

Science Shops

- A democratic approach to science and society – what is in it for civil society and universities
- Danish and European experiences

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The Science Shop concept

- Science Shops play a role as mediators between community-based organisations and science.
 - As providers of scientific knowledge and access to scientific knowledge for civil society organisations (community-based organisations (CBOs) and non-governmental organisations (NGOs))
 - As providers of community organisations' ideas and knowledge for the scientific community to incorporate into research and curricula.



The international definition: **A Science Shop provides**

independent, participatory

research support

in response to concerns

experienced by civil society



The history of Science Shops

- **1970s:** Established in the Netherlands as a response to a growing need for science for society: CSO's; SME's
- **1980s:** Denmark, USA, England, Northern Ireland, Germany, Austria, France and Belgium
- **1990s:** Israel, Canada, Spain, Romania, Norway, New Zealand, Malaysia, South Africa
- **2000s:** Portugal
- **2005:** Greece, Estonia, Latvia, Iceland, Japan, Wales, Scotland, Ireland, Turkey

Forms of organisation

- ❖ **University** (*Act as open doors to the universities by enabling the CSOs to establish co-operation and networks with university researchers and students*)

Central Office (DTU)

Faculty Office



- ❖ **NGO**

Separate entity

University links

- ❖ **Community-University Research Alliances**



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EUROPEAN
COMMISSION

Community Research

Science Shops

→ knowledge for the community

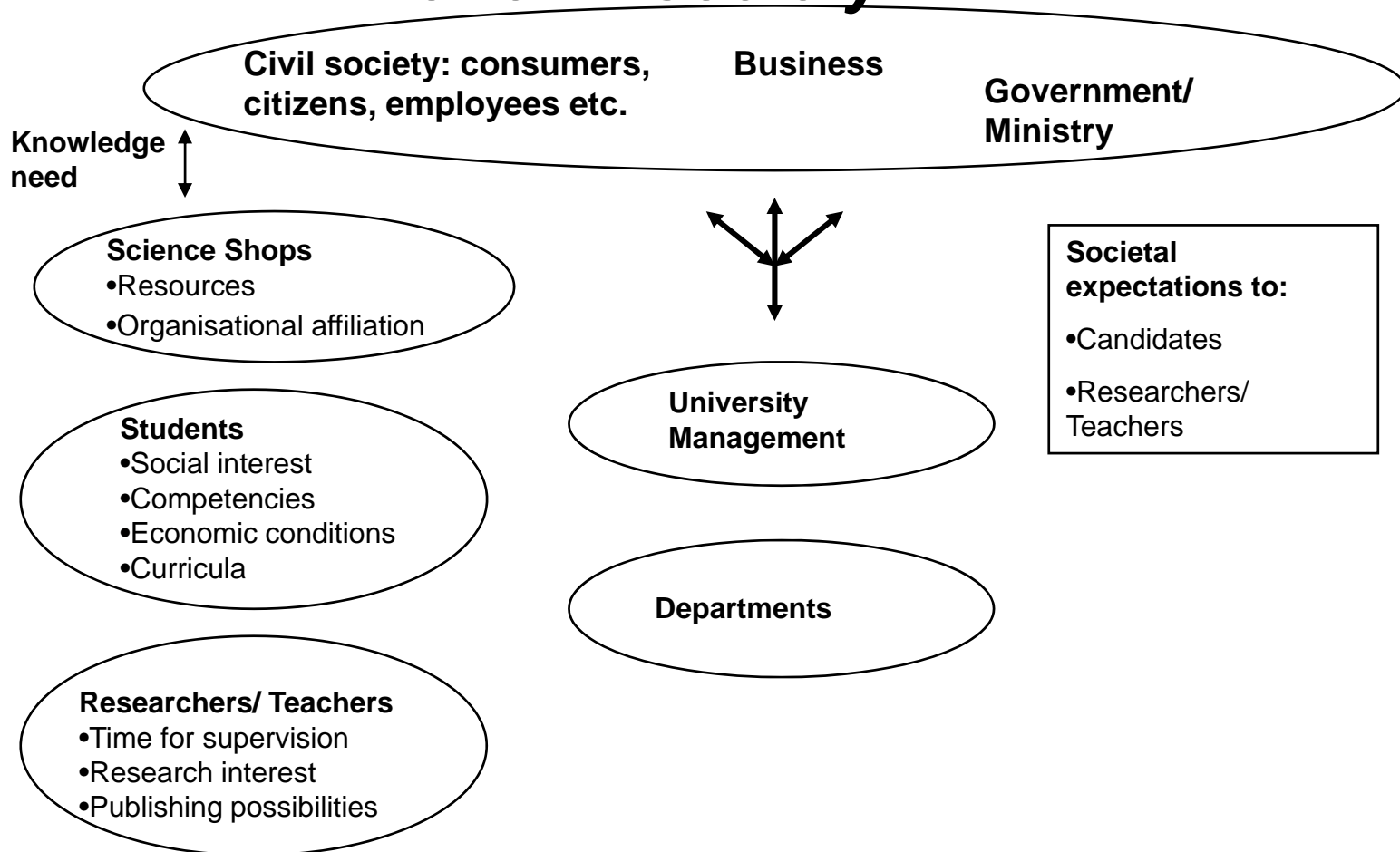




The Science Shop DTU

- Established in 1985
 - Aims:
 - To give civil society organisations access to the resources of the university
 - To contribute to the on-going renewal of the university based on the knowledge needs of citizen groups
 - To give students opportunity to gain experience with co-operation with citizen groups
 - 20-30 requests a year of different types: eligible clients; others
 - 10-15 projects a year of different types
 - Students, researchers, referring to other institutions
-

