Program description:

Challenge-Driven Innovation

- Global sustainability goals in the 2030 Agenda as a driver of innovation

Version 171025

VINNOVA

1   The programme in brief

The 2030 Agenda represents a wide variety of areas and challenges through its 17 global goals for sustainable development. These global goals are integrated and indivisible; they balance the three dimensions of sustainable development economically, socially and environmentally. If the complex societal challenges under the Agenda are to be met then there is a need for interdisciplinary solutions which can address combinations of different principal goals. Sweden aims to be at the forefront of implementing the 2030 Agenda; as a strong welfare state, we are well positioned for this work. Research and innovation initiatives have proved crucial to previous societal changes and will be in this case too. Vinnova's role is therefore an important one; catalysing and enhancing the potential for innovation and thus helping to fulfil the goals.

Since the start of 2011 Vinnova, under the Challenge-Driven Innovation programme, has seen how wide-ranging, interdisciplinary collaboration can help create innovations to solve our most complex societal challenges. The actors themselves have defined the societal challenges and how their solution can contribute to an overarching framework. Vinnova maintains this bottom-up perspective, but is replacing the previous framework with the global goals of the 2030 Agenda[1]. In other words, projects must be able to show how they contribute to one or more of the global goals.

1.1   Background

Global context

By adopting the 2030 Agenda in 2015, the UN's member states agreed a global agenda for sustainable development. Comprising 17 global goals, the 2030 Agenda spans a wide range of societal challenges; from eradicating poverty and reducing inequality to tackling climate change. The global goals are integrated and indivisible, meaning that no single goal can be achieved at the expense of another and that success in all areas is required if the goals are to be fulfilled.

While global goals remind us of the many complex issues facing the world, they also set the direction for the global political and economic climate of the future and provide a driver for invention and innovation. According to UN estimates, a breath-taking investment of some $3 billion a year will be needed to implement these goals. For those

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[1] For further information on the 2030 Agenda and the content of the global goals, please see:
http://www.regeringen.se/regeringens-politik/globala-malen-och-agenda-2030/17-globala-mal-for-hallbar-utveckling/
and
http://www.regeringen.se/48e36d/contentassets/a69f085ada12410989115a1ff64be6d8/att-forandra-var-varld-agenda-2030-for-hallbar-utveckling

able to build alliances and create new solutions to help achieve these goals, there are major growth opportunities.

Swedish context

Sweden is well-positioned. As a nation, we have a number of strengths which are important if we are to participate in these global goals. Some of the building blocks which are vital if we are to assume a leading role in working with these global goals include:

- a well-developed tradition of cooperation,
- high levels of education,
- versatile industry,
- a well-functioning public sector,
- limited bureaucracy and low levels of corruption,
- good language abilities,
- a high level of IT maturity,
- an acceptance of change and restructuring,
- a strong global position for working with gender and social equality.

In other words, there is an opportunity for Sweden to strengthen its global position as a frontrunner contributing to the creation of prosperity, better health, a more cohesive society, increased security, fewer disasters and a better environment for the whole planet.

While Sweden has come a long way in many regards, there is no shortage of challenges; areas such as sustainable energy, consumption and climate issues. Neither is Sweden immune to the international drift towards increased social inequality. In March 2016, the Swedish government appointed a delegation to carry out the work at a national level. Its mission is to:

- propose an overall action plan to the government,
- disseminate information and knowledge,
- establish the 2030 Agenda through a broad dialogue between various societal actors.[2]

Collaboration and innovation, vital pre-requisites

The goals set out in the 2030 Agenda are global in nature and cross various sectorial and disciplinary boundaries. Whilst some societal challenges develop in stages, others present themselves to us through crises and traumas. The societal challenges cannot be solved by individual companies, public actors or universities and sometimes not even by individual nations. Rather, they require effective collaborations between the political

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[2] Further information about the delegation can be found at: https://agenda2030delegationen.se/ and
http://www.regeringen.se/regeringens-politik/globala-malen-och-agenda-2030/

sphere, industry, the public sector, civil society and research. The common factor in these societal challenges is that they require fresh efforts and solutions with a longer reach. Ones that can grasp the bigger picture; looking at the system rather than its parts.

