well as collaborative sustainable development models.

The "Pilaster system", as the company's product is commonly being referred to, is already available on the market. At the same time, several tests and pilot projects are being conducted so as to further develop the system, build capacities to market the system, and fully establish it in a commercial environment. The participation in the Witty City programme primarily enabled Pilaster to access monetary means to set up and develop its system in its initial phases. Further development support is sought for, as demonstrated by Pilaster's repeated current participation in another of Business Finland's programmes.

The prime, if not exclusive benefit from participation and subsequent product development can therefore be traced back to monetary means (i.e. funding).

W H I T E P ( ) I N T ®

Whitepoint Digital Oy participated in the Witty city programme and was member of the VARPU consortium, which was led by Tampere University. The university also served as a coordinating and managerial institution by setting an agenda of the topics and areas to be studied and researched. This structure supported Whitepoint in developing its product / service, which cannot necessarily be materialised or concisely be pinpointed at, but rather be approached as a technological development. In its most simplified form, this development can be conceptualised as a creation of tools to improve ways of working with augmented reality and virtual reality, including production techniques. The fields of application of this technology are city planning, city development or tourism development.

By the time of this report Whitepoint already has parts or elements of the concerned technology in use, while further development is necessary and is being undertaken. The developed technology is more a proof of concept in an organically evolving field, which, in turn, translates into commercial value. Pilots have already been and will be launched in the fields of city planning, city development and tourism development.

The participation in the Witty city programme enabled Whitepoint to have access to greater monetary means as well as the knowledge within the VARPU consortium. Hence, the main benefits from participating in the Witty city programme arose indirectly through the consortium and the involvement in partnership it offered.

Source: Interviews with representatives of Granlund Oy, Whitepoint Digital Oy, Pilaster Oy and Gravicon Oy, and Granlund Oy's and Pilaster Oy's web pages (https://www.granlundgroup.com/asia/solutions/software/virtual-property/, http://pilaster.fi/).

5.4 ADDED VALUE OF PROGRAMME SERVICES

Participants of all three evaluated programmes could benefit from a variety of services. At first programmes operated as a combination of funding and various services offered to the beneficiaries. During implementation funding was detached from programmes and programme services became the main function of the programmes. Services included seminars and other events, for example, beneficiaries of Built Environment programme could participate in development workshop "Implementation and development planning of renovation projects" and final seminar "Renovations: service and industrial activities".

Programme participants could also benefit from Tekes and programme coordinator/activator services in the form of consultancy in project formation and implementation, access to networks, practical reporting issues and other. Publications and other communication material were available to beneficiaries of all programmes.

Internationalization support was also offered in forms various events and international visits. For example, the Witty City programme organized visits to Barcelona Smart City Expo World Congress and Amsterdam Smart City Conference. The programme also offered training on pitching and internationalisation and contests to promote innovation. Smart Procurement programme offered also more specific services as opportunity search and innovation challenges.

Services offered by the programmes mainly supported companies in early stages of behavioural change. Most services were about increasing awareness, collecting knowledge, learning and networking and to some extent experimentation. Further stages of behavioural change such as implementation and embedding were not fully addressed by the available services. Funding provided by the programmes made experimentation possible, but services did not further support these efforts.

Such services as Tekes advice and consultancy, services provided by programme coordinator and programme participants assessed as most valuable. Figure 11 summarizes the most valuable services across all three programmes.

What regards the Smart Procurement programme the survey of beneficiaries indicates that the most valuable services were advice from Tekes and programme coordinator and programme events. Most often the services helped to identify new partners, helped in project planning and supported with new procurement method. Tekes experts and programme coordinators/activators supported project planning, new partner identification

FIGURE 11. Most valuable services of the programmes. Source: Evaluation survey of programmes beneficiaries.

	WITTY CITY	BUILT ENVIRONMENT	SMART PROCUREMENT
Most valuable services	Advice from Tekes Advice from programme coordinator Networking events	Advice from Tekes Advice from programme coordinator	Advice from Tekes Advice from programme coordinator Programme events

and solving problems during implementation. Events and opportunity search supported new partner identification. International collaboration and procurement training supported learning about new procurement methods and practices. End-user engagement was featured in procurement training and international collaboration, whereas opportunity search supported learning about co-creation. Detailed survey results are presented in Appendix B.

Interviews with Smart Procurement programme participants indicate that events were valued, but not always because of the contents provided, but because of the possibility to gain access to networks. Some respondents indicated that some general information related services should be available also after the end of project (see text box below).

> *The interviewee stated that post-participation contact/ support could have been better. In particular, some sort of website or another medium in which all cases are featured would be desirable. This would enable the interviewee to compare her efforts to peers, get a bigger picture not only of the initiative but procurement processes in Finland in general, and learn from peers.*
>
> Smart Procurement programme participant

For Built Environment programme the survey indicates that the most valuable services were services from programme coordinator and Tekes advice and consul-

tancy. Most often the services helped with identification of new partners and project planning. Programme coordinator/activator helped most with project planning and solving problems during the project implementation. Tekes advice helped most with project planning and identification of new partners. Internationalization support and workshops were helpful in identifying new partners and new co-creation methods. Detailed results of survey questions related to the services are presented in Appendix B Figure 10.

Interview respondents highlighted that such services as Tekes assistance in forming consortiums and project planning were most appreciated. But answers to open ended questions of the survey and also interviews indicate that participants expected to have closer relationship with Tekes after the funding decision (see text box below for example).

> *If Tekes would have been interested in what was being done in the project, and contributed to the management of the project, it might have been useful. In my experience, Tekes was only interested in details of cost reporting.*
>
> Built Environment programme participant

Witty City survey demonstrates that the most valuable services were Tekes advice and consultancy and networking events closely followed by the services of programme coordinator/activator. Tekes advice and

programme coordinator services helped most in project planning and identification of new partners. Networking events were instrumental in identifying new partners and new end-user participation methods. The quality of the Witty City programme events was evident also in the feedback collected from event participants by the programme. They rated the events above 4 out of max 5 on average[17]. Identification of new co-creation methods was most facilitated by 6aika events, workshops, clinics and developer camps. Detailed results of survey questions related to the services are presented in Appendix B Figure 13.

Open ended questions of the survey indicate that several beneficiaries would expect more networking support in similar programmes in the future. As with Built Environment, also several Witty City participants indicated that Tekes support after the funding decision could have been better (see text box below).

Closer relationship after the funding decision and during the project and not only focusing to the project plan for the funding decision.

Witty City programme participant

Both survey and interviews indicate that among some participants the services or at least some of the services were not recognized. For example, 76% of Smart Pro-

curement programme survey respondents indicate that they didn't use such services as opportunity search or procurement training. Also interviews with beneficiaries indicate that some of them didn't even know about the existence of services or could not differentiate between the services provided by Tekes and project consortium members (see text box below).

As regards services used during the programme, most services were pretty much organised by the head of the consortium. The interviewee is not entirely sure to what degree the offered services actually had to do with Witty City and its services. For instance, the consortium held several seminars, however, they were really specifically targeted at the technology they were using. In addition, company was at no time during the programme in direct contact with any representatives of Tekes. Instead, most information from Tekes was indirectly received from other (bigger) consortium members, if at all. Once more, the interviewee stresses that the involvement in the consortium probably blurred the lines between what were Witty City's programmes and what was consortium-internal.

Witty City programme participant

Interviews demonstrate that according to beneficiaries, services could have been more actively promoted. Respondents indicated that sometimes they either

[17] https://www.businessfinland.fi/globalassets/vanha-old-tekes-global/ohjelmat-ja-palvelut/ohjelmat/fiksu-kaupunki/fiksu-kaupunki--ohjelman-loppuyhteenveto_huhtikuu-2018.pdf

didn't have the information about some services or it was received too late (for example, after the events). This might partly be explained by changes in character of the programmes and poor communication of these changes to the beneficiaries. As a result, many participants weren't aware of services. There was confusion on what was available besides the funding and this became even more important after the detaching of funding. Some respondents suggested to reconsider advertising of Business Finland events and introduce more direct and company/industry tailored approach.

5.5   OBSERVATIONS RELATED TO PROGRAMME IMPACT

There is clear evidence that the evaluated programmes had the intended incentive effect on programme participants. Majority of participants indicate that they would not have engaged in projects with the same level of attention to new methods and practices such as co-creation, end-user engagement and innovation procurement as they did with the support from the evaluated programmes.

Similarly, there are indications that the evaluated programmes have facilitated behavioural change among programme participants. Behavioural changes happen through processes which require awareness, knowledge, understanding, experimentation, implementation and eventually embedding new methods and practices into normal business and innovation activities. While the

original ambition might have extended to support behavioural change throughout the whole process, the focus in programme activities and services was clearly more in facilitating and supporting the earlier stages of behavioural change, i.e. awareness, knowledge acquisition and to some extent understanding and experimenting how new methods and practices can and should be implemented in the participants' own specific context.

Project funding allowed experimentation and with it, participants were able to gain further understanding of how new methods and practices should be implemented and to what extent it makes sense to embed them into business and innovation activities. As no significant ecosystem level projects were launched, this remained at the level of individual beneficiaries. However, programme services did support mutual learning, which at least facilitated peer support.

Impact on earlier stages of behavioural change indicates that the targeted beneficiary groups were not mature enough or ready to move into larger scale implementation and embedding new methods and practices in full scale into business and innovation activities. This was most evident in the case of Smart Procurement, but also in Witty City as far as cities are concerned. Despite attempts, only limited progress was made towards significant or even noteworthy ecosystem level projects during these programmes. While consortium projects launched in the Witty City programme may in future lead into serious ecosystem level initiatives, they were at the time traditional consortium projects focusing on earlier stages of behaviour change.

Lack of maturity might explain why programme services were designed to facilitate and support mainly awareness raising (activation, communications, events) and knowledge acquisition (events, international visits, trainings). However, as the selection of services provided in these programmes represented types of services very typical to earlier programmes, the real explanation might not be maturity, but a much simpler one: programmes were designed and implemented according to existing programme tradition.

Behavioural changes especially within and among large public sector organisations like cities are typically slow processes and often riddled with significant institutional barriers (traditions, existing practices, political motivations, etc.) compared to companies. Development of Tekes' programmes and programme services had been based mainly on experiences with incentivising, facilitating and supporting behavioural changes within and among innovative companies. This might also explain why programmes didn't provide services aimed at supporting later stages of behavioural change. In the case of individual beneficiaries, this was based on the idea that this should and would be at the beneficiary's own responsibility. While this may be a valid approach/assumption in the case of companies, it most likely is not in the case of public sector organisations who have much less developed innovation culture and capabilities.

Ecosystem development requires actors that are further along the steps of behavioural change in new methods, practices and processes highly relevant for the ecosystem. None of the programmes had any. Built Environment participants included some, but these were consultants and thus not the main business actors in the sector. Smart Procurement and Witty City programmes were targeting large public sector organisations such as cities with the potential to act as ecosystem leaders, but their maturity in view of new methods and practices was clearly not sufficient. This was also evidenced by the very positive experience of the programme coordinator from mentored strategy processes they implemented with some of the bigger cities in parallel but separate from the evaluated programmes. This gives a clear indication that while cities may have had some small experience from isolated innovation procurement projects, the full potential of innovation procurement, how it could benefit cities or how it could or should be integrated more widely as a tool to support city development was missing.

More hands-on strategy level support would have been needed from the very beginning in all evaluated programmes, but specifically in Smart Procurement and Witty City programmes. Experience from international benchmarks (see Chapter 6) clearly indicate the importance of coaching and mentoring support for larger consortia projects aimed at ecosystem level behavioural changes and socio-economic impacts. These should first focus on supporting understanding in parallel or preceding experimentative funded projects, and later the design, launch and implementation of joint ecosystem projects.

To the extent the programmes were able to facilitate behavioural change among the participants, programme services clearly played an important role. Services pro-

vided by Tekes staff and programme coordinator/activator advice was appreciated in project design, identification of new partners, and consortia building. Events and trainings were appreciated by programme participants, especially in view of finding new partners and learning about new methods and practices. Internationalisation services were assessed positively by Witty City programme participants.

However, programme services were not communicated effectively (see Chapter 5.5). Not all programme participants were aware of programme services. Also, participants were not always aware that the event, visit, training, etc. they participated was offered by the programme. This indicates to two possible issues that may need attention in the future. The first one is related to identity, role and activation/incentive effect of programmes as a policy instrument. This is discussed in Chapter 4. The other is related to programme communication and activation activities. Like programme other services, communication and activation should be designed to reflect the maturity/readiness of the target groups and resourced accordingly. Furthermore, communication/activation towards potential and existing programme participants may need different approaches. Anyway, it seems that communication/activation with regards to what the programme can offer in the form of services and funding needs to be enhanced. To avoid unnecessary flow of information and to be cost-effective, this needs to be based on key messages tailored and targeted to specific target groups and beneficiaries.

The evaluated programmes failed to reach ecosystem level objectives and impact in this respect remained negligible. The underlying reasons for this are discussed in more detail in Chapter 3. Despite the ambitious original programme ecosystem level objectives, the practical implementation, governance and mix of programme services, failure to capitalise synergies with parallel policy initiatives, as well as lack of policy initiatives that would have been needed for an effective and impactful ecosystem policy mix made reaching ecosystem level objectives unrealistic.

However, behavioural impact at the level of individual beneficiaries may in future support ecosystem level development as programme participants' maturity level has most likely increased because of the programmes and made then incrementally readier to engage in future ecosystem development activities. Hence, the impact of the evaluated programmes will eventually materialise in full scale in possible future ecosystem developments as the behavioural changes initiated and facilitated by the evaluated programmes progress further.

There are, indeed, clear indications of future impact related to both Smart Procurement and Witty City programmes. One example is the US Navy ONR collaboration initiated at the end of the Smart Procurement programme in 2016[18]. In 2019, a 5-year bilateral collab-

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[18]   https://tapahtumat.tekes.fi/event/usnavy

oration effort between Finland and USA will be launched focusing on Open Cognitive Computing Framework. Some of the 23 consortia projects launched in the Witty City programme have later continued as Growth Engine projects supported by Business Finland. These examples clearly indicate that even though the progress towards ecosystem level objectives during the programmes was limited, the both programmes acted as platforms which supported the identification, planning and initiation of collaborations which may later support ecosystem developments.

There are clear indications of economic-impact at the level of individual beneficiaries. Econometric analysis shows that companies participating in the Built Environment and Witty City programmes were able to grow faster than industry sector averages (see Chapter 5.4). While the economic impact varies across depending on industry sectors these companies are active on, they have been able to grow their turnover faster than other companies. The results of the econometric analysis are somewhat affected by the fact that many of the companies active in the construction sector and thereby participating in the Built Environment programme were more oriented towards the domestic market than international markets.

The less impressive export growth can also be explained by the fact that the international smart city markets are still at an emerging stage. New innovative smart city initiatives have been launched around the world, but more systemic innovations are still largely missing.

Thus, international smart city business (and innovation) ecosystems are also still emerging and yet to be fully developed. Hence, international markets still consist of mainly experimental and demonstration stage projects and implementations and/or partial smart systems developed for isolated purposes.

Therefore, the economic impact of activities such as internationalisation services offered and consortiums forged in the Witty City programme are likely to bear fruit much later as the smart city markets develop further globally. Similarly, and as indicated earlier, the economic impact of Smart Procurement programme will eventually materialise after public sectors fully realise and capture the potential of innovation procurement and start to employ it as a strategic tool to support the development of public services in more extensive scale. One important dimension of this is the platform economy development, which aims at developing business ecosystems based on opening public sector data.

In-depth interviews provide evidence that the observed economic impact has resulted at least partly from new products and services developed in projects implemented because of the programmes. These interviews further demonstrate that access to new markets and new contacts are among main benefits companies gained by participating in the programmes.

Econometric analyses of public interventions can't escape the issue of selection bias, i.e. to what extent are the observed economic impacts a result of merely selecting already better companies as participants. This

issue was examined by looking into turnover per employee over time. This analysis shows that programme participants were able to grow their turnover per employee faster than other companies. This indicates, that the programme had an impact clearly differentiable from mere selection bias.

In summary, there are clear evidence and indications that the evaluated programmes did have an impact in the targeted participant groups and that these impacts can be attributed to the programmes, programme services and funding. This would indicate that in that respect, the use of public funds for these three programmes can be justified. However, there are strong indications, that had the design, implementation and governance of the programmes been better aligned with the maturity of the target groups with respect to both new methods and practices, and ecosystem level objectives, the impact could potentially have been much more significant.

What is clear is that these programmes have had identifiable behavioural impact at the level of individual participants. How that can be translated to support ecosystem level objectives depends on future programmes and other policy interventions. Many of the eventual impacts will take time to materialise, depend highly on further policy interventions, and the extent in which the contributions of these programmes have achieved in promoting and facilitating behavioural changes will encourage further developments and eventually measurable economic impact.

It is also clear that the overall policy mix was not conducive for reaching ecosystem level objectives. Should programmes in future be aimed at facilitating and/or supporting ecosystem development, they should be complemented by appropriate other policy initiatives, thus ensuring a coherent policy mix addressing all necessary ecosystem development barriers.

6 INTERNATIONAL BENCHMARKS

This section briefly outlines the main observations and learning points from 4 benchmarks of similar programmes from Sweden and The Netherlands. Full benchmark studies are available in Appendix D. In the case of the Netherlands two programmes were analysed: City Deals programme and SBIR programme. In Sweden benchmark was based on Smart Built Environment programme and Smart Housing Smaland (SHS) programme.

The City Deals programme from the Netherlands is an example of i**nnovative way in organizing programme governance to provide maximum freedom to the participants**. The programme is a policy experiment of the Dutch Government, in which several departments of the central government, municipalities, businesses, civil society organisations or other societal actors jointly make agreements on specific policy initiatives. The programme has a loose governance framework, which has been coined "network governance" by the City Deals evaluation[19]. This type of governance has a non-hierarchical structure and is composed of actors across sectors. It places the working in networks as the main driver of activities. In practice, the City Deals generally got started by already existing informal groups that want to tackle a problem in the city, demonstrate a business case or identify concrete barriers (regulatory, financial, etc.) and solutions to their problems. The evaluation of City Deals[20] found that the City Deals' implementation design was considered to be valuable through the freedom it offers to the parties working together, and the possibility to personalise the ways to find a solution and tailor the work to the real needs (e.g. either of the citizens, businesses or public authorities, depending on case). Evaluation of the Witty City programme indicates that sometimes beneficiaries are unhappy with reporting requirements and express interest in better coordination of post-project activities. These issues could be addressed by considering a programme model applied by the City Deals programme, which provides greater freedom to involved parties.

The City Deals programme is a good example of **systemic stage-gate approach to projects aimed at co-creation, end-user engagement and adopting new**

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[19]   Ibid, PBL, December 2017
[20]   See PBL, 2017, Evaluatie City Deals – Notitie, May 2017

practices with feasibility/idea – testing/experimenting – scale-up stages. From the time they are announced as starting, the City Deals may last one to two years, and go through three phases:

- Idea phase: gathering the partners and developing the goals and objectives of the City Deal;
- Development: prototyping actions, defining the innovative measures and identifying obstacles to their execution;
- Scaling up: working on the removal of obstacles to the needed innovations and implementing the innovations.

The SBIR programme from the Netherlands was introduced as a pilot in 2004, following a recommendation from the Economic and Social Council of the Netherlands to take inspiration from the US SBIR programme. Through SBIR, the government launches competitions for companies to help solve a social problem. Once the companies develop the innovative solutions, the government may decide to also become a customer of the solutions. The programme has been running for more than 14 years. Also this programme is an example of how to use **different phases for developing the solutions**. Following the call for proposals, the candidates selected for the first round will undergo the following phases:

- A phase of testing the feasibility of the idea and developing a feasibility study (Phase 1). The contract may last six months, with a value usually between € 20k and € 50k (incl. VAT) per project. The results may be a feasibility report and demonstra-

tion. There may be 4–8 projects rewarded for feasibility studies per call.
- Applied research and development phase (Phase 2): based on the results of the first phase, the department in charge of the procurement may do a follow-up order to fund the development of a prototypes and demonstration project. This phase may last 2 years, with a contract between € 100k and € 500k (incl. VAT) per project. The result of this stage is a final working prototype and demonstration. In this phase, usually three to five projects are initiated by call.
- Commercialisation phase (Phase 3). Next, once the second phase is successful, the candidates are expected to find funding for the commercialisation of the product or service developed in the first or second phase of SBIR. Due to EU rules, the government does not guarantee that it will provide further funding or purchase the developed products or services. The entrepreneurs have no preferred position in any subsequent actual procurement.

The Smart Built Environment programme from Sweden provides an **example of how to incorporate the stakeholders in the programme process and give them freedom to steer its development in the sector**. Similar to the Built Environment, the Smart Built Environment programme in Sweden aims to make the building sector user-centric. Both programmes focus on Built Environment, however Smart Built Environment is rather targeting the challenges in the Built Environment by

using digitalisation, which can provide another perspective on the Built Environment. The Swedish programme also shares features with the Witty City programme regarding traffic and infrastructure and one of its focus areas is targeting methods for public procurement. The programme offers funding in two forms: open calls and strategic calls. During the programme's first three years, 35 projects + 18 strategic projects have been initiated through strategic research calls. The programme has offered services and activities like test beds and test beds portal, seminars, workshops, partner network, project leader conference and other conferences and communication tools.

The over 60 partners of the programme are given formal opportunities to influence the strategy and direction of the programme through the Annual General Meetings and in informal meetings in the partner networks. The **continuous dialogue with the programme board and its beneficiaries has made it possible to continually identify areas with improvement potential**. This has contributed to make the programme up-to-date and driven by the needs of the participating actors.

Smart Housing Småland (SHS) programme from Sweden is an example of testing a collaboration/co-creation programme at a smaller scale in one region and providing a thematically oriented mix of funding and services for the participants. SHS aim is to achieve a region with increased competitiveness and sustainable growth by creating good collaborations between academia and local businesses within the two forefront sectors of Småland - wood and glass and was therefore intended to develop measures, which, in extension, would help the glass and wood industry to shift into a more environmentally friendly state.

Implementation mechanism of the programme is based on seed funding and business development project funding and the meeting platform which provides **hands on innovation support** (initiating projects, concept development and project development support), **coaching for companies**, competence maintenance, monitoring support, internationalisation, learning activities, collaboration and networking opportunities, workshops, seminars, theme days, Hackathons, and theme groups.

Lessons learned from these programmes are summarized in the Figure 12.

FIGURE 12. Summary of lessons learned from international benchmarks.

BENCHMARKED PROGRAMME	LESSONS LEARNED
City Deals (NL)	Innovative way in organizing programme governance to provide maximum freedom to the participants.
	Systemic stage-gate approach to projects aimed at co-creation, end-user engagement and adopting new practices with feasibility/idea – testing/experimenting – scale-up stages.
SBIR (NL)	Use of several phases for the development of innovative solution: (1) testing the feasibility; (2) research and development phase; (3) commercialisation phase.
Smart Built Environment (SE)	Example of how to incorporate the stakeholders in the programme process and give them freedom to steer its development in the sector.
Smart Housing Smaland (SE)	Example of implementation mechanism which provides hands on innovation support (initiating projects, concept development and project development support) and coaching for companies.

7 RECOMMENDATIONS

7.1 PROGRAMMES AS AN INNOVATION POLICY INSTRUMENT

PROGRAMMES SHOULD BE IMPLEMENTED IN THE CONTEXT OF WIDER POLICY MIXES

Why policy interventions are needed are based on observations that innovation actors don't behave in ways or develop into directions which would be desirable or optimal for the society and economy. Hence, policy interventions are needed to initiate behavioural changes and change development directions. The fundamental reason why innovation actors don't behave or develop optimally from the society's and economy's point of view is because existing incentive structures encourage them to behave and orient otherwise. The underlying reasons might be related to lack of awareness of new opportunities, lack of knowledge, skills and understanding how to capture new opportunities, barriers posed by current regulations, standards and norms, inertia caused by existing business, organisational or social traditions, practices and institutions, etc. While innovation programmes such as the three evaluated ones with public funding and services may be the optimal instrument to address some of these underlying motivational factors, they are seldom enough to ensure that the incentive structures change sufficiently to encourage behavioural changes towards the desired direction. It is therefore vital that programmes are complemented with other policy initiatives addressing those motivational factors which can't be addressed with innovation programmes to ensure any significant impact.

It is therefore important that programmes should be designed and implemented as policy instruments in a wider policy mix, not as isolated initiatives. Otherwise there is a danger, that many of the more ambitious programme objectives remain unreachable.

The starting point for a policy mix is sufficient understanding of the underlying rationale and strategic objectives related to it. Why are policy interventions needed? What are the most appropriate forms of policy initiatives? How should the policy initiatives be designed and governed so that they can function as a coherent, synergetic, effective and efficient policy mix?

The overall rationale for policy initiatives can typically be well described and understandable. All three evaluated programmes had a clearly described rationale justified by demand and user-driven innovation policy, and clear link to Tekes and Business Finland strategies. However, the alignment with policy and strategy doesn't necessarily ensure appropriateness or justify the allocation of public resources compared to alternative allocation options. These two aspects – why was the programme the optimal form of policy intervention compared to possible alternative policy initiatives, and why resources allocated to the programme was more justified compared to alternative policy initiatives – should be better addressed and elaborated in the rationale of future programmes.

After reaching a strong rationale confirming that the identified policy interventions are indeed needed and the policy initiatives selected are the most optimal for changing the underlying incentive structures to the desired direction, the focus should be on designing the individual policy initiatives so that they can together be implemented as a coherent, synergetic, effective and efficient policy mix. This means that a programme design should clearly identify the other policy initiatives within the policy mix, understand what role they play in it, and what positive synergies there are and how they can be capitalised. This requires sufficient coordination across all relevant policy initiatives within the policy mix during design and implementation.

There can be cases, where complementary policy initiatives are already in place or are not needed. Launching programmes in these conditions can be done with less emphasis on coordination across the relevant policy mix. However, even in these cases it is important that the underlying incentive structures are known, and the role the programme should play within the policy mix and to what extent it's activities should be coordinated with other policy initiatives is understood, and this understanding is reflected in the design, instrumentation and implementation of the programme.

Understanding the underlying incentive structures and especially how different policy initiatives within the policy mix individually and in combinations change the motivations and thereby behaviour of innovation actors, and how these changes materialise over time from early indications to full maturity forms the basis for the programme (or policy mix) impact model. Impact model is an important tool that can be very effective in monitoring and evaluation as it will give early indications of whether the assumed impact mechanisms start to work as intended or not – thus allowing corrections to be made to the policy mix or programme instrumentation – and how fast and extensively behavioural changes proceed within the innovation actor target groups – thus allowing early indication of what potential impacts can be expected and when.

RECOMMENDATION 1: **PROGRAMME RATIONALE AND DESIGN SHOULD BE STRENGTHENED**

Based on the discussion above, the following should be featured better in the design of new programmes:

- Rationale. The rationale should clearly indicate why policy intervention is needed, which innovation actors and which of their motivational factors it aims to influence in order to encourage behavioural change and how, and especially why this programme is the optimal policy initiative compared to alternative policy initiatives.
- Role in the policy mix. The programme role within the wider policy mix should be clearly described and explained, especially with respect to how it needs to and interacts with other relevant policy initiatives, how sufficient coordination and positive synergies can be and are ensured. As different types of policy initiatives have different impact times and mechanisms, it is also important to understand and describe risks related to possible delays and impact mechanism failures, and how these risks may be managed.
- Impact mechanisms. A stronger and well elaborated rationale facilitates the development of impact mechanisms for the overall policy mix as well as for the programme. Impact mechanism should be described as well as how it is used to develop the appropriate data collection, monitoring and evaluation activities for the programme, and how they are integrated and support the governance of the overall policy mix.

The practical implementation of this recommendation can be done by introducing these elements into the Business Finland programme process. Decision to launch new programmes should be based on documentation, which covers the above-mentioned topics. When programmes are launched as integral components of a wider policy mix, Business Finland should ensure or encourage other responsible agencies or ministries to ensure that appropriate governance is established and functional at the level of the overall policy mix.

STRONGER POLICY GOVERNANCE IS NEEDED TO CAPITALISE ON BIG CHALLENGES AND OPPORTUNITIES

When the policy mix is motivated and aim to address important societal challenges or to capture significant new business opportunities, which require material behavioural changes among innovation and/or societal actors, the policy mix should be based on a targeted strategy and action plan. The strategy should be developed in collaboration between all relevant innovation and social actors, and an appropriate governance should be established for the implementation of the respective action plan.

The current practice in Finland is that national strategies are already designed in collaboration with relevant stakeholders. However, governance models are much too weak or non-existent to ensure proper coordination and governance of the action plan if one even exists.

RECOMMENDATION 2: **STRONGER GOVERNANCE SHOULD BE ESTABLISHED FOR POLICY MIXES AIMED AT CAPITALISING ON SOCIETAL CHALLENGES AND SIGNIFICANT INTERNATIONAL BUSINESS OPPORTUNITIES**

Ensuring material behavioural changes takes time and an adaptive mix of policy initiatives, which needs to evolve according to the needs of innovation and societal actors and barriers the mix needs to address. It is therefore important that appropriate governance processes are established at the policy mix level to ensure that the policy mix and policy initiatives are implemented in a coordinated and coherent manner, that positive synergies are captured, and that the policy mix and policy initiatives are continuously updated to ensure efficient and effective implementation.

In the case of societal challenges, the responsibility clearly lies with the responsible ministries. Business Finland should support and possibly consider offering itself as the policy coordinator mandated by the responsible ministry or ministries.

In the case of business ecosystems, the governance should be ensured by the Ministry of Economic Affairs and Employment, preferably using Business Finland as the operational policy coordinating agency. Ministry level steering is needed also, especially when the policy mix includes policy initiatives such as regulatory reforms.

In the case of public sector platforms (e.g. based on opening public data), facilitating the development of new businesses and business ecosystems, the policy mix level governance should be established by the responsible ministry or ministries. Later as the platform becomes mature and policy coordination is less or no longer needed, the governance should shift to business ecosystems policy governance model, i.e. ensured by the Ministry of Economic Affairs and Employment. Here again, Business Finland may be considered as the operational level policy coordinator, subject to approval by the responsible ministries.

One way of ensuring sufficient coordination of a policy mix is to establish and assign coordination and possibly also implementation to a dedicated organisation. To avoid unnecessary administrative burden as well as potential overlapping mandates and decision structures and problems caused by them, the dedicated organisation could act as a project organisation across relevant ministries and agencies involved in the implementation of the policy mix. This project organisation should have a clear mandate and related financial and human resources, full-time leadership, and sufficient decision structure, which allows it to govern the policy mix implementation. The latter would either require mandating the project organisation to make decisions over the ministries and agencies (which is not realistic), or rather as a more realistic option establish decision processes, which would ensure preparation and making of decisions fluently relying on existing internal decision structures of the relevant ministries and agencies. In both cases, strong support is needed from all relevant ministries and agencies for the project organisation.

PROGRAMME INSTRUMENT SHOULD BE REDESIGNED TO BETTER FIT WITH CURRENT AND FUTURE INNOVATION POLICY

Current programme instrument was designed in 1980s to foster industry-academia collaboration. The programme instrument has been developed over time from technology-oriented R&D towards industry driven R&D and innovation as well as societal challenges motivated innovation. Along this development, programme services have also extended from funding related advice, networking events and awareness raising activities to also cover more hands-on support such as internationalisation services, trainings, etc. However, the fundamental programme concept still reflects the original purpose of facilitating collaboration between innovation actors and providing support for individual projects and programme participants.

Current and future innovation policies emphasise demand and international market opportunity driven innovation and much wider engagement of societal actors in innovation activities. The current programme concept does not fully align with these policy emphases.