Science shop: an open door to the university for civil society





Recent types of client groups in Sc Sh DTU – and examples (1)

- Non-governmental organisations (NGOs): (Regional environment and environment centre (KMEK), Local Agenda 21 centre, Birdwatchers' Association (Fugleværnsfonden), The Consumer Council, Danish Nature Conservation local committees)
 - Community-based organisations (CBOs): (LA 21 groups, Citizen association in Raadvad, Local city committee in Vanløse)
 - Citizens: (traffic conditions in Vanløse, Disabled person, Electrical car activist)
-



Recent types of client groups in Sc Sh DTU – and examples (2)

- Trade unions (Working conditions): Physiotherapists (chemicals), dental technicians (vibrations), pedagogical staff (noise)
 - Staff groups in regional or local governmental institutions, including the citizens (day-care centres): food supply, building refurbishment
 - Inventors and entrepreneurs: Referred to NGOs or contact made to DTU departments – but without further support
-

Special characteristics of the Sc Sh DTU

- Focus on civil society as the client/user segment – as an open door besides other open doors to the university (among the few science shops in DK)
 - Focus on external and internal benefits/objectives of the Science Shop (few globally)
 - Part of the staff in ordinary scientific position(s) (few globally)
 - Involved in civil society inspired and related research and education development
 - and operation (few globally)
 - Focus on scientific analyses of the science shop work – as much as the resources allow (some globally)
-

Organisation and structure

- Own model developed in the end of the 1980'ies, inspired by the Dutch Model, based on:
 - Long term embedding in university curricula and research
 - Ordinary scientific positions – to enable to fulfil the objectives and to offer career opportunities for the staff and thereby stability in the Science Shop
 - University based Science Shop as part of an interdisciplinary centre
 - Central office, but now structural placed within Department of Management Engineering
 - Financed by small annual budget – besides the budget for the scientific staff
 - **FREE** access to research and science at the university – through the scientists and the students at the university
-



