Evaluation of the Technium Programme
Stage 1: Scoping and Review

Final Report to the Welsh Assembly Government



DTZ
Marchmount House
Dumfries Place
Cardiff
CF10 3RJ

www.dtz.com

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Quality Assurance Record	
Checked By: **Date:**	Stuart Hardisty
Authorised By: **Date:**	Matthew Linning
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Executive Summary

This report sets out the results of an initial scoping and review study into the Technium Programme. The purpose of the study was to establish whether a full evaluation of the Programme could be carried out. The study has looked to describe and assess the progress made to date, assess the adequacy available data, comment on any additional data that would be required, identify any early lessons in terms of implementation and outputs, and identify next steps and an appropriate methodology for a full evaluation.

In order to deliver against the identified objectives DTZ has undertaken the following tasks:

- A desk review of relevant background policies, strategies and documents used in developing and shaping the Technium concept and each Technium
- A review of economic evidence from similar programmes in other countries to assess the relevance of the evaluation methodologies employed.
- A data gathering exercise to gather detailed quantitative and qualitative data and also to understand what gaps in the data exist. Data was gathered through a series of consultations, a pilot business survey and Objective 1 documentation.

The Technium Network

Technium looks to provide an environment where science and technology businesses can flourish and achieve their potential for high growth. Technium offers businesses an integrated support package which comprises:

- **Accommodation** - the provision of office space and state-of-the-art facilities
- **Business support** - onsite access to specialist support services that cover a range of subjects such as finance, technology, HR and business expansion. Technium can also give advice about grants to help businesses further their research or product development. Links with academic research centres also provide research and development support.
- **Networking opportunities** - connections with leading national and international companies and academics.

There are ten Technium buildings in the Network across Wales. The table below summarises the development of the Network.

Table A: Summary History of the Technium Network

Year	Technium	Location	Sector	Region
2001	Technium 1	SA1 Waterfront, Swansea	No sectoral focus	South West Wales
2003	Digital	Swansea University Campus	Digital & Software Technologies	South West Wales
2004	Technium 2	Adjacent to Swansea 1, SA1 Waterfront, Swansea	No sectoral focus	South West Wales
2004	OpTIC	St Asaph Business Park, Denbighshire	Opto-electronic sector	North Wales
2004	Aberystwyth	Aberystwyth Marina, Ceredigion	Focused towards companies operating in biological and environmental sciences, computer sciences and digital technology/new media. Tends to aid pre-start and very early stage technology and knowledge based businesses	Mid Wales
2005	Digital@Sony	Sony Site, Pencoed near Bridgend	Technology based incubation. Satellite to the Digital Technium in Swansea	South East Wales
2005	Sustainable Technologies	Baglan Energy Park, Neath Port Talbot	Sustainable Technologies and Low Carbon	South West Wales
2005	CAST	Bangor, Gwynedd	Advanced software such as visualisation and communication technologies	North Wales
2007	Performance Engineering	Llanelli Gate, Carmarthenshire	Performance engineering technologies in the automotive, motorsport, aerospace and marine industry	South West Wales
2007	Pembrokeshire	Pembroke Dock, Pembrokeshire	Renewable and sustainable energy resources	South West Wales

The Technium concept was originally developed and led by the University of Wales, Swansea (UWS) in partnership with the WDA, the City and County of Swansea, West Wales TEC, Business Connect and Swansea Institute of Higher Education (SIHE). The concept aimed to bridge the gap between advanced academic research and commercial exploitation and create

high value jobs to increase the retention of graduates in the local area. Existing initiatives in the local area were oversubscribed. There is evidence of a clear rationale for the original Technium.

The first Technium opened on the former Swansea Docks site (now known as SA1 Swansea Waterfront) in 2001. The aims of this Technium were:

- To create a Business Innovation Centre
- To support the growth of existing knowledge driven SMEs
- To support the creation of new knowledge driven SMEs
- To create a one-stop shop capable of providing a seamless support mechanism for mobile R&D investment projects

In its year of opening the Technium in Swansea had nine clients, helped in part by the closure of Swansea Innovation Centre from which a number of clients transferred to Technium. After two years of operation the Technium was benchmarked, the 14 Technium clients on average saw:

- Staff levels grow by 306%
- Of which 75% were graduates
- With 72% of staff focused on research & development
- Commercial turnover also increased by 39%[1]

This success resulted in the Welsh Assembly Government and its partners committing to support a Wales-wide network of Technium centres. *'Wales for Innovation - the Welsh Assembly Government's Action Plan for Innovation'* (2002) stated under Action Area 2 – Developing more high growth potential businesses, that a strand of activity would be *"an integrated all-Wales network of innovation centres, based on the roll-out of the Technium network"*. The plan stated that the network will provide a supportive environment for spin-out companies or activities. The projected cost of the network was £150m over three years.

The Techniums across Wales would:

- Provide incubation space for exciting companies with growth potential
- Act as a highly-visible vehicle for company-academia links
- Provide an attractive way for global companies to invest in Wales in high value added activities
- Host mixed private/public sector support teams
- Act as strong physical focal points for the Welsh Assembly Government innovation communication campaign.

We have been unable to source any formal national strategy for the roll out of the network. Consultations with key stakeholders revealed that in 2003 the then Minister of Economic Development requested that a national strategy for the development of the Technium network be prepared in order to facilitate the pan-Wales roll-out. However, although drafted, this strategy was not formally adopted.

[1] Presentation by Richard Harris, Technium Manager, dated 24 November 2006. Accessed via http://files.zite3.com/data/files/62/215/0/Richard%20Harris.ppt accessed 2nd March 2009

Between 2003 and 2007 a further nine Technium buildings across Wales were added to the network. The total development cost of the 10 Techniums was £93.4m. Of this cost, 89% was funded by the public sector, with EU Structural Funds being utilised extensively to develop the network. Most of the new Techniums in the network had a particular sectoral focus which tended to reflect local strengths, clusters or academic expertise (Technium 1 and 2 do not have a sectoral focus). Some of the sectoral Techniums have specialist equipment to support companies operating in that sector. Providing sectoral Techniums encourages similar companies to locate together which it is hoped will stimulate networking, collaboration, learning and development between Technium clients.

As there was no approved strategy for the roll-out of Technium, there was no co-ordinated approach to ensure consistency in the product across Wales. Different organisations took responsibility for the delivery of Technium projects in their region. In most situations the regional division of the WDA took the lead responsibility for delivering Technium however for some Techniums the project has been led by the Local Authority or local university. Following investigation we have not been able to source research or guidance produced to inform required capacity in each region or how the model should operate. Our wider research and consultation programme suggests that there have been differing interpretations of the model across Wales. Whilst the Technium brand and some of the core services (IT, telecommunications etc) are the same across the network, other key elements such as objectives, ownership and management, eligibility criteria, role of the Technium manager, target markets and exit strategies are different. As a result of the lack of consistency it is difficult to describe the Techniums as a 'programme' and may be better described as the 'Technium network', where there are a number of incubators operating under the same brand but using differing approaches. The lack of consistency could be viewed as a risk to the brand.

The first Technium had a well documented evidence base. Rather than seeking to replicate this kind of work many of the subsequent Techniums appear to have based their business plans on the successes in Swansea and did not sufficiently consider local circumstances. The circumstances that contributed to the success in Swansea were not the same for other areas and therefore there are potential questions as to the validity of the rationales put forward. Many applications for Objective 1 money stated *"Technium 1 was envisaged as the first phase of a clearly defined strategy to develop a network of Techniums and demonstrated the need for further sector specific Techniums in the region"*, however, our literature review and consultation process failed to find evidence of a "clearly defined strategy" or demonstration of "the need for further sector specific Techniums in the region".

Progress Made to Date

A total of 145 companies have been supported in Techniums across Wales, either in incubator units or hot desks. Of these, 87 are current[2] clients, and 58 have left the Technium environment.