RECOMMENDATION 3: **PROGRAMME INSTRUMENT SHOULD BE REDESIGNED**

Drawing from this evaluation, anecdotal evidence from other Tekes and Business Finland programmes, and international experience, the redesign of Business Fin-

land programme instrument should aim at the following characteristics:

- Programme design should be done in close collaboration with key stakeholders and leading innovation actors relevant to the programme focus. The instrumentation should be based on in-depth analysis and understanding of the underlying incentive structures and behavioural change maturity of the targeted groups of innovation and societal actors.

- Eventually, the important thing is that targeted innovation actors understand the policy mix and what it can offer to them. Whether all support is offered under one programme brand or under several programme and initiative brands is not that important. What is important is to ensure that all relevant targeted innovation actors are sufficiently aware what support is available, understand how they may benefit from it, and how they can access it. Communication should therefore be based on target group relevant messages clearly linked to the targeted behavioural changes and covering the whole policy mix, i.e. policy initiatives target group may benefit from.

- Ecosystem programmes.
  These programmes should be based on international business opportunities and driven by companies. Ecosystem programmes should be launched only when sufficient number of key innovation (and societal, if relevant) actors have reached sufficient behavioural change maturity. Each selected ecosystem

should establish a long-term strategy and action plan in an interactive process led by leading companies. The strategy process should be facilitated by Business Finland by offering funding for employment of hands-on coaching/mentoring and consultancy support for the selected ecosystems. Business Finland should facilitate hands-on support throughout the implementation of the programme, preferably by offering funding for the selected ecosystems to employ external mentoring/coaching and consultancy.

One vital component for all ecosystems is a platform. Ecosystem programmes should secure that sufficient resources are allocated for the development of the ecosystem platform, which is a shared resource for the whole ecosystem and vital for the ecosystem development. Ecosystem programmes should not be launched without sufficient commitment and resources allocated to developing the shared platform.

Another feature of ecosystem programmes should be internal competition. While efforts aimed at developing the platform as an underlying shared resource, the development of competitive and complementary businesses utilising the platform should be facilitated.

Ecosystem programmes should be implemented as parts of well-designed and governed mix of policy initiatives based on a national level ecosystem strategy and action plan.

Ecosystems can seldom be created within just a few years, which is a typical duration of a traditional Tekes and Business Finland programme. Ecosystem programmes should therefore be longer than that and last 7–10 years. Periodical ecosystem programme reviews or evaluations should be conducted to ensure programme evolution along the development of the ecosystem. New innovation actors may enter the ecosystem over time, so care must be taken than the ecosystem programme doesn't become a "closed club", where existing ecosystem actors prevent entry of new actors.

To account for differences in behavioural change maturity at the beginning or before launching the programme, these programmes should be structured around a stage-gate approach. The 3-stage approach would be based on (1) feasibility, i.e. ensuring sufficient awareness, competence, understanding of ecosystem development requirements, especially related to the underlying platform, and readiness (behavioural change maturity), resulting in an overall strategy and action plan for experimentation, implementation and commercialisation; (2) experimentation, i.e. developing and testing the ecosystem platform and new innovative solutions aimed at it in large enough scale; and (3) commercialisation and international market launch, i.e. launching several parallel commercialisation projects aimed at further developing the platform and innovative solutions and implementing them internationally in different applications.

- Societal challenge programmes.
Societal challenge driven programmes should be led by societal actors such as cities, healthcare districts, counties, etc. i.e. the owners of the societal challenges. Programme long-term strategy should be based on long-term vision of the role of public sector and what public services will be needed and offered and how. This requires public sector actors to have such long-term visions and related strategies. Often the first step towards societal challenge driven programme is to ensure the existence of such strategies, or to launch processes where these strategies are established. As with ecosystem programmes, pre-condition for launching these types of programmes should be sufficient behavioural change maturity of at least some of the leading societal actors.

As behavioural change is typically more challenging and time consuming among societal actors compared to industry, ensuring hands-on coaching/mentoring and consultancy support is a vital part of programme instrumentation. In the case of societal actors, this can either be facilitated through funding provided for societal actors allowing them to employ external consultancy or through Business Finland (or relevant ministry) procuring external consultancy. As with ecosystem programmes, this support should be made available throughout the implementation of the programme.

Since behavioural change takes time, societal challenge motivated programmes should be designed to last a longer time. An appropriate timeline would in most cases probably be similar to ecosystem programmes, i.e. 7–10 years. This extends over the normal 4-year government cycle and thereby provides continuity over potential fluctuations in political priorities between governments.

Behavioural change takes time but is also strongly reliant on personal experience and specific socio-cultural and institutional context. That is why often good experiences and practices remain isolated and aren't adopted by others who could benefit from them. This emphasises that for societal challenge driven programmes it is particularly important to pay attention to wider knowledge transfer and adoption support.

Given the need to ensure sufficient maturity at the beginning or before launching the programme and ensure wider transfer and adoption of good practices and innovations, these programmes should be considered to be structured around a stage-gate approach. The 3-stage approach would be based on (1) feasibility, i.e. ensuring sufficient awareness, competence, understanding of the societal challenge and how it could be addressed and readiness (behavioural change maturity), resulting in an overall strategy and action plan for experimentation; (2) experimentation, i.e. developing and testing new in-

novative solutions in large enough real-life contexts; and (3) wider adoption, i.e. launching several additional parallel implementation projects aimed at adopting and further developing the innovative solutions in different contexts. To ensure stage 3 success, potential additional implementation projects should be identified and planning of them should be launched during stage 2, and key people planned to manage stage 3 projects should participate actively or at least closely monitor stage 2 projects to foster hands-on learning experience.

Societal challenge motivated programmes should seek to capitalise on the obvious synergies with various relevant public sector development initiatives as well as research funded by the Strategic Research Council. Business Finland programmes driven by societal challenges will most likely focus largely on innovation activities of companies and translating societal challenges into demand for innovations, the other public sector development activities allow societal actors to launch their own innovation activities, whereas research funded by the Strategic Research Council focuses on providing knowledge and better understanding of the underlying reasons behind the societal challenges, what the current incentive structures are, and which behavioural changes could be encouraged and how. Combination of these three can form the core of the policy mix complemented by regulatory as well as governance reforms.

- International business opportunity programmes
  These programmes should be driven by a strongly motivated industry. While behavioural changes are necessary among innovation actors, they take place mostly through strong enough internal motivation without external policy intervention. Activation is important function, but after companies are sufficiently motivated by the international business opportunity, it is often enough to facilitate behavioural change instead of hands-on support as in ecosystem and societal challenge programmes.

  These programmes should be targeted to specific international market opportunities relevant for specific companies. The programmes should typically last 3–5 years, depending on the characteristics of the international market opportunity. If the opportunity and the related international market is just emerging, the programmes can be designed for a longer period. If the market is more mature, programmes should last 2–3 years.

  If these programmes aim at more comprehensive solutions, they may also include some features of ecosystem programmes, such as shared resources and strategies.

  Recently launched Team Finland (or Business Finland) Growth Engine programmes would appear to have many of the features relevant for international business opportunity driven programmes. Current Market Access programmes fall close to these pro-

FIGURE 13. Overview of the types of recommended programme concepts.

KEY FEATURES OF THE PROGRAMMES	
Ecosystem programmes	• Based on international business opportunities and driven by companies that have reached behavioural change maturity • Support strategy development process and shared platform establishment • Part of wider policy mix • Structured around 3-stage approach (feasibility, experimentation and commercialisation) • Duration of 7–10 years
Societal challenge programmes	• Led by societal actors • Based on long-term vision/strategy of societal actors • Behavioural change maturity of involved societal actors • Hands-on support to societal actors (consulting, mentoring) • Part of wider policy mix (especially public sector development initiatives and Strategic Research Council) • Structured around 3-stage approach (feasibility, experimentation and wider adoption) • Duration of 7–10 years
International business opportunity programmes	• Driven by strongly motivated industry • Target specific international market opportunities • Duration of 3–5 years (shorter periods for companies aiming at mature markets)
Knowledge building programmes	• Support to increase industry awareness and ability to adopt new scientific and technological developments • Duration based on commercial maturity of the technology or knowledge

grammes, although with a more limited focus only on facilitating individual companies' access to specific international markets.

- Knowledge building programmes
  These programmes are closest to traditional Tekes programmes and feature awareness, knowledge creation, learning and R&D activities. They are specifically important to increase industry awareness and ability to adopt and capitalise new scientific and technological developments. Linkages to scientific research funded by the Academy of Finland and EU framework programmes are relevant for these programmes. Programme services can be built on existing ones. Programme duration should be designed according to the commercial maturity of the technology or knowledge. Besides science driven programmes, these could also include programmes related to new technologies entering commercial application, new standards and norms, etc. aimed at SMEs.

Programmes discussed above are summarized in the Figure 13. Issues related to programme instrumentation, governance and implementation at a more operational level at Business Finland are discussed in the following chapter.

7.2 PROGRAMME INSTRUMENTATION, GOVERNANCE AND IMPLEMENTATION

Programme instrumentation should be designed based on programme type, programme specific objectives, behavioural change maturity of the target group, and aligned and coherent with the overall policy mix. As indicated in the previous chapter, the important thing is that the target group is aware of the relevant support available for them regardless of which policy initiative or programme offers which value-added services and funding, and by whom these are offered. The important thing is to ensure that they know what is available and how they can access it.

Certain types of support are clearly in the mandate of Business Finland. These include internationalisation and innovation services and funding as well as various other related services. The following two recommendations related to instrumentation focus on services and funding relevant for Business Finland.

INSTRUMENTATION TO BETTER SUPPORT ECOSYSTEM DEVELOPMENT

As this evaluation and international experience indicate, ecosystem facilitation and support require new and much more hands-on services compared to traditional programme services.

RECOMMENDATION 4: **NEW ECOSYSTEM SERVICES AND FUNDING SHOULD BE DEVELOPED**

The international benchmarks presented in Chapter 6 clearly indicate that hands-on coaching/mentoring and consultancy play an important role in ecosystem programmes. Business Finland should therefore develop a service concept which could be included in all ecosystem programmes or programmes with important ecosystem development objectives.

Ecosystem and mission-oriented programme support services and funding could include:

- Mentored needs analysis and strategy support. This could be offered as a process with parallel actor specific support complemented by shared events for all actors to promote mutual learning. This service could be offered in ecosystem, societal challenge driven and international market opportunity driven programmes, or as a separate service preceding a programme during programme design.
- Mentoring/coaching and consultancy support for implementation. This could also be offered to individual programme projects or participants complemented by shared events to promote mutual learning and raise and discuss strategically relevant issues.

- Organised continuous dialogue with end-users. This can be partly based on events but should also explore virtual communities and social media -based solutions. In the feasibility stages, this dialogue should support in-depth identification of development barriers, and during experimentation extend to gathering experiences, feedback and ideas from end-users.
- Challenge competitions, hackathons and other competitions. These can be used to address specific challenges and opportunities identified during the programme and attracting new participants to the programme (activation). These can be targeted to organisations or individuals, of which the latter can also act as a way to attract new talents into the programme.
- Orchestration funding. Funding for the ecosystem or mission consortium for designing and implementing additional services.
- Platform funding. Funding to develop the ecosystem platform to ensure that it reaches large enough scale to allow and support ecosystem development. The most appropriate way to allocate this funding is to a jointly owned ecosystem entity organised in the form of a company. This allows funding both in the form of grants and loans, possibly also equity.

All these can be done at the national level, but they can also include an international dimension through bi- or multilateral collaborative arrangements with similar initiatives or programmes active in other countries.

SERVICE DESIGN BASED ON TARGET GROUP BEHAVIOURAL CHANGE MATURITY

Behavioural changes such as co-creation, end-user engagement, new partnering/networks, and adoption of new practices are often quite fundamental and require changes in organizational culture. This typically takes time and requires overcoming many attitude and mindset related obstacles. Understanding the incentive structures and how they may be influenced as well as time are the keys for successfully supporting change, and therefore basis for service design.

RECOMMENDATION 5: **SERVICE DESIGN SHOULD BE BASED ON TARGET GROUP BEHAVIOURAL CHANGE MATURITY AND ALIGNED WITH PROGRAMME AND POLICY MIX OBJECTIVES**

The following aspects should be taken into consideration when selecting and designing programme services:
- Programme services should support not only general level programme objectives, but a clearly defined programme implementation strategy.
- Programme service design should be based on a systematic and well-resourced market analysis, i.e. given the behavioural change(s) the programme aims to achieve, what services – alone and in combination – would be attractive enough, provide clear added value and best support the needed behavioural change(s) among potential service users.

- Service mix (including funding) should support beneficiaries and networks in their behavioural change over time. Individual services should be selected, offered and tailored accordingly for each beneficiary and network.

INTEGRATION OF FUNDING AND PROGRAMME SERVICES

The current model where funding is detached from programme services should be seriously reconsidered. Detachment clearly causes problems in dealing with less common beneficiaries and topics/activities.

Programme specific funding calls with dead-lines can have a significant activation effect among potential programme participants.

RECOMMENDATION 6: **FUNDING AND PROGRAMME SERVICES SHOULD BE BETTER INTEGRATED**

The following aspects should be taken into consideration when selecting and designing programme services:

- Programmes targeting new beneficiaries, new types of behavioural changes or new types of innovation or related activities should have a dedicated number of people specialised in assessing these types of applications. The same people should be actively supporting all programme activation efforts. The aim would be to ensure that activation (marketing) would be fully aligned with funding decisions.

- Business Finland should consider re-introducing programme specific funding calls with dead-lines to strengthen programme activation. This can be done purely through communication and programme management without formally changing the current practice of internally managing all funding through the same funding process.

STRONGER AND BETTER RESOURCED PROGRAMME GOVERNANCE

The evaluation provides clear indications that programme governance is not as systematic as is could be and insufficiently resourced. This is particularly evident in the ability to manage major changes during programme implementation.

RECOMMENDATION 7: **PROGRAMME GOVERNANCE SHOULD BE STRENGTHENED**

The following issues should be considered in this context:
- Programme governance model should be redesigned to better comply with current Business Finland strategy and with respect to each programme purpose, objectives and implementation challenges.
- The re-design of programmes because of strategic changes during implementation should be done as carefully as programme original design by revising all key aspects of the programme – rationale, strategy, offering and resources.

- Decision processes related to major programme changes should be examined, especially with regards to the roles of Business Finland board and programme steering committee.
- Special attention should be put on managing the ending of programmes, and especially ensuring that potential beneficiaries find the appropriate instruments to support their further efforts.
- The practice of changing programme manager midway into programme implementation should be re-examined. Programme manager needs time to build the relevant networks and trust required in effective and efficient management of a programme. Two years is typically not enough time to achieve this.
- More resources should be allocated to managing a programme, especially when it has ambitious ecosystem level objectives, or it is targeted to potential beneficiaries with less awareness of innovation or experience with Business Finland. A part-time programme manager with little or no support from an inactive programme team and Business Finland management can't manage a programme effectively and efficiently. External coordinator/activator may compensate this at the operational level, but not at strategic level.

BETTER MONITORING

Various problems observed during this evaluation clearly indicate that the data collection approach doesn't support programme monitoring and evaluation to the extent it should. Systematic data collection is limited to project funding. Data related to participation in and feedback from programme services is not systematically collected or managed. It is therefore impossible to use Business Finland current data to monitor the value or impact of programme services or any other Business Finland services.

RECOMMENDATION 8: **MONITORING SHOULD COVER BOTH FUNDING AND SERVICES**

The following should be considered in this context:
- Data collection should better capture the beneficiaries of all forms of support and all instruments – both funding and services.
- Evidence based and data driven programme management requires sufficient information to be collected from all supported activities.

One way of achieving this would be to develop a product database to complement current Business Finland project funding (Eval) and CRM (Asta) databases. Product database would allow:
- Links between clients, services and funding, i.e. to see and analyse e.g. how clients use funding and services over time, or which clients use which programme services. Connecting this with econometric data would allow further analysis of the potential impact of specific services and funding instruments.
- Developing and managing modular services, as well as more systematically documenting and managing product features and especially keeping up to date

when products are changed. Currently the information is distributed in various documents, some of which may be difficult to find.

- Services could be managed as programme services, but also as non-programme services, e.g. after a programme has ended.
- Recording individual persons to specific services would allow more up to date contact information as project database is updated typically during project application stage, and only occasionally during implementation.

7.3   EVALUATED PROGRAMMES IN VIEW OF THE RECOMMENDATIONS

The purpose of this section is to discuss how future programmes with similar thematic focus and objectives as the evaluated programmes should be designed in view of the recommendations. What services should they offer? What other policy initiatives should be included into the overall policy mix. What about thematic focus and potential target groups? etc.

SMART PROCUREMENT

Innovation procurement funding had been available at Tekes already years before the launch of the Smart Procurement programme. The programme strengthened activation and offered further services to enhance the awareness of the potential of innovation procurement to public sector organisations and encouraged them to engage in innovation procurement projects.

As it became obvious that no significant progress was made even with the introduction of the programme in terms of significant innovation procurements, the Smart Procurement programme was geared towards larger procurement consortia during the last two years. However, as this evaluation has clearly shown, the resources and time available were not sufficient to reach any real results.

Analysing the Smart Procurement programme against the recommendations presented in this report highlight clear problems related to insufficient policy mix, lack of understanding and appreciation of behavioural change maturity, lack of appropriate programme services, insufficient resources allocated to programme management, and insufficient programme duration.

In view of the recommendations, promoting, facilitating and supporting innovation procurement in the form a programme would require:

- Focus on specific societal challenges. This makes the identification of the most potential target groups and communication easier. It also makes it easier to combine ecosystem services such as challenge competitions and hackathons into the programme. Similarly, integration of the programme to other initiatives targeted to societal challenges and relevant ecosystems becomes easier.
- Analysis of behavioural change maturity in the identified and selected target groups. It is important to understand which organisations can act as exam-

ples encouraging others, and as leaders of larger procurement consortia. Duration of the programme should be designed according to behavioural change maturity. Depending on external events like major reforms and their eventual impact on public sector developments, and on the specific selected societal challenges, a programme should probably be designed to last for 5–7 years.

- Design and implementation of a functional policy mix. The main problem is that there is no real requirement for public sector to engage in innovation procurement. The objective to use 5% of procurement funds to innovation procurement written in the current Finnish government programme represents wishful thinking rather than any serious policy. No requirements, monitoring or other governance measures have been put in place to ensure that any progress is made towards this objective. Without a real commitment and top-down measures to push public sector to engage in innovation procurement, all support measures will remain largely ineffective. It is therefore important that the policy mix includes a real political commitment communicated through a strong enough requirement or a sufficiently strong incentive to public sector organisations which ensures that they are sufficiently motivated to use a share of their procurement funds for innovation procurement.

- Stronger support for innovation procurements. KEINO network is developing and offering support for innovation procurement as well as sustainable procurement. However, the support it offers remains mainly at the level of knowledge distribution, networking and mutual learning. Stronger support is needed, and possible options include e.g. establishing a dedicated organisation or unit that can either coach/mentor public sector organisations through innovation procurement projects or even implement them on behalf of the public sector organisations or developing and training a network of innovation procurement experts and providing funding for public sector organisations for using external consultancy to support their innovation procurement projects.

- Stronger hands-on support to establish innovation procurement consortia. Real progress in this direction requires hands-on support. This support should be targeted to (1) building procurement consortia, and (2) supporting larger innovation procurement project consortia from market dialogue and functional specifications to completion of procurements. The first one should include both individual and shared coaching/mentoring and consultancy support in parallel and ensure that the eventual consortium is well balanced, all members are aware of their needs and what benefits they can and are seeking from the consortium and innovation procurement. The second one would help orchestrate the consortium and ensure that the procurement process can be implemented successfully.

- Better resourced programme management and communication. Promoting the creation of larger innovation procurement consortia takes time and effort, which can't be managed by a single part-time pro-

gramme manager. Communication resources should focus mainly on illustrating the potential and benefits through successfully implemented innovation procurements.

- Ecosystem services tailored to specific challenges. Challenge competitions and hackathons as well as procurements of innovation (where contracts are awarded to several companies developing competing solutions to the same challenge or functional specifications) should be used to expand the impact of the programme, bring in new out-of-the-box thinking, support market dialogue, etc. The important thing to remember here is that the challenges or at least majority of them should be sufficiently systemic in nature, i.e. single isolated products and services would not be enough, but instead more systemic innovations would be needed to address the defined challenge.

Another alternative would be to integrate innovation procurement as one of the main instruments in relevant other programmes aimed at addressing societal challenges. Most of the features listed above are equally relevant regardless of whether innovation procurement is promoted in a separate programme or if it is promoted as an integrated instrument in several societal challenge motivated programmes.

WITTY CITY

Witty City is thematically closely related to societal challenges, such as climate change, environmental sustainability, health, safety, energy, etc. The thematic area of smart cities is therefore subject to societal challenge motivated programmes. The area also represents an emerging international market with high growth potential.

Therefore, programmatic activities aimed at promoting, facilitating and supporting smart city developments can be built either as societal challenge driven, or international market opportunity driven programmes, or combine or include features from both. The deciding factor should be the demand and maturity of the international market. If the demand already exists and new innovations are introduced frequently, international market opportunity driven programme type would seem more appropriate. However, if the international market is only emerging and the demand is still limited, large scale demonstrations and commercial references are important, thus indicating more towards societal challenge driven programmes.

The relevant features of programmatic initiatives in view of the recommendations would include:

- Programme focus only on consortium projects aimed at internationally marketable systemic innovations. Internationalisation support for individual companies doesn't require nor does it significantly benefit from a programme format compared to services organised in non-programme format.
- Focus primarily on niches such as smart energy grids, smart mobility, etc.
- Establish large scale experimental platforms in collaboration with leading cities. If these are intended

to support ecosystem development, promote the idea of establishing these as separate but jointly owned platform companies. In the smart city context, the platform refers to the "smart" that functions on top of and/or as an integrated feature of physical (built) city infrastructure, not the built physical infrastructure itself (buildings, roads, etc.).

- Programme design based on a systematic stage-gate approach. This approach is described under Recommendation 3 and international examples are described in Chapter 6 and Appendix D.
- Stronger hands-on support to establish and manage consortia. This support should be targeted to (1) building consortia, and (2) supporting larger consortia from preliminary market, technology, etc. analyses through end-user engagement and co-creation to experimentation and demonstration. The first one should include both individual and shared coaching/mentoring and consultancy support in parallel and ensure that the eventual consortium is well balanced, all members are aware of their needs and what benefits they can and are seeking from the consortium. The second one would help orchestrate the consortium and ensure successful implementation. Recently launched Growth Engines facilitate this through orchestration funding. International benchmarks described in Chapter 6 and Appendix D provide further inspiration how this could be managed.
- Establish and utilise international collaboration to reach international partners, access complementary experimental and demonstration platforms, and support internationalisation efforts. EU framework programmes offer one direction, but other bi- and multilateral collaborative arrangements should be actively developed as smart city initiatives are not limited to Europe, nor is it evident that Europe will be the leading market for smart city innovation globally.

BUILT ENVIRONMENT

To justify future innovation promotion in the area of Built Environment could potentially have much bigger impact if oriented more selectively to specific types of innovations and companies with high potential for international growth or integrating Built Environment as a supporting dimension into initiatives targeted to business ecosystems with much higher international growth potential and importance to Finnish economy or targeted to specific societal challenges.

In both cases – geared to international growth or integration into societal challenges – the discussion above dealing with the Witty City programme is relevant also here. Since supporting the internationalisation of individual companies doesn't require or much benefit from programmatic format, the focus of any targeted programme in this thematic area should be on capturing specific identified international market opportunities related to Built Environment. Alternatively, Built Environment could be integrated into smart city or other relevant societal challenge motivated programmes.

APPENDIX A. DETAILED DESCRIPTION OF EVALUATION METHODOLOGY

A1   RESOURCES USED IN DOCUMENT ANALYSIS

Document analysis of programmes documents provided by Business Finland was performed in the beginning of the evaluation. More than 700 document files related to all three programmes were provided by Business Finland. Document analysis looked at materials describing the respective sectors, materials produced during the implementation of the programmes, previous evaluations, previous interviews, company cases, statistics and other.

Documentation provided general insight in programmes rules, operation context and services. Documents on 6aika, KEINO and INKA were also included in the analysis. Few additional materials were collected from programmes managers and coordinators. Based on document analysis initial list of programmes services (including several events) was drafted and later coordinated with programme managers. Analysis of current Business Finland strategy and programmes documentation was performed to evaluate alignment of the two.

A2   SURVEY DESCRIPTION

Beneficiary companies for Witty City and Built Environment programmes and companies and public institutions from Smart Procurement programmes were identified from Business Finland data base. Web-based (SurveyMonkey platform) survey was designed for each programme. All surveys had similar questions, but question on programme services was designed according to respective programme. Survey invitation was sent to companies and organizations contact persons e-mail address. Survey invitation included explanation on the evaluation and invitation letter from Business Finland.

The survey invitation was sent on 14.11.2018. and the survey was open until 21.12.2018. Two reminders were sent to the beneficiaries and programme manager of Smart Procurement programme sent separate e-mail urging beneficiaries to take part in the survey. Despite these efforts, only 18 responses (Witty City 5, Smart Procurement 6, Built Environment 7) were received. The average time to complete the survey was 6 minutes which confirms that the survey does not take much

time. Received responses indicate that the respondents did understand the survey and were able to fill it successfully.

According to the feedback received from beneficiaries (mainly during the telephone interviews) low response rates can be explained by change of personnel, inability of beneficiaries to recall the details of participation, change of Tekes name, change of programmes nature and inability of beneficiaries to recognize the programmes and general survey fatigue. Several beneficiaries couldn't recall participation when referred to programme name, but indication of project name helped.

FIGURE A1. Details of survey response rates.

POPULATION DEFINITION	POPULATION	RESPONSES	RESPONSE RATE
Smart Procurement			
Companies and public institutions (except research organizations) that participated in the programme and contact details (valid e-mail address) are available	37	14	37%
Built Environment			
Companies that participated in the programme and contact details (valid e-mail address) are available	103	26	25%
Witty City			
Companies that participated in the programme and contact details (valid e-mail address) are available	119	23	19,3%

This indicates some problems with recognition of the programmes.

To address the low response rate, telephone interviews were performed with a sample of 20% of participants for each programme. Telephone interviews were performed in the period from 07.01.2019. – 22.02.2019. The same questionnaire was used as for the invited survey. Therefore, the survey results are based on responses collected both via e-mail invitation and via phone interviewing. Details of survey response rates for each programme are illustrated in Figure A1.

A3   INTERVIEW PROCESS AND TEMPLATES

To gain more detailed insight in relevance of the programmes to the beneficiaries, added value of the programmes, impacts and results, behavioural changes of beneficiaries and synergies between the programmes, interviews with beneficiaries were performed. Compared to the survey, interviews tried to explore the wider context of the programmes. Questions on legal barriers, missing competences, participation in EU programmes and other relevant developments were explored.

Interviews with Business Finland stakeholders were also performed. The aims of these was to gain better understanding of the aims of the programmes, expected results, implementation particularities, following programmes and how lessons from programmes for this

evaluation have been taken into account in the design of new programmes.

Interviews were held with beneficiaries suggested by programme managers or coordinators or with the companies that have benefited from more than one programme. Overall 19 beneficiaries were approached.

The total number of beneficiary interviews was 10 (3 for Witty City and Built Environment and 4 for Smart Procurement). 4 interviews with programme managers and coordinators have been performed.

Beneficiary interview topics and questions are provided below.

BEHAVIOURAL IMPACT

Motivation/reasons for participation?

- Why did you participate in the programme(s)? What did you expect from the programme(s)?

What changed because of the programme(s)?

- What changes did you make to your plans because of the programme(s)?
  Was a new project initiated because of the programme(s)?
  Was an already existing project redesigned, how?
- Were plans changed during implementation because of programme services? How?

Value of programme services

Use and added value of programme and related services?
- Which programme services did you use?
- How did the programme services help you?
- Did you participate in any other initiatives at the same time? How useful were these?

Missing services?
- Did you experience particular challenges with your project? What kinds of challenges?
- How did you address these challenges?
- Could or should there have been additional programme activities/services that would have helped you to address these challenges? Were some programme services missing or of poor quality? What services would you suggest for future programmes?

▶▶

> **Impact**
>
> **Outcome and next steps?**
> - What did you develop during the programme(s)? A new or improved product/service/process?
> - Something else, what?
> - Is what you developed already commercialised and/or taken into use? If not, when will it be
> - commercialised / taken into use? If yes, what is its role/share of your business?
> - Did you seek further funding or support for your commercialisation/utilisation efforts? What?
> - To what extent are your original economic projections/calculations still valid?
>
> **Programme benefits**
> - What benefits did you get from participating in the programme(s) or in other related activities?
> - Were the benefits as expected or different?
>
> - Other benefits
> - Are there others (e.g. collaboration/business partners, clients, societies, environment, etc.) who may
> - benefit from your participation in the programme(s) either directly or indirectly? How?

A4   DETAILED DESCRIPTION OF THE ECONOMETRIC ANALYSIS METHODOLOGY

Analysis covers 120 companies involved in at least one of the programmes, i.e. Witty City or Built Environment. Sample consists of 55 companies that were participants of Witty City programme and 65 Built Environment participants. 7 companies from the selected sample participated in both programs. However, due to the low sample size of these companies, this segment is not analyzed separately.

First an absolute and relative performance of companies participating in Witty City and Built Environment programmes were assessed. Three different factors have been chosen to measure the success of the activity, i.e. annual turnover, exports and number of employees. Taking into consideration that the growth of these three factors usually means development of the company such trend in case of its identification is treated as positive result of company's performance. First of all, changes in these factors are assessed in terms of three aspects, i.e. programs in which all companies have been involved, the activities they are implementing, and the segment

of customers to which they belong. Later, a comparison with overall sector growth numbers is made. Finally, it was determined whether there are differences between funding in period 2012–2014 and 2015–2017. All above mentioned factors are analysed using descriptive statistic methods.

In the second part of the analysis the panel regression model was constructed with a purpose to find out factors affecting good performance of participants. The choice of the panel model was based on the available data structure. These models allow combining cross-sectional and time series data and help to increase the number of degrees of freedom, and also the power of the test, by employing information on the dynamic behaviour of a large number of entities at the same time. It can also help to mitigate problems of multicollinearity that may arise if time series are modelled individually. In addition, by structuring the model in an appropriate way, the impact of certain forms of omitted variable bias in regression results can be removed.

For this analysis three potential dependent variables were available, i.e. turnover, export and personnel. However, all these variables are endogenous and cannot be drawn directly into the model. Export can be the part of turnover, while the number of employees can increase turnover also. Though, the company will not hire more personnel if demand (export or turnover) is not growing. Due to this reason, all above mentioned variables were converted into relative indicators or ratios. For example, company's performance is well represented calculating the following ratios:

$$\frac{Turnover}{Number\,of\,employees} = y_1$$

$$\frac{Export}{Number\,of\,employees} = y_2 \qquad (1)$$

$$\frac{Export}{Turnover} = y_3$$

These ratios are used as dependent variables in panel regressions.

Conversion into ratios allows avoiding problems related with different size of companies. For example, large companies have much lower probability to achieve high growth rates comparing with start-up companies. Therefore, these kinds of ratios are more representative and informative.

Independent variables are factors, which might have an impact on company's good performance. The first variable is dummy fixing the year when all financial payments from the support programme were completed and which cover all the periods after these payments. The second important variable represents the share of business impact attributable to the project. Moreover, some type of risks, which might affect performance results, i.e. resource risk, financial risk, technology risk and market risk were included. Remaining variables are novelty of the project, region units, subcontracting amount from SMEs, research organizations, $\left(S_i^{RES}\right)$, international col-

laboration, company's age, customer segment and business industry in which company operates.

In panel modeling, three types of regressions can be created, i.e. pooled regression model, fixed effect (or LSDV) model and random effect model. The major problem with pooled regression model is that it does not distinguish between the various companies. Combining 109 companies by pooling the heterogeneity or individuality that may exist among these companies would be denied. Therefore, taking into consideration that companies are heterogeneous and each of them has individual features, pooled regression model was rejected as inappropriate.