Naturally, there are other aspects, initiatives and societal challenges under the 2030 Agenda, but it is these kinds of societal challenges and demands on society which form the basis of Challenge-Driven Innovation. These are reflected in the programme's vision and goal.

1.2 Vision and goal for the Challenge-Driven Innovation programme

Vinnova's vision is for the Challenge-Driven Innovation programme to become a powerful tool in developing new, sustainable solutions with international eminence that can meet the crucial challenges identified under the 2030 Agenda. This makes the programme a uniquely important component of the Swedish growth and innovation engine. The projects funded are visionary; they challenge existing mental models and tackle issues of a systemic nature. Such issues are characterised by being transboundary and requiring an interdisciplinary approach. The results developed will lead to a more sustainable society and help solve the challenges set out in the 2030 Agenda.

To achieve the vision, the programme sets high standards for tangible and demonstrable results. The success of the programme in meeting societal challenges is measured as two dimensions and five goals. The former relates to general systemic effects and changes in actors' Innovativeness linked to societal challenges. The latter relates to tangible solutions in the form of Innovations.

Dimension: Innovative capability

The programme contributes to:

1. *New, renewed or intensified strategic alliances, partnerships and networks*

The programme helps mobilise actors and establish long-term interdisciplinary collaborations as well as new organisational, collaborative and business models; enhancing the ability to tackle the societal changes in the 2030 Agenda. One manifestation of this is that ideas, knowledge, innovations and so on from funded projects are utilised in various ways in other operations, for other target groups or in other projects.

2. *An enhanced ability to pursue innovations on the boundaries between private sector, public sector and civil society*

The programme contributes actively to public sector operations and civil society and systematically participates in, demands and contributes to the development of innovative solutions to meet the societal challenges in the 2030 Agenda. Moreover, companies will gain a greater understanding of the needs and requirements of the public sector. The programme should strengthen and develop the actors' capability to solve complex societal challenges. Hopefully, this will lead to the initiation and development of new regulations, controls and other solutions, not just for the duration of the project but afterwards as well.

3. *Genuine/increased customer and user involvement*

The programme allows the actors to contribute more (compared with past projects) to the development of innovations with rather than for users, customers and citizens. One result of this may be that after the project, public-sector operations and companies see their users, customers and citizens as natural co-creators in the development of innovations to tackle the societal challenges of the 2030 Agenda.

Dimension: Innovations

The programme contributes to:

4. *Concrete value creation and utilisation*

The programme develops solutions that contribute to the 2030 Agenda. Values that contribute to sustainable growth may be expressed in a number of different ways, such as new solutions to complex problems involving new business opportunities and market segments, new organisational forms, significant benefit to social infrastructure or key services made available to citizens, improvement of policies and rules and clear cost savings for companies and the public sector.

5. *Greater attractiveness and will to invest*

The projects have an eminence and relevance which makes Swedish actors and locations attractive to international actors, whilst also attracting new investments. This in turn can lead to further joint initiatives to fulfil the 2030 Agenda.

2 Key aspects

A number of key aspects of the programme have been defined which all applicants must bear in mind.

2.1 International orientation, positioning and collaboration

To contribute to the goals of the 2030 Agenda and strong Swedish competitiveness, the solutions that are developed under the programme must be attractive in an international market. Thus, the work should be characterised by an international perspective from the outset.

Where the initial aim of the projects is to serve the needs of Sweden, the applicant must be able to demonstrate that the solutions they have developed are well placed for eventual dissemination to international actors or for attracting international organisations and skills to Sweden.