Of the 58 Technium clients that have left the Technium network, 37 are deemed to be 'successful' graduations in that the company left Technium in order to move into larger

[2] As at December 2008

premises or the company has been sold on. 17 companies are deemed to be 'unsuccessful' as the companies have failed to grow as envisaged - the companies have either been wound down or left Technium to go to smaller premises. A further four companies left for other reasons.

The most comprehensive existing data available on Technium performance appears to be WEFO Objective 1 monitoring returns. The tables below set out the targets and outputs for Technium 1 (which received Objective 2 funding), and for the remaining Techniums (excluding Digital@Sony which did not receive European Funding). It should be noted that we have not validated the information that was provided on the final monitoring forms.

Table B: Technium 1 - Targets and Outputs

Indicator	Target (1999)	Output (2002)
R&D centre created	1	4
Direct jobs created	6	6
No of SMEs contacted	600	450
New products and processes adopted	30	32
New products and processes developed	60	32
Jobs created within expanding SMEs	60	54
New linkages	90	102
% increase in turnover of assisted SMEs	15%	23%

Source: Technium 2 Objective 1 Application Form

Table C: Objective 1 Funded Techniums – Aggregated Activity Targets and Outputs

	Whole Network		
	Target	**Reprofile**	**Achieved**
Companies receiving advice in innovation and R&D	649	722	1,148
Collaborative projects between companies and research institutions	110	138	218
New Incubator	7	6	7
Floorspace in incubator and R&D facilities (m^2)	33,643	30,129	33,651
No. of companies receiving financial support for R&D	255	6	4
Projects transferring environmental technologies to the business sector	18	12	1
No. hectares of direct land developed	14.02	5.52	5.76
No. hectares of indirect land developed	3.64	0	0

Source: Techniums Objective 1 Application Forms

Targets and outputs have been aggregated across all Objective 1 funded Technium's. Technium's were approved and were reporting outputs at different times therefore no date is referenced in the table.

Broadly across the network the activity targets set for the Techniums have been met. The network has been successful in the provision of advice and information about R&D; however the evaluators found that this indicator is interpreted differently by different Techniums with different activity being recorded. The network has also exceeded its target with respect to the number of collaborative projects between Technium companies and research institutions. The network appears to have been less successful in 'companies accessing financial support for R&D' and 'projects transferring environmental technologies to the business sector'; however, these indicators were only used by two of the Techniums.

Table D: Objective 1 Funded Techniums - Results Targets and Outputs

	Whole Network		
	Target	**Reprofile**	**Achieved**
Increase in turnover in supported companies	£111,711,000	£81,571,000	£26,038,000
Gross new companies in high tech sectors	250	133	86
Gross jobs safeguarded	850	600	399
Gross new jobs	503	35	178
Gross new jobs in high tech sectors	1,181	789	808
No. of new patents and trademarks	54	54	79
No. of jobs accommodated directly	188	188	188
No. of gross new indirect jobs	0	318	616

Source: Techniums Objective 1 Application Forms

With respect to results targets, the network has exceeded the target for the number of new patents and trademarks, with 25 more patents or trademarks being registered than the target. The network has also outperformed some of the re-profiled job creation targets. Monitoring data reported an increase in turnover of supported companies of £26m when the original target was for £111.7m; however, the business survey highlighted that few businesses in the sample provided their Technium manager with turnover information. The network also failed to meet targets with respect to new companies formed in high tech sectors and jobs safeguarded.

Data Requirements and Availability for Full Evaluation

A key requirement of this part of this study was to identify a suitable methodology for carrying out a full evaluation of the Technium network. A literature review was carried out to research best practice in carrying out evaluations of incubator programmes. This review identified criteria that are typically assessed when evaluating incubators and suggested outputs for each indicator.

UKBI identified that in best practice incubation the focus should be on supporting the business to grow. The success of an incubator should therefore be judged on the success of the businesses which pass through it. A stated aim of the Technium concept was employment generation, particularly in the knowledge economy. We question whether incubation is the most appropriate tool for job creation as entrepreneurs will be concerned with maximising profit; this will often mean employing the minimum number of people. However, as employment generation was an aim of Technium job creation needs to be considered as a performance indicator in the evaluation, however, there may be other more appropriate performance indicators that better align to the activities of Technium.

The issue of business growth raises the question of measurement. Work by the European Commission has used the benchmark of average growth in turnover, however while it is an important indicator it will not be relevant to pre-revenue knowledge businesses. It may

therefore be more appropriate to consider the overall business value[3]. A further issue which needs to be considered is the performance of businesses once they have graduated from the network. The support in the incubator is targeted at putting the foundations in place to allow strong growth which may occur after the business has graduated from the incubator. The best practice review identified an example from New Zealand where businesses are required to provide data on business performance for five years after leaving the incubator to allow for this impact to be captured.

Based on our understanding of the key aims and objectives of the original Technium and building on the literature reviewed and the issues raised by UKBI, we outline the potential key indicators to be assessed in Stage Two as part of a full evaluation of the Technium network – under the objectives of: Business Growth; Knowledge Economy; and Higher Education Collaboration. These indicators would need to be supplemented with qualitative information on the support provided to companies. It was necessary to test whether data already exists for all of these proposed indicators or whether information will have to be collected directly from businesses in order to carry out the full evaluation.

Figure E: Objectives and Indicators

Objectives	Indicators
Business Growth	Turnover/Profit Business Value Employment (numbers and type)
Knowledge Economy	IP Generated Workforce Skill Levels Business to Business Collaborations
Higher Education Collaboration	Higher Education Collaborations Spin Out Companies

Each Technium Manager was asked to provide information on their clients (both current and graduated clients). The level of detail provided by the managers varied quite considerably with some managers being unwilling or unable to provide us with anything more than the names of their current clients. The most comprehensive data we have accessed is from WEFO returns linked to Objective 1 funding. However, this does not give the most up to date picture of Technium performance as data is only available to the end of the Objective 1 funding period. In addition, there are some questions arising from the WEFO monitoring data such as the consistency of targets, how outputs are measured and whether any net output data was collected. Indicators that were used to monitor the performance of the Technium programme during the Objective 1 funding period are set out in tables C and D.

The indicators to meet EU requirements do not always align well to measuring performance of the network against the core objectives. For example, although one of the objectives behind the Technium concept was to create jobs to retain graduates in the area, monitoring data has only measured the number of 'jobs created' so there is no way of knowing whether graduate jobs have been created. A better measure of the Technium activity is to record information that relates to the skills levels of the jobs created. A more suitable indicator may be 'jobs created requiring NVQ level 4+'. Going forward further work needs to be carried out to ensure

[3] Business Value refers to the value that is placed on a business based on its business model, IP, assets and projected revenue.

that performance indicators are fully aligned with a clear set of objectives for the network and that there is consistency in the targets set for each Technium and the way in which they are measured.

Given the inconsistency of existing data available we sought to establish whether more appropriate data could be collected directly from Technium businesses. A pilot business survey of 25 current clients gathered a range of qualitative information and tested the availability of quantitative data including:

- Business value
- Turnover
- Profit
- Employee numbers
- Skill levels of staff
- Wages/salary costs

The survey showed that the information required to measure the impact of the Technium network should generally be available from businesses – including employee numbers and skill levels of staff. A critical aim of the survey was to establish the extent to which businesses are able to provide information on their business value[4] taking into account best practice guidance and the views of UKBI. The survey found that only a very few companies could provide an indication of their business value. Therefore in order to provide some measure of business performance there is a need to rely on turnover and/or profit data, which could be used to generate GVA impacts at the aggregate level. As stated previously turnover/profit data has particular limitations for pre-revenue businesses and any results would need to be caveated appropriately.