The fixed effect model allows for heterogeneity among programme participants by allowing having its own intercept value. First of all, a simple regression model (2) has to be considered, and the disturbance term was decomposed, u_{it}, into an individual specific effect, μ_i, and the reminder disturbance, v_{it}, that varies over time and entities (capturing everything that is left unexplained about Y_{it}).

$$Y_{it} = \alpha + \beta \chi_{it} + u_{it} \tag{2}$$

Therefore, the equation (2) was rewritten to obtain:

$$Y_{it} = \alpha + \beta \chi_{it} + v_{it} + \mu_i \tag{3}$$

We can see μ_i as encapsulating all of the variables that affect Y_{it} cross-sectionally but do not vary over time. For example, the sector that a company operates in, a person's gender and etc. This model could be estimated using dummy variables, which would be termed the least squares dummy variable (LSDV) approach (4).

$$y_{it} = \beta \chi_{it} + \mu_1 D_1 + \mu_2 D_2 + \ldots + \mu_N DN_1 + v_{it} \tag{4}$$

The term fixed effect is due to the fact that the intercept may differ across companies (4). However, the intercept does not vary over time, i.e. it is time invariant. Variability of both intercepts and slopes over individuals and time requires even more variables. Unfortunately, a lot of dummy variables make degree of freedom lower and increases risk of multicollinearity. On that case, random effects model (5) can be used as an alternative.

$$Y_{it} = \beta_{1i} + \beta_2 X_{2it} + \beta_3 X_{3it} + u_{it} \tag{5}$$

The intercepts/effects β_{1i} are assumed to be random variables with mean value $E(\beta_{1i}) = \beta_{1i}$ and the intercept value for individual i can be expressed as

$$\beta_{1i} = \beta_1 + \varepsilon_i \tag{6}$$

where $E(\varepsilon_i) = 0$ and $Var(\beta_{1i}) = \sigma_\varepsilon^2$

On that case we make an assumption that companies have a common mean value for the intercept.

In analysis both, i.e. fixed and random effect models are used. Trying to decide which of these two models is more suitable to analysis, the Hausman test was performed. Null hypothesis rejection means that fixed effect model is more appropriate than random effect model and vice versa.

In the beginning models with all available variables were constructed and insignificant variables eliminated step-by-step until the model with all statistically significant variables was found.

In the panel model construction, the sample size was reduced from 120 to 109 companies as not all previously selected entities had necessary data.

APPENDIX B. SURVEY RESULTS

The following sections present summary of survey results for each evaluated programme.

B1 SMART PROCUREMENT SURVEY RESULTS

FIGURE B1. Reasons for participating in programme.

Why did you participate in the programme?
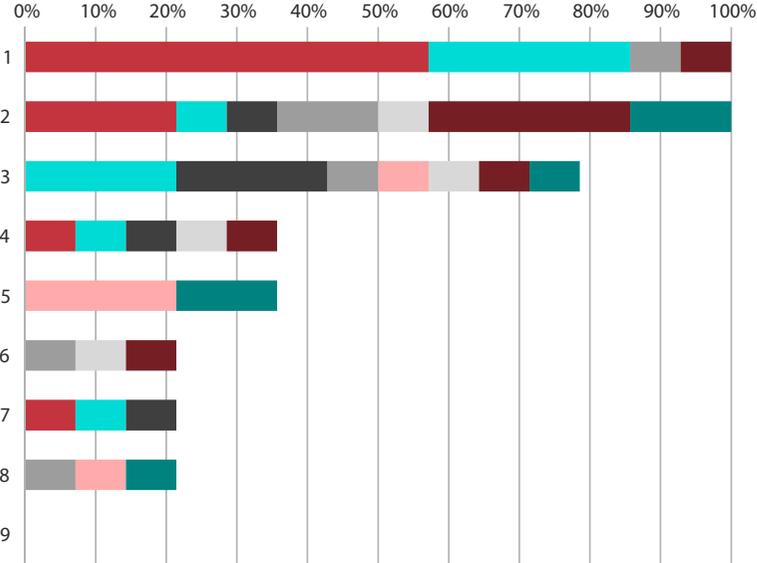
	9	8	7	6	5	4	3	2	1
■ Funding	0%	0%	7%	0%	0%	7%	0%	21%	57%
■ Knowledge of what others in this area were doing	0%	0%	7%	0%	0%	7%	21%	7%	29%
■ Identify potential new partners	0%	0%	7%	0%	0%	7%	21%	7%	0%
■ Learn about or experiment with collaboration with public sector	0%	7%	0%	7%	0%	0%	7%	14%	7%
■ Learn about or experiment with co-creation methods and practices	0%	7%	0%	0%	21%	0%	7%	0%	0%
■ Learn about or experiment with end-user involvment	0%	0%	0%	7%	0%	7%	7%	7%	0%
■ Learn about or experiment with new procurement methods and practices	0%	0%	0%	7%	0%	7%	7%	29%	7%
■ Learn about other new practices, methods, etc.	0%	7%	0%	0%	14%	0%	7%	14%	0%

FIGURE B2. Change of project plan because of programme.

Did you change your project plan because of the funding or programme requirements?
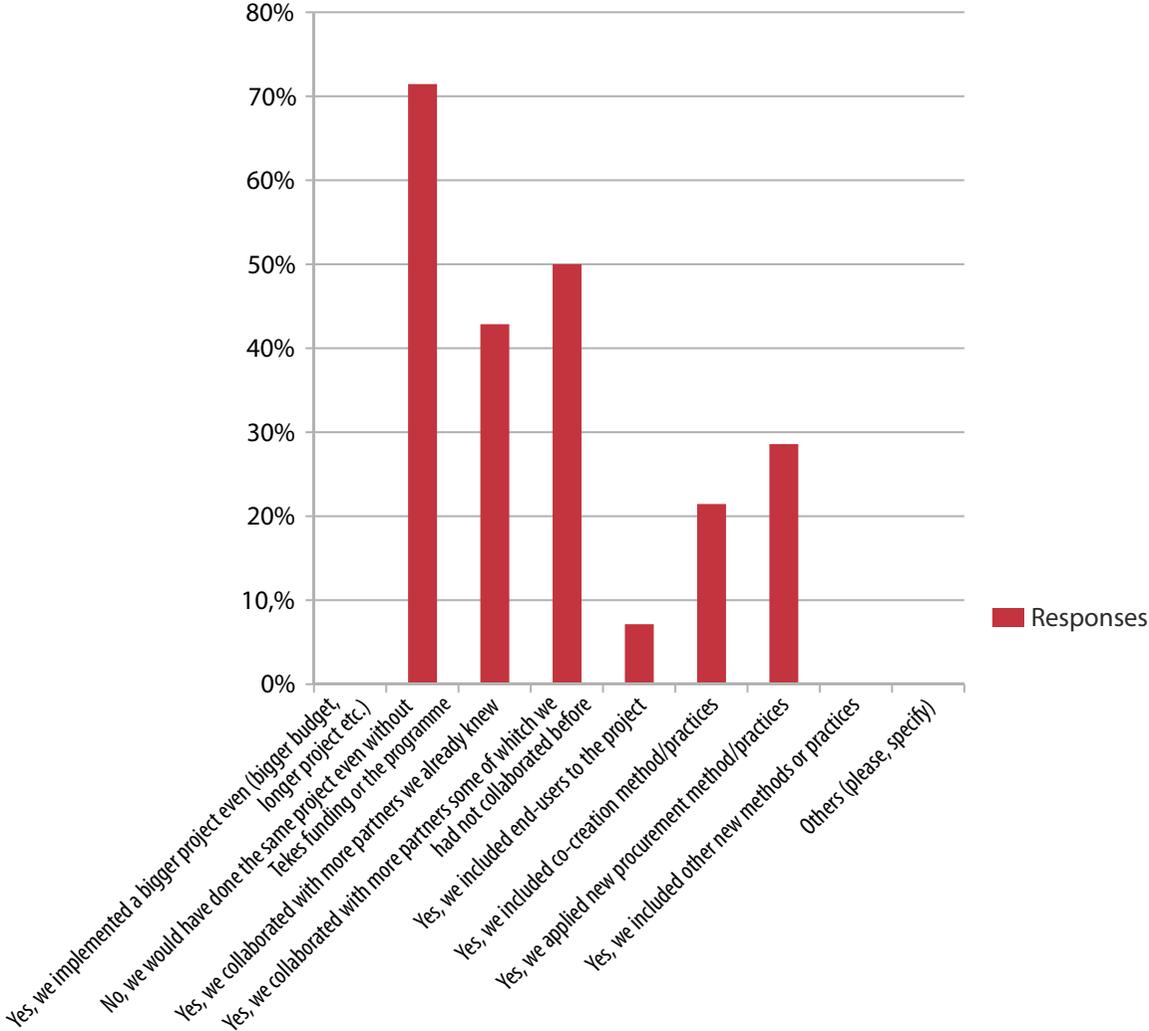
FIGURE B3. Value of programme services.

*You indicated that you found value in the programme services.
What was that value?*

Legend:
- Identified potential new partners
- Identified/learned new co-creation methods or practices
- Identified/learned new end-user participation methods or practices
- Identified/learned other new methods or practices
- Helped in project planning
- Helped solve problems during the project
- Supported us with a new procurement method/practice
- Other

B2 BUILT ENVIRONMENT SURVEY RESULTS

FIGURE B4. Reasons for participating in programme.

Why did you participate in the programme?
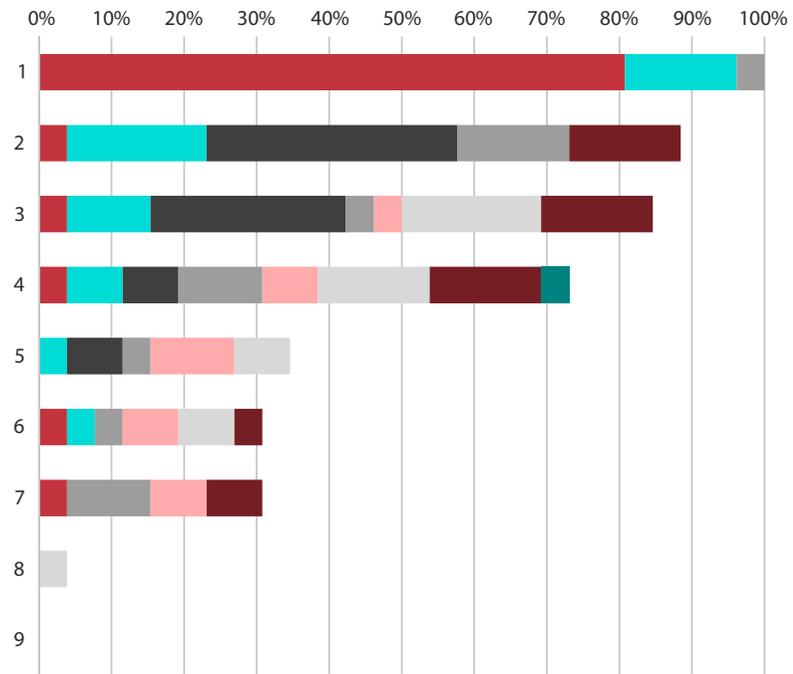
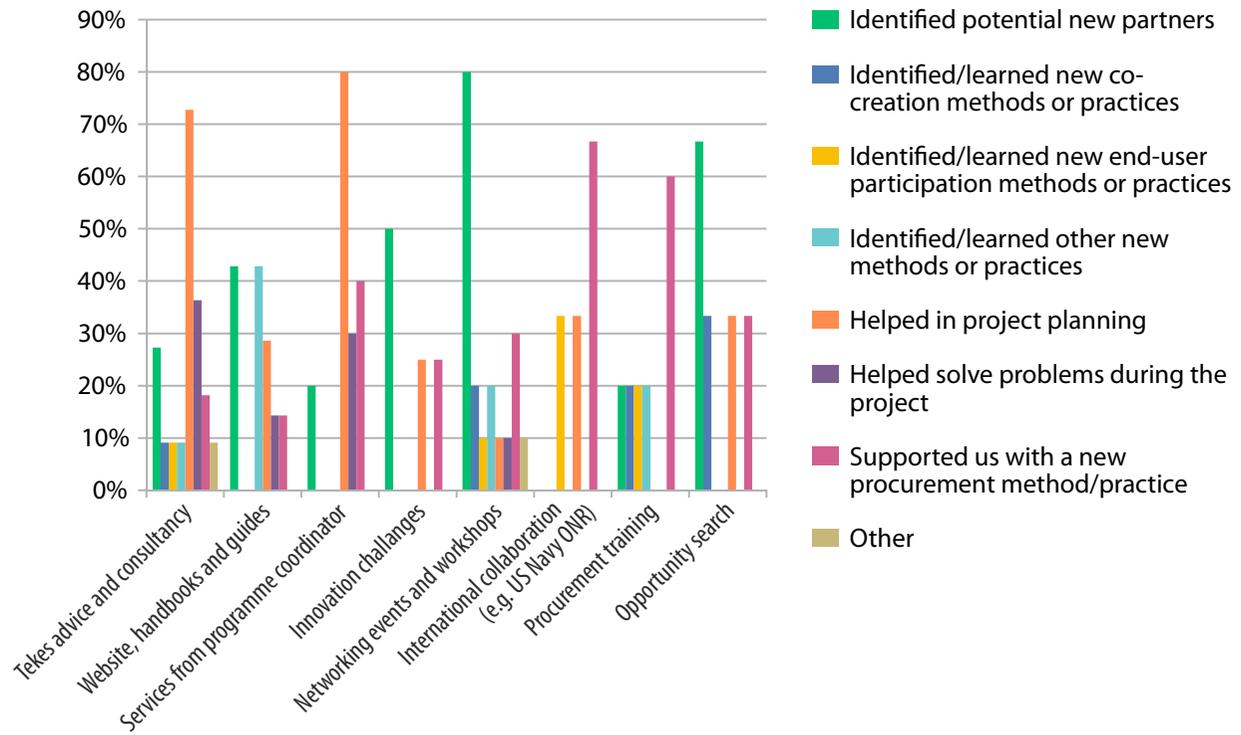|	9	8	7	6	5	4	3	2	1
Funding	0%	0%	4%	4%	0%	4%	4%	4%	81%
Knowledge of what others in this area were doing	0%	0%	0%	4%	4%	8%	12%	19%	15%
Identify potential new partners	0%	0%	0%	0%	8%	8%	27%	35%	0%
Learn about or experiment with collaboration with public sector	0%	0%	12%	4%	4%	12%	4%	15%	4%
Learn about or experiment with co-creation methods and practices	0%	0%	8%	8%	12%	8%	4%	0%	0%
Learn about or experiment with end-user involvment	0%	4%	0%	8%	8%	15%	19%	0%	0%
Learn about other new practices, methods, etc.	0%	0%	8%	4%	0%	15%	15%	15%	0%
Other	0%	0%	0%	0%	0%	4%	0%	0%	0%

FIGURE B5. Change of project plan because of programme.

Did you change your project plan because of the funding or programme requirements?
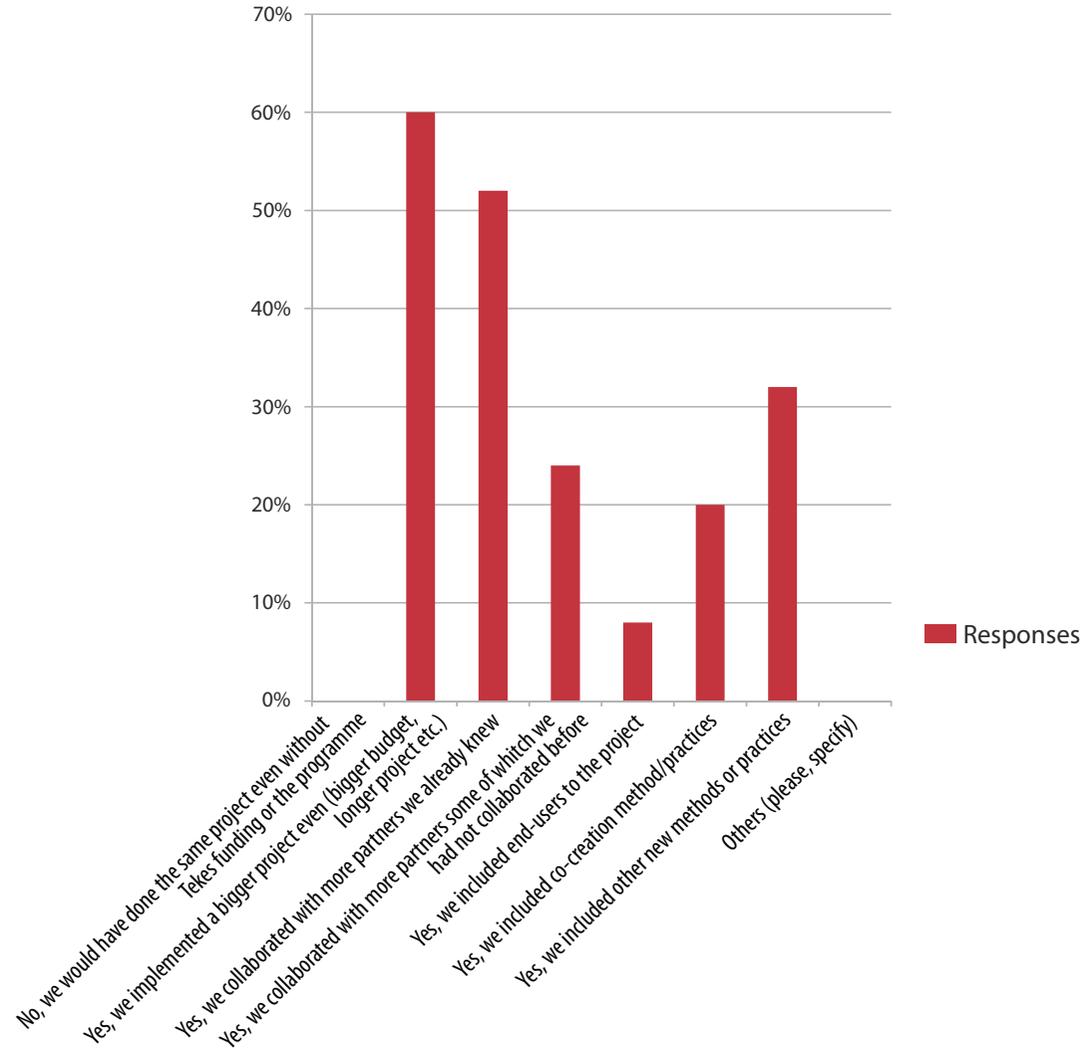
FIGURE B6. Value of programme services.

*You indicated that you found value in the programme services.
What was that value?*

Legend:
- Identified potential new partners
- Identified/learned new co-creation methods or practices
- Identified/learned new end-user participation methods or practices
- Identified/learned other new methods or practices
- Helped in project planning
- Helped solve problems during the project
- Other

B3 WITTY CITY
SURVEY RESULTS

FIGURE B7. Reasons for participating in programme.

Why did you participate in the programme?
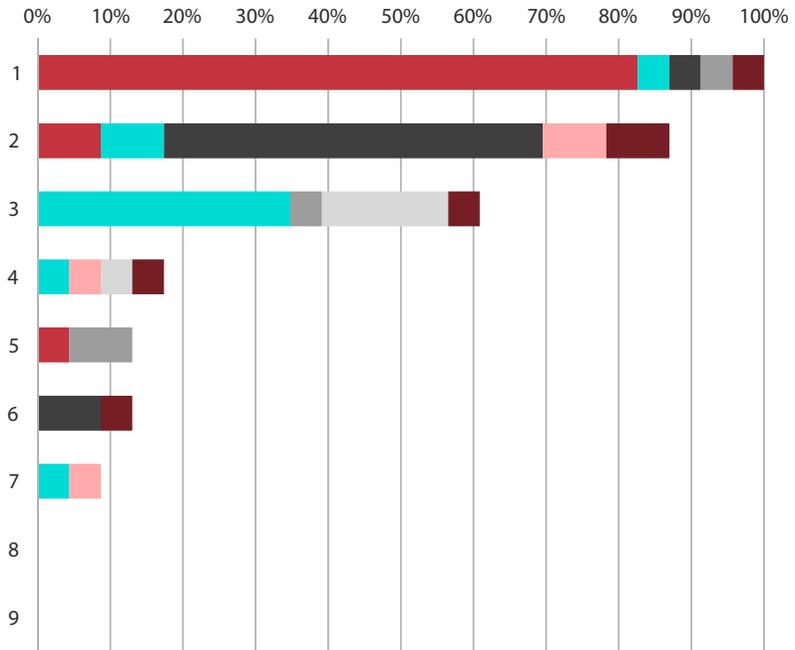
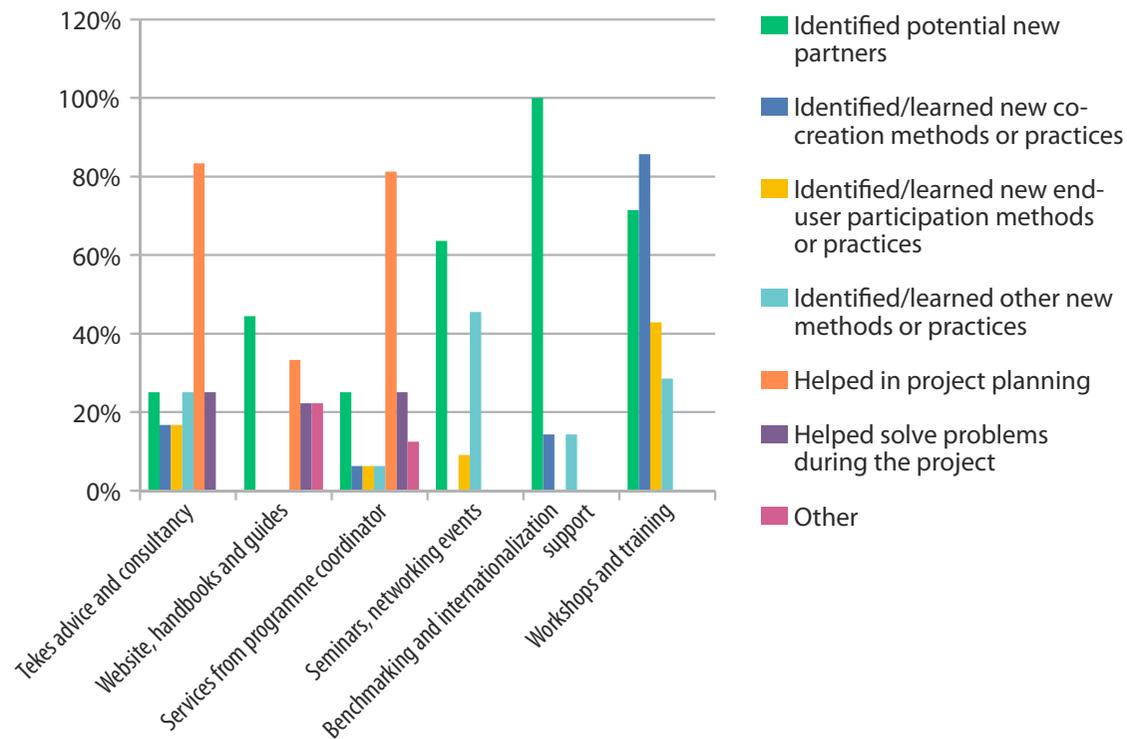|	9	8	7	6	5	4	3	2	1
Funding	0%	0%	0%	0%	4%	0%	0%	9%	83%
Knowledge of what others in this area were doing	0%	0%	4%	0%	0%	4%	35%	9%	4%
Identify potential new partners	0%	0%	0%	9%	0%	0%	0%	52%	4%
Learn about or experiment with collaboration with public sector	0%	0%	0%	0%	9%	0%	4%	0%	4%
Learn about or experiment with co-creation methods and practices	0%	0%	4%	0%	0%	4%	0%	9%	0%
Learn about or experiment with end-user involvment	0%	0%	0%	0%	0%	4%	17%	0%	0%
Learn about other new practices, methods, etc.	0%	0%	0%	4%	0%	4%	4%	9%	4%

FIGURE B8. Change of project plan because of programme.

Did you change your project plan because of the funding or programme requirements?
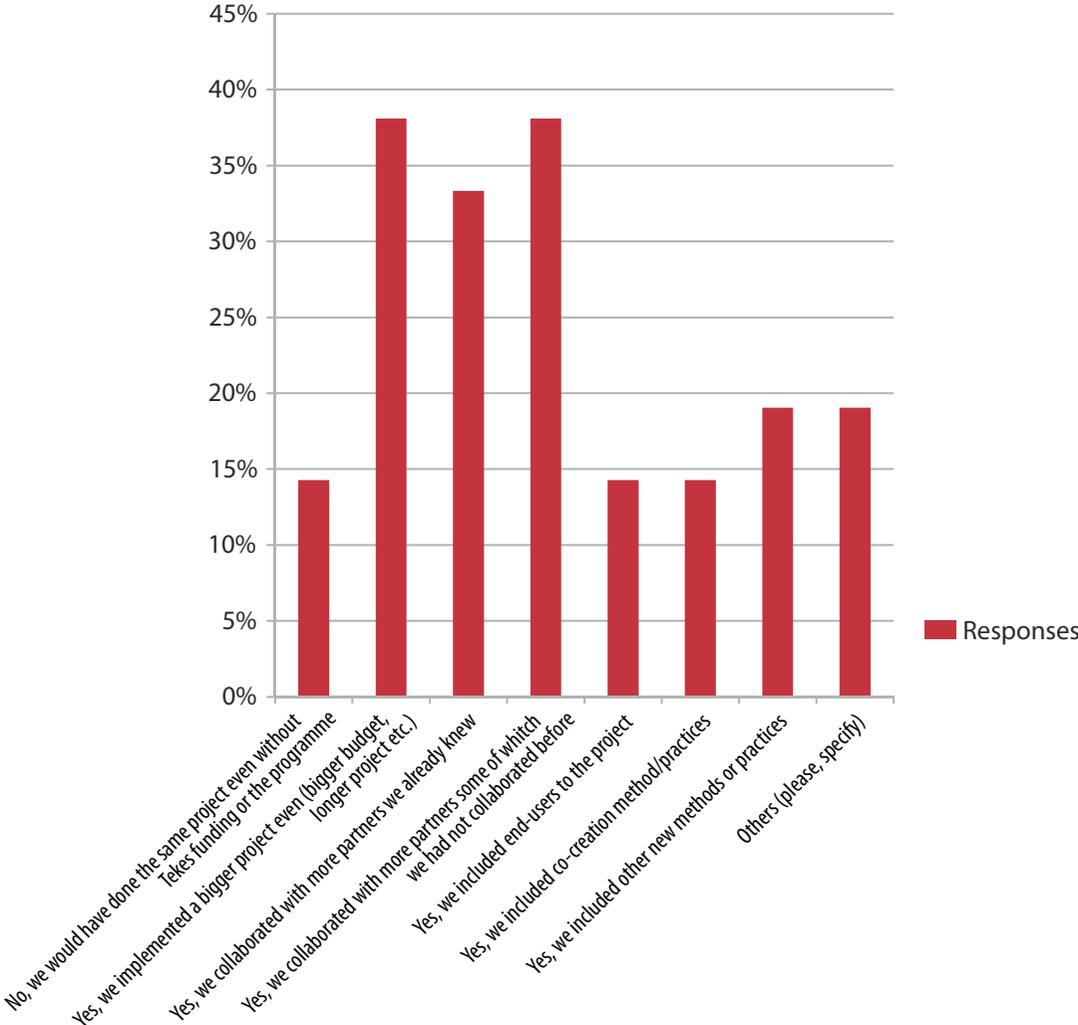
FIGURE B9. Value of programme services.

You indicated that you found value in the programme services.
What was that value?

APPENDIX C. APPENDIX C RESULTS OF ECONOMETRIC ANALYSIS

C1 ABSOLUTE PERFORMANCE ANALYSIS

In this section an absolute and relative performance of companies involved in Witty City and Built Environment programmes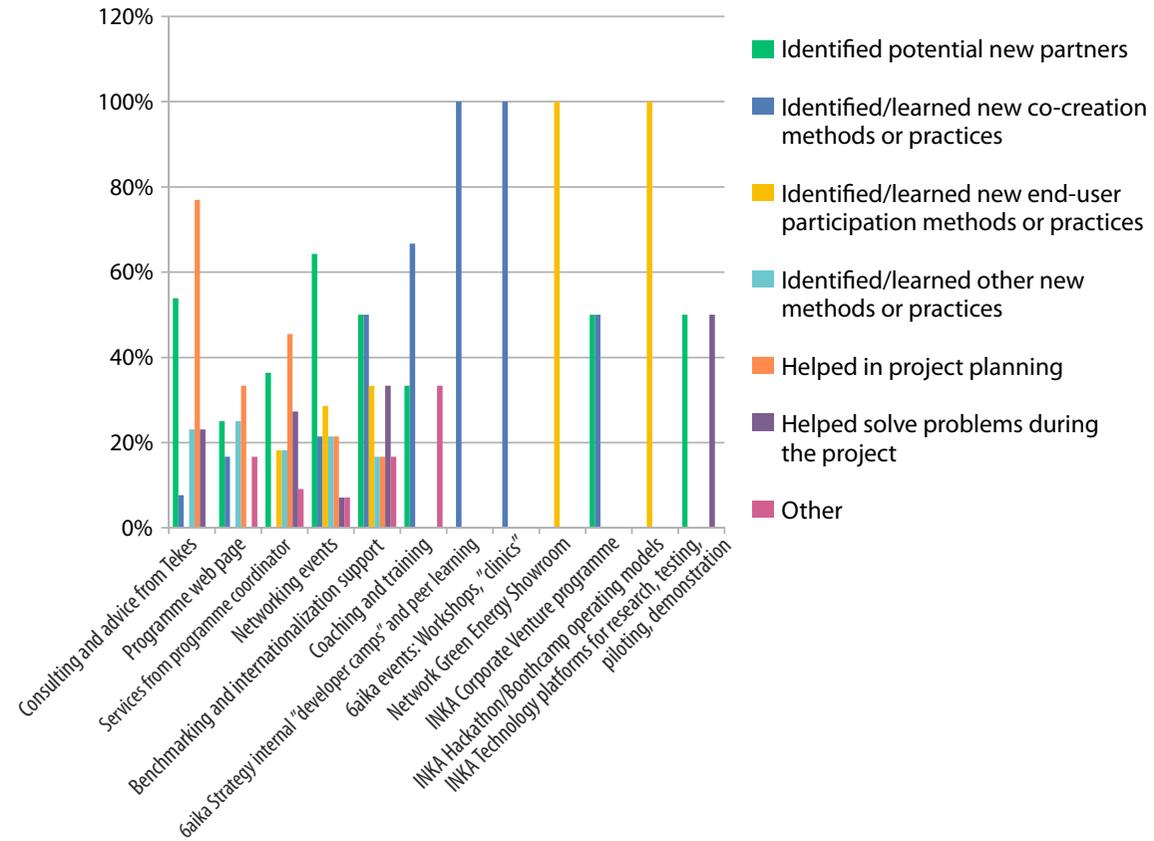 will be assessed. Three different factors have been chosen to measure the success of the activity, i.e. annual turnover, exports and number of employees. Taking into consideration that the growth of these three factors usually means development of the company such trend in case of its identification will be treated as positive result of company's performance.

In the beginning, changes in these factors will be assessed in terms of three aspects, i.e. programme in which all companies have been involved, the activities they are implementing, and the segment of customers that are targeted. Later, a comparison with overall sector growth numbers will be made. Finally, we will try to determine whether there are differences between funding in 2012–2014 and 2015–2017.

This analysis covers 120 companies involved in at least one programme, i.e. Witty City or Built Environment. In our sample 55 companies were participants of Witty City programme and 65 Built Environment participants. 7 companies from the selected sample participated in both programmes. However, due to the low sample size of such companies, this segment will not be analysed separately.