DTU Science Shop resources today

- One co-coordinator/associate professor – part time (10 hours/week (?)) (ordinary scientific position)
 - Funds from the university for assistance and consumables
 - One research assistant (10 hours/week)
 - One student assistant (7-10 hours/week)
 - Participation in regional Science Shop newsletter
-



The Science Shop research

Research done by:	In % of Science Shops
Science Shop staff	71
Students	
-Voluntary	34
-Course/diploma	71
Researchers	
-Voluntary	45
-Paid	48

Overall steps in DTU Science Shop projects

- Group/organisation approaches the Science Shop
 - Dialogue about knowledge need and its background
 - Action-based
 - Non-commercial
 - Strategy for handling the request
 - Refer to previous report or governmental institution
 - Short advice
 - Student project
 - Research project
 - Advisory group
 - Conducting the project
 - Dissemination – the use of the findings and publication
-

Science Shop projects and curricula

- Scientific introductory project (4th semester)
- Bachelor project (6th semester)
- Master Thesis (10th semester)
- Special course
- As part of a course



Overall steps during a student project in a Science Shop

- Scientific supervisor responsible for the scientific quality
 - Introductory meeting between 'client', students, supervisor, Science Shop:
 - Aim of social group.
 - Agreeing upon project aim and plan – based on time frame and competencies
 - Midterm meeting: Status. Adjusting focus?
 - Final meeting: Discussion of results. The use of the results. Publishing the results
 - Follow up after 1 yr: Actual use of results
-

Approaches to science and the public

- Public understanding of science should be improved: the deficit model (citizens do not know enough about science)
- Dialogue between researchers and the public about risk (research does not automatic lead to legitimacy and acceptance of a technology)
- Upstream participation – needs and alternatives of the public integrated into scientific and technological development



The perception of NGOs in EU: Science, society and the citizen in Europe (2000)

2.2 Involving society in the scientific venture, pp. 8f.

„Nowadays scientific knowledge and technological know-how are no longer the sole result of the activities of specialised institutions. They are produced within a very broad spectrum of organisations and structures and of networks encompassing research bodies and the users, both public and private, of the products of scientific endeavour.

The **involvement** of patients' associations, transport user groups or consumer organisations in **defining and monitoring research** activities and programmes brings research and society together and helps **to ensure that results match needs**”.



Community based Mode 2 knowledge production: the role of Science Shops

- Increased focus on the interaction between research institutions and society in the production of knowledge – **Mode 2**
 - problem-focused and interdisciplinary
- **Mode 1**: traditional research, which is academic, investigator-initiated and discipline-based knowledge production.
- Most Mode2 discussions focus on business-research co-operation
- However..... Co-operation with civil society organisations can also contribute to the research agenda and methodologies at universities = community-based research

Civil society needs identified in the EU financed project INTERACTS

- Documentation of problems already perceived by CSOs – in order to obtain acceptance from other stakeholders, like government and businesses (e.g. different types of pollution)
- Development of new knowledge about a concern CSOs have (a new technology area and its possible paths and impacts)
- Development of design proposals supporting implementation of a preventive CSO strategy (urban ecology, organic food)

Knowledge production in community-research

- *Interactive knowledge* production between students/researchers, the Science Shop and the CSO
- *Knowledge supply*, where researchers or students produce new knowledge, which is transferred to the CSO
- *Knowledge transfer* to NGOs, where existing knowledge is transferred to an NGO by the science shop

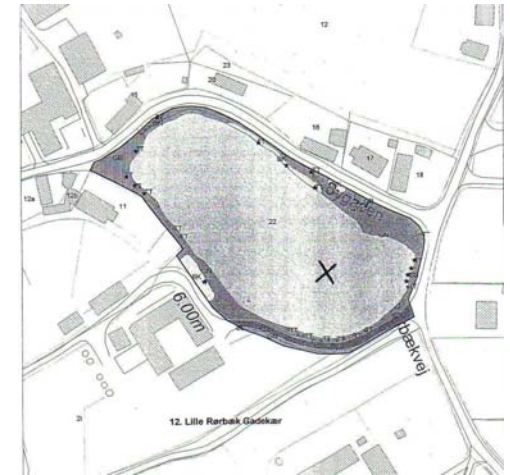
Contribution to capacity building in CSOs – enhancing the capacity for changing practice