Key Findings

The key finding arising from this stage of the research was that there is a lack of a clear set of rationale, objectives and targets for the network. After investigation DTZ has not been able to source documentary evidence to confirm that robust project appraisal or business planning was carried out to determine the need for a Technium in each area. It appears that many of the Techniums assumed that their rationale would be the same as that stated for the original Technium in Swansea and specific local circumstances were not adequately considered.

Few of the Techniums have explicit stated objectives, and where they are available they tend to differ between Techniums. As an evaluation is to test progress against objectives the differing (or lack of) objectives for each Technium presents a challenge for full evaluation. In addition, the lack of commonality in the way that each Technium is managed and run means that providing an aggregated assessment of the network will not necessarily provide a full picture of the individual performance of the Techniums within the network.

The review of best practice highlighted that the success of an incubator is measured by the success of the businesses that it supports. Much of the support in an incubator is targeted at

[4] As an investor would use to value a business based on potential future revenue streams and business assets, either physical or knowledge based.

putting the foundations for growth and success in place. However, growth may not occur until after the company has graduated from the incubator. It is therefore necessary to monitor an incubator's performance by monitoring the performance of its businesses both during its time in the incubator and for a number of years after graduation. The best practice review also emphasised the importance of aligning monitoring data to the objectives of the incubator.

We understand the objectives of Technium are concerned with encouraging business growth in the knowledge economy through the exploitation of linkages with academia. We have set out monitoring indicators which measure performance against these objectives that also capture business performance.

The study has found that the Technium Managers were unable to provide detailed data on the Technium clients (current and graduated) that would be needed to carry out a full evaluation. More comprehensive data was obtained through WEFO Objective 1 records however these are only available until the end of the Objective 1 funding period and so do not give the most up-to-date data on performance. The WEFO monitoring covers many of the indicators set out in Table E; however, some questions have been raised with respect to the consistency of monitoring data across the Network.

The pilot business survey identified that much of the data that would be needed to carry out an evaluation is available directly from current Technium clients with the exception of 'Business Value' data. Ideally, we would have liked to be able to obtain information on business value as it can be used as a measure of business growth for both pre-revenue and revenue generating companies. However the business survey has found that few businesses can provide business value figures. Proxy indicators for business value could be turnover and profit which will provide some indication of business growth. However, as a number of Technium businesses are at the pre-revenue stage of development they will not have any turnover or profit data therefore aggregated results would need to be caveated appropriately. This issue highlights the importance of continuing to monitor the performance of supported businesses once they have left the Technium environment to ensure that the full impact of Technium support is measured when revenue starts to grow and mature. Currently monitoring data is not collected from graduated businesses.

Occupancy rates across the network average at 46%[5] compared to best practice benchmarks of 85%. Although some of the Techniums are in their infancy, the evidence suggests that there are questions whether there is too much capacity in the network, or whether improvements could be made to generate a stronger pipeline of client businesses. This is an area where further work is required to assess occupancy over time. It is important to note that given the objectives of Technium is it inappropriate to just judge success on occupancy; rather, success should be measured by the growth of the Technium businesses. However, we would still expect occupancy levels to be higher than their current levels.

Key elements of the Technium offer are the provision of onsite business support, access to technical expertise and facilities in Wales' HEIs and increased opportunities for networking and collaboration. Whilst the business survey revealed some evidence that businesses had used these services, the take up was not always as high as one might expect given the aims

[5] The occupancy rate excludes OpTIC from the calculations as we were unable to obtain details of the total floorspace let to tenants in OpTIC

of the Technium network. Further research is needed to establish the extent to which these services are being taken up by client businesses and the value that they place on these services. The Stage 2 evaluation will need to investigate the net additional benefit to businesses of being in a Technium. In particular the evaluation will need to investigate the value placed on the ready availability and co-location of Welsh Assembly Government services in a Technium by clients as initial indications suggest that many of the services offered to Technium businesses are also available to non-Technium businesses in Wales through mainstream Welsh Assembly Government provision.

Stage 2 - Full Evaluation

Due to the lack of commonality between Techniums it may be more appropriate to consider a series of individual Technium-level assessments of performance and achievements than a network-wide consideration of impact. However, as some Techniums have very low numbers of clients, Technium-level assessments will create problems with disclosing data. In these situations a more qualitative assessment will have to be used. The quantitative data from each individual assessment could be aggregated to provide an indication of the whole Network impact.

Where objectives are lacking we propose to assess the Technium against the original objectives for Technium 1. Many of the Techniums based their rationale on the success of Technium 1 therefore it is reasonable to assume that the underlying aims of each Technium were consistent even if the implementation method varied.

Consideration also needs to be given to the fact that the Techniums have been operating over different time periods and in different geographies. For example, Technium Pembrokeshire opened in December 2007 in a very different market/environment to Technium Swansea that has been operational for eight years; these factors would be expected to affect the scale of impact. It may be that it is not appropriate to include some Techniums in the evaluation due to their infancy.

A standard evaluation methodology would be used to assess each Technium according to its economy, efficiency and effectiveness. Data will be collected through a business survey (extending the pilot undertaken in this scoping stage) of all current and previous clients for which contact details are available. The survey will also gather information on a range of qualitative factors.

It is vital that the evaluation measures the net additional impact of the Technium network and not just the gross impact. Allowance will need to be made for deadweight (the reference case, what would have occurred in any event), leakage, displacement, substitution effects and multipliers. We have also considered the need to take account of other unintended impacts, spillovers and potential crowding out/crowding in effects.

Vital to assessing the net additional impact of the public expenditure on the Technium network is the assessment of the counterfactual. Best practice guidance indicates that this could take the form of assessing both what would happen with no intervention at all and alternative intervention options. As there was no options appraisal for the Technium network there is no ready list of alternative intervention options to consider. We would need to discuss with you whether alternative intervention options need to be tested in this case.

In order to estimate the counterfactual and the extent to which impacts could be attributed to the Technium intervention two methods will be used. The first will be a number of questions within the business survey. Businesses will estimate the effect that Technium has had on their businesses. The weakness of this approach is that it is based on opinion and individuals may either over or underestimate the impact, although it can provide useful impact on the scale of additional impact of the intervention. Rather than relying on a single estimate of impact a number of questions in the survey will explore the counterfactual and other aspects of additionality. This will allow cross-referencing within responses to ensure that estimates are consistent.

The second method to assess the counterfactual will be to carry out a business survey with a control group. The control group would be made up of businesses that have not received Technium support, but are similar in all other ways to Technium companies. Surveying the control group helps to identify the extent to which the impact has been caused by the Technium intervention, or if the particular companies would have created these impacts anyway.

In undertaking this review we have identified a number of issues which the Welsh Assembly Government may want to consider in the future development of the Technium network[6]:

- Should Technium be a programme, a network or a series of independent incubators?
- If it is a programme – what is the programme rationale? Is there a current consistent rationale for all the Techniums? Should Techniums that do not fit with the rationale be removed from the programme?
- Should the rationale and objectives be the same for each Technium? Or should the concept be flexible to allow Technium to adapt to local conditions and circumstances?
- If it is a programme – what needs to be done to bring the Techniums together into a programme that ensures consistency of objectives, delivery and management?
- Should we require consistent monitoring data across all Techniums and their tenants? Should this include requiring supported businesses to provide Technium management with key performance data – including information on business value both during their time in Technium and after graduation?
- How can Technium be structured to incentivise both the client and Technium management to enter into a partnership to grow the client business?
- How can we ensure that the Technium network maximises the opportunities for client businesses to collaborate with HEIs?