ANALYSIS BY PROGRAMME

The results of the study revealed that a quarter of selected companies that participated in at least one programme increased their turnover over each year from 2013 to 2017 and almost one-fifth of companies increased their turnover four years out of five. Only 2.5% of companies have been unable to increase their turnover for at least one year (see Figure C1).

Analysis also revealed that there was no single year of high success or failure. The share of companies that increased their turnover in a particular year ranged from 63 to 69%. However, we found that almost every year, the share of companies that increased their turnover was higher among entities from Built Environment programme rather than Witty City, but the differences (except 2017) were not significant (see Figure C2).

FIGURE C1. Share of companies that participated in at least one business support programme and were able to increase turnover in 2013–2017 by number of years.

Percentage

Sources: Finland statistics and authors calculations

FIGURE C2. Share of companies that participated in business support programme and increased turnover by different years.

Percentage
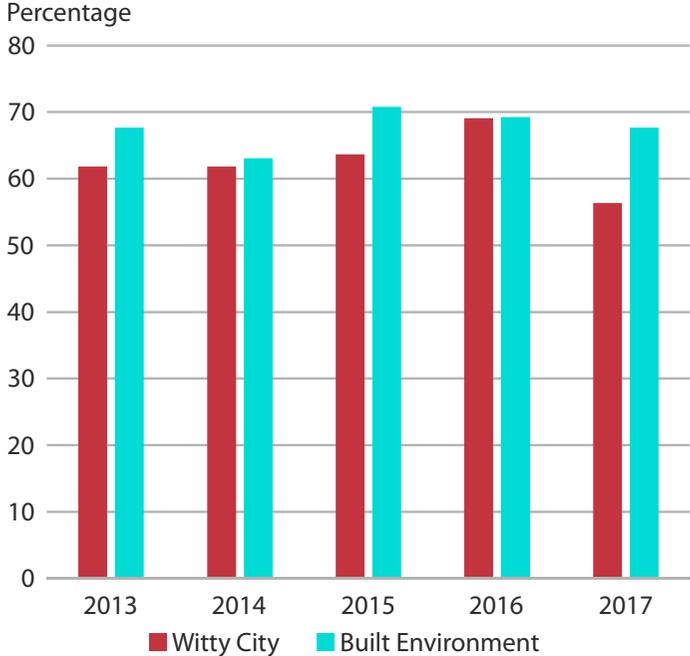
Sources: Finland statistics and authors calculations

Export is the next criterion that reflects the performance of companies. We noted that the results of export development were not so satisfactory as turnover. Only 1% of companies participating in at least one programme managed to increase their exports for five years, while almost one fifth of companies did not increase their exports at all (see Figure C3). However, we must take into account that, depending on the nature of their activities, some companies may not provide goods or services to international markets at all. Therefore, such circumstances could make an impact on the final results. No distinctions have been found also analysing each year separately. The range of successful companies was from 39 to 45% over 2013–2017 (see Figure C4).

FIGURE C3. Share of companies that participated in at least one business support programme and were able to increase export in 2013–2017 by number of years.

Percentage

Sources: Finland statistics and authors calculations
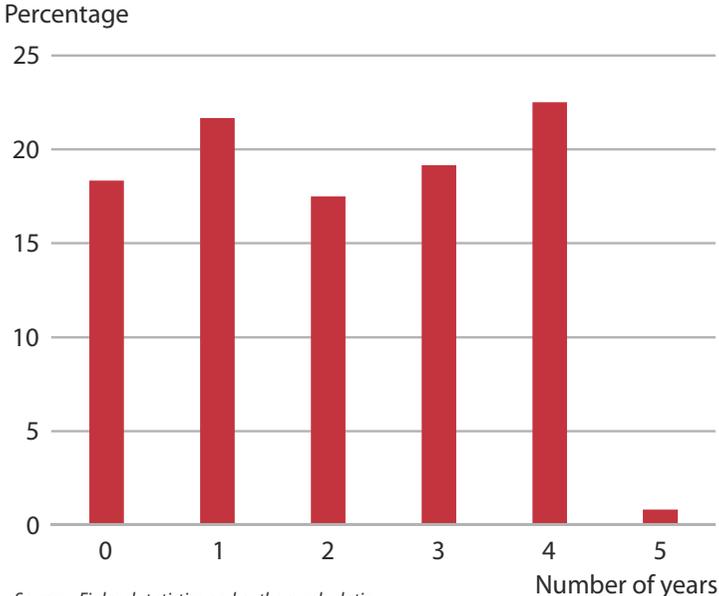
FIGURE C4. Share of companies that participated in business support programme and increased export by different years.

Percentage

Sources: Finland statistics and authors calculations

Finally, the last factor is the change in personnel. Here the distribution was more even. For example, 10% of sampled companies that participated in at least one programme were able to increase their number of employees each year during 2013–2017 and 18% of companies had no significant changes or declined their person-

nel (see Figure C5). In 2013–2017 approximately 15% of analyzed Built Environment programme companies raised their personnel each year, while there were only 4% of such companies in the Witty City programme (see Figure C6).

FIGURE C5. Share of companies that participated in at least one business support programme and were able to increase personnel in 2013–2017 by number of years.

Percentage

Number of years

Sources: Finland statistics and authors calculations

FIGURE C6. Share of companies that participated in business support programme and increased personnel by different years.

Percentage

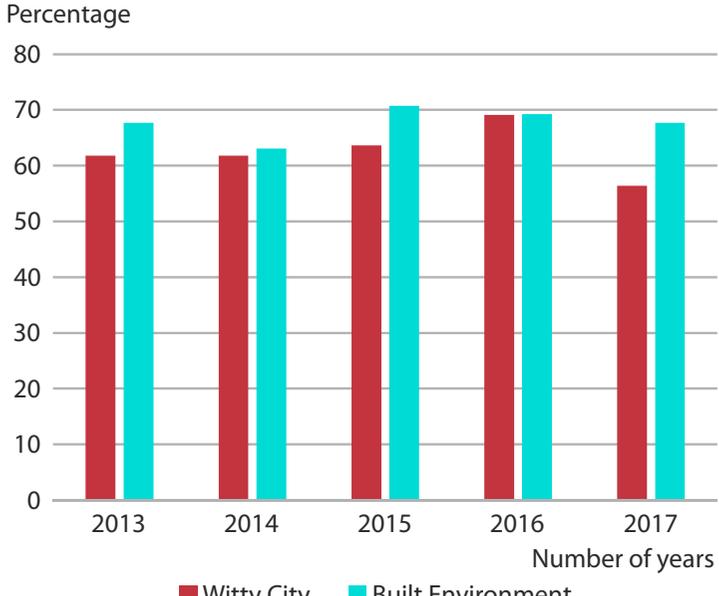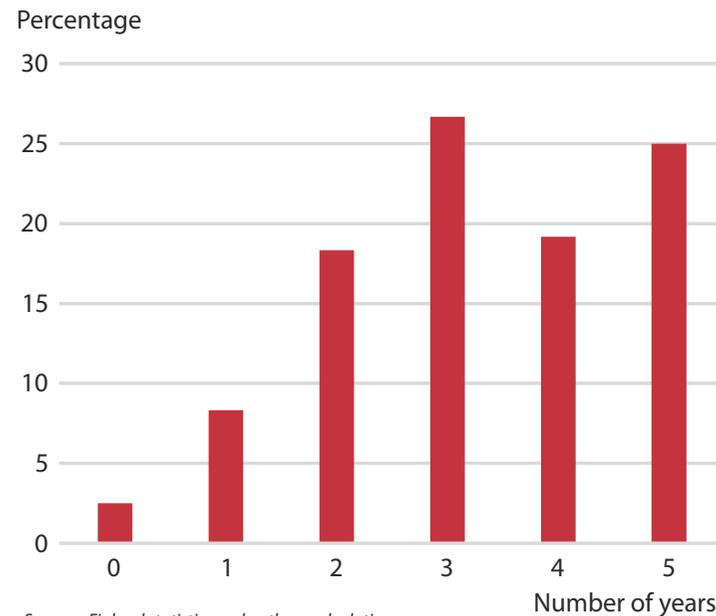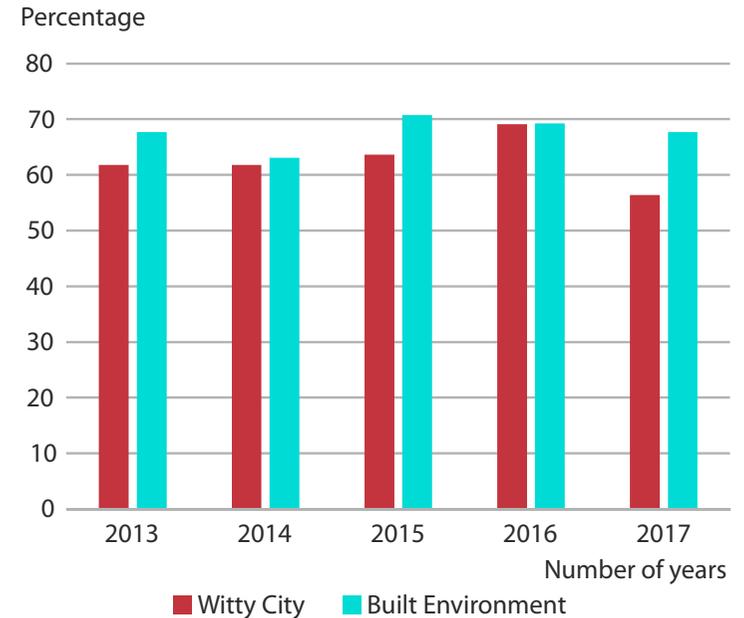Number of years

■ Witty City ■ Built Environment

Sources: Finland statistics and authors calculations

ANALYSIS BY INDUSTRY

Further, the performance of the program participants is assessed in terms of their business activities. Four sectors dominate in the sample, i.e. manufacturing, construction (including real estate development), information technologies (further – IT) and professional, scientific and technical activities (further – PSTA). All these sectors cover 29%, 23%, 21% and 13% of the sample respectively. Remaining industries are not representative.

In 2013–2017 the best performers were IT companies. Almost one third of companies involved in this activity increased their turnover each year and more than half (60%) climbed up with turnover for at least four out of five years. The worst performer was PSTA sector which had no companies able to generate growth in turnover each year. During 2013–2017 about 17% of companies from other industries (excluding manufacturing, construction, IT and PSTA) were not able to generate growth at all (see Figure C7).

Analysis of separate years also confirmed the supremacy of IT sector. In 2013–2014 and 2016 this segment was the most successful comparing with other activities. For example, about 85% of IT companies increased their turnover in 2013, while other industries (except construction, manufacturing and PSTA) reached 50% only. In addition, the most successful year for majority of industries was 2016, while the worst performance was fixed in 2014 (see Figure C8).

IT companies have turned out to be the best also in terms of exports. More than three-quarters of these companies increased their exports for at least three years out of five. The worst performers were construction companies, i.e. only 21% of them were able to increase export in 2012–2017 by than two years. About 30% of construction companies were unable to increase export at all. Usually, construction companies (especially SME's) are not focused on export. Construction is not an export-oriented business by its nature (see Figure C9). It was also noted that there was no period that was exceptionally successful for majority of businesses. For IT and construction companies 2013 was the best year by export, while manufacturing and PSTA companies achieved highest results in 2017. Remaining industries performed better in 2016 (see Figure C10).

FIGURE C7. Share of companies that increased turnover in 2013–2017 by industry and number of years.

Percentage

Number of years

- Manufacturing
- Construction (including real estate)
- PSTA
- Information technologies
- Other industries
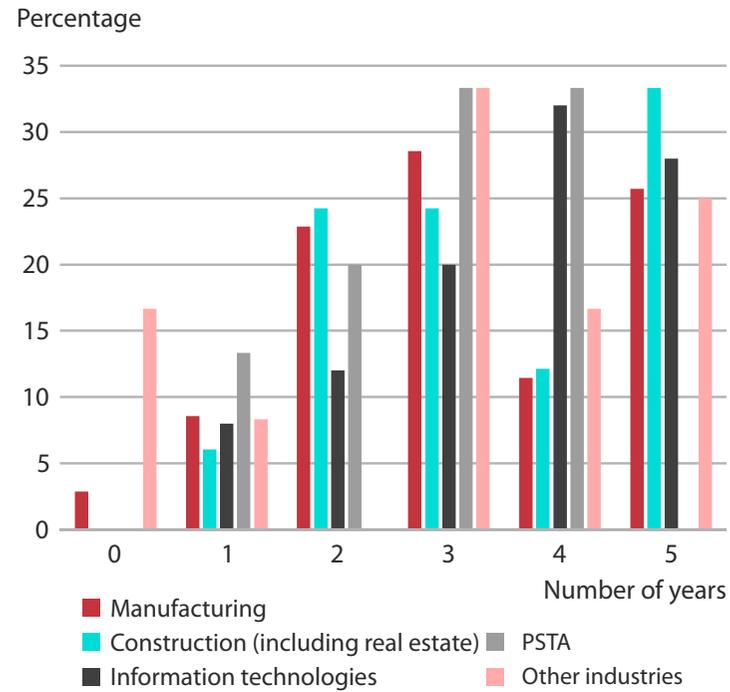
Note: PSTA – professional, scientific and technical activity
Source: Finland statistics and authors calculations

FIGURE C8. Share of companies that increased turnover by industry and different years.

Percentage

- Manufacturing
- Construction
- PSTA
- Information technologies
- Other activities
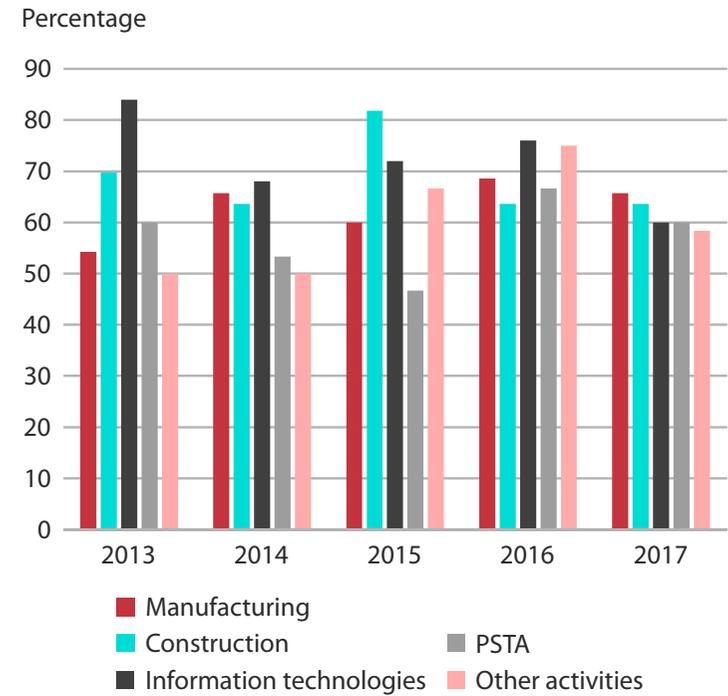
Source: Finland statistics and authors calculations

FIGURE C9. Share of companies that increased export in 2013–2017 by industry and number of years.

Percentage

- Manufacturing
- Construction (including real estate)
- PSTA
- Information technologies
- Other industries
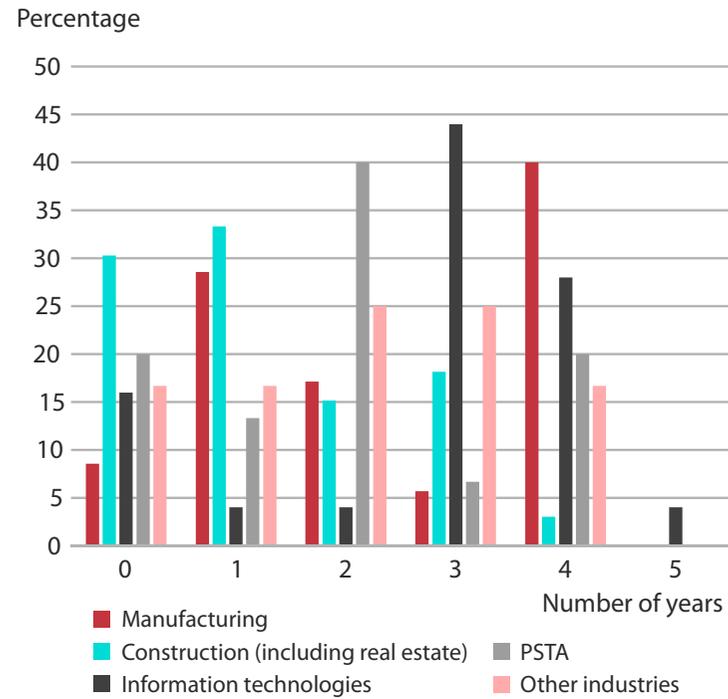
Source: Finland statistics and authors calculations

FIGURE C10. Share of companies that increased export by industry and different years.

Percentage

- Manufacturing
- Construction
- PSTA
- Information technologies
- Other activities
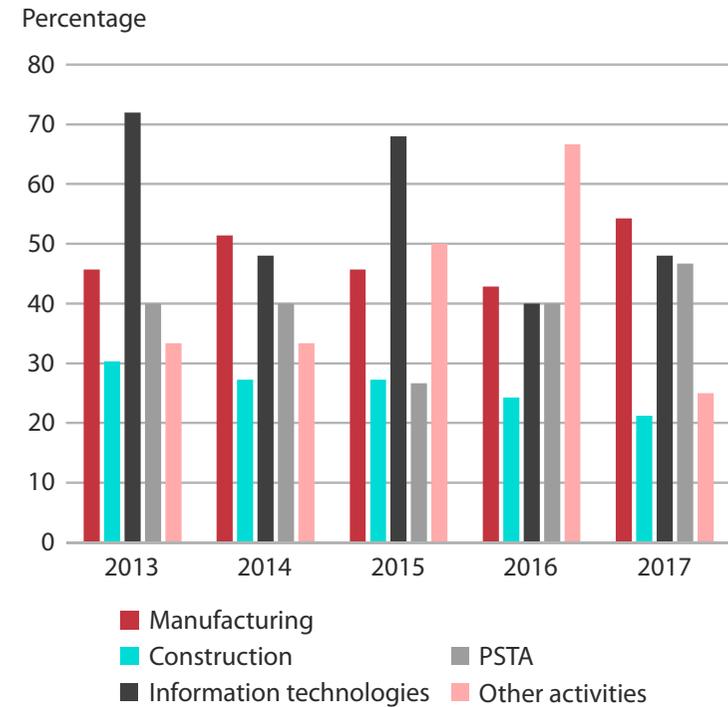
Source: Finland statistics and authors calculations

Unlike exports, construction companies involved in programmes were the best at attracting the staff. About 50% of construction companies have successfully increased their workforce by at least three years out of five over 2012–2017. PSTA companies were far less successful. One third of them did not increase the number of employees at all (see Figure C11). As in the case of exports, there were no exceptional years for the change of personnel. No specific tendencies have been identified (see Figure C12).

The analysis of the whole 2012–2017 period revealed that the results are similar to those presented earlier. The most successful were IT companies. About 84% of them were able to increase turnover and 80% climbed up with export. The worst performers were construction (including real estate) companies. Only 58% of them increased turnover and 27% were able to improve export. However, as it was mentioned before, we need take into consideration that construction is not export oriented business. Moreover, it was noted that majority of companies (70%) which increased turnover were also able to rise the number of personnel. This means that program participants were focused on performance improvement rather than on growth with the market.

FIGURE C11. Share of companies that increased personnel in 2013–2017 by industry and number of years.

Percentage

Source: Finland statistics and authors calculations

FIGURE C12. Share of companies that increased export by industry and different years.

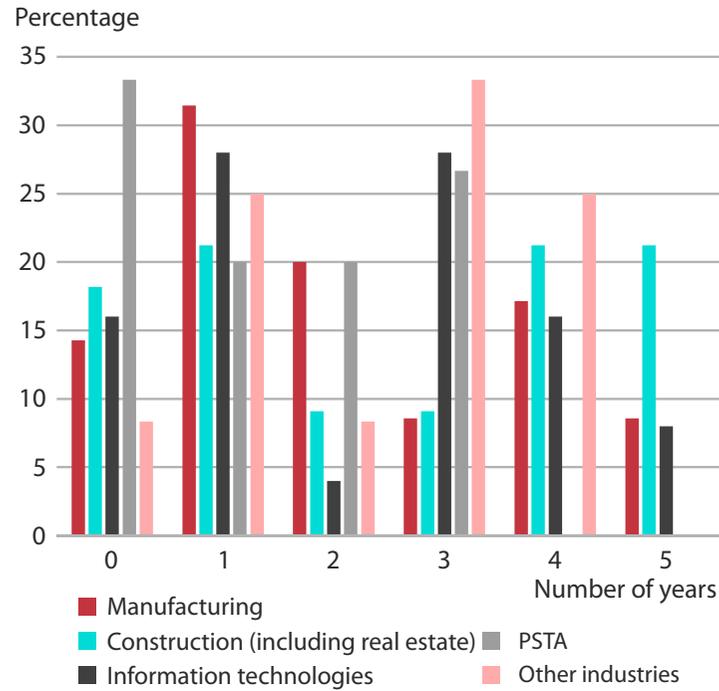Percentage
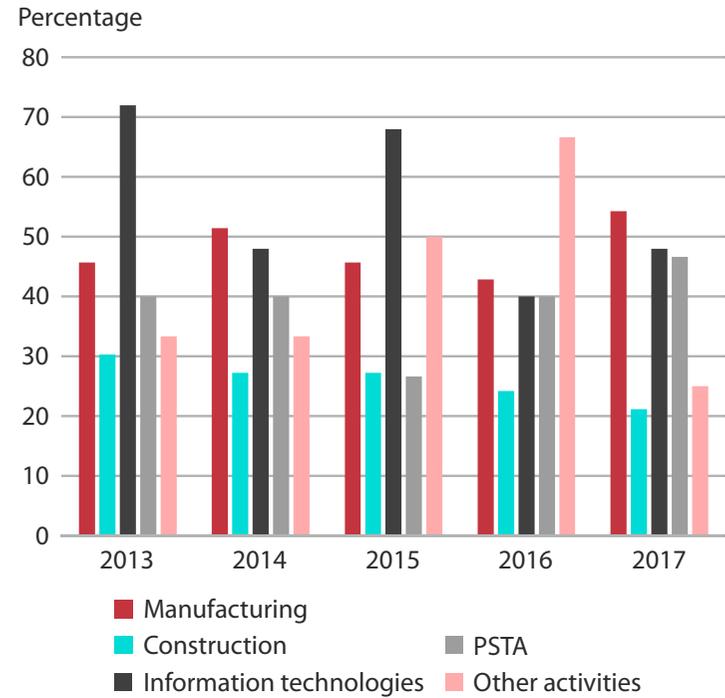
Source: Finland statistics and authors calculations

ANALYSIS BY CUSTOMER SEGMENT

Further, an analysis of selected factors (turnover, export and personnel) will be performed using distribution by customer segment. The main goal is to determine which changes in the selected factors were typical for programme participants with specific features. There are four type of companies that have been analysed, i.e. local, international, growth and large companies.

Turnover analysis revealed that the most successful companies were focused on large potential growth. Almost 90% of such companies were able to increase turnover for at least 3 years out of five in 2012–2017. The international companies were the least likely to increase turnover. Only 58% of them climbed up with turnover from 3 to 5 years. Companies focused on the local market and also large companies achieved 76% and 66% respectively (see Figure C13). It was also noted, that the best year for local companies was 2016. About one third of such companies increased turnover in that year. International entities and also growth companies moved up with sales frequently in 2013, while the best year for large companies was 2017 (see Figure C14).

However, the best export results were demonstrated by large entities. About 60% of large programme participants increased export from 3 to 5 years over 2012–2017.

No surprise that the worst performers with export were local companies (see Figure C15). About 30% of such companies were unable to increase export at all.

There was no single year that was exceptionally successful for all segments. For example, about 71% of growth entities increased their export. However, the next year was twice worse taking into consideration that this share dropped to 35%. The best year for international companies was 2014 (58%), however, this share went down to 42% in 2015. Therefore, we can conclude that no trend has been found analysing export performance in different years (see Figure C16).

Finally, the number of employees is analysed as the last factor. It was noted that international companies increased personnel most frequently. About half of such companies enlarged their human resources for at least three years in 2013–2017. On the other hand, local entities were most passive (38%). A quarter of companies focused on domestic customer was unable or had no necessity to increase personnel (see Figure C17). Like in the case of turnover and export, there was no clear trend that could help to identify which year was the most active in development of personnel. Each group (by customer segment) had different years of the best performance (see Figure C18).

FIGURE C13. Share of companies that increased turnover in 2013–2017 by customer type and number of years.

Percentage
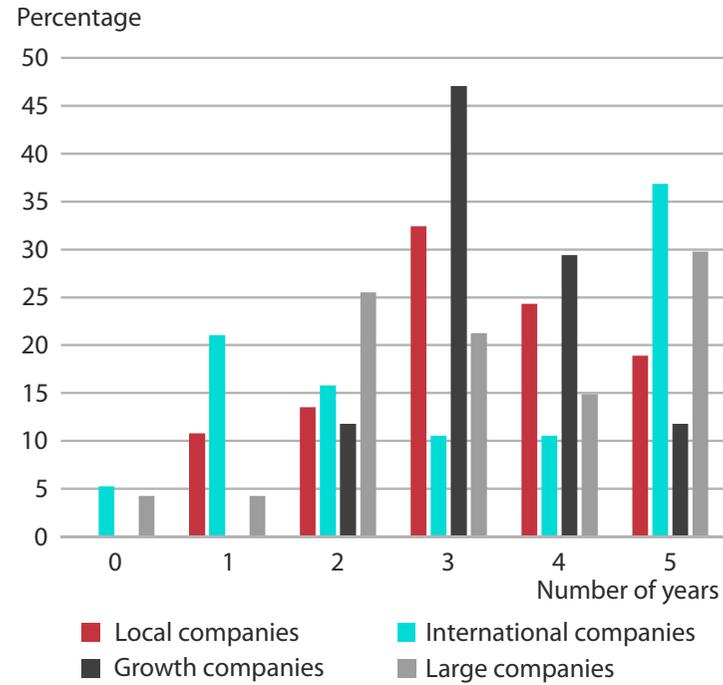
Source: Finland statistics and authors calculations

FIGURE C14. Share of companies that increased turnover by customer type and different years.

Percentage
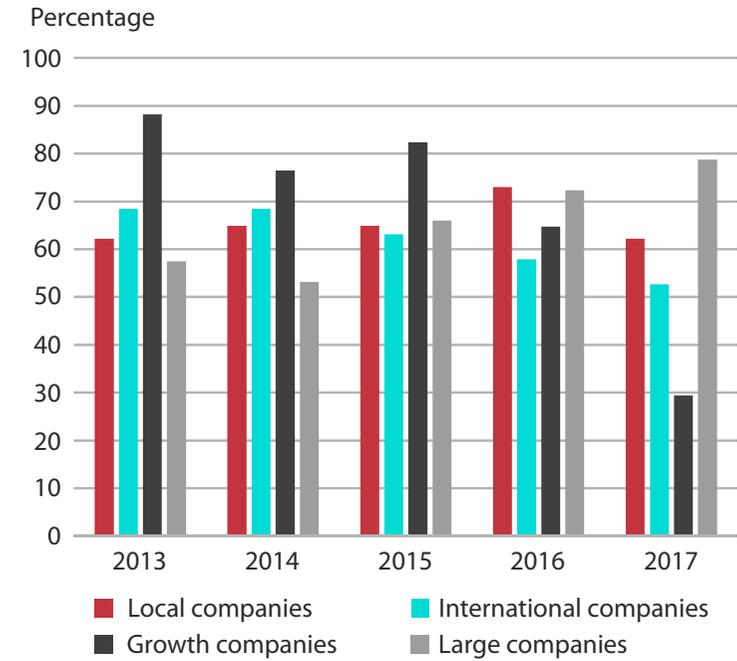
Source: Finland statistics and authors calculations

FIGURE C15. Share of companies that increased export in 2013–2017 by customer type and number of years.

Percentage

Number of years

- Local companies
- International companies
- Growth companies
- Large companies
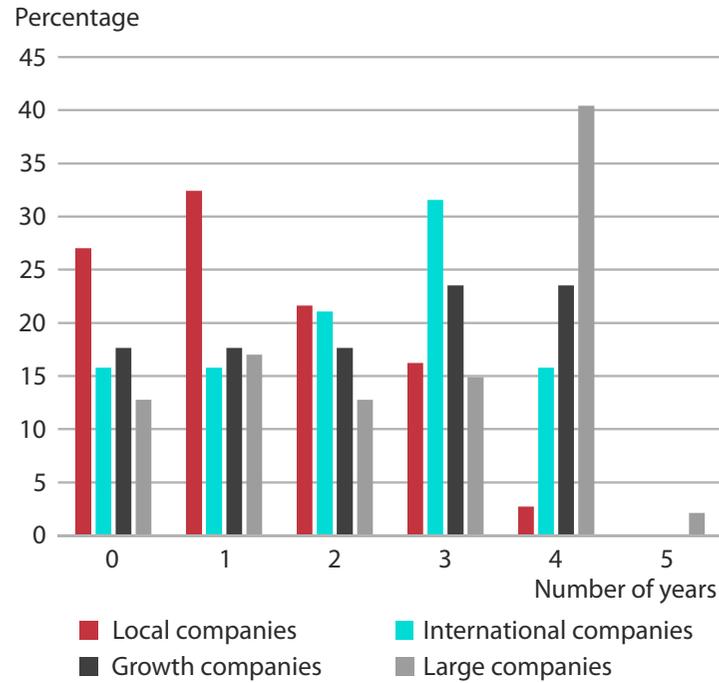
Source: Finland statistics and authors calculations

FIGURE C16. Share of companies that increased export by customer type and different years.

Percentage

- Local companies
- International companies
- Growth companies
- Large companies
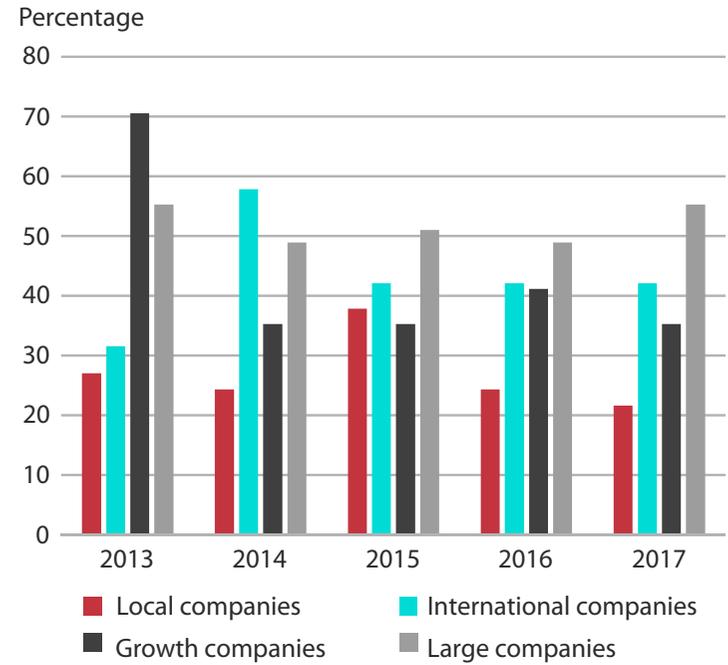
Source: Finland statistics and authors calculations

FIGURE C17. Share of companies that increased personnel in 2013–2017 by customer type and number of years.

Percentage

Number of years

- Local companies
- International companies
- Growth companies
- Large companies

Source: Finland statistics and authors calculations

FIGURE C18. Share of companies that increased personnel by customer type and different years.

