TECHNOLOGY CLINICS

Report produced for the EC funded project

INNOREGIO: dissemination of innovation and knowledge management techniques

by Martin Rhisiart
Gareth Roberts
Meirion Thomas

Observatory of Innovation
& Business Development
Cardiff Business School

JANUARY 2000

Contents

Note:
This report has been compiled to contribute to the EC funded project "Innoregio: innovation management tool development, diffusion and evaluation" and has been prepared by Martin Rhisiart, Gareth Roberts and Meirion Thomas of the Observatory of Innovation and Business Development at Cardiff Business School. Much of the content of the report is based on reports from the TEKES organisation in Finland which has been operating a technology initiative since 1992.

1 INTRODUCTION

Large firms usually have enough financial and human resource to allow them to address complex technology issues in house, indeed they often have dedicated teams for the purpose. For SMEs, on the other hand, the day to day pressures of running their business means that they can devote little time and resources to addressing the problems and opportunities involved in exploring and implementing new technologies.

So how do SMEs ensure that they are keep abreast or indeed ahead of technological developments in the products and processes within their markets? Clearly SMEs have their own ways of addressing the issues, but in many cases progress is hampered because:

- SMEs frequently do not have the resources, compared to larger firms, to dedicate to exploring and developing technological issues
- approaches to technological development are often ad hoc, taking the form of tacit, incremental, learning-by-doing experience rather than an organised explicit activity
- SMEs often tend to internalise their approach to technological development – not taking advantage of the knowledge and expertise which exists outside the firm.

These problems for SMEs frequently persist against a background in their region of significant technology resource and know-how residing within universities, colleges, technology support organisations and importantly other firms. It is with this paradox in mind that the Technology Clinic initiatives have been developed.

A technology clinic is an activity implemented by a technology support organisation which aims to bring together a series of priorities in the development of small and medium sized enterprises (SMEs); technology problem solving, technology watch, and technology transfer. The aim is that the process of going through a clinic would equip an SMEs with the appropriate know-how and support from technology experts to allow it to successfully implement new technologies.

This report outlines the details of the technology clinics technique, providing case studies and exploring implementation issues.

2 THE TECHNOLOGY CLINIC TECHNIQUE

In this section, the basic methodology underlying technology clinic activities is described illustrated by reference to a primary example from Finland and two alternative approaches from Sweden and Wales.

2.1 Methodology

2.1.1 Background

A technology clinic is an initiative operated by innovation support organisations to assist the development of innovation and technology in SMEs. The basic idea is to pre-select a technology issue which is strategically important for a firm, sector or for a region in general, and support SMEs in understanding the issue *and* implementing responses within their firms. In this way it represents a sophisticated supply side innovation support measure rather than a response to specific expressed problems for individual SMEs.

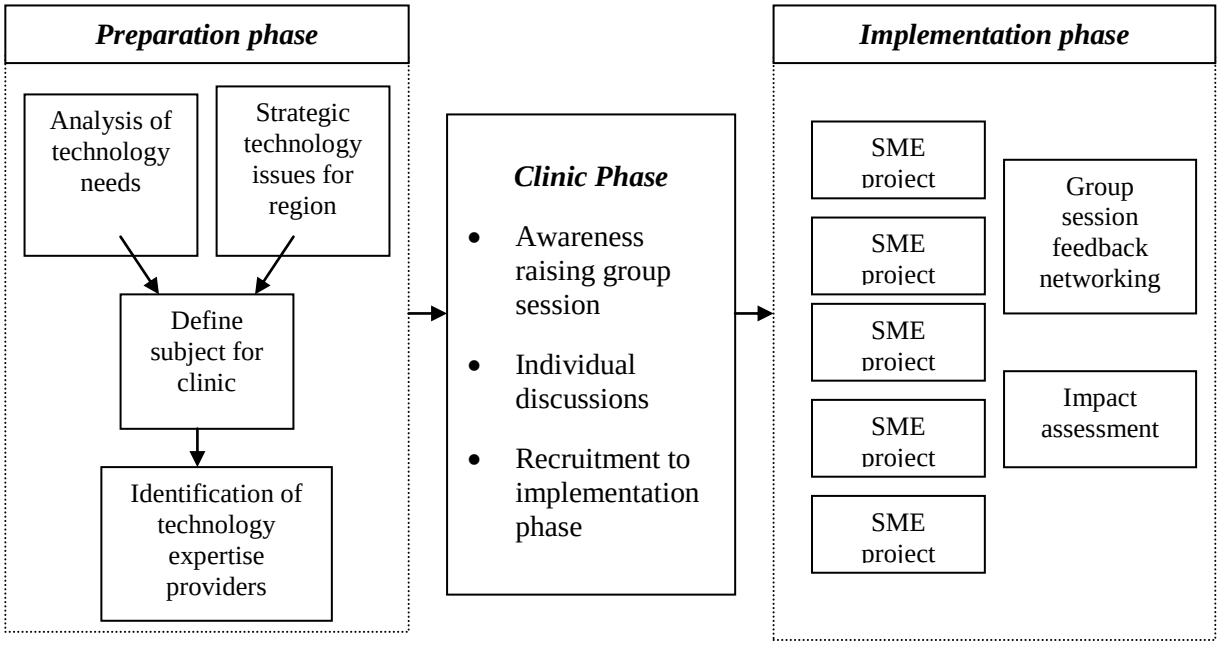
A technology clinic programme will likely involve multiple clinics - the same basic approach being applied to addressing a number of innovation and technology issues. As such there are a number of possible objectives for a technology clinics