In those cases where the initial focus on projects is on solving needs in other countries, applicants must be able to demonstrate how the results can help strengthen Swedish competitiveness and growth.

2.2 Sustainable growth

To fulfil the 2030 Agenda, we need to view the three dimensions of sustainable growth (economic, social and environmental) as interconnected. Thus, a key aspect of the programme is to balance these three dimensions and fund projects which innovatively address societal challenges under the Agenda. They must also contribute to sustainable growth whilst strengthening Swedish competitiveness.

Within the programme, this means specifically that:

- projects are to be based on the global objectives laid out in the 2030 Agenda. The projects will make a clear contribution to increased Swedish competitiveness and attractiveness. Based on the specific societal challenge defined by the project, applicants will specify how the solutions they have identified may aid one or more of the global goals set out in the 2030 Agenda;
- sustainable growth, competitiveness and attractiveness must be viewed from a systemic perspective. For example, this means a solution may not involve simply transferring costs from one actor to another, or that environmental benefits can be realised at the cost of increased social divisions.

A prerequisite of sustainable growth is equal conditions for women and men. Gender equality is a specific global goal of the 2030 Agenda, whilst the gender equality

perspective permeates all the other global goals. It is inherent in the Challenge-Driven Innovation programme that funded projects should be clear about their position on relevant gender issues (sex and/or gender) associated with the societal challenge being tackled and work proactively with these aspects when a project is implemented[3]. Moreover, this means working to ensure that women and men benefit equally from the award, can influence funded projects and actively participate in their implementation.

2.3 Innovation at the interface between sectors and actors

Given that the societal changes encompassed by the 2030 Agenda span a number of boundaries (areas of expertise and organisational boundaries), broad collaborations and solutions are required which are clearly based on a user and needs perspective. This means that solutions from an individual industry or sector will often be insufficient. It is desirable that the skills in the consortium are sector-wide and that the results are disseminated to users and customers in a variety of sectors. Moreover, for many projects it is necessary to work proactively with vertical integration involving different levels. For example, various decision-making levels within the healthcare sector or organisational levels (such as state, regions, municipalities, districts and citizens) in sustainable urban development.

2.4 Principles of a challenge-driven approach

Vinnova has defined a number of principles that govern evaluations and are set out in the evaluation criteria. Under these principles, a challenge-driven project must:
- be based on societal challenges which are within the framework of the 2030 Agenda and have clear requirement owners,
- have a system approach, i.e. take a holistic view of what is required to solve the societal challenge and not just look at the parts,
- be based on a profound interaction between all actors needed for successful implementation, in particular through the active participation of users, customers and other relevant stakeholders,
- develop innovations, in a broad sense, which can challenge mental models and deliver systemic impacts,
- result in innovations that combine international business potential with societal benefit,
- integrate international aspects. For example, developing solutions for a global market and building the capability to attract international expertise and investment to Sweden.
- contribute to gender equality through the project's results and implementation.

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[3] More information about a sex and/or gender perspective associated with the 2030 Agenda overall can be found at: http://igar-tool.gender-net.eu/en/reference/the-role-of-gender-based-innovations-for-the-sustainable-development-goals-toward-2030

3 The 2030 Agenda and Challenge-Driven Innovation

It is important to point out that Challenge-Driven Innovation is just one of Vinnova's tools in fulfilling the global goals addressed in the 2030 Agenda. Vinnova funds projects under other efforts that are relevant to the Agenda, but which do not fall under the remit of the central principles mentioned above. This may be because their focus is on individual regions/companies/industries, or because they are developing knowledge that may result in innovations for the long-term.