- NGOs provided with knowledgeand are (maybe) able to implement results in their activities or services
- NGOs bring forward the *scientific* research and its results in order to raise interest and support around a topic.
 - Although a scientific report might not be enough to convince other stakeholders
- NGOs learn to apply scientific methods or theories used by the researchers or the students (focus group interviews)
- Provision of organisational frames and experts for workshops and other events

Impact: NGOs bring forward the scientific research and its results in order to raise interest and support around a topic

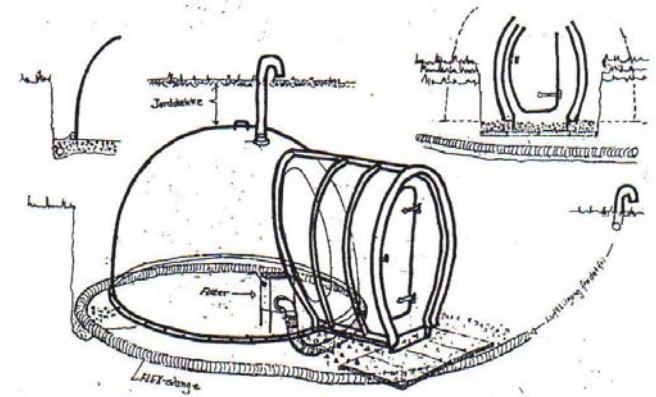
- **Case 1: Polluted ponds**

- Initiated by a local branch of the Danish Society for Nature Conservation
- The municipal government did not recognise the problem
- The Science Shop via the organisation documented the problem and came up with solutions
- The municipality chose not to rehabilitate the pond despite scientific evidence of pollution level
- The environment in the pond were not prioritised
- *Would a more dialogue-based approach with the municipal government about the problem have given influence on the policy priorities?*



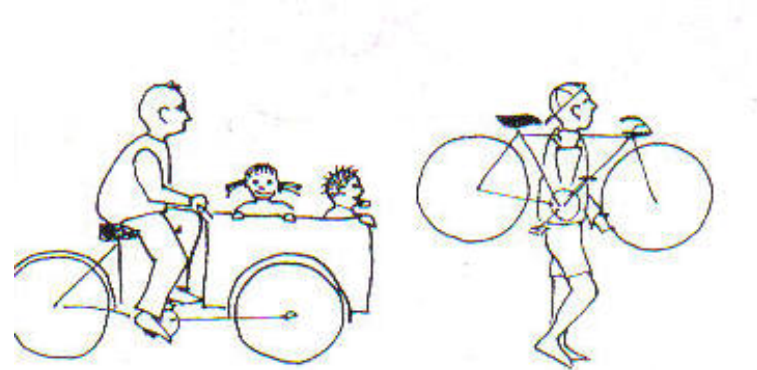
Impact: NGOs provided with knowledgeand are (maybe) able to implement results in their activities or services

- **Case 2: Development of approach for sustainable use of organic food**
 - Initiated by the day care centre, Vognporten
 - Local initiative to contribute to global sustainability (Brundtland)
 - Confusing for Vognporten to figure out if implementing organic food would be more sustainable and how to implement it
 - Through the Science Shop project, the Vognporten got an understanding of how to integrate the ‘technical system’ into the daily life
 - Economic support for earth igloo
 - Information about how to use the concept of ‘the products of the seasons’



NGOs learn to apply scientific methods or theories used by the researchers or the students (focus group interviews)