- ***Technology-based clinics*** focus on a specific technology with the objective of diffuse the specific technology into the SME sector.
- ***Theme-based clinics*** promote awareness of and provide solutions to a specific theme or regulatory change. Such problems may be solved by applying a range of alternative technologies or methods.
- ***Cutting-edge clinics*** are intended to keep SMEs at the forefront of technological development on an international scale, or to help companies to increase their lead over international competition.
- ***Catching-up clinics*** aim at reaching the standards already achieved by the best international competition in some areas of technology.
- ***Methodology clinics*** disseminate good management practices and methodologies into the SME sector.
- ***Demonstration clinics*** offer demonstration services to a selected group of SMEs in a particular sector.

A technology clinic programme may chose to concentrate on one of these types of clinic or cover a range within the same programme.

2.1.2 Basic approach

At the heart of the technique lies three stages; (a) preparation phase, (b) clinic phase, and (c) implementation phase. The following figure illustrates how the approach operates in more detail:



2.1.3 Preparation phase

The preparation phase lays the foundation for the phases to follow. The basic outcomes of this phase are the identification of an issue on which to concentrate and the identification of relevant expertise to support the clinic and implementation phases.

Identifying the issue for the clinic

Clearly, identifying an innovation issue on which a clinic should concentrate is of utmost importance. An issue which is emotive, relevant and timely for firms is likely to provide the basis for a successful clinic. It probably most relevant to for this decision to be taken by a panel made up of technology experts, firms, regional innovation support bodies and the clinic co-ordinators. In deciding, it is advisable to consider the various types of clinic outlined in 2.1.1 above.

- **The express needs of firms in the region** should provide the most important input into deciding the issue. This information might be gathered from a number of different source:
  - formal needs analysis and technology audits which in some regions will have been carried out for RIS/RITTS/RTP projects,
  - industrial associations and sector organisations may identify the improvement or diversification issues facing sectors,
  - innovation responses required as a result of changes in the regulatory environment,
  - innovation and technology 'futures' issues highlighted via Foresight programmes, and also
  - the cumulative knowledge and experience of innovation and technology support practitioners in the region.
- **The strategic innovation and technology issues facing a region** in general may also contribute to determining the innovation and technology issue for a clinic. This may be highlighted again through RIR/RITTS/RTP projects or through other regional strategies.
- **Good practice from other regions** may also provide input**.**

Identifying expertise to support the clinic

Particular effort is needed to identify the most appropriate expertise for a clinic. It is important for the effectiveness and credibility of the clinic that those people delivering the content of the clinic are experts in their field – not only in the theoretical technology issues, but also in their commercial application. Also, the clinic would greatly benefit if there was continuity between the experts making the initial presentations and the experts involved in supporting individual companies' implementation projects.

Relevant expertise may be found within the region, in various sectors, including:

- universities and colleges
- technology centres, and,
- private consultancies.

Connecting firms with innovation and technology expertise in the region has the potential to improve the culture of innovation networking which is emerging as a key driver of innovation in general within a regional.

Of course, where the appropriate expertise does not reside within a region, it will be necessary to source expertise elsewhere.

2.1.4 Clinic phase

The clinic phase basically consists of initiating contact with firms, presenting the clinic issue and laying the foundation for implementation projects through individual counselling / diagnosis sessions.

The targeted audience may be different from one clinic to the next depending on the nature and specificity of the issue being explored. The audience may include technology support practitioners as exposure to the issues is of general interest in their work.

The clinic phase is likely to begin with the announcement to firms that the clinic has 'opened'. There are two approaches to achieving this; a group launch seminar, or; information provided by post (or email) or direct individual approach by the clinic co-ordinator.