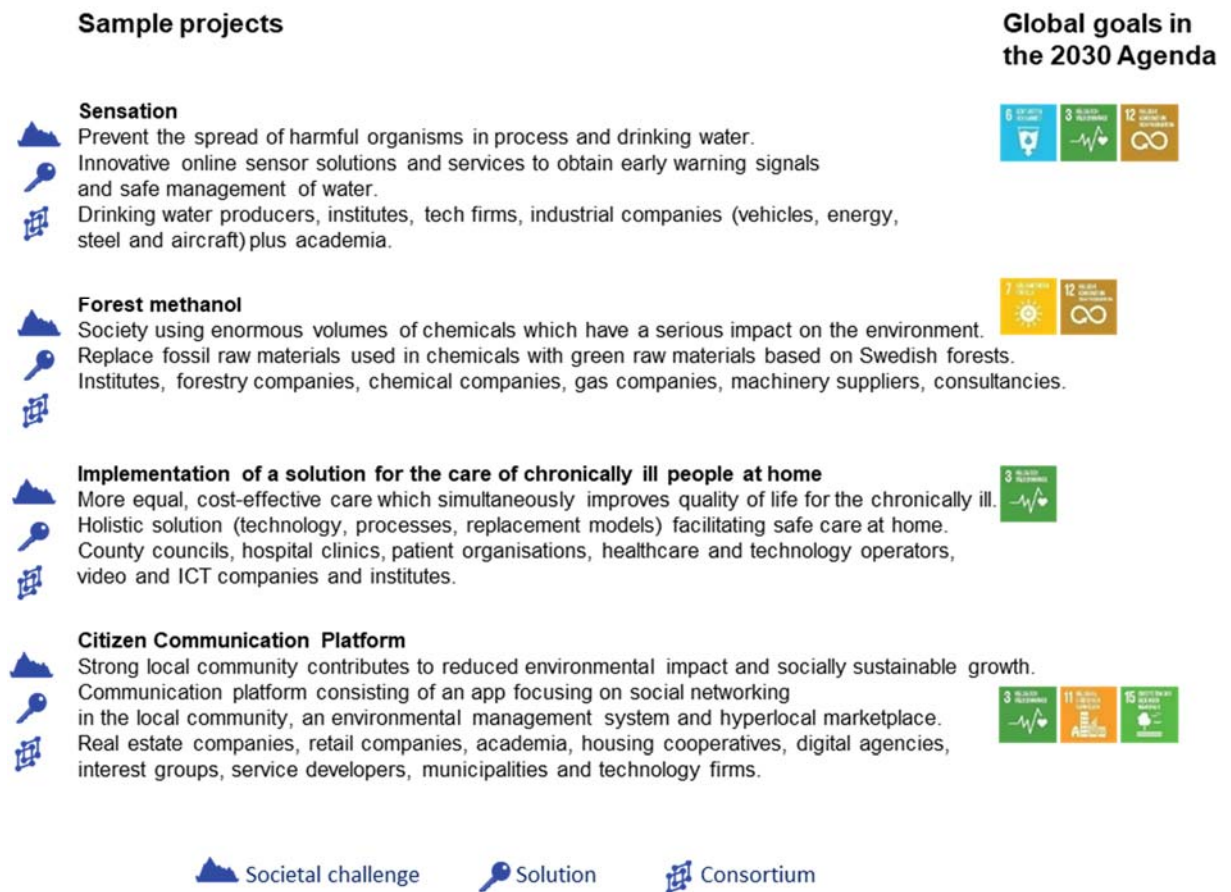Vinnova does not want project proposals under Challenge-Driven Innovation that:

- lack systemic reasoning and can adversely affect one of the sustainability dimensions. For example, in regard to impaired patient safety and integrity, working situations and safety and influence for citizens,
- look at technical solutions (such as IT systems, digitalisation) without considering other important aspects such as compensation systems, organisation and governance, behaviours, flows and processes and so on.
- are purely explorative or facilitative. For example, hypothetical use of Big Data to find possible problems which can be solved by analysing data in new ways, or development of a general platform with no clear application.
- focus on the needs of a single organisation, such as changes in a hospital, county council, district, neighbourhood, city, region, or company with no potential for scalability and dissemination.
- are not sufficiently mature, or are constrained by rules and regulations that cannot be changed in the foreseeable future. For example, Vinnova considers that it may be difficult to get funding for projects which are developing new medicines and vaccines.