- Case 3: Obstacles to city bicycling
Initiated by the Danish Cyclist Foundation
 - Intention: a project documenting bicyclists environmental awareness and fear of cars and busses
 - The Science Shop project highlighted that the personal motivation and fear for using the bicycle is something else than first anticipated
 - Fear of other bicyclists important
 - The Science Shop project highlighted new barriers experienced by the bicyclists
 - DCF used existing networks and occasions to apply the new insight
 - Project together with a municipality about cycling conditions included a focus on bicyclist behaviour
 - DCF able to use focus group interviews as a methodology in other situations inspired by the methodology behind the Science Shop project





Provision of organisational frames and experts for workshops and other events

- Citizen meeting about the use and wishes to a regional water stream, including several lakes and dams
- Initiated by a local citizen group and the Science Shop DTU
- Initiative based on a project co-operation between the local citizen group and the Science Shop DTU
 - based on results from a project focusing on the possibilities for improvement of the water quality in one part of the water stream
- The local group wished to have a public debate
- The local citizen group not able (time, knowledge) to initiate the citizen meeting themselves, so the Science Shop mediated the process
- Organised in co-operation with the local branch of a large environmental organisation and the municipality
- Success: public, politicians and interest groups attended and highlighted a lot of wishes and interests: recreation, environment
- Next step: Develop a strategy paper for the politicians pointing out the suggestions and wishes from the citizen meeting



Student (and researcher) competences from Science Shop work

- Translating from practice to theory and from theory back to practice.
- Understanding and appreciation of citizens' expertise
- Co-operation skills: the student co-operates with people outside the university
- Project and task management skills
- Writing skills

Enabling factors and conditions for long-term impact on curricula and research (SCIPAS):

- Science shop influence on strategic university decisions - through participation or through alliances
 - Personal resources for networking and own initiatives at the university and towards citizen groups
 - Science shop staff working as teachers and researchers give the opportunity to develop own courses and research activities
 - Visibility of the science shop makes the university administration and the scientific staff aware of the potentials
 - Changes in the societal discourse about the competence needs of academic candidates towards more practice or user oriented competence
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Barriers to university co-operation with civil society through Science Shops (1)

- Researchers are under a constant time pressure: research has to lead to publications, and teaching obligations has to be fulfilled => need for tangible incentives
- Most of the Science Shop projects contribute “only” to “grey” literature
- Projects might be seen as based on a practical problem rather than on a scientific problem => no scientific interest in the projects

Barriers to university co-operation with civil society through Science Shops (2)

- Universities are more interested in “big projects” with a high amount of external funding and co-operation with companies and governmental institutions => smaller CSO-related projects not attractive

Experiences with dialogue and co-operation with CSOs



- **CSOs participate in research projects**
 - CSOs gives input to research projects
 - CSOs participate in data collection
 - CSOs as research partner
 - CSOs as member of stakeholder boards
- **Researchers give scientific input to CSOs**
- **Guidance and advise to CSOs**
- **Dissemination of research results to CSOs**
- **Discussions and dialogue with CSOs**
- **Participation in events organised by CSOs**
- **CSOs invited to conferences**