Next Steps

A number of questions have been raised through the process of carrying out Stage 1 of this project. In order to get the most out of the evaluation we need to achieve consensus on the questions raised above and the following key points:

[6] It is understood that many of these issues are being addressed through a new application for European Funding

- We need to understand where the Welsh Assembly Government want to take the Technium network
  - Improve what is there?
  - Continue operating as it is?
  - Grow the network?
  - Shrink the Network?
- We need to understand what the Welsh Assembly Government is trying to achieve through the Technium Programme. Is incubation the most appropriate tool to achieve this? What is the rationale behind Technium?
- We need to agree whether the Techniums have had enough time to make progress, for an evaluation to be sensible. Should the evaluation exclude those Techniums that have not been open very long?

Answering these, and the questions raised above will provide a clear framework and terms of reference for the second stage of the evaluation.

1. Introduction

Techniums are business incubation and innovation centres established to support and provide focal points for the development of innovative, knowledge-based businesses in Wales. They provide general and specialist support, high-quality facilities, co-location of similar businesses, and links to academic expertise and centres of excellence. The Technium network is seen as a key tool for delivering against innovation and entrepreneurial policy objectives.

DTZ was commissioned in August 2008 to undertake an evaluation of the Technium Programme on behalf of the Welsh Assembly Government.

For this assignment DTZ partnered with:

- UKBI who have expertise in advising on, supporting, developing, managing and facilitating business development processes and networks; and
- The Research Partnership, who have expertise in conducting business surveys.

1.1 Aims and Objectives

The evaluation of the Technium programme is planned to comprise two stages. Stage One is to involve the collection of evidence of progress in implementing the Technium programme and the development of a robust evaluation methodology, while Stage Two is to conduct a full evaluation to consider both the operational aspects of the programme and the economic effects/value for money of the programme expenditure, identifying lessons from the programme.

1.1.1 Stage One Objectives

The broad objectives for Stage One are to:

1 describe and assess progress to date;
2 assess adequacy of data collection and any additional information requirements for the full evaluation;
3 identify any early lessons in terms of implementation and outputs; and
4 identify an appropriate methodology for Stage Two.

This document is the final report for Stage One of the study.

1.1.2 Stage Two Objectives

If commissioned, Stage Two will be to carry out a full evaluation of the Technium programme to date. The detailed objectives and methodology for this work will need to be determined following the sign off of the Stage One research and a decision has been made whether to a full evaluation is needed. The broad objectives for Stage Two are to:

1 Assess the extent to which the original stated aims and objectives of the Technium initiative are being/ have been met - considering outputs, outcomes and net impact;
2 Draw on comparisons with similar initiatives, identifying what has worked and under what particular circumstances, outlining lessons learned and options for achieving improvements;
3 Identify whether there is a 'Technium effect' on the performance of tenant and graduated businesses, and the extent to which supported businesses might be predisposed to growth;
4 Assess how successful the Technium programme has been in attracting additional resources/ leveraging investment into Wales or parts of Wales, and whether value for money is being achieved;
5 Consider the extent to which the Technium programme may have provided spillover benefits to the local / regional economy;
6 Consider the counterfactual i.e. what might have happened/ be happening had the Technium programme not existed (hence the nature of its net impact);
7 Establish whether the diversity of supported businesses (type, age, technologies, markets) has influenced the extent and nature of any improvements in innovation performance.

Further details on a proposed methodology for stage two are included at section 8 of this report. This is based on the findings of Stage One research.

1.2 Methodology

In order to deliver an evaluation against the identified objectives DTZ has undertaken the following tasks:

- A background desk review of relevant documents to:
  - Review relevant policies and strategies to identify where the Technium concept fits within the wider framework of economic development in Wales
  - Assess the original economic evidence base used to design the model for delivery in Wales
  - Review the original aims of the Technium concept, including the rationale for developing the programme
  - Understand the background and rationale behind each Technium

- A review of economic evidence from similar programmes in other countries to assess the relevance of the evaluation methodologies employed. There were two elements to this stage:
  - A review of work undertaken by the European Commission which defines benchmarks for business incubators
  - A review of previous evaluations of incubator programmes undertaken by DTZ and UKBI

- A data gathering exercise to gather detailed quantitative and qualitative data and also to understand what gaps in the data exist. Data was gathered through the following methods:
  - Consultations with key stakeholders to complement the desk research. Consultees were drawn from the public, private and higher education sectors as well as direct Technium staff.

- A pilot business survey of 25 businesses from across the Technium network.
- A review of Objective 1 documentation (application forms, approval letters and monitoring claim forms).

The purpose of the pilot business survey was to test the availability of data needed for a full evaluation. Although we cannot draw strong conclusions from the results of the survey given the small sample size some of the main findings from the survey are included throughout the report as they raise questions for further investigation.

1.3 Structure of the Report

This report sets out the findings of Stage One. The remainder of the report is structured as follows:

- Section 2 summarises the background and rationale for the Technium concept and outlines the development of the network since its inception;
- Section 3 describes the entry process to Technium;
- Section 4 describes the facilities and support available to Technium clients;
- Section 5 provides an initial review of targets and outputs of the Technium network based on monitoring information and information from Technium managers;
- Section 6 sets out the findings of a literature review to identify best practice in evaluating incubator schemes and benchmark performance indicators. We also review the availability of data on the Technium network;
- Section 7 sets out the early lessons and key findings from this stage of the research;
- Section 8 sets out some areas for consideration for Stage 2;
- Section 9 sets out the next steps.

A number of appendices to this report provide additional information.

- Appendix 1 provides case studies for each Technium within the network;
- Appendix 2 provides further detail on the policy and strategy context relevant to the Technium network;
- Appendix 3 provides further details on the rationale for each Technium in the network;
- Appendix 4 provides Technium level detail on targets and outputs;
- Appendix 5 provides further details on benchmarking and performance indicators;
- Appendix 6 provides further details on the business survey process, including narrative on the methodology adopted for the pilot, a review of the pilot survey and the implications for further research in stage two and a copy of the pilot questionnaire;
- Appendix 7 provides a summary of some of the elements of the evaluation methodology;
- Appendix 8 provides a list of those consulted as part of the stage one evaluation; and
- Appendix 9 sets out a list of documents referenced as part of this research.

2. Technium Rationale and Background

Key Messages

- There is evidence of a clear rationale and policy support for Technium 1
- The roll out of the Technium concept lacked strategic planning and a strong evidence base of rationale or demand resulting in a fragmented programme and many Techniums lack a clear set of objectives
- There is a great deal of variability across the network in terms of rationale, objectives, ownership and management structure, facilities, sectors and support.
- The lack of objectives and the variability of the Techniums across Wales present challenges for the full evaluation.

2.1 Overview of the Technium Concept

Technium looks to provide an environment where science and technology businesses can flourish and achieve their potential for high growth. Technium offers businesses an integrated support package which comprises:

- **Accommodation** - the provision of office space and state-of-the-art facilities
- **Business support** - onsite access to specialist support services that cover a range of subjects such as finance, technology, HR and business expansion. Technium can also give advice about grants to help businesses further their research or product development. Links with academic research centres also provide research and development support.
- **Networking opportunities** - connections with leading national and international companies and academics[7].

A criteria based screening process takes place in order to ensure that applicant companies fit with the aims of the Technium and can benefit from Technium support. The operational strategy for the incubation centre[8] was clear that the Technium must retain its focus of *"attracting and growing technology based, high-growth, high value added employment"*.

Once in Technium, client[9] companies should have the support of the Technium manager who monitors business performance and can broker in appropriate business support as and when necessary. Initiatives are also in place to support client businesses in working with higher education and research institutions both in Wales and further afield. The co-location of similar companies encourages business-to-business collaboration and co-operation. In addition to business support Technium offers flexible leasing arrangements to allow businesses to take more space as they grow.

[7] Technium Website http://www.technium.co.uk/server.php?show=nav.8346 Accessed 2nd March 2009

[8] DTZ Pieda Consulting (2000) *A New Business Innovation Centre for Swansea and South West Wales*

[9] The term client has been adopted when referring to businesses within the Technium network. Although 'tenant' may seem a more appropriate term this is frequently seen to be synonymous with the 1954 Landlord and Tenant Act which confers rights to the tenant business. In many cases Technium clients are offered terms 'outside the Act' under license or short term contracts.