Percentage

- Local companies
- International companies
- Growth companies
- Large companies

Source: Finland statistics and authors calculations

Main messages:

- Participants of Built Environment programme increased their turnover and personnel more often than Witty City participants. This could be related with the fact that majority of companies participating in the Witty City programme received their funding later than companies in Built Environment program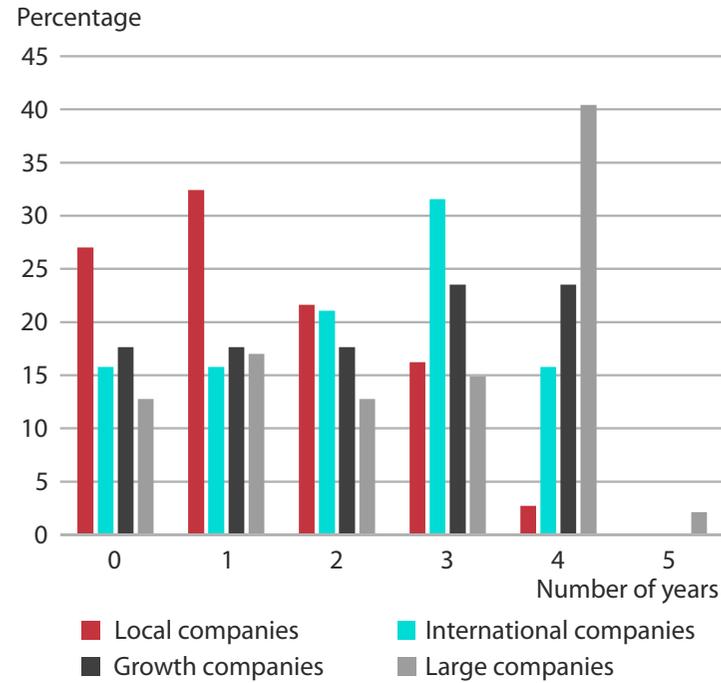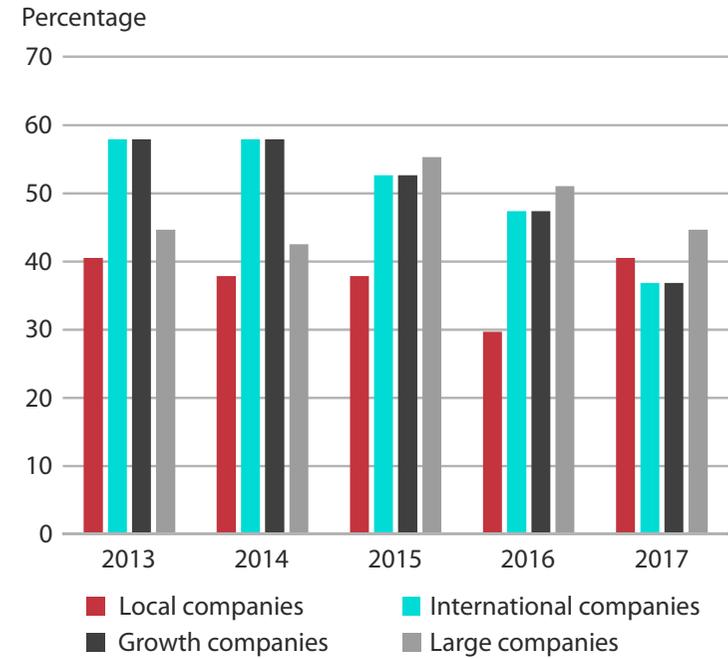me. Due to this reason, Built Environment companies were able to start their development process earlier and increased turnover or personnel more frequently in 2013–2017. There is a large probability that Witty City participants will improve their results in 2018–2019 or later as significant part of their funding was received in 2017–2018. Such circumstances allow suggesting that funding provided by programmes affects the performance of companies.
- Witty City programme participants outperformed Built Environment companies by export, i.e. they increased export more often, however, this is necessary to note, that members of Witty City programme were more focused on international customers and businesses rather than companies participating in Built Environment programme.
- Programme participants working in information technology area achieved the best results by turnover criteria. Moreover, they have turned out to be the best performers also in terms of exports. However, construction companies were the leaders in attracting the staff.

- No trend was detected analysing companies by customer segment. Entities with potential growth increased their turnover most often. However, best export results were demonstrated by large entities. In addition, international companies increased their personnel most frequently.

C2 RELATIVE PERFORMANCE ANALYSIS

COMPARISON AMONG INDUSTRIES

The next aim is to make a comparison between the performance of programme participants and overall economy. Moreover, an analysis of different industries will be also provided.

In 2012–2017 turnover of Finnish companies increased only twice, i.e. in 2016 and 2017. On the same time programme participants increased their sales 3.3 years on average. Built Environment programme participants had 3.4 and Witty City 3.1 of successful years. Moreover, market was outperformed by 70% of programme participants that were included in the sample of this research. Therefore, this is evident that programme participants climbed up their turnover more often than overall sector.

However, there were no significant differences by changes in personnel. Enterprises in Finland were able to increase personnel twice during 2012–2017 period, i.e. in 2016 and 2017. Programme participants achieved the same result. There is a necessity to note that Built Environment programme companies increased personnel 2.5 years on average and outperformed the overall industry, while Witty City companies had 1.9 years on average. In addition, only 44% of programme participants increased personnel more frequently than total industry. This could be related with the earlier mentioned fact that not all companies are focused on the staff enlargement. On the contrary, they are investing with a purpose to increase efficiency reducing the number of employees.

In addition, it is useful to compare turnover per employee ratio that represents the size of turnover generated by one employee on average. In 2012–2017 programme participants outperformed the market each year and their turnover per employee average was about 28% higher than overall industry's. On the other hand, in 2012–2017 industry's average was close to € 271k, i.e. one employee generated such amount of turnover per year. However, only 32% of programme participants were able to beat this amount. This can be explained by the fact that some companies participating in the programme outperformed the market significantly comparing with other participants and we have large standard deviation of analysed ratio.

Further, a comparison among different business activities was made. Here we are focusing an attention to four main business industries, i.e. manufacturing, construction, information technologies (IT) and professional, scientific and technical activity (PSTA) as they cover 86% of our total sample. It was noted that over 2012–2017 period manufacturing and construction companies which participated in at least one programme increased their turnover and personnel more often comparing with all companies from these industries. However, programme participants from IT and PSTA sectors achieved lower results than their segment (see Figure C19).

IT and manufacturing companies participating in the programme were less efficient than the market as their turnover per employee ratio was lower every year over 2012–2017 period. On the contrary, construction and PSTA companies from our research sample were much more efficient than their competitors (see Figure C20).

FIGURE C19. Increase in turnover in 2012–2017 by number of years.

Number of
years
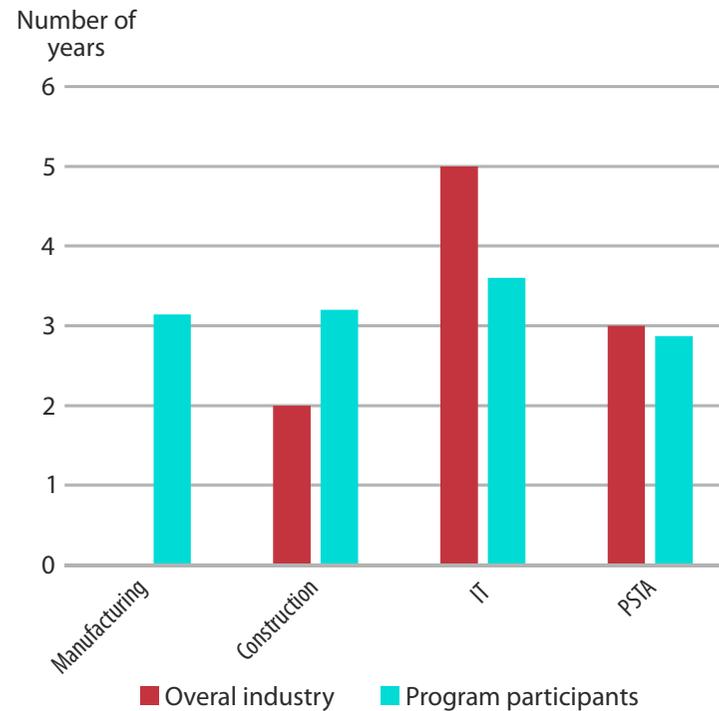
Source: Finland statistics and authors calculations

FIGURE C20. Average of turnover per employee in 2013–2017 by industry.

in
thousands
Euros
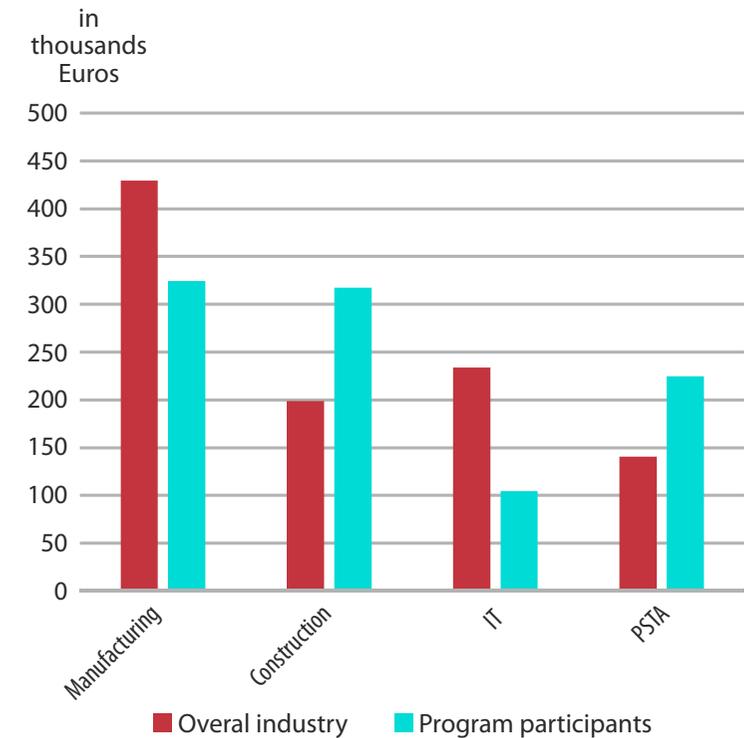
Source: Finland statistics and authors calculations

Main messages:
- In 2012–2017 programme participants achieved better results than overall enterprises performing in Finland. They increased turnover more often and were more efficient having higher turnover per employee ratio each year. However, there were no significant differences assessing by personnel.

- Despite the fact that programme participants achieved better efficiency (on average) only 32% companies from the selected sample had better results than the market. Such result was affected by large standard deviation of turnover per employee ratio of programme participants.

- Manufacturing and construction companies that participated in the programme increased turnover more frequently in 2012–2017 comparing with their rivals from the same industry. IT and PSTA companies were less successful. However, PSTA companies had better efficiency ratio while manufacturing and IT performed worse comparing with theirs sectors.

IMPACT OF FUNDING TIME

It was noted previously that participants of Built Environment programme achieved superior results than companies which participated in Witty City programme. We also noted that in many cases during 2012–2017 Built Environment companies received financing earlier than companies from Witty City programme. This led us to an assumption that Built Environment companies were able to improve their businesses earlier than Witty City programme participants, because majority of funding was received in 2012–2014, while Witty City companies have got their finance in 2016–2017 and had no enough time to feel positive effect yet.

First of all, it is necessary to note that in our analysis the time when final funding was received is more important than date when it was approved. Decision to approve financing does not mean that entity receives funding from that moment. Therefore, decision itself cannot improve company's performance. Due to this reason, the date of funding received is much more significant and we use it in our analysis. We should also recognize that in some cases all funding could be provided not in one year. However, we have no data about how financing was distributed over time. Therefore, we use data related with final funding and make an assumption that the funds were evenly distributed over the duration of the project.

We found clear evidence that companies that received financing in 2011–2014 achieved better results in 2012–2017 rather than companies which got their funding in 2015–2018. For example, about 73% of companies from the first period were able to increase turnover at least three years out of five in 2012–2017 while companies from the second group achieved lower results. Similar trend has been detected assessing changes in export and personnel (see Figure C21). Some evidence is also seen looking at some efficiency ratios. For example, companies that received their funding in 2011–2014 had reached €344k turnover per employee ratio on average in 2012–2017 while companies with later financing had € 323k. The first group of companies was outperformer also by export to employee ratio (€79k v. €50k). Moreover, its export share in turnover contained 23.2% on average, while the second group achieved less, i.e. 17.1% (see Figure C22).

Having in mind that absolute majority of companies funded in 2011–2014 were from Built Environment programme, there is no surprise regarding Built Environment programmes superiority in 2012–2017. There is large probability that companies participating in Witty City programme will achieve higher impact later.

FIGURE C21. Share of companies that increased turnover in 2013–2017 by funding period and number of years.

Percentage

■ Companies that received finansing in 2011–2014
■ Companies that received financing in 2015–2018
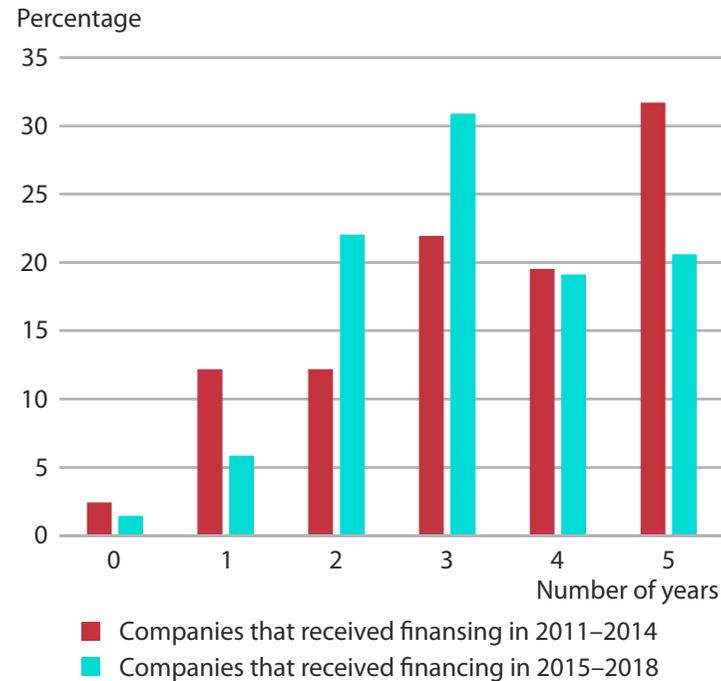
Source: Finland statistics and authors calculations

FIGURE C22. Average ratios of program participants in 2012–2017 by funding period.

■ Turnover per employee
■ Export per employee
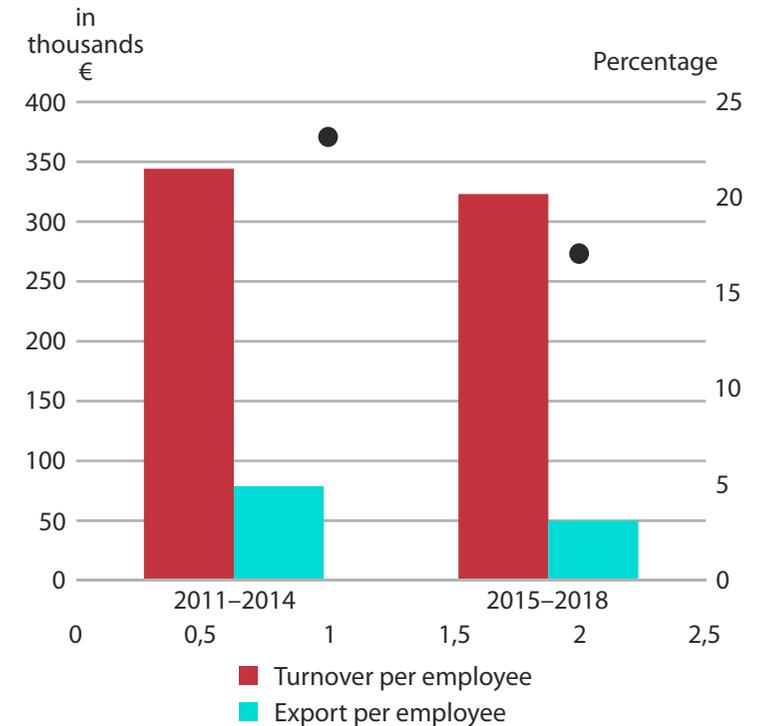
Source: Finland statistics and authors calculations

Main messages:
- Analysis of two different funding periods revealed that 2012–2014 funded projects already had an impact on the company performance, whereas 2015–2017 funded projects have ended more recently and have had little impact on company performance.

C3 FACTORS EXPLAINING GOOD PERFORMANCE

PROGRAMME IMPACT ASSESSMENT USING PANEL MODEL

Previously, we found some evidence that participation in the programmes have made positive impact on companies' business development. Trying to find out more solid evidence and to identify factors affecting good performance of programme participants, a panel model will be proposed further.

First of all, the choice of the panel model was based on the available data structure. The sample contains 109 companies participating for at least in one programme (Witty City or Built Environment) and there are also time series covering 2012–2017 period. Such type of models allows combining cross-sectional and time series data. Moreover, panel models help to increase the number of degrees of freedom, and the power of the test, by employing information on the dynamic behaviour of a large number of entities at the same time. It can also help to mitigate problems of multicollinearity that may arise if time series are modelled individually. In addition, by structuring the model in an appropriate way, we can remove the impact of certain forms of omitted variable bias in regression results[21].

In our case we have three potential dependent variables, i.e. turnover, export and personnel. However, this necessary to note, that all these variables are endogenous and cannot be drawn directly into the model. Export can be the part of turnover, while the number of employees can increase turnover also. Though, the company will not hire more personnel if demand (export or turnover) is not growing. Due to this reason, all above mentioned variables will be converted into relative indicators or ratios. For example, company's performance could be well represented calculating the following ratios:

$$\frac{Turnover}{Number\ of\ employees} = y_1$$

$$\frac{Export}{Number\ of\ employees} = y_2 \qquad (1)$$

$$\frac{Export}{Turnover} = y_3$$

Above mentioned ratios (1) will be used as dependent variables in our panel regressions.

It is also necessary to note, that such conversion into ratios will allow avoiding problems related with different size of companies. For example, large companies have much lower probability to achieve high growth rates comparing with start-up companies. Therefore,

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[21]   BROOKS, C., Introductory Econometrics for Finance, Cambridge University Press, p. 488-489.

such kinds of ratios are more representative and informative.

Our independent variables will be factors that might have an impact on company's performance. The first variable is dummy (D_i) fixing the year when all financial payments from the programme were completed and which cover all the periods after these payments. The second important variable (I_i) represents the share of business impact attributable to the project. Moreover, we include some type of risks, which might affect performance results, i.e. resource risk (σ_i^R), financial risk (σ_i^F), technology risk (σ_i^T) and market risk (σ_i^M). Remaining variables are novelty of the project (N_i), region units (R_i), subcontracting amount from SMEs (S_i^{SME}), research organizations (S_i^{RES}) international collaboration (IN_i), company's age (A_i), customer segment (CS_i) and business industry in which company operates (BI_i).

In panel modelling, we can create three types of regressions, i.e. pooled regression model, fixed effect (or LSDV) model and random effect model. The major problem with pooled regression model is that it does not distinguish between the various companies that we have. Combining 109 companies by pooling we deny the heterogeneity or individuality that may exist among these companies. Therefore, taking into consideration that our companies are heterogeneous and each of them has individual features, pooled regression model is rejected as inappropriate.

The fixed effect model allows for heterogeneity among program participants by allowing to have its own intercept value. First of all, we need to take a simple regression model (2), and decompose the disturbance term, $u_{it,}$ into an individual specific effect, $\mu_{it,}$ and the reminder disturbance, , that varies over time and entities (capturing everything that is left unexplained about Y_{it}).

$$Y_{it} = \alpha + \beta\chi_{it} + u_{it} \tag{2}$$

Therefore, we could rewrite equation (2) to obtain:

$$Y_{it} = \alpha + \beta\chi_{it} + v_{it} + \mu_i \tag{3}$$

We can see u_i as encapsulating all of the variables that affect Y_{it} cross-sectionally but do not vary over time. For example, the sector that a company operates in, a person's gender and etc. This model could be estimated using dummy variables, which would be termed the least squares dummy variable (LSDV) approach (4).

$$y_{it} = \beta\chi_{it} + \mu_1 D_1 + \mu_2 D_2 + ... + \mu_N DN_1 + v_{it} \tag{4}$$

The term fixed effect is due to the fact that although the intercept may differ across companies (4). However, the intercept does not vary over time, i.e. it is time invariant. Variability of both intercepts and slopes over individuals and time requires even more variables. Unfortunately, a lot of dummy variables make degree of freedom lower and increases risk of multicollinearity. On that case, random effects model (5) can be used as an alternative.

$$Y_{it} = \beta_{1i} + \beta_2 X_{2it} + \beta_3 X_{3it} + u_{it} \tag{5}$$

The intercepts/effects β_{1i} are assumed to be random variables with mean value $E(\beta_{1i}) = \beta_{1i}$ and the intercept value for individual i can be expressed as

$$\beta_{1i} = \beta_1 + \varepsilon_i \tag{6}$$

where $E(\varepsilon_i) = 0$ and $Var(\beta_{1i}) = \sigma_\varepsilon^2$

On that case we make an assumption that companies have a common mean value for the intercept.

Trying to decide which of these two models is more suitable to our analysis, we need to perform the Hausman test. Null hypothesis rejection means that fixed effect model is more appropriate than random effect model and vice versa.

Therefore, our first model will be fixed effect panel regression model with all previously mentioned variables. Model results for y_1, i.e. turnover per employee ratio are represented in Table C1 (see econometric analysis tables at the end of this appendix). We see that there are no significant variables as all p-values are above 5% significance level except dummy fixing the moment when all financial payments are completed. Similar results were received using y_2 (export per employee) ratio (Table C2), here we can also note that dummy fixing the moment of funding receive is statistically significant (p-value = 0.0011). The coefficient of this dummy is positive, and this means that funding makes a positive impact on company's performance. Dummy was also significant using y_3 (export ratio turnover ratio) as dependent variable (see Table C3).

In addition, we also constructed random effect model that demonstrated quite similar results (see Table C4, Table C5 and Table C6) (see econometric analysis appendix below). Therefore, we can conclude that in both types of models, majority of selected variables were statistically insignificant, and models are weak.

Further, some of these independent variables were step by step excluded from the model until we found the model where all explanatory variables are statistically significant. We found that movements in turnover per employee ratio can be explained by dummy (D_i) fixing the year when all financial payments from the support program were completed and the share of business impact attributable to the project (I_i). This means, that company's performance could depend not from financing itself, but also from its importance to the company's overall business structure. Results of such fixed effect model are presented in Table C7. However, this model seems not appropriate as the coefficient of the impact (I_i) is negative. This contradicts to the simple economic logic, i.e. if the project has high importance to the business, then together with funding it should improve company's performance. In our model negative coefficient means, that significant project makes negative impact on company's efficiency. Therefore, this model requires some corrections.

Further, we decided to exclude the dummy (D_i), i.e. the moment of financial inflows from the model leaving only the factor representing the importance of the project to company's business. Moreover, we also squared this factor, i.e. this squared variable means that project makes positive impact to company's performance until it reaches the size when the project starts making negative impact on the efficiency. This means that if the project is too large for the company, it starts generating higher costs than benefits. Thus, our fixed effect model for y_1 is presented in Table C8. Its variables are statistically significant, however only with 10% significance level.

In Figure C23 we can see that project which covers till 40% of business size makes positive impact on company's efficiency (for example, turnover per employee ratio). If project's share in business is higher, then efficiency moves down. Quite similar results were achieved using random effect model (see Table C9 and Figure C24).

Further, correlated random effects Hausman test was performed trying to decide which of the above-mentioned models, i.e. fixed or random effect is more appropriate. P-value was above 5% significant level, thus null hypothesis was not rejected, i.e. random effect model is more suitable in our analysis rather than fixed effect (see Table C10, see econometric analysis appendix below).

Superiority of random effect model could be explained by statement that individual features of the company (individual specific effect) is a random variable that is uncorrelated with the explanatory variables of all past, current and future time periods of the same company.

Further analysis revealed that fixed and random effect model which was a relatively good explanator of turnover per employee ratio is not appropriate for other ratios, because both independent variables were statistically insignificant. For example, export per employee ratio was explained only by dummy variable representing time of funding and only in random effect model with 10% significance level. Project size was not important on that case (see Table C11). Export to turnover was explained by the dummy also, but with three lags, which means than funding's impact on export is felt over three years when financing is received (Table C12).

We also found the evidence that majority of selected factors have no influence on company's performance, however, strong impact was detected using lags (see Table C13, see econometric analysis appendix below). For example, export to turnover ratio could be affected by financial and market risks and by novelty also, but not earlier than after two years. This means that a lot of factors could affect performance only over longer period of time.

FIGURE C23. Project size impact on turnover per employee ratio (fixed effect model).

in
thousands
€

The share of the project in company's business, %
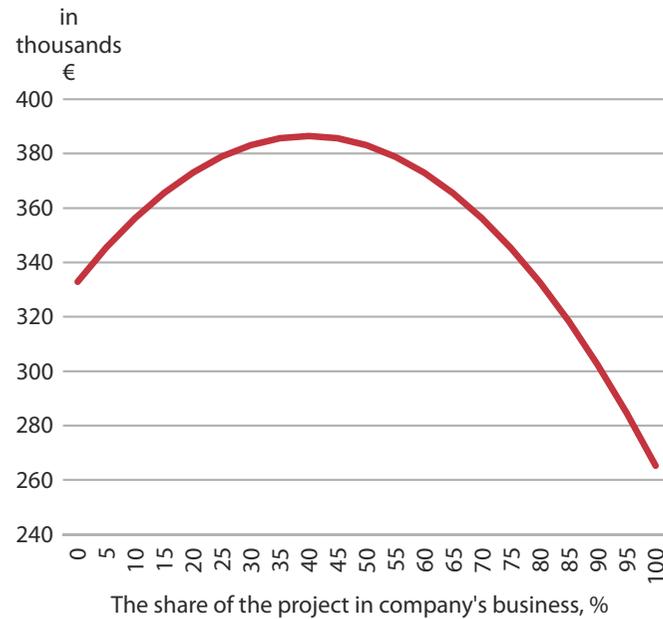
FIGURE C24. Project size impact on turnover per employee ratio (random effect model).

in
thousands
€

The share of the project in company's business, %
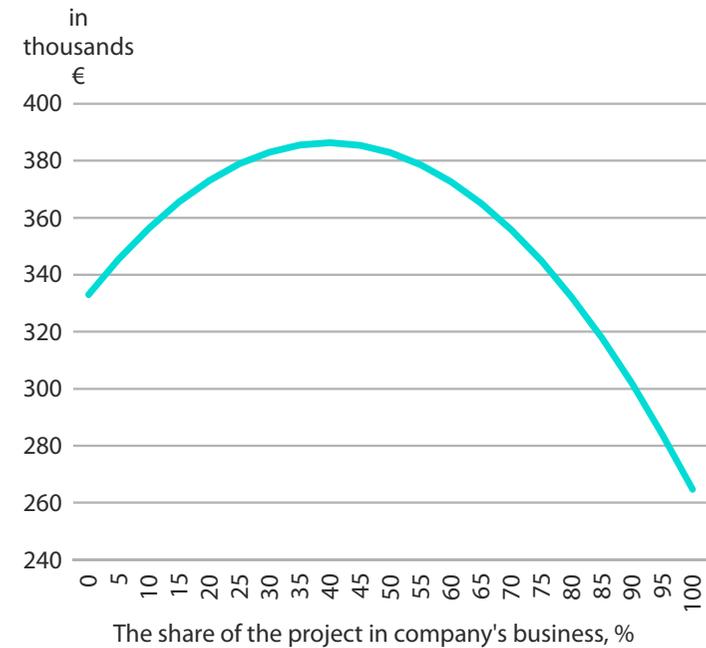
CONCLUSIONS

- Hausman test revealed that in our analysis random effect model is more appropriate than fixed effect model. Superiority of random effect model means that specific features of selected companies have no correlation with independent variables.
- Different ratios are explained by different factors. Project size is the most important explanator of turnover per employee ratio, while remaining ratios are more affected by dummy representing the period of funding.

- Other factors were not statistically significant, and this could be explained by the fact that most of them make an impact on company's performance only over long-term period. Therefore, lags must be included in the models also.

C4 CHALLENGES RELATED TO THE QUALITY OF DATA AND THE CONTEXT OF THE ANALYSIS

A highly complex group of companies ranging from micro start-ups to large multinational corporations belonging to several very different industries ranging across construction, expert services and IT have been analysed. Moreover, the analysis covers two programmes implemented over different time periods and with different participant groups.

There were 274 programme participants that took part in at least one programme. About 35% of them were micro start-ups, 27% small-medium size companies and remaining share was large corporations. Majority of these entities operated in quite different industries. For example, 37% of programme participants performed activity in manufacturing area, while construction and IT companies covered 33% and 25% respectively. Moreover, complexity of the analysis was increased due to the fact that there were two different programmes that were implemented over different time periods. This means that financing was received in distinct moments and was of various sizes. This led to difficulties in analysing the impact of participation in the programme and made a comparison between those companies and total industry complicated. For example, about 75% of programme participants were financed till 2014, while remaining companies received it later.

In econometric analysis 109 entities have been selected. Entities operating in manufacturing industry contained about 31% of the sample while 29% and 19% was covered by construction and IT companies. Remaining share belongs so PSTA and other activities. Moreover, about 32% of selected companies received financing before 2014, while remaining part got their funding in 2015 or later.

From the first point of view it seems that there are some biases in the sample compared to all participants as proportions in the sample weakly correspond with proportions of all participants. However, this is necessary to note that major part of companies was excluded from the sample due to insufficient data and most of these entities received financing in 2011 or earlier. This is the main reason why proportion of the new projects is higher in the sample of econometric analysis rather than of all participants. In any case, this illustrates complexity of participants portfolio and thereby our samples and this could also be one of the reasons why econometric models provided slightly worse results than expected.

In many cases we concluded that programme participants outperformed their industry averages, i.e. they were able to increase turnover, export or personnel more often than overall industry and they achieved better efficiency ratios (e.g. turnover per employee). However, due to the issue of selection bias it could be that programme participants achieved better results not because they participated in the programme. Maybe they would have achieved the same results without participating in it. Trying to solve this issue we have made a comparison between turnover per employee growth rates over time.

Analysis revealed that in all industries (except construction) programme participants increased their turnover per employee ratio faster than overall industry. In 2012–2017 entities participating in at least one programme achieved higher growth than industry average almost in each year. The largest difference was noticed in PSTA and IT industries. There the difference between growth rate averages was 38 and 9 percentage points respectively. Taking into consideration that programme participants were able to grow faster than industry average, this would probably imply that programme funding had a positive impact on companies' performance.

ECONOMETRIC ANALYSIS TABLES

TABLE C1. Fixed effect model with y_1 as dependent variable

Dependent Variable: Y1
Method: Panel Least Squares
Sample: 2012 2017
Periods included: 6
Cross-sections included: 109
Total panel (balanced) observations: 654

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
C	307152.5	12681.33	24.22085	0.0000
AGE	-397.9716	1724.082	-0.230831	0.8175
DUMMY	**67708.76**	**24647.38**	**2.747098**	**0.0062**
FINANCIAL RISK	2155.255	1443.338	1.493243	0.1360
MARKET RISK	-747.4587	2079.127	-0.359506	0.7194
RESOURCES RISK	-2539.778	2161.667	-1.174916	0.2406
TECHNOLOGY RISK	1900.164	1971.979	0.963582	0.3357
IMPACT	-1277.513	748.0417	-1.707810	0.0883
INTERNATIONAL	-641.8989	54437.83	-0.011791	0.9906
NOVELTY	241.0266	1654.239	0.145702	0.8842
REGION	-1069.242	17364.96	-0.061575	0.9509
SUBSME	-0.014423	0.078117	-0.184634	0.8536
SUBRES	-0.029038	0.147404	-0.196995	0.8439
SECTOR	1755.579	17545.00	0.100062	0.9203
SEGMENT	1325.380	19605.51	0.067602	0.9461

TABLE C2. Fixed effect model with y_2 as dependent variable

Dependent Variable: Y2
Method: Panel Least Squares
Sample: 2012 2017
Periods included: 6
Cross-sections included: 109
Total panel (balanced) observations: 654

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
C	51856.75	3761.473	13.78629	0.0000
AGE	451.3571	511.3888	0.882610	0.3778
DUMMY	**24056.26**	**7310.785**	**3.290517**	**0.0011**
FINANCIAL RISK	352.3664	428.1159	0.823063	0.4108
MARKET RISK	-403.4476	616.7004	-0.654204	0.5133
RESOURCES RISK	-366.3200	641.1833	-0.571319	0.5680
TECHNOLOGY RISK	-123.9905	584.9188	-0.211979	0.8322
IMPACT	-177.3998	221.8805	-0.799529	0.4243
INTERNATIONAL	-4738.047	16147.08	-0.293431	0.7693
NOVELTY	376.4742	490.6723	0.767262	0.4433
REGION	596.3325	5150.710	0.115777	0.9079
SUBSME	-0.012879	0.023171	-0.555845	0.5786
SUBRES	0.003631	0.043722	0.083047	0.9338
SECTOR	-6246.325	5204.113	-1.200267	0.2306
SEGMENT	5323.538	5815.291	0.915438	0.3604

TABLE C3. Fixed effect model with y_3 as dependent variable.