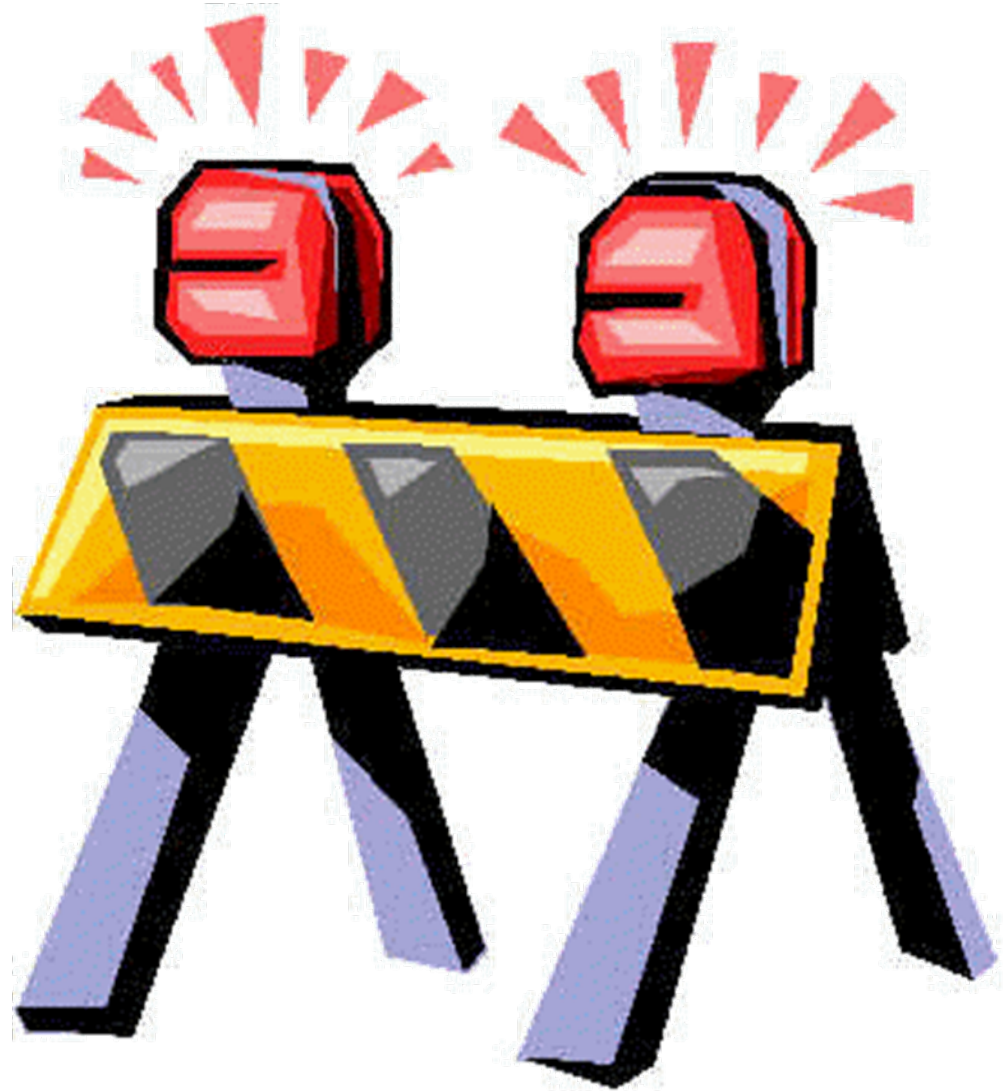
Some benefits by co-operation between researchers and CSOs - expressed by researchers



- **New or other issues are discussed**
- **The problems are put into a context in society**
- **Network useful in other projects or activities**
- **Creates more publicity around results**
- **Creates interest in society**
- **Seen as part of public duty**
- **CSOs experts in setting agenda**
- **Research based on a need from society**

Some barriers to co-operation researchers – CSOs - expressed by researchers

- CSOs do not relate to science in a neutral way. Some researchers want to remain objective
- CSOs not attractive as research partner because they do not have access to funding
- CSOs wants the researchers to take a stand point
- CSOs do not have scientific expertise





Strategies for research development in relation to Science Shops

- Science shops as antenna and repository about new problems and needs (many science shops)
 - Science shops as facilitator btw. CSOs, university and other stakeholders (some science shops) (DTU, TU Berlin KUBUS)
 - Science shop as incubator for new research area (few science shops) (DTU, Groningen Chemistry, Groningen Medicine)
 - Science shop as centre for community based research (few science shops) (the early DTU model, Loyola university)
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Changes made in research and curricula at DTU