The Challenge-Driven Innovation programme combines a top-down perspective consisting of demanding but relatively loose constraints (key aspects) with a bottom-up perspective in which applicants must define the specific societal challenge being tackled, what solutions are needed, which actors must be involved and how this can contribute to fulfilling the programme and global goals. This is partly illustrated in Figure 2 below.

Figure 1 demonstrates the breadth of the programme portfolio and that projects can contribute in very different ways to one or more of the global goals. Note that the number of global goals a project contributes will not influence the assessors' recommendation; the important factor is the potential of the project. The sample projects below work with, and contribute to, more of the global goals than are shown.

The illustration shows the main global goals that they contribute to. Given Vinnova's role, plus the vision and programme goals for Challenge-Driven Innovation, all projects will touch upon, and need to address, global goals: 5 Gender Equality, 8 Economic Growth and 9 Innovations. We have therefore chosen not to highlight these global goals in Figure 1.

Figure 1. Example of how funded projects can serve the global goals of the 2030 Agenda.

Sample projects

Global goals in the 2030 Agenda

Sensation
Prevent the spread of harmful organisms in process and drinking water.
Innovative online sensor solutions and services to obtain early warning signals and safe management of water.
Drinking water producers, institutes, tech firms, industrial companies (vehicles, energy, steel and aircraft) plus academia.

Forest methanol
Society using enormous volumes of chemicals which have a serious impact on the environment.
Replace fossil raw materials used in chemicals with green raw materials based on Swedish forests.
Institutes, forestry companies, chemical companies, gas companies, machinery suppliers, consultancies.

Implementation of a solution for the care of chronically ill people at home
More equal, cost-effective care which simultaneously improves quality of life for the chronically ill.
Holistic solution (technology, processes, replacement models) facilitating safe care at home.
County councils, hospital clinics, patient organisations, healthcare and technology operators, video and ICT companies and institutes.

Citizen Communication Platform
Strong local community contributes to reduced environmental impact and socially sustainable growth.
Communication platform consisting of an app focusing on social networking in the local community, an environmental management system and hyperlocal marketplace.
Real estate companies, retail companies, academia, housing cooperatives, digital agencies, interest groups, service developers, municipalities and technology firms.

Societal challenge   Solution   Consortium

4 How does Vinnova work with Challenge-Driven Innovation?

4.1 Programme logic

Vinnova's calls for proposals in the Challenge-Driven Innovation programme are based on a three-stage process in which projects must make continuous and genuine progress towards fully developed solutions and utilisation of the results. Although the projects are very different they have in common (as illustrated by Figure 2) the fact that their scope expands as these stages progress. They are also characterised by uncertainty and ongoing revisions, which makes for additional challenges. It may even be that "sidetracks" (spinoffs) become the new primary direction in which the solution will develop. However, even if adjustments are made, the objective is always the same: solving the societal challenge that the project has identified and contributing to the global goals of the 2030 Agenda.

The primary focus in Stage 1, Initiation is on developing both the concept and the consortium. However, tests sometimes begin as early as the first stage. At Stage 2, Collaborative Projects, the focus is on developing the solutions identified at the previous stage. Limited tests are often carried out, for example in labs and with a few key clients. Stage 3 may differ significantly from projects at other stages. However, like the other stages, there is still some form of testing, implementation and utilisation of the results on a larger scale than in previous stages.[4]

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[4] Where it concerns state aid rules, in general Stage 1 comes under Feasibility Studies, while Stage 2 is more focused on Industrial Research and Stage 3 on Experimental Development. The difference between Feasibility Studies, Industrial Research and Experimental Development is set out in Commission Regulation (EU) No 651/2014, Article 2, paragraphs 85-87.