Dependent Variable: Y3
Method: Panel Least Squares
Sample: 2012 2017
Periods included: 6
Cross-sections included: 109
Total panel (balanced) observations: 654

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
C	0.164910	0.018593	8.869323	0.0000
AGE	0.002132	0.002528	0.843459	0.3994
DUMMY	**0.095636**	**0.036138**	**2.646412**	**0.0084**
FINANCIAL RISK	-0.001724	0.002116	-0.814843	0.4155
MARKET RISK	-0.002128	0.003048	-0.698200	0.4854
RESOURCES RISK	-0.001004	0.003169	-0.316887	0.7515
TECHNOLOGY RISK	-0.000878	0.002891	-0.303741	0.7614
IMPACT	0.000559	0.001097	0.509882	0.6103
INTERNATIONAL	-0.055701	0.079816	-0.697862	0.4856
NOVELTY	0.001530	0.002425	0.630979	0.5283
REGION	0.010065	0.025460	0.395335	0.6928
SUBSME	-4.06E-08	1.15E-07	-0.354420	0.7232
SUBRES	2.73E-08	2.16E-07	0.126180	0.8996
SECTOR	-0.024112	0.025724	-0.937312	0.3490
SEGMENT	0.018257	0.028745	0.635141	0.5256

TABLE C4. Random effect model with y_1 as dependent variable.

Dependent Variable: Y1
Method: Panel EGLS (Cross-section random effects)
Sample: 2012 2017
Periods included: 6
Cross-sections included: 109
Total panel (balanced) observations: 654
Swamy and Arora estimator of component variances

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
C	306959.1	55916.39	5.489609	0.0000
AGE	-521.6125	1720.227	-0.303223	0.7618
DUMMY	**68283.34**	**24442.45**	**2.793637**	**0.0054**
FINANCIAL RISK	1819.128	1439.753	1.263500	0.2069
MARKET RISK	-666.3790	2074.341	-0.321248	0.7481
RESOURCES RISK	-2710.957	2156.834	-1.256915	0.2092
TECHNOLOGY RISK	1737.230	1967.608	0.882915	0.3776
IMPACT	-1266.223	746.3223	-1.696617	0.0903
INTERNATIONAL	-140.1715	54316.33	-0.002581	0.9979
NOVELTY	456.1223	1650.582	0.276340	0.7824
REGION	-1283.868	17325.88	-0.074101	0.9410
SUBSME	-0.013965	0.077932	-0.179196	0.8578
SUBRES	-0.029926	0.147074	-0.203478	0.8388
SECTOR	2039.001	17507.89	0.116462	0.9073
SEGMENT	944.3772	19566.88	0.048264	0.9615

TABLE C5. Random effect model with y_2 as dependent variable.

Dependent Variable: Y2
Method: Panel EGLS (Cross-section random effects)
Sample: 2012 2017
Periods included: 6
Cross-sections included: 109
Total panel (balanced) observations: 654
Swamy and Arora estimator of component variances

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
C	51719.32	12505.25	4.135807	0.0000
AGE	418.4196	509.3369	0.821499	0.4117
DUMMY	**24454.73**	**7202.555**	**3.395285**	**0.0007**
FINANCIAL RISK	283.9098	426.2120	0.666123	0.5056
MARKET RISK	-393.8126	614.1545	-0.641227	0.5216
RESOURCES RISK	-396.3713	638.6113	-0.620677	0.5350
TECHNOLOGY RISK	-129.8232	582.5926	-0.222837	0.8237
IMPACT	-175.8544	220.9660	-0.795844	0.4264
INTERNATIONAL	-2582.238	16082.42	-0.160563	0.8725
NOVELTY	391.2312	488.7257	0.800513	0.4237
REGION	109.4580	5129.912	0.021337	0.9830
SUBSME	-0.005413	0.023072	-0.234616	0.8146
SUBRES	0.010334	0.043546	0.237305	0.8125
SECTOR	-5646.156	5184.359	-1.089075	0.2765
SEGMENT	4110.143	5794.730	0.709290	0.4784

TABLE C6. Random effect model with y_3 as dependent variable.

Dependent Variable: Y3
Method: Panel EGLS (Cross-section random effects)
Sample: 2012 2017
Periods included: 6
Cross-sections included: 109
Total panel (balanced) observations: 654
Swamy and Arora estimator of component variances

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
C	0.165997	0.030811	5.387611	0.0000
AGE	0.001994	0.002481	0.803465	0.4220
DUMMY	**0.092055**	**0.033819**	**2.722024**	**0.0067**
FINANCIAL RISK	-0.001528	0.002074	-0.737025	0.4614
MARKET RISK	-0.001759	0.002991	-0.588157	0.5566
RESOURCES RISK	-0.001475	0.003111	-0.474061	0.6356
TECHNOLOGY RISK	-0.001220	0.002838	-0.429931	0.6674
IMPACT	0.000616	0.001076	0.572400	0.5673
INTERNATIONAL	-0.023207	0.078346	-0.296212	0.7672
NOVELTY	0.001367	0.002381	0.573909	0.5662
REGION	9.89E-05	0.024987	0.003959	0.9968
SUBSME	1.36E-08	1.12E-07	0.121406	0.9034
SUBRES	9.17E-08	2.12E-07	0.432124	0.6658
SECTOR	-0.020638	0.025275	-0.816540	0.4145
SEGMENT	0.010517	0.028278	0.371915	0.7101

TABLE C7. Fixed effect model with y_1 as dependent variable.

Dependent Variable: y1
Method: Panel Least Squares
Sample: 2012 2017
Periods included: 6
Cross-sections included: 109
Total panel (balanced) observations: 654

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
C	306468.0	16936.55	18.09507	0.0000
DUMMY	71878.81	36434.41	1.972828	0.0490
IMPACT	-759.1528	359.5564	-2.111359	0.0352

TABLE C8. Fixed effect model with y_1 as dependent variable.

Dependent Variable: y1
Method: Panel EGLS (Cross-section random effects)
Sample: 2012 2017
Periods included: 6
Cross-sections included: 109
Total panel (balanced) observations: 654
Swamy and Arora estimator of component variances

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
C	332979.7	8960.049	37.16271	0.0000
IMPACT	2676.968	1595.128	1.678215	0.0938
IMPACT^2	-33.59523	17.48130	-1.921781	0.0551

TABLE C9. Random effect model with y_1 as dependent variable.

Dependent Variable: y1
Method: Panel EGLS (Cross-section random effects)
Sample: 2012 2017
Periods included: 6
Cross-sections included: 109
Total panel (balanced) observations: 654
Swamy and Arora estimator of component variances

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
C	332979.7	8960.049	37.16271	0.0000
IMPACT	2676.968	1595.128	1.678215	0.0938
IMPACT^2	-33.59523	17.48130	-1.921781	0.0551

TABLE C10. Correlated Random Effects – Hausman test.

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

TEST SUMMARY	CHI-SQ. STATISTIC	CHI-SQ. D.F.	PROB.
Cross-section random	1.483305	2	0.4763

Cross-section random effects test comparisons:

VARIABLE	FIXED	RANDOM	VAR(DIFF.)	PROB.
IMPACT	2684.105967	2676.968016	8616.829963	0.9387
IMPACT^2	-33.598725	-33.595234	1.179058	0.9974

TABLE C11. Random effect model with y_2 as dependent variable.

Dependent Variable: y2
Method: Panel EGLS (Cross-section random effects)
Sample: 2012 2017
Periods included: 6
Cross-sections included: 109
Total panel (balanced) observations: 654
Swamy and Arora estimator of component variances

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
C	54337.57	4640.752	11.70878	0.0000
DUMMY	**14395.48**	**8473.547**	**1.698873**	**0.0898**

TABLE C12. Random effect model with y_3 as dependent variable.

Dependent Variable: y3
Method: Panel EGLS (Cross-section random effects)
Sample (adjusted): 2015 2017
Periods included: 3
Cross-sections included: 109
Total panel (balanced) observations: 327
Swamy and Arora estimator of component variances

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
C	0.267702	0.025281	10.58914	0.0000
DUMMY(-3)	**-0.179068**	**0.075242**	**-2.379876**	**0.0179**

TABLE C13. Random effect model with y_3 as dependent variable.

Dependent Variable: Y3
Method: Panel EGLS (Cross-section random effects)
Sample (adjusted): 2014 2017
Periods included: 4
Cross-sections included: 109
Total panel (balanced) observations: 436
Swamy and Arora estimator of component variances

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
C	0.188855	0.016820	11.22779	0.0000
FINANCIAL RISK(-2)	0.011262	0.003318	3.393996	0.0008
MARKET RISK(-2)	0.016477	0.004177	3.944280	0.0001
IMPACT(-2)	-0.002540	0.001505	-1.688283	0.0921
NOVELTY(-2)	-0.009262	0.003000	-3.087701	0.0021

APPENDIX D. INTERNATIONAL BENCHMARKS

D1 SMART BUILT ENVIRONMENT, SWEDEN, FIRST PHASE 2015–2018

PROGRAMME FEATURES	
Funding body	Vinnova, Formas, The Swedish Energy Agency
Programme duration	First phase: 2015–2018 (2016–2028)
Budget	200 MSEK first three years
Nr and type of beneficiaries supported	60 beneficiaries in the academia, industry and public sector
Type of support offered (key words)	Open workshops, test bed portal, dialogues, communication tools

D1.1 SHORT OVERVIEW OF PROGRAMME

CONTEXT OF THE PROGRAMME

Every year the Swedish Government invests 3 billion SEK in research and innovation. In comparison to other countries, Sweden stands out in high investments in innovation the private and public sector. The Ministry of Enterprise and Innovation has enabled the impor-tance of collaboration. The last years the Government has made several investments in need and challenge driven innovation, such as the needs-driven innovation programme (UDI) and the strategic collaboration pro-gramme, which shall develop new sustainable solutions and promote innovation partnerships between industry, the public sector and universities and institutes.[22, 23] Examples of co-creation and end-user participation can

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[22] https://www.vinnova.se/globalassets/mikrosajter/utmaningsdriven-innovation/dokument/udi-informationsmote-juni-2018.pdf
[23] https://www.regeringen.se/regeringens-politik/innovation/mal-for-innovation/

be found in test labs. In 2016 the Government launched TestBed Sweden and in 2018 the Government distributed MSEK 25 to develop and stimulate test and demonstration environments in the public and private sector.[24] Other examples of end-user participation can be found in Vinnova's (the Swedish Agency for Innovation Systems) investment in Policy Labs where the actors jointly find innovative methods in areas such as transport, sharing economy and finance. The purpose is to include citizens, companies and the civil society in the forming of innovative policy development and governance of public authorities.[25] In 2017 Sweden adopted the National Procurement Strategy, which states that all public procurement shall be efficient, promote innovative solutions and take into account environmental and social aspects. Furthermore, the strategy states that innovative procurements shall become a part of the public authorities' organisational development. In 2015 the Government established the National Agency for Public Procurement to promote efficient and sustainable public procurement by providing practical guidance, criteria and support in the procurement process, however, the agency does not offer funding.[26] Similar to the Finnish initiative KEINO, the objective of the National Agency of

Public Procurement to increase innovative and sustainable procurements and to provide support for contracting authorities.[27]

The strategic innovation areas were implemented by three R&D funding agencies: Formas, the Swedish Energy Agency and Vinnova by using two types of instruments: Strategic Innovation Agendas and Strategic Innovation programmes. (SIPs) The SIPs emerged from the identified strategic research- and innovation areas that promoted collaboration between academia, industry and society.[28, 29] They were introduced in 2012 and are funding initiatives where leading actors from industry, academia and public sectors collaborate within areas that are strategically important for Sweden. The SIPs shall promote the implementation of the Strategic Innovation Agendas with overall objective to create prerequisites for sustainable solutions for the global societal challenges and promote international competitiveness. Through a bottom up process, the SIPs are developed together with a group of stakeholders that formulates visions and goals for their common agenda. The purpose is to collect national competence, stimulate investments in innovation and enable new collaboration and networks.[30] Although Sweden has a long history of

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24 https://www.regeringen.se/pressmeddelanden/2016/09/845-miljoner-kronor-till-en-kraftsamling-for-innovation/
25 https://www.vinnova.se/m/smart-policyutveckling/nationella-och-internationella-policylabb/
26 https://www.upphandlingsmyndigheten.se/en/omossmeny/about-us/uppgifter/
27 https://www.hankintakeino.fi/en
28 (prop. 2008/09:50)
29 https://www.vr.se/analys-och-uppdrag/vi-analyserar-och-utvarderar/alla-publikationer/publikationer/2015-05-11-evaluation-of-the-strategic-research-area-initiative-2010-2014.html
30 https://www.vinnova.se/m/strategiska-innovationsprogram/

public-private partnership, the private and public collaboration in the Built Environment is a relatively new phenomenon and the programme is one of the biggest investments in Built Environment.[31] The Smart Built Environment programme is one of 17 SIPs and is based on several strategic innovation agendas but primarily based on the agenda called ICT BIM for Sustainability in the Built Environment.[32]

Similar to the Finnish programme Built Environment, the Smart Built Environment programme aims to make the building sector user-centric; both programmes focus on Built Environment, however Smart Built Environment is rather targeting the challenges in the Built Environment by using digitalisation, which can provide another perspective on the Built Environment. Some projects and calls in the Built Environment programme have a focus on building information management, such as the LCFIN2 call. The Swedish programme focuses on developing new business practices and methods, hence it has a focus on changing the behaviour within the sector. The Finnish programme Built Environment faced problems with goals being too ambitious, partly because it can be difficult to implement fast changes in the construction market. The Smart Built Environment has developed an impact logic that aims to tie the activities to results and, short- and long-term goals. This can provide a good example of how to set up goals in a sector where new ideas take time to implement. The Swedish programme also shares features with the Witty City programme regarding traffic and infrastructure and one of its focus areas is targeting methods for public procurement. The SIPs can be compared to the discontinued Finnish SHOKs competence centres. The design of the SIPs can provide inspiration to Business Finland's future programme structure. The SIPs provide a unique structure where the programmes are focused on a bottom up process where the users are a part of the process and promotes public-private collaboration.

PROGRAMME GOALS

The programme was introduced to use digitalisation as a tool to address the following challenges in the Built Environment sector: low productivity, long lead-time, and negative impact on the environment The purpose was also to bring in actors from outside the sector. The Built Environment sector is the single largest industry in Sweden and accounts for about half of the national wealth of Sweden, however, the sector is fragmented with many different actors and processes. To reform the Built Environment sector by using digitalisation therefore requires cooperation with many actors and the ability to change long-term patterns.[33] From a bigger perspective, the programme addresses housing shortages, need for

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31   Interview 190108
32   https://www.smartbuilt.se/library/1766/agenda-smart-built-environment.pdf, p.4
33   https://www.vinnova.se/contentassets/bd665965db654ec68132d17841f1e8a9/utvardering-strategiska-innovationsprogram.pdf

robust infrastructure, climate changes, urbanisation and demographical changes. The programme is addressing the overall problem with the lack of public funding for the Built Environment sector.[34]

The vision of the programme is a *sustainable Built Environment and maximum user benefits through efficient information management and industrial processes*.[35] The overall goals to be achieved by 2030 are: reduce the environmental impact by 40%, reduce planning and construction time by 33%, reduce total construction by 33% and enable new business logic in the Built Environment sector. The results for the sector and impact on society can be found in appendix 1. The programme promotes the potential of using BIM and industrial processes in the sector in order to make the sector more effective. However, this requires that the traditional working methods and long-established patterns and behaviours of the stakeholders must be changed. The programme also aims to change the behaviour of the sector towards prioritising a sustainable Built Environment. The life-cycle perspective should be considered in areas such as planning, design, construction and facility management. This is also related to the goal of the programme to re-

duce the environmental impact by 40%. As indicated in the programme's result for the sector, the programme aims to bring a customer-centric perspective to the sector through projects that focus on including the costumer in the building process.[36]

GOVERNANCE OF THE PROGRAMME

IQ Samhällsbyggnad[37] coordinates the programme and has the overall administrative responsibility for the management of the programme. Its secretariat consists of one programme director, one strategic programme director and two communicators. In five of the eight focus areas of the programme there exists strategic projects. Each one of these five have commissioned a coordinator with the responsibility to coordinate the strategic projects. The secretary and the coordinators form the programme management. In 2018, the Smart Built Environment programme had over 60 partners from the industry, research and public organisations, however, in total 120 organisations are registered as partners of the programme. The programme board consist of representatives from the partner organisations.

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34   Interview, 190108
35   https://www.smartbuilt.se/library/1766/agenda-smart-built-environment.pdf
36   https://www.smartbuilt.se/projekt/nya-tillaempningar/smaahus/
37   The Swedish Centre for innovation and quality in the Built Environment (IQ Samhällsbyggnad) is a member organisation for companies and organizations in the built environment sector that combines research and innovation issues with cross-border collaboration.

D1.2 PROGRAMME IMPLEMENTATION

FUNDING

The programme offers funding in two forms: open calls and strategic calls. During the programme's first three years, 35 projects + 18 strategic projects have been initiated through strategic research calls.[38] Three of the five of the calls have had direct focus on innovative working methods or solutions on identified challenges. In contrast to the strategic calls, open calls have been given a greater independence. Open research calls and strategic projects have been initiated in eight areas: Standardising, Research platform, Competency development, Life cycle perspective, Innovation lab, Business models, Law, regulation and organisation and Innovation and new applications. The programme enables the whole value chain in the processes of planning, construction and management.[39] In order to ensure that the commercialisation potential of the project the results of the projects must have potential to be put in the practice in 3–5 years. In all projects at least one actor from the public or private sector must be included. For the strategic calls, the programme has developed a specific process for initiating projects. From suggestions from the programme management, the board elects a process leader and for six months the process leader has the mission to define the prioritised projects in an open process with other actors in the sector. During the process background research, interviews and open workshops are carried out in order to identify strategic projects.[40]

ACTIVITIES AND OTHER MODE OF SUPPORT

The programme has offered services and activities like test beds and Test beds portal, seminars, workshops, partner network, project leader conference and other conferences and communication tools. To ensure that innovative solutions will be applied among the actors, the programme have supported the development of test beds and demonstration arenas. The programme has created a "Test bed portal" where a virtual portal has been developed to stimulate dialogue and bring together ideas and project results with actors that have resources to try the ideas.

The over 60 partners of the programme are given formal opportunities to influence the strategy and direction of the programme through the Annual General Meetings and in informal meetings in the partner networks. The partners have also helped with funding calls description and writing referral answers to departments. Beside from workshops and seminars the programme has carried out several open workshops such as the "Idea workshops: Innovation lab" where actors from the private, public and research sectors participate to discuss possibilities

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[38]   Self-evaluation report Smart Built Environment 180531, p.15
[39]   https://www.vinnova.se/contentassets/bd665965db654ec68132d17841f1e8a9/utvardering-strategiska-innovationsprogram.pdf
[40]   Self-evaluation report Smart Built Environment 180531, p.18

in relation to the Built Environment process.[41] Moreover, the programme offers tools on its website to support the projects, this involved guidelines for reporting, communication material and presentation material about the programme in forms of PowerPoints, movies, graphical templates and templates and instructions for a communication plan.[42]

Within the programme a national platform is run for Swedish participation in the EU framework programme for research and innovation. In addition, partner networks have been created throughout the programme where actors with joint needs and interests have been tied together. The programme has organised meeting in four cities in Sweden.[43]

In 2018 Vinnova, Formas and the Swedish Energy Agency commissioned external experts carried out the first three-year evaluation of 5 of the 17 strategic innovation programmes. The purpose with the three-year evaluation is to evaluate how the programmes have managed to establish themselves, examine the strengths and provide recommendations for the future. Aspects that were examined included: leadership, openness and impartially, how they carried out the strategy, communication and project support. In the long term, the vison is that the programmes will scale-up and develop towards a stronger international position and competitiveness. The evaluation provided recommendations that will im-

prove the future implementation of the programme.[44] In 2019–2020 Vinnova, Formas and the Swedish energy agency have commissioned a consult agency (Technopolis Group) to evaluate the 17 strategic innovation programmes. The purpose of the evaluation is to identify results and effects in order to provide a basis for the authorities' decision on continued funding and to provide support for the future development of the SIPs.

ASSESSMENT OF THE IMPLEMENTATION MECHANISMS

The programme aimed to change the working methods, long-term old patterns in the Built Environment sector and to bring actors that don't usually interacts together. This is made by the initiating process of strategic projects, the open workshops, partner networks, test beds and virtual test beds portal. These are providing dialogues arenas to different actors to meet and finds new methods of working together.

The Smart Built Environment programme have had some synergy with the other 17 strategic innovation programmes, for instance Infra Sweden and Re:Source. However, this is something that will be strengthened in the future. The programme participated in a SIP-conference in 2016 with the other programmes which provided an opportunity for experience-sharing. Other collaborations include the Swedish Environmental Protection

41   Self-evaluation report Smart Built Environment 180531 p. 12-13
42   Ibid, p. 24
43   Ibid. P.23
44   https://www.vinnova.se/contentassets/bd665965db654ec68132d17841f1e8a9/utvardering-strategiska-innovationsprogram.pdf

Agency and InfraSweden 2030 to cooperate with funding calls and innovation competitions. The programme has had a collaboration with the research programme E2B2 and the Finnish sister program Kira-Digi, however, the impact remains to see. Overall, the collaborations have made it possible to bring in new partners in to the projects and allowed for experience-sharing between different areas.

D.1.3 EVIDENCE OF IMPACT
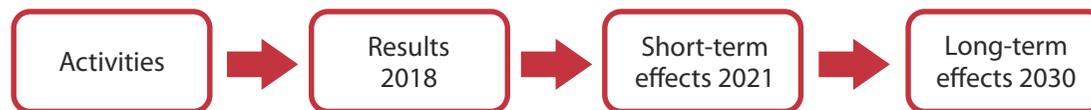
IMPACT MEASUREMENT

All the SIPs are required to develop an impact logic[45] for every three-year period in order to ensure measurable effect analyses. All calls have been related to expected effects, connected to every area of focus and based on evaluation criteria. The impact logic of the programme connects the activities with the result of every three-

year period and short- and long-term effects of the programme.[46] The impact logic is illustrated in the figure below.

One example of this process is how the activity "Innovation Labs" in 2018 resulted in 10 innovative procurements, 6 project applications to Bygginnovation, and 15 test pilots. These are connected to the short-term effects 2022 "Increased productivity" and "5 new services/products" which addresses the long-term effects "Reduce planning and construction time by 33%". Through one of its projects the programme has developed *Programme generic methods* for measuring which measures the effects of the programme qualitatively and quantitively.[47] By carrying out interviews, surveys and dialogues it looks at indicators such as collaboration with the academia, definitions of digitalisation and industrialisation and the introduction of new practices.[48]

The impact of the programme is communicated to policy makers through the three-year evaluation as well as the up-coming evaluation in 2019–2020. In addition, the programme has written referral responses to the Ministry of Enterprise and Innovation regarding their reports and deliberations.[49] The impact of the programme has also been communicated through its participation in seminars and discussions in the Swedish politicians' week, Almedalen, in 2016, 2017 and 2018.

FIGURE D1. Impact logic of Smart Built Environment.

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45   Effekt logic in Swedish
46   https://www.vinnova.se/contentassets/bd665965db654ec68132d17841f1e8a9/utvardering-strategiska-innovationsprogram.pdf
47   Self-evaluation report Smart Built Environment 180531, p. 12
48   https://www.smartbuilt.se/library/4412/generiska-maetmetoder_resultatoeversikt-maetning-1_engstroem-och-moscati.pdf
49   https://www.regeringen.se/4af96b/contentassets/f0d932955d3542fea01d9a744b94dbbe/smart-built-environment.pdf

RESULTS AND ADDED VALUE OF THE PROGRAMME

In 2018 IQ Samhällsbyggnad did a self-evaluation of the programme. The main conclusions from the report are that the programme provided:
- New partner constellations
- Communication support to the participating actors
- Coordination of the strategic projects

Through the projects, organisations and individuals who works in nearby areas but never have interacted, now co-operates. The new actors' constellation can be seen in the initiated projects. The partners are representing a broad mix of the sector as property owners, construction and installation contractors, consultants, architects, authorities, municipalities, universities and interest organisations. The partners are engaged in different networks for experience-sharing and for the continuous impact of the direction of the programme. Through the initiation process for strategic projects actors with common needs and interests have been brought together and created networks. As an effect of the many initiated dialogues, new project support has been developed, as project leader conferences and collaboration meetings between the focus areas. Moreover, the impact logic gives a long-term structure of the programme but at the same allows space for flexibility for the programme to adapt to new conditions and possibilities.[50]

The Smart Built Environment programme has proven to have good potential to create renewal in the innovation area.[51] In the Built Environment an information gap can be found in the exchange of information between different actors. The programme aims to develop innovative business practices to increase the overall efficiency of the sector which can be seen in the implementation of new working methods between actors from GIS and BIM. The programme is strengthening the collaboration between municipalities, the private sector and academia in a field where the public-private collaboration has not been extensive which makes it possible for the actors to jointly develop innovative solutions.[52]

IMPACT ON BEHAVIOUR CHANGE AMONG BENEFICIARIES

The many dialogues that have been initiated in the programme (workshops, open seminars, participation in panel discussions) have made it possible for the programme management to identify the sector's needs in relevant areas and being able to implement this in the programme. The programme has contributed to new constellations between actors that have not worked to-

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[50]   Self-evaluation report Smart Built Environment 180531, p.9-20
[51]   Evaluation stratetic innovation programmes, Formas, november 2018, p.31
[52]   Self-evaluation report Smart Built Environment 180531, p.16

gether before. The programme has especially contributed to introduce a dialogue between actors that works in GIS and BIM which has taken historical steps and is now carried out at a level that allows implementation of new working methods.[53]

D1.4 CONCLUSIONS

The three-year evaluation of the Smart Built Environment programme stated that the programme has managed to gather relevant actors in its area. The programme has established resources and tools for communication for the project leaders that are easily accessible on the website. The continuous dialogue with the programme board and its beneficiaries has make it possible to continually identify areas with improvement potential. This has contributed to make the programme up-to-date and driven by the needs of the participating actors. Examples of this are the developed project supports such as the project leader conferences and collaboration meetings between the focus areas. To extend the project support the programme has started several collaborations with the other 17 SIPs. The developed process of initiating strategic project has beside from including a wider collection of actors in the initiating phase, also contributed to an openness and transparency of the programme. The impact logic has been used as an important tool for strategic governance and planning of the direction of the programme. By connecting activities to goals, the programme effect chain is visible. The programme has established an easy-accessible platform for communication support for the projects on the website. The first phase of the programme has showed how the initiated dialogues has resulted in new actor constellations in the projects. The programme has contributed to the open the dialogue with the actors working in Geodata/GIS and BIM which has taken historical steps and works now at a level that allows implementation of new working methods. The programme provides an example of how to incorporate the stakeholders in the programme process and give them freedom to steer its development in the sector.

D1.5 REFERENCES

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Smart Built Environment, Self-evaluation of the strategic innovation programme Smart Built Environment. 2018-05-31

Swedish Government, prop. 2008/09:50 A boast for research and innovation https://www.regeringen.se/rattsliga-dokument/proposition/2008/10/prop.-20080950/

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[53]   Ibid. P.14-16

D1.6 SUMMARY OF PROGRAMME RESULTS AND IMPACT

RESULTS FOR THE SECTOR	IMPACT ON SOCIETY
Customer-centric sector – from fragmentation to an overall focus	World-class facilities and infrastructure
Shorter lead times – cost reductions for housing and infrastructure	Investments and construction in balance with demand
Increased profitability and exports – increased productivity, strong demand and sustainable growth	More housing construction and robust infrastructure
An internationally attractive sector – in which to invest and work	Sustainable growth and more export
Planning, design, construction and facility management are managed from a sustainable life-cycle perspective	Enhanced skills and international competitiveness
	Sustainable Built Environment

Source: https://www.smartbuilt.se/library/1766/agenda-smart-built-environment.pdf

D2   SMART HOUSING SMÅLAND, SWEDEN, 2013–2023

PROGRAMME FEATURES	
Funding body	Main financier: Vinnova – the Swedish Governmental Agency for Innovation Systems, through the 'Vinnväxt'-programme
	Other financiers: Region Jönköping County, Region Kalmar County (*Regionförbundet i Kalmar län*), Region Kronoberg, the County Administrative Board of Jönköping, County Administrative Board Kalmar and County Administrative Board Kronoberg.
Programme duration	2013–2023 (ongoing)
Budget	16 MSEK/year
Nr and type of beneficiaries supported	Approx. 40 finished projects and 25 ongoing = approx. 65 projects in total
Type of support offered (key words)	Project funding, project support, workshops, seminars, networks, coaching for companies, collaboration opportunities in the shape of "meeting-platform", learning activities and international knowledge exchanges
Material	An interview with Mikael Ludvigsson and Kirsi Jarnerö (contact persons of SHS) and an international evaluation conducted on behalf of Vinnova named *Shaping the Future now – Good Start! International evaluation of Geo Life Region, Smart Housing Småland and The Paper Province 2,* written by: Lisa de Propris, Markku Sotarauta, Peter A Hecker, Roya Ayazi, Berit Time, Jan Belis, Tiina Pursula & Jack Saddler, edited by: Marit Thunberg Werner (Vinnova)

D2.1   SHORT OVERVIEW OF PROGRAMME

The innovation platform or programme Smart Housing Småland (SHS) was created in 2013 as a 'Vinnväxt'-initiative to meet future challenges and promote sustainable development in the housing sector. It is intended as a catalyst and engine for the local business community and the regional growth and innovation system of the Småland region, a system largely shaped around Småland's industrial strengths; wood and glass. The vision of SHS is to become an internationally leading innovation environment that creates smart living and a sustainable Built Environment, where end-user needs are at the centre of attention. In order to reach this vision SHS facilitates collective knowledge production and learning experiences in close collaboration with local actors of Småland's innovation system; the academic world, the business community and local public authorities (in

accordance with the triple helix-model). Concludingly, SHS main fields of interest are digital development, construction and living conditions.[54]

The 'Vinnväxt'-programme is furthermore one of the measures that the Swedish Governmental Agency for Innovation Systems (Vinnova) has developed to promote sustainable growth in Sweden's regions, through the improvement of innovation conditions and the stimulation of public-private (and international) collaborations, in accordance with the triple helix model. 'Vinnväxt' is moreover a competition with open calls, as most of Vinnova's measures are, where Swedish regions are able to receive funding if they successfully incorporate one (or more) of Vinnova's six prioritised areas (smart cities, transport, connected industry, material, health and circular economy), and in addition to this ensure that the initiative contributes to sustainable development, gender equality, the Agenda 2030 goals, and sufficiently promotes public-private collaborations.[55]

Vinnova is also assigned the mission to contribute to sustainable growth by improving Sweden's conditions for innovation. This task was assigned to Vinnova by the Swedish Government through The Ministry of Enterprise and Innovation. Vinnova is one of the agencies commissioned to sustain Sweden's innovation policy programmes, labelled Innovation partnership programmes – mobilising new ways to meet societal challenge. The priorities listed in these programmes are the following: The next generation's travel and transport; Smart cities; Circular and bio-based economy; Life sciences; A connected industry and new materials. The priorities mirror the six priority areas of Vinnova.[56]

RELEVANCE OF SMART HOUSING SMÅLAND TO THE BUSINESS FINLAND PROGRAMMES

SHS is of relevance to the Business Finland programmes since it deals with key features of the Business Finland programmes; end-user activities, collaborations between public and private sector, co-creation, and innovative procurement. The programme has also been evaluated by Vinnova as part of its funding from the 'Vinnväxt'-programme. The Business Finland programmes SHS mostly resembles are Built Environment (Rakennettu ympäristö) and Witty City (Fiksu Kaupunki) and there are also features of the Smart Procurement (Huippuostatjat) programme present in SHS. Furthermore, SHS is a relevant comparison to the Business Finland programmes as it deals with features of co-creation, end-user involvement, innovative procurement, innovation and public-private collaboration to change common practices and meet future demands of sustainability within the innovation sector – similarly to the Business Finland programmes.