- Based on the knowledge needs put forward to the Science Shop:
 - Research programme and new course modules within urban ecology, cleaner production and environmental management.
 - Research programmes and integration of new aspects into existing courses on waste-water treatment and food technology.
 - Research and new course modules concerning technological change and co-operation between experts and citizen groups.
-

Science Shop as incubator:

The embedding of organic food production as research area at DTU

Period	Development in societal discourse related to organic food production	The activities of the Science Shop and the affiliated community research centre	The interest of the 'established' researchers at the university
1985-1990	<ul style="list-style-type: none"> •Organic agriculture starts growing on the initiative of city people moving into the countryside 	<ul style="list-style-type: none"> •The Science Shop receives questions from agriculture organisations •Projects done as student projects 	<ul style="list-style-type: none"> •Food and environmental researchers as supervisors on Science Shop projects
1990-1998	<ul style="list-style-type: none"> •Organic agriculture increases due to problems with pesticides in ground water •Conventional farmers converts to organic farming in bigger numbers 	<ul style="list-style-type: none"> •Apply for funding from national organic food research programme ⇒ Science Shop develops own research group 	<ul style="list-style-type: none"> •Science Shop invited to give lectures at food technology course •Food researchers not interested in participating in research project on organic food processing
1998-	<ul style="list-style-type: none"> •Processed organic food products increase 	<ul style="list-style-type: none"> •Apply for funds from national food research programme •Suggests consumer organisation to plan research project on consumer policy 	<ul style="list-style-type: none"> •Food researchers agree to co-operate with organic food research group on project on care in organic food processing

Science shop as facilitator of new research area: the embedding of re-use of rain water at DTU

Period	Development in societal discourse related to green water management	The activities of the Science Shop and the affiliated community research centre	The interest of the 'established' researchers at the university
1985-1990	<ul style="list-style-type: none"> •Focus on low-tech wastewater treatment •Focus on reuse of rainwater 	<ul style="list-style-type: none"> •The Science Shop receives questions •Projects done by students 	<ul style="list-style-type: none"> •Teachers find Science Shop projects time saving and interesting
1990-	<ul style="list-style-type: none"> •Debate on the reuse of rainwater •Stakeholders participate in seminars •EPA starts projects on reuse of rainwater and local wastewater management 	<ul style="list-style-type: none"> •Science Shop decides to try to embed activities on 'green water management' •Proposes two departments to organise seminars in co-operation with the Science Shop 	<ul style="list-style-type: none"> •Teacher integrate topics in courses •Teacher proposes new project themes – from a more critical angle •Departments get national research funding

Changing context – re-shaping strategy: **Recent strategic considerations Sc Sh DTU (1)**

- The Danish law about universities binds the universities to co-operate and exchange knowledge and competences with the surrounding society.
 - *Through its co-operation with citizens, consumers and non-profit organisations the Science Shop contributes to DTU's co-operation and exchange of knowledge and competences.*
- According to DTU's strategy, the usefulness to the society is an important criteria in research priorities.
 - *The Science Shop contributes to the focus on societal usefulness through the co-operation with citizens and non-profit organisations about their knowledge needs*



Questions an institution may consider: **Demand and supply in relation to the Science Shop concept**

- Do civil society organisations see a need for co-operation with the universities in their strive for ‘a better society’?
- Are there need and interest for better opportunities for students to work problem- and project oriented?
 - And with topics from civil society?
- Is there need and interest for more orientation towards civil society needs in research?
 - As part of the societal relevance of research?

An application for a Science Shop should consider the following:

1. Why a Science Shop at the university: potential benefits for the university and the society
 2. Potential user groups and their need for knowledge. *Pilot projects*
 3. Experiences from other Science Shops
 4. Activities in the Science Shop
 5. Affiliation of the Science Shop to the university: Organisation and management
 6. How can a Science Shop with students project work fit into the curricula of the university?
 7. How can the scientific personnel be involved in the Science Shop work: As co-ordinators? As supervisors? As researchers?
 8. Budget and financing: University funding? External funding?
-



Funding models for Science Shops (1)

Full funding by university:

- The universities provide direct financial support for Science Shops.
- The Science Shop staff can be dedicated Science Shop staff or scientific staff, who is conducting part of their teaching and research in the Science Shop.
- The project research is carried out by
 - students as part of their education (earning ECTS points) and by the supervisors as part of their ordinary work
 - the Science Shop staff.