The Operational Strategy[10] produced for the first Technium in Swansea highlighted the importance of understanding resident companies likely timescale for move on from the Technium to ensure that the Technium achieves its central objective of incubation and not become a static first phase science park type development. The Technium aims to offer companies a 2-3 year lease contract[11]. At the end of the contract period, Technium discusses with the company their requirements and depending upon availability, grow-on space within a Technium centre can be arranged. The length of time a company can remain in a Technium centre again varies according to individual circumstances. However as a guideline companies are encouraged to graduate out of the Technium environment within a 5 year period[12].

2.2 Background

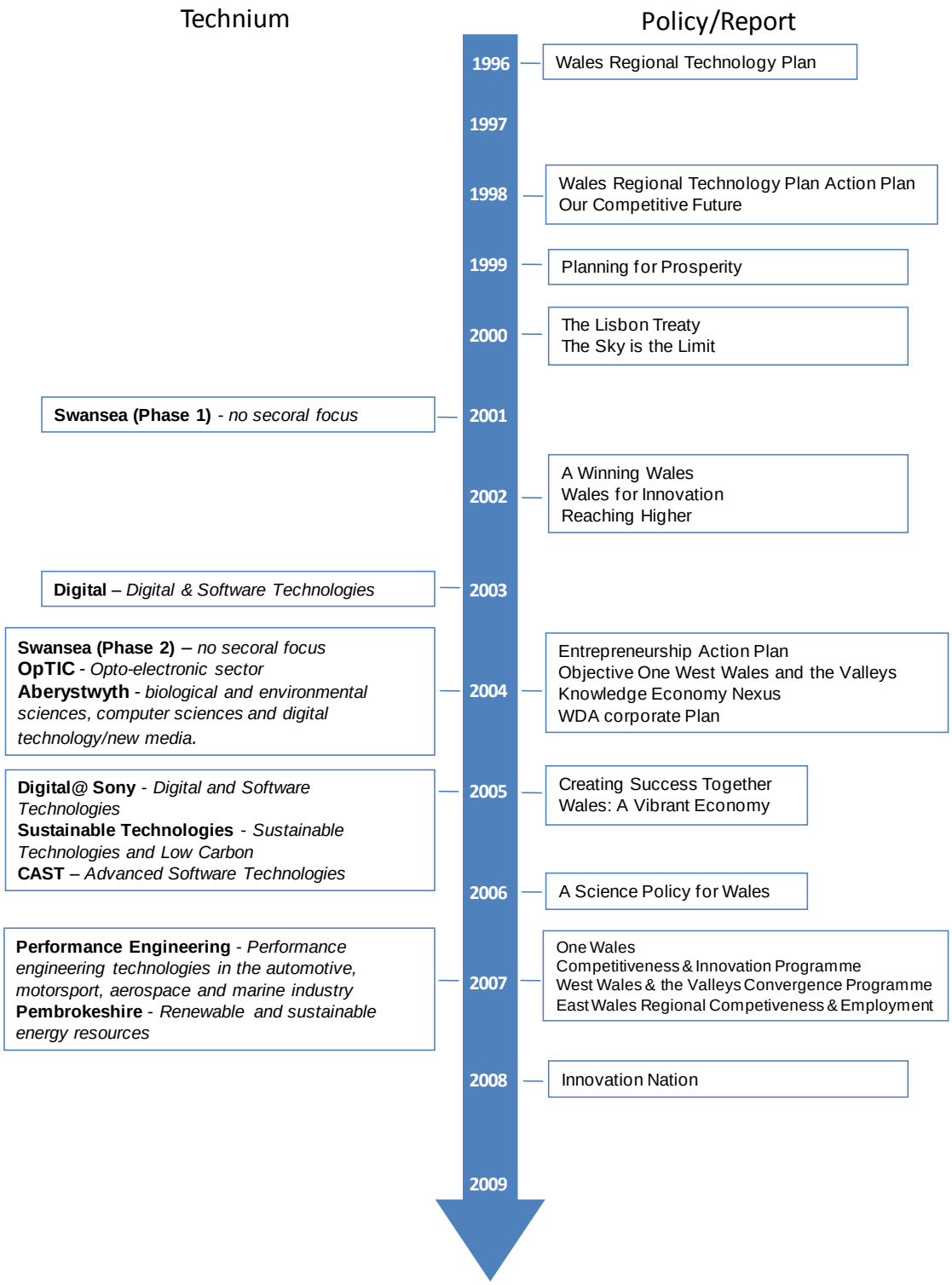
The diagram below provides an overview of the Technium network and the policy and strategies in Wales that have influenced its development.

[10] DTZ Pieda Consulting (2000) *A New Business Innovation Centre for Swansea and South West Wales*

[11] A number of lease and license arrangements are used.

[12] Technium Website - http://www.technium.co.uk/server.php?show=nav.8411 Accessed 2nd March 2009

Figure 2.1: Technium and Policy Agenda Timeline



A more detailed case study of each Technium can be found at Appendix 1.

2.3 Policy Context

A review of the policy agenda reveals that a substantial number of documents have been published going back to 1996 which are relevant to the development of the Technium network. It also shows a clear aim within the strategies on developing the knowledge economy, building linkages with businesses/HEIs and in supporting entrepreneurship – across Wales and the whole of Europe.

Figure 2.1 shows that there are a significant number of policies have been produced since the late 1990's (at least 20) which are relevant to the Technium network. A more detailed policy review can be found in Appendix 2.

Looking back, there is a strong strategic fit in terms of how the Technium network relates to the main policy documents, beginning with the Regional Technology Plan (RTP) in 1996. This first raised the possibility of developing an incubator to support new technology businesses.

Since the RTP was published, strategies at a European, UK and Welsh level have placed increasing emphasis on the need to support innovation activities and on the role which higher education institutions can play in the development of the knowledge economy. Indeed, some of the more recent documents (Creating Success Together and Wales: A Vibrant Economy) have highlighted the role which the Technium network is playing in order to achieve this. In addition, the most recent round of European funding announced for Wales up to 2013 recognises the role which business competitiveness, innovation and a skilled workforce can play in helping to support the economy – all of which links well to a number of the original aims of the Technium network.

2.4 Rationale for the First Technium

The Technium concept was originally developed and led by the University of Wales, Swansea (UWS) in partnership with the WDA, the City and County of Swansea, West Wales TEC, Business Connect and Swansea Institute of Higher Education (SIHE)[13]. The concept aimed to bridge the gap between advanced academic research and commercial exploitation.[14] The project had the intention of producing an environment to create and retain high value jobs in South West Wales[15] in order to increase the retention of graduates in the local area.

The Technium concept arose as a result of a number of different strategies and ideas coming together at the same time. The Regional Technology Plan in 1996 highlighted the need for specialist innovation and incubator centres in support of new high growth companies. The subsequent Regional Technology Plan - Action Plan (1998) reported a preference for incubator centres to be linked closely to either Higher Education or Further Education

[13] UWS is now known as Swansea University, the functions of the WDA have been absorbed into the Welsh Assembly Government and SIHE is now known as Swansea Metropolitan University. The Technium concept was originally developed in SIHE. The individual leading the development then transferred to Swansea University during the project's development.

[14] Clement, M and Davies, S (2002) *Technium Concept*. Seventh International Conference on Education and Training in Optics and Photonics (Proceedings Volume) Proceedings of SPIE Volume: 4588

[15] Davies, S (2008) *Proposal for Maximising the Economic Impact of Technium*.

institutions[16]. Initiatives already in place in South West Wales to support innovation, including existing space at the Swansea Innovation Centre were oversubscribed.