54 http://smarthousing.nu/en/wp-content/uploads/2018/04/2017_SHS_Annual_Report_ENG.pdf, http://smarthousing.nu/en/
55 https://www.vinnova.se/om-oss/sveriges-innovationsmyndighet/om-vinnova/,
    https://www.vinnova.se/m/vinnvaxt/om-vinnvaxt/, http://smarthousing.nu/wp-content/uploads/2014/04/SHS-Verksamhetsberattelse-2016.pdf
56 https://www.regeringen.se/regeringens-politik/innovation/mal-for-innovation/,
    https://www.government.se/articles/2016/07/innovation-partnership-programmes--mobilising-new-ways-to-meet-societal-challenges/

PROGRAMME GOALS

As mentioned, SHS aims at increased competitiveness and sustainable growth by creating good collaborations between academia and local businesses within the two forefront sectors of Småland – wood and glass – and is therefore intended to develop measures which will help the glass and wood industry to shift into a more environmentally friendly state. To obtain this principal objective a number of measures are taken by the programme, such as innovation and development support, project support (short and long-term funding), theme groups, learning opportunities and internationalisation. The aim of the programme is furthermore to help the Småland region learn to collaborate for wood and glass sector innovation and also help local firms to upgrade their businesses to better match future needs. These particular aims appear to be especially important since the housing business of Småland is already well-established but in need of a kick-start to manage to shift into a more innovative and growth providing direction where sustainable development is at centre and where the end-user needs are taken into account in the production processes. The innovation platform of SHS also has sub-goals to obtain within the business plan in the following fields: meeting-platforms,

pilot studies and business development projects, prototypes and demonstration projects, city development projects, RDI-projects, internationalisation, learning strategies and activities (including ongoing evaluation and communication). These sub-goals, combined with objectives of sustainable development and gender equality, are set up in order to obtain the principal objective and to support behavioural changes amongst the programme's beneficiaries.[57]

D2.2 GOVERNANCE OF THE PROGRAMME

Building Technology[58] – a sub-division of the Research Institute of Sweden's (RISE) division RISE Built Environment – is the leading organisation of SHS. Building Technology runs SHS in close collaboration with the non-profit organisation Träcentrum. Other close collaboration partners are local companies, the three county administrative boards of Småland, the county federations of Småland, RISE Glass (before Glafo – the Swedish Glass Research Institute), Linnaeus University and Jönköping University. These recounted organisations govern the programme and coordinates the provision of support (funding, services and activities) to the programme beneficiaries (parties and stakeholders of the local triple helix).[59]

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[57]   http://smarthousing.nu/smart-housing-smaland/, http://smarthousing.nu/wp-content/uploads/2014/04/Arsrapport-Smart-Housing-Smaland-20131.pdf
[58]   https://www.sp.se/en/units/risebuilt/hallbarsamhallsbyggnad/Sidor/default.aspx
[59]   http://smarthousing.nu/wp-content/uploads/2018/02/SHS_verksamhet_2017_webb.pdf, http://smarthousing.nu/smart-housing-smaland/,
       The interview conducted with the contact persons of SHS Mikael Ludvigsson and Kirsi Jarnerö

D2.3 PROGRAMME IMPLEMENTATION

DESCRIPTION OF THE IMPLEMENTATION MECHANISMS

Modes of support delivered to beneficiaries of SHS consist mainly of the provision of funding to projects and innovation efforts, but also the main offerings derived from the meeting-platform of SHS. These offerings encompass networking and innovation support and consist mainly of project support, theme groups, coaching for companies, internationalisation and learning activities as well as workshops, seminars and collaboration opportunities.[60]

FUNDING

Funding is offered by the SHS-programme in two ways: funding of pilot studies/business development projects, and basic seed funding. Regarding business development projects, larger or semi-large pilot studies or business development projects receive funding up to SEK 200,000 if they contribute with 50% additional in-kind means (own work and/or other direct implementation costs of the project). In addition to this, the projects must ensure the involvement of at least one local business partner and one local academic partner or at least more than one local academic partner, to receive SHS funding. The funding should primarily finance the participation expenses of academia or institutes involved in the projects, but costs for consultants or architects might also be financed in some cases.[61]

Regarding seed funding, the programme contributes with funding to write R&D project applications for (other) research financiers if the project aims to support the construction of the SHS innovation environment and its programme vision. Local anchorage is important, since at least one local academic partner or institute should be part of the planned R&D project, and, in addition to this, the project should preferably incorporate one or several local companies or public organisations. Seed funding from SHS usually amounts to SEK 20,000–50,000, and a maximum of 50% of the application cost is covered.[62]

ACTIVITIES OR OTHER MODES OF SUPPORT

SHS supports the entire innovation chain, both in terms of financing (as described above) as well as through the provision of services and activities derived from the SHS meeting-platform. The activities and services include hands-on innovation support (initiating projects, concept development and project development support), coaching for companies, competence maintenance, monitoring support, internationalisation, learning activities, collaboration and networking opportunities, workshops, seminars, theme days, Hackathons, and theme groups.

[60] http://smarthousing.nu/wp-content/uploads/2018/02/SHS_verksamhet_2017_webb.pdf, http://smarthousing.nu/smart-housing-smaland/,
The interview conducted with the contact persons of SHS Mikael Ludvigsson and Kirsi Jarnerö

[61] http://smarthousing.nu/medverka/, The interview conducted with the contact persons of SHS Mikael Ludvigsson and Kirsi Jarnerö

[62] http://smarthousing.nu/medverka/, The interview conducted with the contact persons of SHS Mikael Ludvigsson and Kirsi Jarnerö

FIGURE D2. The innovation support chain of SHS. Source: Smarthousing. nu/2018/09/smart-housing-smaland-stodjer-innovationsprocessen

Noteworthy is also that the modes of support primarily offered by the programme are derived from the meeting-platform concept, since it enables the presence of a locally anchored and well-functioning innovation system.[63]

Innovation support consists primarily of help with initiating projects, developing concepts and ideas, and basic project development support.[64]

Theme groups are focus groups, interest groups or networks within a certain area of development such as fire or a certain building skill, exports and the like, where the beneficiaries meet and engage in developing activ-ities surrounding the principal theme. The activities within these theme groups result in projects, research proposals or applications and workshops or other similar activities.[65]

The *Hackathon*-events gather different competencies such as architects, engineers and different housing companies during one day, where they, in mixed working-groups of 4–5 persons, receive a building plot in different stages and develop innovative solutions for the particular building site at hand. This type of activity is described as a kind of match-making opportunity where different stakeholders meet and possibly plant some seeds for future innovation projects.[66]

Collaboration opportunities include the workshop day, which was an event where SHS gathered different stakeholders of the housing sector to engage in discussions about animation and automation within house factories; it also planted a seed to the theme group on the same topic. *Collaboration opportunities* also include The innovative public procurement-project, which was a project for an open call from the Swedish Association of Local Authorities and Regions (SKL) to simplify housing procurement for Swedish municipalities and county councils. This particular project is furthermore an example of when the meeting-platform's collaboration opportunities has resulted in further collaboration among beneficiaries; some of them joined forces to

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63   http://smarthousing.nu/wp-content/uploads/2018/02/SHS_verksamhet_2017_webb.pdf, http://smarthousing.nu/smart-housing-smaland/, http://smarthousing.nu/2018/09/smart-housing-smaland-stodjer-innovationsprocessen/

64   http://smarthousing.nu/2018/09/smart-housing-smaland-stodjer-innovationsprocessen/

65   http://smarthousing.nu/medverka/temagrupper-inom-smart-housing-smaland/

66   http://smarthousing.nu/2018/10/hackaton-tavling-i-trabyggande-for-arkitekter-foretag-och-studenter/

create the SKL call-project after prior collaboration on a SHS project called Housing prototype 1.0 (Bostadsprototyp 1.0[67]). The BOOST-project is yet another example of when the SHS meeting-platform has resulted in further collaboration amongst beneficiaries. The abbreviation BOOST stands for Housing and housing development for strengthened growth (translated from Swedish) and is a major investment in cross-border cooperation for housing and housing development. Other collaboration services offered by SHS include support directed towards municipalities to help them to work with other parties of the triple helix (academia and businesses) better, as well as to work with the Agenda 2030 objectives. Knowledge exchanges between the SHS innovation environment and other similar innovation clusters across Europe, China and Australia are examples of the collaboration opportunities that SHS offers as well.[68]

ASSESSMENT OF THE IMPLEMENTATION MECHANISMS

Initially, there were some anticipated difficulties in the implementation of SHS service provision, since the programme is for the most part striving to make a significant behavioural change amongst its beneficiaries – beneficiaries which are active within two sectors that are quite difficult to reform. However, there have been signs of behavioural changes amongst the beneficiaries, despite the, above described initial anticipations, thanks to the character of services provided by SHS's meeting-platform concept and the combination of both financial support and services. It is furthermore due to these combined measures that there are both project success stories as well as added value in terms of increased collaboration between all parties of the local triple helix (academia, business and government). The added value of increased collaboration is furthermore one key aspect especially highlighted by the contact persons[69] of SHS (interviewed for this study), and it was also confirmed by an international evaluation team[70] appointed by Vinnova to conduct a three-year evaluation of SHS as part of the overall monitoring of the 'Vinnväxt'-programme initiatives. The international evaluation team also highlighted SHS work on services, derived from their meeting-platform, to facilitate collaboration as a specific implementation advantage. However, the entire programme period is not yet finished, so results and outcomes might not be as precise or developed now as they might be after the programme has ended.[71]

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[67]   The Housing prototype 1.0 (Bostadsprototyp 1.0) was an innovative housing model presented on the fair Almedalen Week, where beneficiaries of SHS collaborated. More information available at: http://smarthousing.nu/prototyper/prototyp-1/

[68]   http://smarthousing.nu/2018/09/smart-housing-smaland-stodjer-innovationsprocessen/, http://smarthousing.nu/boost/om-boost/, http://smarthousing.nu/wp-content/uploads/2014/04/Arsrapport-Smart-Housing-Smaland-20131.pdf, the interview conducted with the contact persons of SHS Mikael Ludvigsson and Kirsi Jarnerö

[69]   The contact persons of SHS Mikael Ludvigsson and Kirsi Jarnerö were interviewed in January 2019 as part of the material collection of this study.

[70]   The evaluation board consisted of; Lisa de Propris, Markku Sotarauta, Peter A Hecker, Roya Ayazi, Berit Time, Jan Belis, Tiina Pursula & Jack Saddler, and Marit Thunberg Werner was the coordinator from Vinnova

[71]   The interview conducted with the contact persons of SHS Mikael Ludvigsson and Kirsi Jarnerö

D2.4 EVIDENCE OF IMPACT

IMPACT MEASUREMENT

The early results of SHS were monitored through Vinnova as part of the 'Vinnväxt' initiative monitoring, which consists of ongoing evaluations of all initiatives usually every third year. Vinnova appointed an international evaluation team – as part of this ongoing evaluation – to perform a three-year evaluation on SHS back in 2016. The three-year evaluation of SHS consisted of a SWOT-analysis on SHS's objective fulfilment. The 'Vinnväxt' initiative evaluations in combination with other more overarching evaluations of the entire Vinnväxt-programme – as well as other Vinnova measures – are furthermore all parts of a larger evaluation conducted on Sweden's overall innovation policy. This entire oversight is done to assess fields of improvement, future strategies and priorities of Sweden's innovation policy, Vinnova, and the Swedish innovation programmes.[72]

RESULTS AND ADDED VALUE OF THE PROGRAMME

Early outcomes of the programme are mainly the establishment of a stable consensus regarding innovation in the glass and wood sector amongst regional key stakeholders and local parties of the triple helix, as well as a collective vision on how progress in this area could receive a well-needed kick-start through more collaboration. This particular vision is furthermore something that the evaluation by the international team also emphasised by highlighting the fact that SHS has made a significant success in mobilising local business actors to participate in the collaboration activities; activities refer to both the establishment of collaborative projects as well as opening up for a sectoral discussion. The mobilisation and the consensus building activities were also something the contact persons of SHS's implementing body mentioned as a major key outcome when interviewed as part of this study. The interviewees added a bit more onto the evaluation team's view and pointed out that they as a 'Vinnväxt' environment are dealing with large societal and system changes with the end goal to achieve sectoral change in the (house) building sector – a rather demanding task since the building sector of Sweden is very difficult to reform. But, regardless of this challenge, they have managed to establish a number of significant prototypes, projects and rather substantial collaborations between beneficiaries and parties of the local triple helix simply thanks to the SHS meeting-platform. The interviewees furthermore highlighted some explicit gains such as the establishment of an ongoing dialogue among beneficiaries as well as collaborations regarding mutual challenges where parties do not compete with each other; mostly large future societal challenges such as environmental issues, where cooperation and innovation are necessary. Nevertheless, since the

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[72] Vinnova, regreingskansliet, innovations programmen

programme is not yet finished there are some difficulties assessing whether and to what extent the measures of SHS actually have made a long-lasting impact on beneficiaries, their behaviour, and their ways of working together within the triple helix. However, there are quite a few achievements already.[73]

IMPACT ON BEHAVIOUR CHANGE AMONG BENEFICIARIES

Both the seed funding and the pilot study/business development project funding have seen recent progress according to the interviewed contact persons of SHS, as applications have increased for both of these funding measures. The interviewees also mentioned that at the last board meeting (in December 2018) the applications for the latter was at an all-time high, amounting to 11 applications. They also mentioned a couple of good examples of these types of measures, where one of them was an innovative business development project that the housing developer OBOS Sweden had created. The innovative project, called High6, was set up by OBOS in order to develop their new housing product even further, to be able to better meet market demands. The outcome of the business development project was partly successful and

OBOS managed to develop their methods enough to be able to build four stories high buildings (instead of the initial three) with their innovative approach to construction, thanks to the development funding.[74]

In terms of the services connected to the meeting-platform there have been signs amongst the beneficiaries of behavioural changes in terms of increasingly more innovative collaboration between different local businesses and other parties within the triple helix. This was confirmed by both the interviewees as well as the international evaluation team. The fact that SHS seems to be able to pool and connect parties via the meeting-platform has been underlined by both the evaluation and the interviewees as especially valuable, and the fact that SHS offers a combined mode of support is stressed to be their largest advantage. This is because it establishes valuable relationships between different beneficiaries and stakeholders within the Småland region's innovation system, and this facilitates well-needed collaborations on innovation projects, set up to meet future sector and societal needs. Moreover, two hands-on examples of what has come out of the meeting-platform are The BOOST project and The innovative public procurement-project for the SKL call established post the Housing prototype 1.0-project. The Housing prototype 1.0-project is further-

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[73] The interview conducted with the contact persons of SHS Mikael Ludvigsson and Kirsi Jarnerö and Lisa de Propris, Markku Sotarauta, Peter A Hecker, Roya Ayazi, Berit Time, Jan Belis, Tiina Pursula & Jack Saddler. Marit Thunberg Werner (Vinnova) (Ed.) (2016). Shaping the Future now – Good Start! International evaluation of Geo Life Region, Smart Housing Småland and The Paper Province 2.0, available at: https://www.vinnova.se/contentassets/0699b674b1244589936cb3131c9a0629/vr_16_11t. pdf?fbclid=IwAR3GqI4VB_FJH8JijJz9rh5pT9k46oGUXwIOnN6T_csHLWD4kMZbIUeeOrE

[74] http://smarthousing.nu/projekt/high6-tra-och-glas-i-kombination-med-digitala-plattformar/

more a good example of a successful end-user engagement project, as it incorporated the public in the product development process on the Almedalen week.[75,76]

EVIDENCE ON INTERACTION WITH OTHER PROGRAMMES, INITIATIVES, REGULATION

SHS's contact persons mentioned during the interviews conducted with them that it has been several opportunities for knowledge exchange (approximately two times a year) between the different 'Vinnväxt'-initiatives through the 'Vinnväxt'-programme, especially between the ones active in social planning and Built Environment and SHS. Programme leaders of the different initiatives have thanks to these events been able to network and exchange experiences of ups and downs throughout the whole programme, and especially in the earlier stages of the initiatives. Additionally, there is also a specific beginner's network present, that has helped to support the initiatives at the beginning of their respective programme periods. Experience exchanges between SHS and other innovative clusters within the field of housing, building and foresting have also occurred. These opportunities to share experiences and exchange knowledge were described by the interviewees as especially valua-

ble in terms of learning to lead a programme like SHS in a well-functioning direction.[77]

D2.5 CONCLUSIONS

An important success factor of the programme is the arena (the meeting platform) which SHS provides for local actors – businesses, academia and governmental bodies within the wood and glass sector – both the interview with the implementation body as well as the international evaluation performed on the initiative give evidence to this. The fact that SHS is a non-profit-seeking organisation with an overarching mission to improve and develop society through its platform is what stands out as SHS's advantage in comparison with other collaboration fora, according to the interviewees. This particular advantage exists due to the fact that SHS programme leaders operate without hidden motives and can, as such, approach all parties neutrally to be able to collectively formulate an agenda with overarching mutual objectives. Thus far, this type of approach seems to have worked really well in order to get actors within the local innovation system to join forces and get involved in collaboration activities provided by SHS. This is valuable for SHS as it, through this, comes

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[75]   Almedalen Week is a Swedish annual event with speeches, seminars and other political activities which takes place in Almedalen, Gotland

[76]   Lisa de Propris, Markku Sotarauta, Peter A Hecker, Roya Ayazi, Berit Time, Jan Belis, Tiina Pursula & Jack Saddler. Marit Thunberg Werner (Vinnova) (Ed.) (2016). Shaping the Future now – Good Start! International evaluation of Geo Life Region, Smart Housing Småland and The Paper Province 2.0, available at: https://www.vinnova.se/contentassets/0699b674b1244589936cb3131c9a0629/vr_16_11t.pdf?fbclid=IwAR3GqI4VB_FJH8JijJz9rh5pT9k46oGUXwIOnN6T_csHLWD4kMZbIUeeOrE
   The interview conducted with the contact persons of SHS Mikael Ludvigsson and Kirsi Jarnerö, http://smarthousing.nu/boost/om-boost/

[77]   Ibid.

closer to reach the programme's overarching goal; a region with increased competitiveness and sustainable growth by creating good collaborations between academia and local businesses within the two forefront sectors of Småland, wood and glass.[78]

Future expectations of SHS from both Vinnova as well as the leaders are henceforth to be able to establish a long-term-functioning model for the housing sector of Småland (and Sweden, in extension) to be able to work in a more environmentally friendly and competitive way; thus be able to achieve the principal objective(s).[79]

D3   CITY DEALS NETHERLANDS, 2015-ONGOING

PROGRAMME FEATURES	
Funding body	Ministry of the Interior and Kingdom Relations
Programme duration	2015-ongoing
Budget	€20,000 per City Deal
Nr and type of beneficiaries supported	19 City Deals
Type of support offered (key words)	Cooperation framework

D3.1   SHORT OVERVIEW OF PROGRAMME

CONTEXT OF THE PROGRAMME

The City Deals are a policy experiment of the Dutch Government, in which several departments of the central government, municipalities, businesses, civil society or-

ganisations or other societal actors jointly make agreements on specific policy initiatives. The agreements are meant to develop the cooperation context for finding innovative solutions for social and / or environmental issues, or for solving problems related to the economic ecosystem of an urban area.

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[78]   Ibid.
[79]   Ibid.

DEFINITION OF CITY DEALS UPDATED IN 2018

What is a City Deal, a definition:
- provides a tangible result for the inhabitants of the involved cities / urban regions;
- is established after a combined exploration and analysis of a thematic or region-related issue;
- has an appealing ambition to address this issue;
- stimulates agglomeration effects (between / economies of scale) door communication between and / or within urban regions;
- consists of a collaboration between various public and private parties, including the central government (multi-level-governance;
- is innovative and focused on breakthroughs, reshaping existing types of eco-systems. (Resulting in: better regulation, better financing and more knowledge sharing (as stated in the Urban Agenda for the EU)
- where possible connections are made with the Urban Agenda for the EU
- it's result is possibly not only a regional, but also an (inter) nationally appealing and scalable solution.

Reasons for not closing a City Deal/not to embark on a City Deal:
- the central government does not need to be involved, as the issue can be addressed by decentralized governmental bodies amongst themselves
- in case there is already another obvious instrument(s) (e.g. other programs) in place to the tackle the issue. Within the Dutch system, other deals are present (each with their own organisational and financial apporach such as: *'Green Deals', Regional Deals, Health Deals,* which are funded and run in other ways.
- The partners in a City Deal see the instrument as a means to lobby the Central Government for funding.
- The Deal would result in preferential position for one party involved.

Source: Information sent by the Dutch Ministry of Interior within the context of this evaluation

The programme is part of the Agenda City of the Dutch Government, which places innovation at the heart of cities. The Agenda Stad ('Agenda City') has been promoted since 2015, in tandem with the Urban Agenda for the European Union, which supports the formation of cross-EU city partnerships that make the cities' voice heard in EU-level policy-making and solve concrete urban challenges.

Albeit different in the approach to supporting innovations, as it takes an approach based on network governance and participatory development of solutions to urban challenges (in various thematic areas), the City Deals approach is relevant to the Witty City programme of Business Finland.

In addition, the City Deals are an example of a wider trend in the Dutch policy approach to support research and innovation, as framed in the *Dutch Enterprise policy* (published in 2011 and renewed with the *government coalition agreement* of 2017) and in the *Dutch Government's Science Vision 2025*. Both policies emphasise the need to support innovations that respond to grand societal challenges.

PROGRAMME GOALS

The vision of the Netherlands' Agenda Stad is to tackle the urban issues related to the economy, innovation and liveability through collaboration between the nation-al government, cities and other stakeholders. Agenda Stad has been defined by the Dutch government as a response to the increasing challenges faced by cities (e.g. population growth, pollution, economic development, well-being etc), which require concerted efforts at multiple levels.[80]
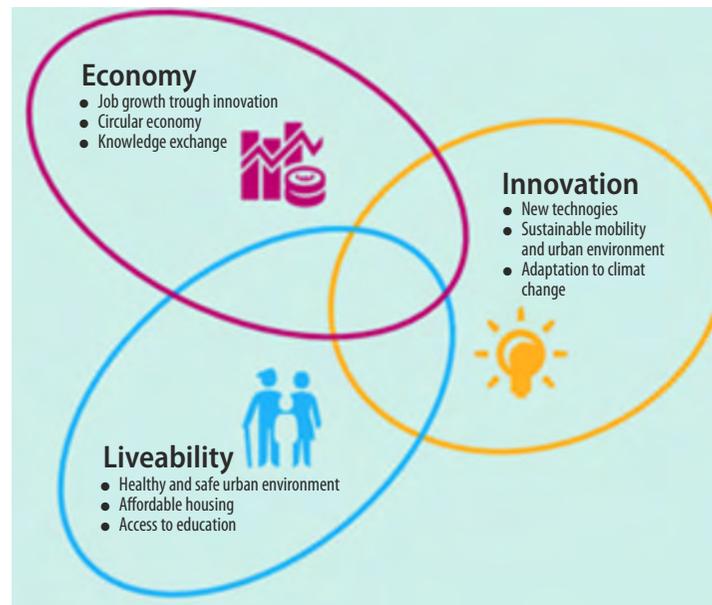
The City Deals instrument is meant to support the achievement of the vision of the Agenda Stad through enabling experimentation on collaborative processes that better enable the various parties and innovate, and accelerate 'transitions' in specific thematic areas. While not directly mentioned as a goal, stimulating behaviour change towards cooperation across multiple levels of governance is an implicit intention of the City Deals. The behaviour change is meant to happen not only in companies, but more so in local, regional or central governments.

The main goals of the City Deals include[81]:

· Harnessing innovative capacity of cities oriented to transitions / wicked problems
· Multilevel and multidisciplinary cooperation
· Stimulate experimentation and learning

Economy
● Job growth trough innovation
● Circular economy
● Knowledge exchange

Innovation
● New technogies
● Sustainable mobility and urban environment
● Adaptation to climat change

Liveability
● Healthy and safe urban environment
● Affordable housing
● Access to education

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80   See PBL, 2015, Cities in Europe, Cities in the Netherlands report
81   See PBL, 2017, Evaluatie City Deals – Vervolg, December 2017

GOVERNANCE OF THE PROGRAMME

The City Deals are a multi-stakeholder process within the Agenda Stad framework of the Dutch Government. The Agenda Stad is governed by a Steering Group composed of Directors-General of several ministries, the programme director and official representatives of cities and stakeholders, who have defined the goals of the Agenda and are actively promoting its goals. The Programme Director of the Agenda Stad is part of the Ministry of the Interior and Kingdom Relations.

The Ministry of the Interior and Kingdom Relations is also in charge of coordinating the City Deals, streamlining the various City Deal processes, and progress monitoring. It is also in charge of the retrieval and transfer of the lessons learned about the new ways of working in City Deals.

Within this framework, the City Deals have a loose governance framework, which has been coined "network governance" by the City Deals evaluation[82]. This type of governance has a non-hierarchical structure and is composed of actors across sectors. It places the working in networks as the main driver of activities. In practice, the City Deals generally got started by already existing informal groups that want to tackle a problem in the city, demonstrate a business case or identify concrete barriers (regulatory, financial, etc.) and solutions to their problems.[83]

At national level, several ministries are involved directly in the development of city deals aside from the Interior Ministry, depending on the topic of the deals: Ministry of Economic Affairs, Infrastructure and the Environment, Health, Social Affairs, Education etc. In addition, several cities can be part of a deal, as well as a number of relevant private sector, academic or community-based partners. On average, 5 cities are involved in each of the coalitions, together with other partners[84]. By 2016, there were 40 cities involved in total, with 40% of those cities participating in multiple city deals.[85]

City Deals had no prescribed way for developing the public-private-societal/ academic coalitions or for the implementation of the actions. However, a series of roles evolved in the course of implementation for the national government, the majority placing the state in the "co-acting" seat[86]:

- Facilitator: provide space for experimentation and innovation; monitor progress and facilitate learning process
- Participant: letting the cities be in charge as problem owners
- Connector: help the network develop across multiple levels of governance and actors; provide knowledge and expertise about laws and regulations

82   Ibid, PBL, December 2017
83   See PBL, 2017, Evaluatie City Deals – Notitie, May 2017
84   See Dutch Ministry of Interior, 2016: Progress Report Urban Agenda for EU and Agenda Stad
85   Ibid, Dutch Ministry of Interior, 2016
86   PBL, December 2017

- Inspiration: may formulate vision and discuss it with the parties
- Framework setting and enforcement: providing the framework for the City Deals to happen; responsibility for implementing proposed legislative changes; monitoring the status quo and making sure promises are kept.

D3.2 PROGRAMME IMPLEMENTATION

DESCRIPTION OF THE IMPLEMENTATION MECHANISMS

The Dutch government made an appeal to municipalities to propose coalitions for specific urban issues in 2014, but other city Deals have been also started through a bottom-up process, at the cities' own initiatives (e.g. on "food in the urban agenda")[87].

From the time they are announced as starting, the City Deals may last one to two years, and go through three phases:
- **Idea phase:** gathering the partners and developing the goals and objectives of the City Deal
- **Development:** prototyping actions, defining the innovative measures and identifying obstacles to their execution
- **Scaling up:** working on the removal of obstacles to the needed innovations and implementing the innovations.

City Deals have been found to be of two types in terms of geographic scope: either based on a thematic cooperation between Dutch cities, focusing on knowledge sharing and network building; or concentrated in one single urban agglomeration testing solutions that may later spread to other cities.

The City Deals also make use of different types of implementation methods:
- **Technology or solution based** (e.g. experimenting with new concepts such as innovative safety solutions, new transport modalities, affordable housing)
- **Integration of new challenges in urban policy through concrete cases** (e.g. integration of climate adaptation measures, ecosystem services in the city based on determining the economic and social value of nature and water etc.)
- **Improving the customer journey in public services offered by the city** through changing rules or eliminating rules that are counterproductive or costly for the citizens or businesses (e.g. starting a business, finding work or changing the purpose of a building).

Initially, there was no specific service or public financial support offered up-front to the City Deals, except for the dedicated staffing or coordinators from the involved public organisations. Following the 2017 mid-term evaluation, the Ministry of Interior made available €20,000 per City Deal for experts to undertake the process man-

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[87]   PBL, 2017, Evaluatie City Deals – Notitie, May 2017

agement. Some of the partners may also contribute with further funding, up to €5–7,000[88].

The City Deal is the main document where the activities and budget are defined for each city deal, and is very tailored to the context of the issue to be tackled. Depending on the case, municipalities or the ministries involved commit themselves to, e.g. co-funding market studies or research, coordinating parts of the activities proposed related to regulatory or policy issues, or indicating sources of funding for business case or technology demonstration activities from available public programmes. Co-funding from partners from the private sector is also possible but not mandatory.

The activities that may be implemented by the partners in the City Deal are very diverse, including:

- Knowledge development on the urban issue at stake: e.g. market studies, community-based research
- Testing and demonstration of solutions, including through setting up or using existing living labs
- Activities building consensus and solutions among partners (e.g. workshops, roundtable discussions etc.)
- Follow-up activities of the City Deal members from the public sector on removing regulatory obstacles, or introducing new policy instruments based on the City Deal's findings, etc.

ASSESSMENT OF THE IMPLEMENTATION MECHANISMS

One major challenge of the programme is the fact that **collaboration requires effective project or process management and leadership**, which is not always granted. The coordination of the City Deals does not always have a nominated facilitator, there are no pre-defined roles, as they evolve in time and require customization. Roles may also shift during the Deal implementation. Each City Deal defines its own management and implementation routes. The evaluation found that some City Deals lack a clear division of labour, and participants muddle through the process of developing the ideas for the City Deals. In addition, because of the nature of the problems tackled, finding solutions may take time, as partners need to understand the issue better, and resolve the potential diverging positions in the coalition.

The evaluation of City Deals[89] found that the City Deals' implementation design was considered to be **valuable through the freedom it offered to the parties working together**, and the **possibility to personalise the ways to find a solution and tailor the work to the real needs** (e.g. either of the citizens, businesses or public authorities, depending on case). This was confirmed in the interview performed within this evaluation.