Figure 2. Illustration of the programme's three-stage process.

4.2 Investment model

The investment model is based on increased competition at each stage. Vinnova's grant, calculated as a proportion of the project's total costs, decreases with each stage, even though the actual monetary figure increases. As the project gets closer to implementing its results (commercialisation for example), the involvement of the project partners must increase (see Figure 3).

Figure 3. Overview of the programme's investment model.
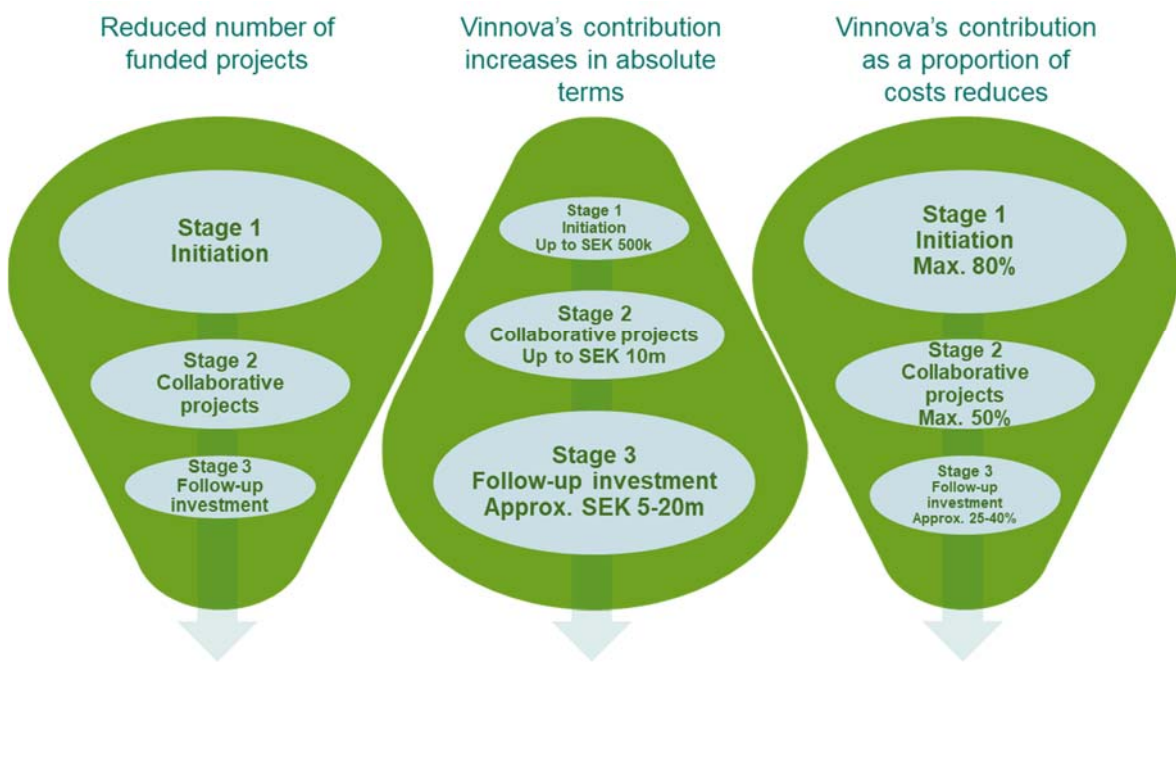
4.2.1 Evaluation structure

What the application consists of and how it is assessed differs at the various stages. Information on this (such as evaluation criteria) may be found in the call text for each stage.