Approach 1: Launch seminar
A launch seminar would consist of:

- invitations being sent to firms to attend the seminar, possible followed up by discussions with the clinic co-ordinator to discuss the ideas behind the clinic
- a single launch event in the form of a seminar / workshop at which
  - an expert gives a presentation to raise awareness of the issue – theory, practice and relevant responses
  - a series of one to one sessions take place where firms have the opportunity of speaking to the experts directly about the issue and how its importance in the context of their business – a preliminary diagnosis
- highlighting the to firms the support available for implementation projects under the clinics and recruiting firms for this next stage.

This launch approach has the advantage of bringing together firms facing similar innovation and technology issues, a situation that can help stimulate inter-firm discussions and learning.

Approach 2: Individual contact
In this case, there is no launch event or networking between firms. The approach relies solely on one-to-one contact between firms and experts. The expert may be available at the clinic location over a period of time and firms may book sessions with him / her. The sessions will consist of general awareness raising and a discussion / diagnosis of the firm's current situation. Support for an implement project for the firm will be offered.

2.1.5 Implementation phase

Once a firm (or group of firms) have confirmed their willingness to proceed with an implementation project, there are a number of stages which follow.

- Expertise to carry out the project must be identified and commissioned. To maintain continuity, it would be advantageous to commission the same expert as made the initial contact during the clinic phase. At this stage it is even more important that the expert has direct commercial know-how and to be fully credible when engaging with firms.
- Once the manager/director of an enterprise has agreed to carry out an implementation project, it will also be necessary to brief the key members of staff and to obtain their commitment to the project .
- At the outset, and before any detailed work is carried out, it is important for the key staff and the expert to agree an action plan for the project.
- An implementation project will of course involve committing resources. These will be financial as well as human resources. The financing of the project is a key issue, and it may be necessary for the clinic co-ordinator together with the enterprise to explore and agree upon the most appropriate approach to financing. In some cases,

public sector subsidies may be available – but it is advisable to ensure that the enterprise also commits to the project.
- Once the plan and the resources are in place, the project can go ahead. In some cases, the project may be short term intensive undertaking, and in others, the project may be longer term, with periodic interventions from the expert.
- After the implementation projects have been completed, it is advisable where possible to organise a group feedback session at which enterprises which carried out an implementation project can report their experiences and discuss the issues with other firms.
- Finally, a short report highlighting the impact the projects had on the enterprises is a important. This can guide the methodology of future clinics and highlight where the issue may be relevant for a wider audience.

2.2 Case studies

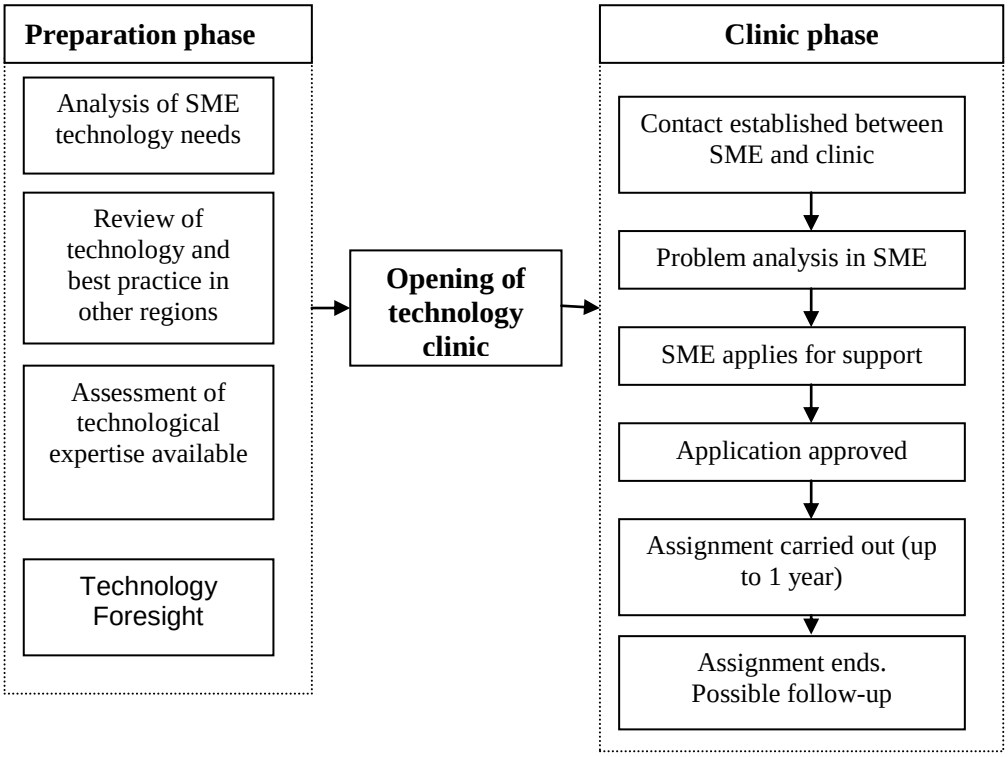
2.2.1 TEKES (Finland)[1]