The Swansea Bay Economic Strategy[17] set out a need for Swansea to enable local businesses to compete based on skills and knowledge. Key elements identified in the strategy for creating a more competitive and knowledge based economy included: creating a skilled and enterprising workforce; targeting of higher value added sectors such as finance, cultural services, advanced engineering and ICT; and building on the existing strengths of the University and Institute in creating a flagship innovation programme.

A key element of the Swansea Bay Strategy was the concept of a *"flagship Business Innovation Centre"* to help encourage business innovation and to create and retain more highly skilled jobs. Combined with the experiences of both UWS and SIHE in running their own initiatives to encourage innovation and technology transfer, this demonstrated a need for a business incubator that would offer a wider range of services than those already provided at the universities. The HEI's tended to only provide technical support whilst the proposed Business Innovation Centre (BIC) would provide both general, hands on business support (such as market research, business planning and access to finance) as well as detailed technical support through linkages with HEIs[18]. In addition the BIC would offer support to companies from the concept of a product or service to its realisation.

In partnership with the WDA, UWS submitted a bid for ERDF funding to develop the Swansea Technology Transfer Centre which would provide more accommodation and better facilities for spin out companies in order to create and retain high value jobs. Due to financial constraints the WDA had to withdraw from the project and the project did not proceed.

Several years later the Technology Manager for South West Wales was working in partnership with SIHE to develop an idea to create and retain high value jobs in the region. It was this partnership which created the Technium concept. The project idea was progressed and suitable premises were identified and costed at the then derelict ABP building (subsequently became Morgans Hotel). A subsequent chance meeting between the Technology Manager and the head of regional property in South West Wales resulted in a sharing of the vision. An overall priority identified in the Swansea Bay Economic Strategy was to ensure that *"sufficient high profile physical development takes place on Swansea Docks. This will act as an exemplar and flagship for the very essence of the Strategy"*.[19] As a result the Property Team of the Welsh Development Agency were looking for a suitable flagship project for the regeneration of the Swansea Docks site. The Technology Manager then proposed to the Technium steering group that rather than refurbishing the ABP building that Technium is located in a new build on the docks site. The Technology Manager then worked with the steering group and submitted a ERDF proposal at the end of 1999 for Technium 1.

[16] http://cordis.europa.eu/wales/strat_commitment.htm

[17] City and County of Swansea and Welsh Development Agency (1999) *A New Swansea Bay Economic Strategy – Strategy and Action Plan.*

[18] DTZ Pieda Consulting (2000) *A New Business Innovation Centre for Swansea and South West Wales*

[19] City and County of Swansea and Welsh Development Agency (1999*) A New Swansea Bay Economic Strategy – Strategy and Action Plan*. p33

The inclusion of the WDA addressed the major weakness of the first ERDF bid by providing match funding. The second bid was successful which resulted in £1m ERDF Objective 2 funding for two years from December 1999[20].

The rationale behind the development of the Technium was to *"deliver the original vision of helping create a successful, sustainable Welsh economy by providing an environment which would help nurture and support the accelerated growth and development of technology and knowledge based businesses"*.[21]

The Objective 2 funding was used to create the first Technium in a 21,000 sq ft building in the Prince of Wales dock at Swansea Docks; this was the first development of what is now known as SA1 Swansea Waterfront (SA1) and was seen as the flagship building for the development[22].

The aims of this Technium were:

- To create a Business Innovation Centre
- To support the growth of existing knowledge driven SMEs
- To support the creation of new knowledge driven SMEs
- To create a one-stop shop capable of providing a seamless support mechanism for mobile R&D investment projects

In 2001 the Technium in Swansea opened. The building comprises central administration and meeting room facilities and purpose built incubator units ranging from 625 sq ft to 1,900 sq ft. The building can accommodate up to 13 businesses operating in high-tech or knowledge based sectors and the incubator units have a flexible design which allows businesses to take more space as they expand. The Technium is equipped with high speed broadband internet connections and telephony infrastructure. There is no sectoral specialist equipment within the building.

2.4.1 Rationale for Public Sector Intervention

In order to justify public sector intervention there must first be a clear rationale for it – generally expressed as a market failure. According to the HM Treasury Green Book, market failure can be defined as, *"An imperfection in the market mechanism that prevents the achievement of economic efficiency"*. The European Commission note that, *"A 'market failure' is said to exist when the market, if left to its own devices, does not lead to an economically efficient outcome. It is in those circumstances that state intervention, including state aid, has the potential to improve the market outcome in terms of prices, output and use of resources."*

Looking specifically at market failures relating to the development of the first Technium, the Swansea Bay Economic Strategy stated that technology start-ups and other more general start-ups offer no covenant and are high risk – creating an on-going role for the public sector to ensure a constant availability of premises of the right quality and offering flexible tenure. On

[20] http://cordis.europa.eu/wales/strat_commitment.htm

[21] Davies, S (2008) *Proposal for Maximising the Economic Impact of Technium*.

[22] The regeneration effects of such a flagship building on an area could be more fully explored in the full evaluation.

a similar note, the Strategy also stated that there was an increasing need for flexible tenure, which would not be looked on favourably by the investment market – again creating an on-going role for the public sector to ensure continuous availability. The Strategy went on to state that this role must be tightly ring-fenced to avoid undermining those segments of the market which are self-sustaining.

There was therefore a need for the public sector to be heavily involved in the property development/provision side of the Technium concept in order to allow the economic development aspirations to be fulfilled (i.e. the support of high risk, weak covenant businesses). In the absence of any public sector support, if the process had been managed by a private sector company, the outcome is likely to have been different. For example, it can be argued that the private sector would want to achieve a level of return on its investment, which may make it more focused on achieving high occupancy rates and less likely to target purely high growth/knowledge based businesses – with little encouragement for tenant companies to move on and graduate. This does not align with one of the main aims of an incubator, which is to encourage businesses to grow and move into larger premises over a period of time.

In addition, a literature review prepared for the Operational Strategy reported that *"the rationale for incubation is that new or young innovative firms are a vital source of job creation and competitiveness for local and national economies. However, such firms often not only lack, but often find it difficult to gain access to, business skills, training and finance"*[23]. This provides a rationale for the public sector to intervene in order to provide innovative firms with the business skills, training and finance that they require in order to succeed.

Overarching this debate are the EU Structural Funds Programmes which recognise the need for strategic public sector intervention to support the development and restructuring of economies on distributive grounds. This provides a separate underlying rationale.

2.5 Development of the Technium Network

The Technium in Swansea was seen to be a success. In its year of opening (2001) the building had nine clients which was helped in part by the closure of the Swansea Innovation Centre, from which a number of clients transferred to Technium. After two years of operation the Technium was benchmarked, the 14 Technium clients on average saw:

- Staff levels grow by 306%
- Of which 75% were graduates
- With 72% of staff focused on research & development
- Commercial Turnover also increased by 39%[24]

This success resulted in the Welsh Assembly Government and its partners committing to support a Wales-wide network of Technium centres. *'Wales for Innovation - the Welsh Assembly Government's Action Plan for Innovation'* (2002) stated under Action Area 2 –

[23] DTZ Pieda Consulting (2000) *A New Business Innovation Centre for Swansea and South West Wales* Appendix 3, para 1.3

[24] Presentation by Richard Harris, Technium Manager, dated 24 November 2006. Accessed via http://files.zite3.com/data/files/62/215/0/Richard%20Harris.ppt accessed 2nd March 2009

Developing more high growth potential businesses, that a strand of activity would be *"an integrated all-Wales network of innovation centres, based on the roll-out of the Technium network"*. The plan stated that the network will provide a supportive environment for spin-out companies or activities. The projected cost of the network was £150m over three years.