4.3 Evaluation and follow-up

4.3.1 The programme's impact logic

Impact logic is a systematic and visual presentation which highlights a correlation, firstly between resources and activities for an effort and secondly between the changes and impacts to be achieved. For Challenge-Driven Innovation (see Figure 5 below) this means the programme goals are achieved by funding projects which provide solutions to societal challenges. Because the Challenge-Driven Innovation programme is a comprehensive and broad one, its programme goals are general. Thus, one or more indicators (metrics) have been defined for each programme objective that Vinnova follows up, to determine whether the programme's goals are being met and what overall contribution is being made to meeting the global goals of the 2030 Agenda.
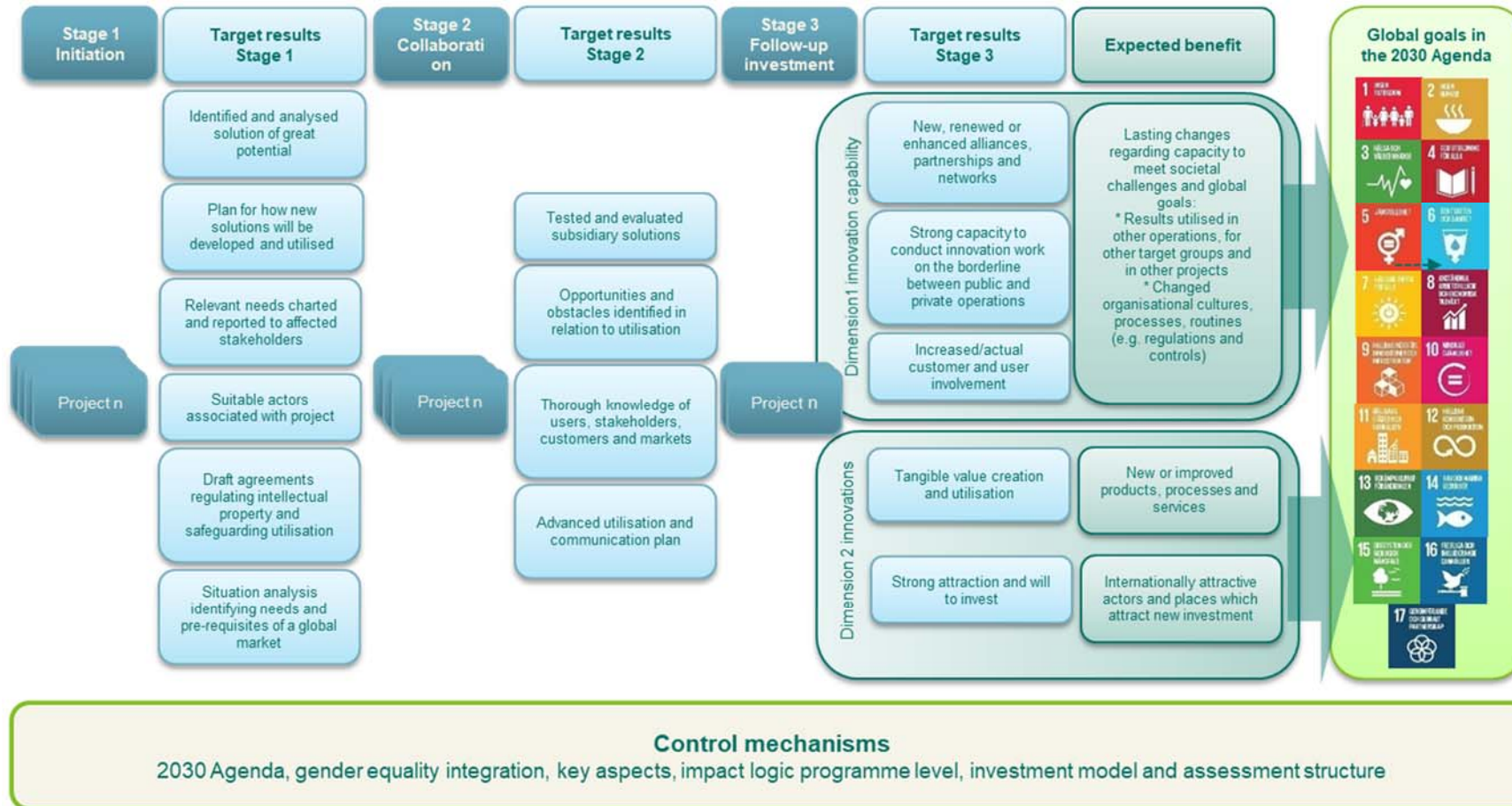
Please note that impact logic represents an aggregated level, in other words what the programme as a whole should achieve. This means that certain programme goals will not be addressed by a particular project or that the individual project may contribute to the goal indirectly.