Partly funding by university:

- If universities are unable to finance the full cost of a Science Shop:
 - part-funding by attracting external funding from government or European programmes or private and charitable grants.
-

Funding models for Science Shops (2)

Social entrepreneurship:

- Some Science Shops act as social entrepreneurs supporting socially beneficial research with NGOs
 - Staff conducts profitable research or other activities with organisations and funding agencies, which can pay market costs

Co-funding with NGOs for research and evaluation:

- Science Shops co-operate with NGOs when the latter are making applications for funding
 - ...by having Science Shop research written into the bid to contribute to the monitoring and evaluation of activities

Studentships and research grants:

- Universities or funds provide dedicated studentships and grants for Master level students or researchers in Science Shops.
-



Changing context – re-shaping strategy: **Recent strategic considerations Sc Sh DTU (2)**

- An important element in DTU's vision is sustainability.
 - *The Science Shop contributes to the implementation of this part of the vision since a number of student projects and research projects initiated through the Science Shop focus on aspects of sustainability.*
 - New thinking is emphasized in DTU's strategy as an important criteria in research.
 - *The Science Shop contributes hereto, since projects carried out through the Science Shop has contributed to the initiation of research. E.g. within organic food production, the Science Shop activities have included the formation of a research group at IPL.*
-



Changing context – re-shaping strategy: **Recent strategic considerations Sc Sh DTU (3)**

- In DTU's strategy the need for further development of the engineer education within creative synthesis and polytechnic holism. The way of teaching should also develop the personal and the social competences of the students
 - *The Science Shop contributes to the implementation of this part of the strategy, since the students through the Science Shop has the possibility of working problem-oriented in co-operation with civil society stakeholders.*
 - Within innovation it is a part of DTU's mission to have an active knowledge transfer to the society
 - *The Science Shop contributes to active knowledge transfer through ongoing dialogue with the civil society stakeholders during the project co-operation and the subsequent dissemination of the reports etc.*
-



Changing context – re-shaping strategy: **Recent strategic considerations Sc Sh DTU (4)**

- In DTU's vision the university campus, where scientific partners and co-operation partners and other stakeholders meet and mutual inspiration and synthesis develop.
 - *The Science Shop DTU contributes to this kind of inspiration and synthesis through the meetings between students, researchers and civil society stakeholders as part of project co-operation organised the Science Shop*

Recent ideas about future strategic objectives and activities in Sc Sh DTU

1. Increase the number of student projects carried out based on requests to the Science Shop (identify barriers to the limited number of projects)
 2. Contribute with educational experience from projects organised through the Science Shop to other educational activities at DTU: from teaching to learning
 3. Reinforce the strategic research dimension in the Science Shop activities through further research activities
 - A. User-driven innovation (stakeholder workshops) (consumers, elderly people etc.)
 - B. Up-stream civil society participation in DTU research
 - Nanotechnology. Probiotics
 - C. Develop co-operation with the local community around sustainable development (the local municipality and local environmental NGO)
 - Support the strategic climate abatement role of the university
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Emerging technology case from the Science Shop DTU

- **New knowledge – knowledge enhancement**
 - **Prebiotics and Probiotics**
 - Requested by the Danish Consumer Council
 - Is being conducted as a Master Thesis by a Danish student (2007)
 - **Aim:** A need for scientific documentation of prebiotics and probiotics in general in order to get an understanding of the health potentials.
 - **Recommendation:** need to look into the claims about health improvement and the documentation behind these claims