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88   Information based on the interview performed within this evaluation
89   See PBL, 2017, Evaluatie City Deals – Notitie, May 2017

It has also been found that the **Deals achieve easier their goals if they are in line with existing policy processes**. The allocation of funding for the actions needed to implement results from City Deals is still performed within existing policy instruments most of the times.[90]

Most importantly, the City Deals **participants find the programme a good way to "get things done"**, which otherwise would not have got off the ground. Many consider City Deals as a new way to work together, with shorter lines between government and third partners, and was seen as a response to a rapidly changing society. It offers a new role for the national government and city governments, whose voice continues to be extremely important in solving issues at stake.[91]

In terms of needs for improvement, there was an identified **demand for facilitation services to be provided to the coalitions formed**. Due to the openness of the City Deals set up, coalition members may also feel confused about the roles they can play. In some cases, the demands of the cities may be in contradiction with those of the government. In addition, as City Deals progress in implementation, the need for professional knowledge is important. At the same time, not all participants have the same level of interest, expectations, resources or capacity to carry out the needed activities.[92]

Navigating the uncertainties created by this context requires a clearer structure for facilitation that supports the process of coming to agreements and make progress.

The facilitator should be independent, in order to keep the work focused on the goal of the City Deal as a whole, and not on individual interests.

There is also a need for better **guidance on the working conditions and expectations from the City Deals work**. This has been found as a way to speed up the City Deal formation and implementation.

However, there is a fine line to make between the benefits of a too rigid structure and the flexibility the City Deals structure leaves to the participants in finding own solutions. Importantly, **the participants need to have intrinsic motivation and be committed to the goal of the City Deal**, especially as the City Deal work is performed in parallel to or on top of regular work within their own organisations. Further challenges found include:

- commitment of the top management – it is thus necessary to have top management both from municipalities and government departments engaged, in order to carry out the commitments
- recalibrating the partnership should be possible – for this, intermediary targets were considered necessary before reaching long-term system change goals, in order to be able to adjust course if needed
- creating a basis of trust – which takes time and requires good process guidance; informal ways of communication and openness to unconventional approaches to solving problems are factors for success

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[90]   See PBL, 2017, Evaluatie City Deals – Notitie, May 2017
[91]   See PBL, 2017, Evaluatie City Deals – Notitie, May 2017
[92]   Ibid, PBL, May 2017

- the creation of a knowledge centre or platform for City Deals – methodological and practical assistance was considered necessary both during the process of arriving at a City Deal, and afterwards, when putting it in practice. This platform has been created following the evaluation, in the form of a Community of Practice composed of the project managers of each City Deal.

There were no clear initial targets for behaviour change, however, based on the interview findings, there has been a perceived improvement of two dimensions related to cooperation in multi-level governance settings. On the one hand, cooperation improved between government levels, resulting in shorter pipelines to deliver; on the other hand, there were shorter collaboration paths to co-operate with private sector.

There were no other directly relevant support services that the City Deals participants could tap into from other programmes.

D3.3 EVIDENCE OF IMPACT

IMPACT MEASUREMENT

A monitoring framework is not available. The latest available progress report (2016) provides a short overview of the number of City Deals developed and the patterns observed in their activities (types of methodologies used for implementation).

The evaluation recommended that intermediary targets are incorporated into City Deals, in order to not only have long-term goals, so that participants are able to track progress and to re-calibrate the City Deals earlier on.

In practice, based on the interview findings, it appears that the definition of targets and tangible results is a significant challenge, as is the implementation or scaling up of the City Deals results at national or international level.

RESULTS AND ADDED VALUE OF THE PROGRAMME

In total, by January 2019, there were 19 City Deals that were signed, and 8 Deals that have been completed. The City Deals addressing societal challenges have mobilised a large amount of partners. Out of the 19 deals established, eight ministries, 125 municipalities, 7 provinces, 5 water boards, 26 cooperative associations, 40 companies and 27 knowledge institutions[93]. This points to the City Deals' significant effect on connecting the different actors into a network of action. In addition, a positive result is related to the fact that there were new relationships explored and developed between municipalities and the central government.

The 2017 evaluation found that it was too early to understand to what extent the City Deals programme contributed as a whole to the objectives of the Dutch Agenda Stad. The evaluation of the City Deals programme fo-

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[93]   Based on data received from the Dutch Ministry of Interior in the context of this evaluation, January 2019

cused more on investigating the changes in the process and the system that were triggered by the City Deals.

However, according to the interview performed, the following issues were considered advantages introduced by the City Deals:

- *"Closer cooperation instead of insular policy development.*
- *New ways of cooperation and responsibilities in the wide-ranging field of Urban policy were felt as an essential leap forward.*
- *Many policies were previously considered 'top down', while urgency for policy change is felt directly in Cities. The awareness of the major position of cities in tackling societal issues, has resulted in a closer direct collaboration between the central government and cities by means of the City Deal instrument."*

As City Deals progress, there is **evidence from individual innovative City Deals** that they have led or are expected to lead to specific results, especially related to innovative business models to tackle urban challenges, or improvement of national or local policies. Examples provided in the interview included the following:

- City Deals with a focus on vulnerable groups in society ("Inclusieve Stad"(Inclusive City) and 'Zorg voor een Veilige Stad' (Caring for a Safer City) City Deals) resulted in the development of new ways to support and provide custom-made care which were taken up in the Social Policy Program

- A City Deal focusing on *Inner City urban Transformation* (Binnenstedelijke Transformatie) resulted in the resurrection of the Urban Transformation platform, involving major players in the field in both real estate, different governmental bodies and cities, aiming to contribute to the acceleration of Inner City Real estate development;
- The City Deal on *Digital Living* has sped up the digitalisation of 20.0000 homes in the Province of Noord-Brabant. It also resulted in the national-wide *Connect-NL* platform, where the City Deal partners (Ministry of Interior, North-Brabant provice and private actors) aim to raise awareness of their actions, and call for engagement from nation-wide city neighbourhoods to enable the co-creation and testing of solutions for new digital housing solutions with citizens.
- The City Deal *'Electrical mobility in urban area development'* is a three-year program in which the Ministries of Infrastructure and Water Management and the Ministry of the Interior and Kingdom Relations, the Province of South Holland, seven cities and large private parties jointly acquire experience in sharing electric cars and in managing and sharing solar energy generated by homes. By the end of the City Deal, in seven cities, innovative housing projects will be delivered over the next three years, with a major role for fueling electric shared cars.
- City Deal on *"Housing Subscription"* developed an innovative program on affordable energy measures

– paid for 'by subscription'. The City Deal experimented with other ways of financing to make homes climate-neutral. Lessons learned are taken on board in the National Energy transition approach.

In addition, there are **results in the outreach and scale up of the City Deal approach**, which has also been adopted in a similar format at EU level, through the Urban Agenda for EU (UAEU). The UAEU was proposed by the Dutch Council Presidency in 2016 and in the mean time has fostered the creation of 14 partnerships across EU to tackle different themes relevant to citiees (from Circular Economy to digitalisation and public procurement), and within those themes, bring the voice of cities closer to the EU level, and support the improvement of finance, regulation and knowledge for cities at EU level.

In addition, individual assessments were carried out internally by City Deals partners. Combining their results with the results of the evaluation, by the end of 2018, there were the following updates to the design of the programme[94]:
- Definition of 'What is a City Deal' was refined (see definition in chapter 9.1).
- An extended preparatory phase was introduced– common ground and focus needs to be explored before parties commit to participate in a City Deal
- More emphasis on the implementation of the results of the City Deals

- A Community of Practice (CoP) for City Deal Project managers was introduced. The CoP aims to offer advice, speed up and back up during the process, but also to facilitate crossovers between different City Deals and domains.

IMPACT ON BEHAVIOUR CHANGE AMONG BENEFICIARIES

The main added value of the programme considered by the interviewee was the **creation of a new framework for collaboration between different levels of government for solving societal challenges**, and the use of new approaches by government and city representatives in **working together with the private sector and externals**. This is confirmed by the 2017 evaluation, whose clear finding is that the programme created new relationships and lines of communications between the different layers of government, private sector and societal actors.

The participants appreciated the space offered for experimentation and learning, especially for testing solutions on concrete cases and develop innovations at a smaller scale. As a follow-up of the 2017 evaluation, and in order to make the results more sustainable, the Ministry of Interior announced the continuation of the City Deals and the start of the work on developing a Community of Practice was for the participants in City Deals, where they can exchange on good practice and learn on what works and doesn't work.[95]

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94   Information from the interview performed within the context of this evaluation
95   See Agendastad.nl, 2019: Community of Practice onderstreept nieuw elan City Deals: https://agendastad.nl/community-of-practice-onderstreept-nieuw-elan-city-deals/

EVIDENCE ON INTERACTION WITH OTHER PROGRAMMES, INITIATIVES, REGULATION

The City Deals are all about interaction with regulations and other programmes, or improving existing frameworks. The cities and private sector or societal partners can make use of existing sources of funding available in other programmes, when there are specific conclusions of the City Deals requiring extra funding or co-investment.

Smilar programmes are running in parallel on specific topics, such as the : 'Green Deals' (focused on improving regulation for sustainable development), Regional Deals (where regions can submit a proposal on what they want to address for regional development and obtain funding from the federal government) and the Health Deals, focused on enabling innovation in health.

D3.4 CONCLUSIONS

The City Deal instrument has been appraised in a learning conference organised with the ministries and City Deals partners, where the participants recognised it as a **"powerful approach to solving social challenges, because of the focused approach and the horizontal cooperation between the parties"**.

The factors of success of the programme include the participatory nature and freedom offered by the programme that the City Deals partners find own solutions that are tailored to the issue at stake. The involvement of actors across sectors and organisations towards solving concrete issues has proven to be a useful format towards creating new ways of working together across governmental levels, and between the public and private sectors.

Key issues that the programme needed to improve and would be useful to keep in mind when launching similar programmes are:

- Providing a small amount of funding for facilitating the process and a more substantial amount of investments or regulatory changes once the City Deals are finalised;
- Providing a common framework for roles and milestones within City Deals, as well as progress tracking
- Capitalising more on the knowledge and learning accumulated within City Deals, better communication of results to the public
- Provide guidelines for developing City Deals and clear ways to select new City Deals (e.g. based on urgency, potential social impact and the involvement needed from the national government and cities)

INTERVIEWEE:

Diana van Altena - Team Regio – Agenda Stad - City Deals / Urban Agenda for the EU, Dutch Ministry of Interior and Kingdom Relations, 30 January 2019.

D4   SMALL BUSINESS INNOVATION RESEARCH (SBIR) INNOVATION PROCUREMENT, NETHERLANDS, 2004-ONGOING

PROGRAMME FEATURES	
Funding body	Dutch Ministry of Economic Affairs
Programme duration	2004-ongoing (but with modifications)
Budget	RVO SBIR: • average budget per call: € 1.76m; • total budget 2004–2016: € 102m
Nr and type of beneficiaries supported	RVO SBIR: • type of beneficiaries – companies of all sizes; the majority of beneficiaries have been SMEs, small, R&D and innovation oriented engineering and technical design agencies (2014–2016). • beneficiaries: per year, on average 42 contractors awarded for feasibility studies in 2004–2016; 16 contractors awarded for the testing and feasibility phase. NWO SBIR (knowledge transfer focused): • type of beneficiaries – university & research institutes employees; college graduates; academic hospitals
Type of support offered (key words)	Support to feasibility studies (up to €50,000) Support to R&D activities (up to €450,000 for the RVO SBIR; up to €250,000 to NWO SBIR)

D4.1   SHORT OVERVIEW OF PROGRAMME

CONTEXT OF THE PROGRAMME

The SBIR programme was introduced as a pilot in 2004, following a recommendation from the Economic and Social Council of the Netherlands to take inspiration from the US SBIR programme.

Through SBIR, the government launches competitions for companies to help solve a social problem. Once the companies develop the innovative solutions, the government may decide to also become a customer of the solutions. The programme has been running for more than 14 years, and has been evaluated in 2017.[96] The evaluation stands at the basis of this case study.

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[96]   See Dialogic, 2017:Evaluation of SBIR, https://www.dialogic.nl/file/2018/05/Dialogic-Eindrapport-Evaluatie-SBIR.pdf

The programme was initially implemented and managed by three different organisations:

- RVO (Netherlands Enterprise Agency) SBIR: where parties are invited to tender for a government knowledge question. Ministries or other government agencies collaborate with RVO (Netherlands Enterprise Agency) to convert a societal or procurement issue into an SBIR call.
- NWO (Netherlands Organisation for Scientific Research) SBIR: Aims to valorise knowledge generated by the (university) knowledge infrastructure. Up until 2014, this program was called the Valorisation Grant. After 2014, it continued as a similar 'take-off' programme[97].
- TNO-SBIR (Netherlands Organisation for Applied Scientific Research) - here, the emphasis is on valorising TNO knowledge. This SBIR encourages SMEs to pick up, develop and commercialize product ideas that have emerged at TNO. The TNO-SBIR was not part of the 2017 evaluation and will not be covered in this case study either.

The SBIR programme is a core part of the Netherlands' R&I policy-mix and is positioned as one of the schemes that explicitly target the solving of grand societal challenges.[98] The programme places the government in an active role, as a market shaper.

D4.2 PROGRAMME GOALS

The goal of the programme is to develop innovative solutions for social challenges, or support government agencies gain more insights into potential solutions in the field of sustainability, safety and accessibility. The programme is implemented through consortia of partners, who develop an innovative solution at the request or call of the public procurer.

The intended effects of the programme relate to:

- enabling system changes – e.g. market development for innovations solving societal challenges, improvement of legal frameworks and developing public legitimacy in the case of the RVO SBIR.
- encouraging knowledge spill-overs in the case of NWO SBIR

The programme had no explicit goals or objectives that relate directly to supporting behaviour change in companies towards cooperation or end-user engagement. However, these might be indirectly achieved through the programme.

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97   https://www.nwo.nl/onderzoek-en-resultaten/programmas/take-off
98   See European Commission, 2018, RIO Country profile, the Netherlands

D4.3 PROGRAMME IMPLEMENTATION

DESCRIPTION OF IMPLEMENTATION MECHANISMS

RVO SBIR

In the case of the RVO SBIR, the measure is delivered through a process of pre-commercial public procurement of research and development services. It was introduced as a tool to stimulate innovative behaviour in companies, as well as tackle societal challenges. SBIR calls are individually defined by the client and contractor and have a place within existing procurement, innovation programs and budgets of clients. Budgets vary by department issuing the calls. However, it is estimated that between € 500k and € 4 million are spent per call for phases 1 and 2.

The Ministry of Economic Affairs has provided the framework on SBIR implementation. It can be used by various government organizations as a client, such as ministries, government agencies or municipalities. The client may choose to implement the SBIR itself, but the implementation may also be outsourced to RVO. In the first case RVO has only an advisory role, and in the second case an executive role. Therefore, based on societal problems or challenges defined by the different government organisations ('clients'), companies of all sizes (including SMEs or large companies) as well as academic organisations are invited to send proposals for innovative solutions to solve the challenges.

Following the call for proposals, the candidates selected for the first round will undergo the following phases:

- A phase of testing the feasibility of the idea and developing a feasibility study (Phase 1). The contract may last six months, with a value usually between € 20k and € 50k (inc. VAT) per project. The results may be a feasibility report and demonstration. There may be 4-8 projects rewarded for feasibility studies per call.
- Applied research and development phase (Phase 2): based on the results of the first phase, the department in charge of the procurement may do a follow-up order to fund the development of a prototypes and demonstration project. This phase may last 2 years, with a contract between € 100k and € 500k (incl. VAT) per project. The result of this stage is a final working prototype and demonstration. In this phase, usually three to five projects are initiated by call.
- Commercialisation phase (Phase 3). Next, once the second phase is successful, the candidates are expected to find funding for the commercialisation of the product or service developed in the first or second phase of SBIR. Due to EU rules, the government does not guarantee that it will provide further funding or purchase the developed products or services. The entrepreneurs have no preferred position in any subsequent actual procurement.

In most cases, RVO implements the SBIR for other departments. The following steps are undertaken for the selection of the bidders:

The general steps in the execution of the SBIR (phase 1) by RVO are as follows[99]:
1. Commissioning the SBIR by Ministry/Minister to RVO;
2. Administrative and financial preparation by RVO;
3. Setting up the evaluation Committee (by Ministry and RVO);
4. Publication of the SBIR call by RVO;
5. Receiving and processing SBIR proposals by RVO (with a large number of entries, this is accompanied by a pre-selection);
6. Meeting assessment committee; committee determines its own working method (within the framework of tender documents). The bids are ranked according to assessment criteria (impact, economic perspective, technical feasibility and price); In addition, additional constraints can be set.
7. The providers usually have the opportunity to present their proposal for the committee;
8. The ministry decides on the basis of advice of the evaluation;

The RVO SBIR calls can also be split into two types, depending on their goals:
- *Catalytic SBIR:* government departments ('clients') use SBIR to stimulate the development and testing of desirable innovation directions. Clients allow contractors to experiment with solutions, with the aim that the society / economy then picks up such solutions.
- *Non-catalytic SBIR:* the aim is for contractors to develop solutions that the client primarily benefits from in their policy implementation and possibly be delivered to other (public) clients. The SBIR is in this case used to purchase innovative solutions for their own use. Especially this internally focused procurement SBIRs have more in common with classical public procurement.

NWO SBIR

In the case of the NWO SBIR (since 2014 called "take-off"), the intervention aims to cover the funding gap that exists at the beginning of the knowledge transfer process, related to transferring scientific to applied knowledge. The target group consists of employees assigned to the universities and university colleges, and since the design of 'Take-off', also young companies. The NWO SBIR offers funding for feasibility studies and early stage projects, which in some cases may take the form of creating spin-offs or startups created by university staff.

The implementation of the SBIR calls is performed twice per year. The first phase of a call is implemented both by NWO (for university staff) and by the Taskforce for Applied Research SIA (also part of NWO) for the university college graduates.

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[99]   See Dialogic, 2017, Evaluation of the SBIR, https://www.dialogic.nl/file/2018/05/Dialogic-Eindrapport-Evaluatie-SBIR.pdf

The calls follow a similar 3-phase procedure as in the case of the RVO SBIR (feasibility study, testing, commercialisation), with funding for Phase 1 provided by NWO and SIA. Funding for Phase 2 by the Ministry of Economic Affairs (up to € 250k) **in the form of a loan**. The latter also decides on the award of the tenders for Phase 2. There is again no funding for Phase 3. It is not necessary to go through Phase 1 to submit a proposal to Phase 2.

FIGURE D3. The different types of SBIR in the Netherlands.

Source: Dialogic, 2017, Evaluation of the SBIR

The criteria for selecting proposal for Phase 2 relate to: the knowledge and innovation potential; the commercial potential; team qualities (motivation and entrepreneurial skills) and the project approach. In Phase 1, all criteria have the same weight, while commercial potential is weighed two times in the Phase 2.

Overall, the different types of SBIR are portrayed in the picture below.
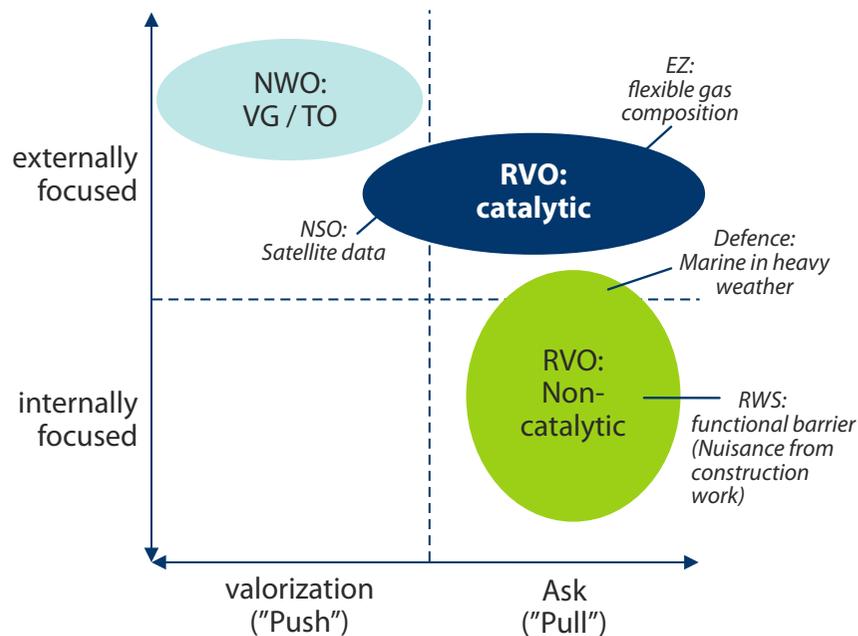
D4.4 ASSESSMENT OF THE IMPLEMENTATION MECHANISMS

The 2017 evaluation found that, as an instrument, the RVO SBIR is a relatively expensive in terms of costs of execution and contract value of the contracts awarded, including an average funding of €8 million/year (€102 million in 2004-2016), and implementation costs of €0.5 million / year. Especially the selection process is staff capacity-intensive, as it also requires to make visits to companies participating in the calls. The NWO SBIR (knowledge-transfer related) has been considered more efficient in terms of costs, as the selection process is coordinated by a "take-off" coordinator, and there is a policy coordinator for each of the three academic clusters in focus. Following the selection procedure, the guiding of the applicants is performed by the applicants' own universities or research institutions.

The main issue found in the 2017 evaluation in terms of the design of the implementation is related to the Phase 3, where the beneficiaries have found it unclear what is the role of the client commissioning the first

phases of the project. In the commercialisation phase, the beneficiaries are independently seeking finance to enter the market.

In order to implement the SBIR programme, government departments are supported through the PianOo helpdesk for public procurement, which provides capacity building services to departments wishing to develop a call. PianOo also launched an online with information, good practices, tools and advice for enabling public procurement of innovations.[100] Nevertheless, there is no evidence on to what extent these services supported the implementation of the programme so far.

D4.5 EVIDENCE OF IMPACT

IMPACT MEASUREMENT

The impact measurement framework provided by the 2017 evaluation is portrayed in the figure below. The programme measures as a first round of direct results the impact on the innovation behaviour of the beneficiaries, which is considered a trigger of the longer-term effects. The framework shows two types of impacts: business and economic impact, measured through revenues generated, exports/ profit, as well as RDI investments leveraged; and the societal impact related to knowledge spillovers, system changes and new innovation directions.

FIGURE D4. The SBIR impact measurement framework.
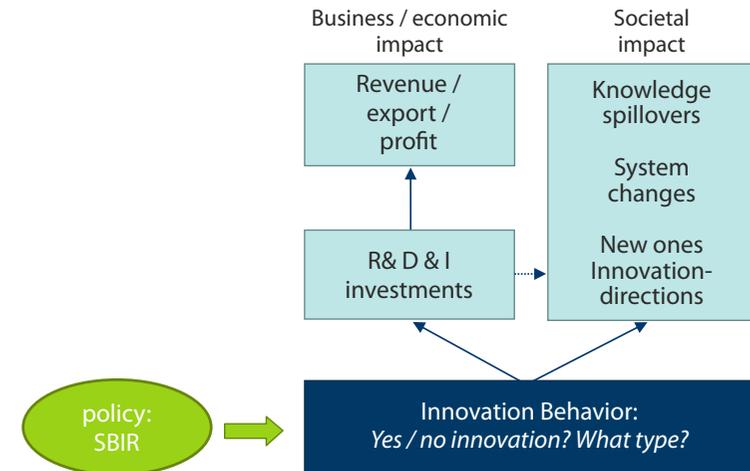
Source: Dialogic 2017

There is no information on whether the monitoring system in place recorder more than static outputs of the SBIR process (e.g. nr. of funded beneficiaries), as the evaluation relies on a survey with beneficiaries to measure the intended effects of the programme.

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[100] See http://www.innovatiekoffer.nl/

D4.6 RESULTS AND ADDED VALUE OF THE PROGRAMME

RVO SBIR

Based in the 2017 evaluation survey, the spending on R&D, sales and number of workplaces have been found to increase in the companies participating in both Phase 1 and Phase 2 of the RVO SBIR. In the views of the beneficiary companies interviewed, being contracted for SBIR is a door-opener for companies to request further bank financing. Nevertheless, the econometric analysis found that the participation in RVO SBIR (both phase 1 and phase 2) does not have a statistically significant positive effect on the R & D or turnover.

The RVO SBIR led to a product being launched on the market in 25% of the cases, while 35% expect to launch it within the two to five years after, especially for the companies having participated in both Phase 1 and 2 of the RVO SBIR. In 31% of the cases, the client who actually purchased the innovation was the government department who had launched the call.

The companies that were rejected in by the SBIR process had not started the project without the funding due to insufficient financial resources (around 70%) or due to too high risks (around 42%) in 2017.

NWO SBIR

In the case of the NWO SBIR, based on the 2017 evaluation survey, more than half of the participants have increased expenditures in R&D and number of employees following the SBIR funding. Revenues remained stable since participation in SBIR in more than half of the beneficiaries. However, as in the case of the RVO SBIR, the econometric analysis also shows no statistically significant effect on R&D and sales for applicants of NWO SBIR.

80% of the NWO SBIR evaluation survey respondents had had their application in development before submitting it for funding. Moreover, 30% reported that their innovation has led to a product or service that / which was launched on the market. More than 40% is expected that this will occur within two years or five.

D4.7 IMPACT ON BEHAVIOUR CHANGE AMONG BENEFICIARIES / SOCIETAL IMPACT

RVO SBIR

The RVO SBIR has lead to creating new collaborations with new market participants, which shows an increased networking following the SBIR project (especially after phase 2). In general, SBIR had an effect on the projects' collaboration patterns, as the SBIR funded projects collaborated with more partners than the non-funded projects that were rejected in the SBIR process.
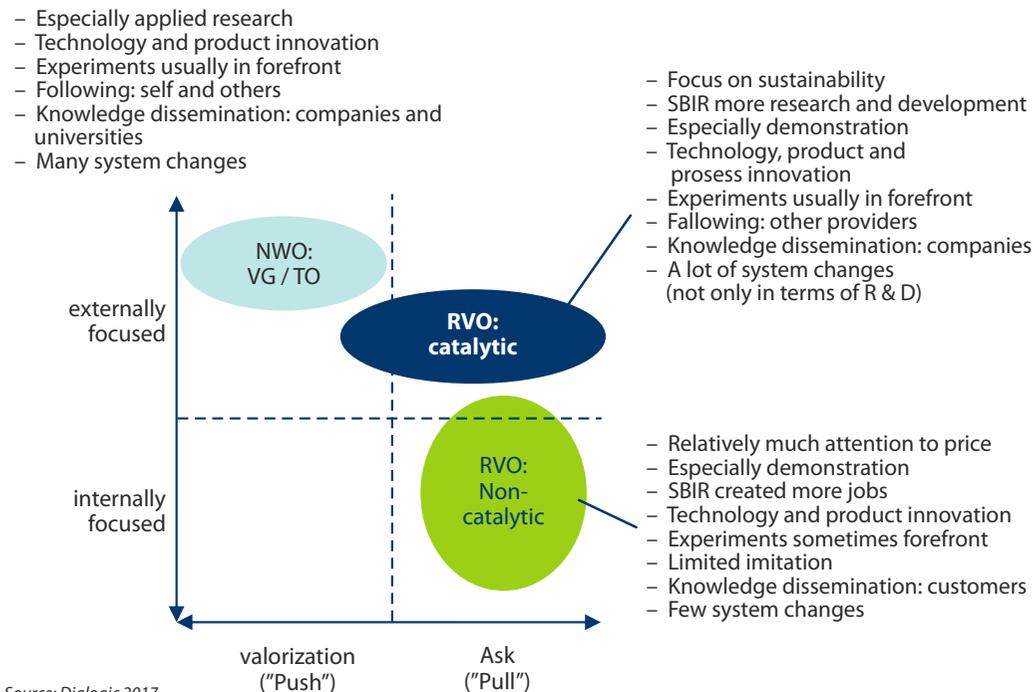
The added value of the RVO SBIR is found to be the fact that the innovations are more sustainable than SBIR. In addition, 20% believe the innovations developed are cheaper than the ones existing.

In addition, it is important to mention that 70% of the beneficiaries surveyed consider that the innovations developed are new to the industry, also internationally.

The RVO SBIR enabled a large degree of knowledge spill-overs, as aside from public sector customers, other companies in the industry make use of the knowledge generated through the SBIR project, especially related to gaining insight into new technological options, and less related to new markets.

At systemic level, especially the RVO *Catalytic* SBIR seems to have had a positively perceived impact on strengthening knowledge, boosting market relevant research and creating markets.

FIGURE D5. The different types of effects per SBIR instrument.

- Especially applied research
- Technology and product innovation
- Experiments usually in forefront
- Following: self and others
- Knowledge dissemination: companies and universities
- Many system changes

- Focus on sustainability
- SBIR more research and development
- Especially demonstration
- Technology, product and prosess innovation
- Experiments usually in forefront
- Fallowing: other providers
- Knowledge dissemination: companies
- A lot of system changes (not only in terms of R & D)

NWO:
VG / TO

externally
focused

RVO:
catalytic

internally
focused

RVO:
Non-
catalytic

- Relatively much attention to price
- Especially demonstration
- SBIR created more jobs
- Technology and product innovation
- Experiments sometimes forefront
- Limited imitation
- Knowledge dissemination: customers
- Few system changes

valorization
("Push")

Ask
("Pull")

Source: Dialogic 2017

In addition, the beneficiaries mentioned that further points of added value of the RVO SBIR include the fact that it can significantly accelerate the implementation of innovations. Moreover, the programme allows the beneficiaries to test the ideas with end users. In addition, the beneficiaries appreciate the flexibility of the instrument, especially that the expected results are not completely set in stone, and there is a possibility to deviate from the expected results.

NWO SBIR

The NWO SBIR has supported to a large majority applied research projects, which shows that one of the goals of the programme was achieved, namely to capitalise on existing knowledge. 81% of the respondents to the NWO SBIR evaluation survey claimed that their project was new for the entire industry, including internationally.

The added value of NWO SBIR is also found in the fact that the marketing of the innovations generated in the project proceeds after the project completion through an academic startup. In the case of RVO SBIR, the commercialisation of the results is left entirely at the level of the applicant, and depends on further factors to be successful (e.g. potentially further development, other public procurers being interested or a successful market introduction).

Both types of SBIR were useful from the perspective of the beneficiaries, as it allowed them to experiment with new technologies and methods. To sum up, the picture below provides an overview of the different SBIR strands.

D4.8 EVIDENCE ON INTERACTION WITH OTHER PROGRAMMES, INITIATIVES, REGULATION

There are further other forms of public procurement of innovations in the Netherlands, including the Innovation Partnership (introduced in 2016). With this instrument, the government defines a specific demand for innovation, for which the it starts a development process with a group of companies. Following the development stage, the government moves on to commercial and large-scale purchase of the solution. The government enters into partnership with at least one provider, and gradually, some providers can drop out or lose weight.

The Innovation Partnership has been found to be in some ways similar to the RVO Non-catalytic SBIR, as both relate to specific solutions that are commissioned by the government. This is why it was recommended that governments do a thorough analysis in choosing one instrument over the other. The difference with SBIR is that the Innovation Partnership does not focus on the development of a prototype (phase 2 part), and it is more binding for the procurement department to actually purchase the solution later (agreements are made about price, minimum quality and total purchase). The evaluation found the Innovation Partnership to be a better choice when a sought solution is concretely defined, as it is easier and faster to develop it, and then easy to purchase it.

D4.9 CONCLUSIONS

The evaluation found that SBIR supports not "just" innovations, in the sense that the bidders provide solutions that solve societal problems, which is the main driver for their application. SBIR has been found to lead to solutions that are more innovative and new to the industry, including internationally. The most radical system-changing projects have been found in the catalytic type of RVO SBIR.

Difficulties encountered are that the project results do not always lead to marketable solutions, and the market is not yet there for those products. As a consequence, the commercialisation of the products developed is a challenge. Nevertheless, SBIR has been proven to accelerate the development of innovations and give an impulse to those that can have societal impact.

The evaluation found that factors of success especially for the more advanced stages of development and for later on potential for commercialisation include the higher involvement of the public clients and more awareness raising of the SBIR's offer.

Further lessons learned from the evaluation include the need to involve more diverse government departments in the commissioning of SBIRs in order to introduce a wider scope of themes. In addition, investing in a better digital platform for SBIR to better raise awareness of the programme and support knowledge exchange and promote the use of SBIR would be beneficial.