The Techniums across Wales would:

- Provide incubation space for exciting companies with growth potential
- Act as a highly-visible vehicle for company-academia links
- Provide an attractive way for global companies to invest in Wales in high value added activities
- Host mixed private/public sector support teams
- Act as strong physical focal points for the Welsh Assembly Government innovation communication campaign.[25]

Annex 1 to the 'Wales for Innovation' document proposes the concept of "hub" Technium centres and sector specific "satellite" Technium centres across Wales, but does not provide any further detail on the proposed location of hubs and satellites and the different functions they will provide.

It was envisaged that there would be more than one Technium building. The Operational Plan for the Swansea Technium proposed a further two Technium buildings would be provided on the Swansea Docks site to provide a progression of business space for tenants. Technium 1 was to house companies in the start-up and early growth stages of development, Technium 2 was for move-on accommodation and Technium 3 was for dedicated units for further larger scale move-on space. A second Technium has been built in Swansea next to the original Technium using Objective 1 funding[26]. A third Technium building for larger grow on space has not been built by the public sector, however, a private sector partnership developed the Ethos building next to the two Swansea Techniums. Ethos opened in May 2008 and a number of graduated Technium clients have taken space in the building. Ethos is linked to the Technium IT and telecoms network but is not part of the Technium.

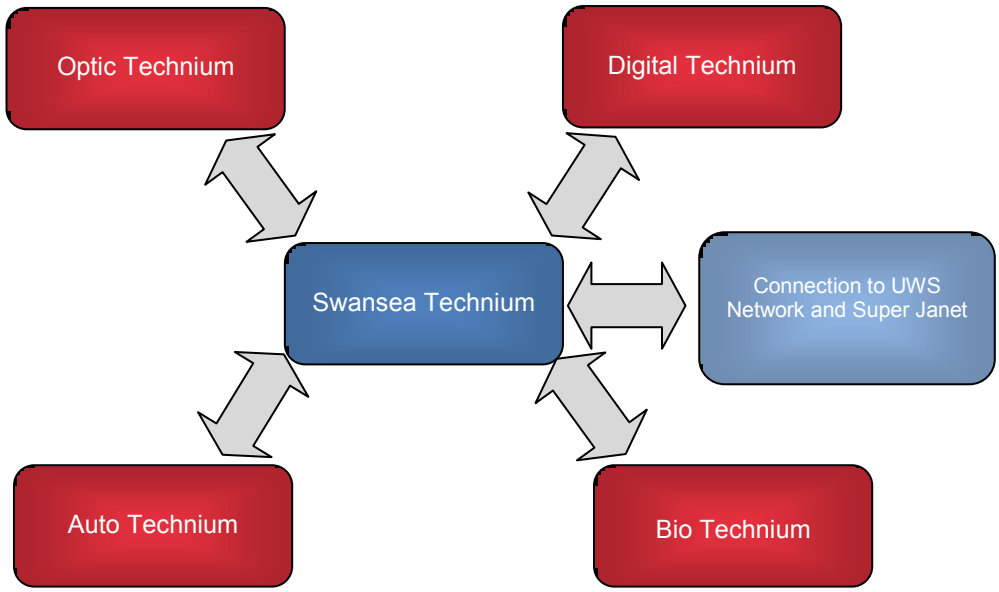
Apart from the statement made in 'Wales for Innovation' for the roll-out of the Technium concept to create a pan Wales network, the evaluators have been unable to source any formal national strategy for the development of the network and the role of each Technium. Consultations with key stakeholders revealed that in 2003 the then Minister of Economic Development requested that a national strategy be prepared in order to facilitate the pan-Wales roll-out. However, although drafted, this strategy was not formally adopted.

[25] Welsh Assembly Government (2002) *Wales for Innovation – The Welsh Assembly Government's Action Plan for Innovation*. Consultation Document.

[26] Technium 2 was in part developed as grow on space for the first Technium. Operationally there is no hard division between the two buildings in terms of incubator and grow on space. Therefore new clients are accommodated in the most appropriate location depending on their business requirements and the availability of space.

A paper by the founders of the Technium concept[27], reported that the Technium 1 would be the 'hub' of the Technium network and would house and manage the business support mechanisms and the IT infrastructure which would connect the whole network to UWS. The model suggested that the *"hub Technium would be non-sectorally specific whilst each satellite Technium would be predominantly active in a specific defined commercial sector"*. The paper states that the *"sectors will be defined by market forces and that the economic activity of the region has led to plans for developing Techniums in the automotive, digital, bio-technology, media and energy sectors"*. The diagram below sets out how the network would work:

Figure 2.2: Technium Network Concept



Source: Clement, M and Davies, S (2002) Technium Concept. Seventh International Conference on Education and Training in Optics and Photonics (Proceedings Volume) Proceedings of SPIE Volume: 4588

However, some consultees have also suggested that the requirement for subsequent Techniums to have a sectoral focus came from a response from WEFO in order to differentiate the projects and avoid duplication and competition.

Between 2003 and 2007 a further nine Technium buildings across Wales were added to the network. Most of the new Techniums in the network had a particular sectoral focus which tended to reflect local strengths, clusters or academic expertise (the exceptions being Technium 1 and 2 which have no sectoral focus). Some of the sectoral Techniums have specialist equipment to support companies operating in that sector. Providing sectoral Techniums encourages similar companies to locate together which it is hoped will stimulate networking, collaboration, learning and development between Technium clients.

[27] Clement, M and Davies, S (2002) *Technium Concept*. Seventh International Conference on Education and Training in Optics and Photonics (Proceedings Volume) Proceedings of SPIE Volume: 4588

Where possible, competition between the Techniums is avoided and companies are directed towards the Technium that represents their specific sector[28]. However, a company will not be prevented from taking space in a particular Technium if they do not fit with the sectoral focus but meet the Technium entry criteria.

During the course of this evaluation some comments have been made about the appropriateness of having sectoral branding. Some felt that there is not always evidence of demand for each sector whilst others highlighted that although all Techniums are open to companies operating in any high technology/knowledge based sector that meet the basic entry criteria, the sectoral branding may be discouraging potential applicants from even enquiring about space if they feel that they do not fit within the sector. Whilst Technium Managers take care to ensure that companies are not turned off by the sectoral emphasis, the sectoral branding could be artificially limiting the market (number of enquiries) for incubator space.

As there was no approved strategy for the roll-out of the network different organisations took responsibility for the delivery of Technium projects in their region. In most situations the regional division of the WDA took the lead responsibility for delivering Technium however in some Techniums the project has been led by the Local Authority or local university. For example, the original Technium in Swansea is owned and managed by the Welsh Assembly Government. All other Techniums in South West, South East and Mid Wales tend to be owned and managed by the public sector[29] (the Welsh Assembly Government, Local Authority or a local University). However, in North Wales, the Techniums are managed by private sector companies which secured contracts from the public sector. The individual Technium case studies in Appendix 1 provide more detail on the ownership and management arrangements for each Technium.

As different organisations took the lead for developing each Technium this has resulted in the Technium concept being interpreted differently. Consequently there is a great deal of variability between Techniums. Whilst there are some areas of consistency such as the Technium brand and IT systems, other areas vary considerably across the network. This includes: the stage of development of supported businesses (pre-start, early stage etc), target markets (sectoral specialism or generic), management (Welsh Assembly Government, University, Local Authority), rental levels, rental agreements (lease or licence), entry criteria and exit criteria.

As a result of the lack of consistency it is difficult to describe the Techniums as a co-ordinated 'programme' and it may be better described as the 'Technium network', where there are a number of incubators operating under the same brand but using differing approaches.