TEKES launched a technology clinic initiative, believed to be the first of its kind, in Finland in 1992. Indeed, much of this report is derived from their experiences since that time. In the context of the methodology highlighted above, the key features of the TEKES approach include:
- The typical duration of contact with a SMEs under a clinic assignment is 1 to 3 weeks. But in practice this may actually take up to one year to complete.
- TEKES have concentrated on interacting with SMEs on a one-to-one rather than a group basis.
- Implementation projects with firms have benefited from subsidies from the public sector.
- Sixteen clinics done - working with 260 companies (see annex 1 for full details).
- TEKES have seen the technology clinics as an approach to packaging the various services and expertise within the organisation

After 5 year of operation, TEKES commissioned an evaluation of the initiative. The main conclusions were:
- Flexibility is a key success factor, in terms of funding, assignment identification, clinic organisation and clinic theme selection
- The clinics provided a strong and wide-ranging learning impact , especially on product and process development, technology adoption, technology strategy, technical recruitment and out-sourcing expertise.
- Experience should be shared between clinics.
- Clinics succeed because of the commitment of those who promote them
- Before initiating a clinic, the plan for the clinic should be formalised, including; rationale, objectives, evidence of demand and availability of expertise.

1 Information derived from Technology Clinic Initiative Evaluation Report, TEKES, Finland

The flow of a typical TEKES technology clinic assignment, is shown below:



The nature of the contact between the clinic and the firm under the TEKES approach is outlines in Annex 2.

2.2.2 Other case studies

At the heart of the technology clinic initiative is the idea of providing support for the implementation of change within an enterprise or the solution of innovation and technology related problems – a process of carrying out diagnosis and facilitating a solution. With this in mind, it is useful to highlight some related approaches.

- The **Technology Implementation Programme** was carried out in Wales by the Welsh Development Agency. The programme followed-up some of the results of over 250 technology audits which were carried out as part of the preparation for Wales Regional Technology Plan. Firms were requested to identify their prime innovation and technology concerns and, working through consultants, to identify the solutions most appropriate for their firms. Subsidised technical consultancy support was then provided to facilitate implementation of the solutions.

- **Kunskapsbron** or (Knowledge Bridge) is operated by Teknopol in the South Sweden. It has the objective of promoting innovation in SMEs through better links between companies and universities. Kunskapsbron employs a team to engage with individual SMEs in the region to identify their innovation and technology needs and then seek out where the relevant expertise resides within the universities in the region. The initiative then supports collaboration projects

3 APPLICATION ISSUES

3.1 Marketing the activity

In order for the clinics to be effective, it is desirable for the maximum number of enterprises to be made aware of the clinic. The is awareness might be raised in a number of ways:

- direct mailing of promotional material
- personal networking of technology support organisations
- web-sites
- presentation at conferences and other seminars and workshops in the regions
- local and regional press

3.2 One-to-one clinics or group clinics

The TEKES approach concentrates only on one-to-one contact between the enterprise and the expert. This approach has the advantage of focusing all the attention of the expert on one enterprise at any time. In this way the interaction is more detailed earlier in the process and the enterprise feels that it is receiving personal attention.

On the other hand, it is now accepted that firms learn best not from universities or from experts but from other firms, and that a culture of co-operation between firms can enhance the innovative capacity of a region. Other approaches, therefore, may involve more emphasis on group sessions in an effort to facilitate this learning. Group sessions are relevant at the launch of a clinic and as a feedback session after implementation projects have been completed. But importantly, where a number of companies are carrying out similar implementation projects, it is also possible to make group working a fundamental part of these projects with companies comparing progress throughout their projects.

3.3 Resourcing implementation projects

The implementation phase of a technology clinic is likely to involve the most financial and human resources. With the implementation phase so important in the overall initiative, the problem of resourcing this phase should be settled before beginning the clinic.

- It is essential for the success of implementation project that the firm itself is able to commit management and other human resources to carrying out the project. Firm should be made aware of this from the outset.
- Experts generally require payment for their participation. It is important to fully explore the various financing options. At TEKES, the implementation phase benefited from generous financial subsidy. Other initiatives may not be able access such support and may look to financial contributions from the firms to match any subsidy.