In other words, the impact logic of the programme should not be confused with the impact logic of the individual project. So, the consortium must specify what concrete activities, performance goals and impact targets they anticipate as necessary to meet the specific societal challenge tackled by the project. This means it should be clear how the project helps meet the programme goals and global goals of the 2030 Agenda.

For instance, some of the performance goals for Stages 1 and 2 in Figure 4 are activities which say nothing about the quality of the individual project or whether it is on the right track. Such goal specifications are made by the funded projects. Each individual project is expected to help fulfil the majority of the programme's performance and impact goals, especially those in "Dimension 2, Innovations".

The programme's design means that all projects should be pervaded by a challenge-driven working method. This suggests that, in their implementation, all projects will affect and relate to global goals 5 Gender Equality, 8 Economic Growth and 9 Innovations; even if the project's results are linked to other global goals.

Figure 4. Impact logic for the Challenge-Driven Innovation programme.

Stage 1 Initiation	Target results Stage 1	Stage 2 Collaboration	Target results Stage 2	Stage 3 Follow-up investment	Target results Stage 3	Expected benefit	Global goals in the 2030 Agenda

Target results Stage 1:
- Identified and analysed solution of great potential
- Plan for how new solutions will be developed and utilised
- Relevant needs charted and reported to affected stakeholders
- Suitable actors associated with project
- Draft agreements regulating intellectual property and safeguarding utilisation
- Situation analysis identifying needs and pre-requisites of a global market

Target results Stage 2:
- Tested and evaluated subsidiary solutions
- Opportunities and obstacles identified in relation to utilisation
- Thorough knowledge of users, stakeholders, customers and markets
- Advanced utilisation and communication plan

Target results Stage 3:

Dimension 1 innovation capability:
- New, renewed or enhanced alliances, partnerships and networks
- Strong capacity to conduct innovation work on the borderline between public and private operations
- Increased/actual customer and user involvement

Dimension 2 innovations:
- Tangible value creation and utilisation
- New or improved products, processes and services
- Strong attraction and will to invest
- Internationally attractive actors and places which attract new investment

Expected benefit:
Lasting changes regarding capacity to meet societal challenges and global goals:
* Results utilised in other operations, for other target groups and in other projects
* Changed organisational cultures, processes, routines (e.g. regulations and controls)

Control mechanisms
2030 Agenda, gender equality integration, key aspects, impact logic programme level, investment model and assessment structure

4.3.2 Indicators used to measure the programme's success

To evaluate the success of the programme, Vinnova has defined a number of indicators/metrics for each programme objective which are to be followed by the projects. Figure 5 gives a conceptual illustration.

Figure 5. Overview of vision-dimensions-goal-indicators-evaluation issues.

The indicators/metrics are monitored by collecting data from the projects at various points (see Figure 6):

- During the course of the project, every six months via status reports (Stages 2 and 3 only).
- At the conclusion of the project, via a final report (standardised template) and questionnaire.
- After the project has concluded, given that the impacts usually arise in the longer term. All project partners (and in particular the coordinator) therefore have a responsibility to note the results and impacts which arise after the end of the project and report them to Vinnova upon request (see Vinnova's general terms for contributing further information).

Figure 6. Overall illustration of tentative model for evaluation and follow-up.[5]

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[5] Please note that the percentages in brackets are based on historical data and do not necessarily give a true picture of how many applications will be passed in the future.