3.4 Management and co-ordination

Organising a technology clinic programme requires project management and co-ordination, and how this responsibility should be organised should be made clear from the beginning. A technology centre or other support organisation is probably the most appropriate co-ordinator.

The person with responsibility for co-ordinating should be capable of facilitating the project from the preparation to the end of the implementation phase. Further, where

several clinics may be operated under the same programme, the co-ordinator should be able to develop and apply a model of good practice across the whole programme.

3.5 Measuring impact

It is important to measure the impact of the technology clinics in order to

- understand the nature and extent of the impact of the initiative on the firms
- identify related issues which might form basis of future clinics
- assess the relevance of the issue for a wider audience – perhaps a second clinic on the same theme
- refine clinic methodology, and,
- assess the relevance of the both the initiative in general and the specific issues explored in context of regional innovation strategies

It is expected that the initiative would have a series of tangible and intangible impacts upon the firms and the support organisations.
Possible intangible impacts include:

- culture of innovation fostered
- technology problem solving skills improved
- regional networking between firms, experts and support organisations improved.

Tangible outcomes for companies will depend on the specific issue of the clinic, but may include:

- production system
- quality control
- lead times
- R&D project feasibility reports
- new equipment / material testing
- measurement systems
- raw material optimising

Outcomes for the supply side may include;

- By reaching several SMEs at the same time support organisations can obtain maximum impact for their resources
- Improved packaging and marketing of services
- Exposure to new innovation and technology issues can provide input into the other existing and activities of support organisations.
- Improved networking with expertise inside and possibly outside the region.

4 CONCLUSIONS

In conclusion, technology clinics are an initiative promoted by innovation and technology support organisations to assist enterprises in understanding prevailing innovation and technology issues and make the appropriate response within their business.

With very few technology clinic initiatives active in Europe, the approach to support is largely untested. However, evidence from those programmes that have been running for some time, especially at TEKES in Finland, suggests that the technique has the potential, if managed carefully, to be very effective.

Annexes

Annex 1: Clinics carried out by TEKES in Finland (since 1992)

Name of technology clinics	*Number of SMEs participating*
Analogue Electronics Clinic (eventually cancelled)	0
Machine Vision Clinic	19
Recycled Materials in Road Construction Clinic	5
Rapid Prototyping Clinic	15
Product Approval Clinic	27
Electro-Magnetic Compatibility Clinic	3
Usability Clinic	6
Noise and Vibration Clinic	24
Surface Coating Clinic	50
Beam Welding Clinic	18
Food Hygiene Clinic	62
Plastic Composites and Light Structures Clinic	11
Intelligent Systems Clinic	3
Wood Drying Clinic	13
Technology Strategy Clinic	6
Lon-Works Clinic	2
Total	**264**

M. Rhisiart, G. Roberts, M. Thomas
Cardiff Business School

Annex 2: TEKES approach to SME contact (step-by-step)

Step	*Participants*	*Duration*	*Objectives*	*Actions*
(1) Definition of problem in SME and submission of application for help	SME	n/a	• Establish contact between SME and Clinic • Diagnosis and identification of technology problem within the company, together with potential solutions already tested/addressed (if applicable).	• SME to draft summary of technology problems and needs and use to submit application for participation in the technology clinic.
(2) Drafting and presentation of Action Plan to SME	Co-ordinator, Technology Provider, SME	1 day company visit	• To introduce the SME to the external technology expert. • To agree and formulate plan of action which will address technology needs of SME. • To establish a clear and shared vision between the partners of the project of the task in hand and how it can be achieved.	• Draft an action plan for the project. • Agree budget and financial considerations for the project. • Draw up a timetable of implementation.
(3) Piloting of project and evaluation of results	Technology service and SME	Based on complexity of the project	• To develop and test technology or processes that aim to solve the needs of the SME (to be carried out at technological facilities of experts).	• Write report to evaluate the pilot testing project. • Submit recommendations for implementation in SME.
(4) Adaptation and implementation of new technology to SME	Technology provider, SME co-ordinator	2 days	• To apply the results and knowledge derived from the pilot project to the working environment of the SME	• The technology expert and the principal representatives of the SME to discuss in detail the practical aspects of introducing new technology. Technology experts to provide technical counselling for vital transitional period.
(5) Monitoring and evaluation – report of project and feedback of SME opinions	Co-ordinator, SME and technology expert	1 day	• To gather and use information on the SME project to complete full evaluation. This will become a learning tool for other technology clinic project.	• Involve the company and the technology expert to evaluate their contribution and views on the overall project. The findings are to be recorded in a brief report.