It is evident that first Technium had a well documented evidence base. However, a review of Objective 1 application forms has been unable to locate similarly clear rationales for the subsequent Techniums (further detail can be found in Appendix 3). Rather than seeking to replicate the background work produced for Technium 1, or for a nationally considered

[28] Clement, M and Davies, S (2002) *Technium Concept*. Seventh International Conference on Education and Training in Optics and Photonics (Proceedings Volume) Proceedings of SPIE Volume: 4588

[29] The exception is Digital@Sony where Sony own the building that the Technium is housed in. The management of Digital@Sony is undertaken by the Welsh Assembly Government.

strategy, many of the subsequent Techniums have appear to have based their business plans on the success in Swansea and did not sufficiently consider local circumstances.

The circumstances that contributed to the success in Swansea were not the same for other areas. At the time of the development of Technium 1 local HEIs were carrying out a range of entrepreneurship and innovation activities which were stimulating the creation of spin out businesses. In addition the Swansea Innovation Centre at Swansea University was over-subscribed but the University wanted to wind-down activities at the centre as they wished to use the building for academic activities. We have not seen any evidence that other areas of Wales were experiencing similar circumstances that would demonstrate demand and need for a Technium. Therefore there are potential questions as to the validity of the rationales put forward by the subsequent Technium developments. Many applications for Objective 1 money stated *"Technium 1 was envisaged as the first phase of a clearly defined strategy to develop a network of Techniums and demonstrated the need for further sector specific Techniums in the region"*, however, our literature review and consultation process failed to find evidence of a "clearly defined strategy" or demonstration of "the need for further sector specific Techniums in the region".

A total of £94m was spent on developing the Technium network. Of this, £66.6m was used for capital expenditure (71%) and the remaining £27.4m was used for revenue expenditure. The most expensive Technium to build and fit out was OpTIC at £14.9m. However, this is reflected in the amount of specialist equipment available to clients in this Technium. The least expensive Technium was Aberystwyth. This is because an existing WDA building in Aberystwyth Marina was used for the Technium and so there were no build costs associated with this Technium.

Table 2.1: Capital and Revenue Costs

	Capital Costs	Revenue Costs	Total Costs
Aberystwyth	£668,959	£1,156,080	£1,825,039
CAST	£10,967,361	£6,840,247	£17,807,608
Digital	£7,693,561	£1,857,927	£9,551,488
Digital@Sony	£602,000	£0[30]	£602,000
OpTIC	£14,945,691	£7,708,090	£22,653,781
Pembrokeshire	£11,994,782	£1,360,349	£13,355,131
Performance Engineering	£5,618,330	£2,874,554	£8,492,884
Sustainable Technologies	£6,634,466	£1,988,058	£8,622,524
Technium 1	£2,291,000	£964,000	£3,255,000
Technium 2	£5,169,060	£2,686,693	£7,855,753
Total Costs	**£66,585,210**	**£27,435,998**	**£94,021,208**

Source: WEFO Final audited claim forms.

NB: Figures for Technium 1 in Swansea and Digital@Sony have been taken from a summary table in "Proposal for Maximising the Economic Impact of Technium"[31] as these Technium's did not receive Objective 1 Funding

[30] Revenue budget did not exist for Sony, rather it formed part of the Technium Digital project.

[31] Davies, S (April 2008) *"Proposal for Maximising the Economic Impact of Technium"*

Funding was secured from a variety of sources in order to finance the development and running of each Technium. The tables below summarise the sources of capital and revenue funding used.

Table 2.2: Summary of Sources of Funding Secured for the Technium Programme

	Funding Source	Amount	Proportion	
Public Funds	European Funding	£38,149,848	40.8%	89.3%
	Welsh Assembly Government – Pathways 2 Prosperity	£13,425,165	14.4%	
	Welsh Assembly Government – LRF	£9,661,630	10.3%	
	WDA/WAG	£17,239,821	18.5%	
	Local Authorities	£372,849	0.4%	
	HEI's	£4,552,457	4.9%	
	Private Sector	£10,033,828	10.7%	
	Total	**£93,435,598**[32]	**100.0%**	

Source: WEFO Final audited claim forms.

NB: Figures for Technium 1 in Swansea and Digital@Sony have been taken from a summary table in "Proposal for Maximising the Economic Impact of Technium" as these Technium's did not receive Objective 1 Funding

2.6 Summary

It is clear that there was a clear rationale and policy support for the first Technium. There is evidence of consideration of the need for an intervention such as Technium 1 and the aims and objectives for the project were considered. However, this evidence base is not always available for subsequent Technium projects.

A review of Objective 1 application forms found that many Technium projects were based on the success of Technium 1 and assumed that the rationale and objectives for subsequent Techniums would be the same as Technium 1. We have found however that there were particular circumstances that contributed to the success of Technium 1 which were not present in all Technium locations. Local circumstances and conditions were not adequately considered in the roll out of the Technium concept.

In some instances there was clearly existing activity on which to build the Technium intervention, in others the Technium was seeking to create a market, rather than serve a market. The rationale for sector specialisation appears to have been a response to a request from WEFO rather than clear evidence that the market required sector specific incubation.

Few of the Techniums in the network have explicit rationales and objectives which presents challenges for full evaluation. There is a potential lesson to be learned here, to ensure that in future all projects are clearly appraised and their aim, objectives, targets and indicators are clearly set out. This will not only ensure that spending is appraised before it is committed, but allow for effective evaluation and assessment at a later date.

[32] The total funding amount is less than the total costs due to slight anomalies on some of the WEFO claim forms.

3. Entering Technium

Key Messages

- At inception there was a clear emphasis on the importance of maintaining the focus of the Technium concept on high growth businesses operating in the knowledge and technology sectors and ensuring that applicant businesses have a clear strategy for moving on from Technium.
- All Techniums use entry criteria to ensure the quality of businesses in Technium. However, there is a lack of consistency in the entry criteria and assessment methods across Wales.
- Different Techniums enter into different legal arrangements with clients. Some Techniums use leases whilst others use licences. The fact that businesses pay rent to occupy Technium immediately gives the expectation of a landlord and tenant type relationship. This may not be incentivising either the Technium management or client business to work in partnership to achieve the aims of the Technium concept.
- Technium managers reported that clients would be expected and encouraged to graduate out of Technium after five years occupancy. However, a number of examples were found where clients had been in Technium for longer than five years. The business survey also highlighted that a sizeable number of the sample had no intention of moving from Technium.
- Further research is needed to determine whether Technium has stimulated private sector activities and whether there is a case for the public sector to withdraw from these markets.

Below we provide a brief overview of the entry process to Technium and any variability between different Techniums around the country. This information has been sourced through consultations with each Technium Manager and through information available on the Technium website.

3.1 Entry Criteria

The Technium concept was developed to encourage the creation and growth of knowledge and technology based businesses in Wales. The Operational Strategy[33] produced for the original Technium identified through a literature review of best practice the need for selection criteria if Technium is concerned with the development of its businesses rather than just occupancy of the building. The document goes on to stress the importance of retaining the focus of the Technium initiative and that *"all the partners fully endorse the emphasis contained in the Swansea Bay Economic Strategy towards attracting and growing technology based, high growth, high value added employment."*

It goes on to emphasise the need to consider the likely timescale for move-on in applicants business planning if the Technium wishes to achieve incubation rather than a 'static' first phase science park type development.

[33] DTZ Pieda Consulting (2000) *A New Business Innovation Centre for Swansea and South West Wales*

Technium has a list of admissions criteria on its website which are used, with varying degrees of interpretation by each Technium. Applicant businesses are assessed to determine whether they are:

- Innovative, with high growth potential
- High-tech or in a knowledge-based sector
- Exploiting IPR
- Engaged in research and development
- Developing academic links
- Run by a capable management team
- Knowledgeable of the market the company is operating in
- Financially sustainable
- Aware of their residency and exit requirements
- In ownership of an established and credible business plan[34]

Different Techniums have taken different approaches to the admissions process. In South West Wales, the Techniums (Technium 1 & 2, Sustainable Technologies, Digital and Performance Engineering) have a consistent application process. This is described in more detail in the individual case studies in Appendix 1, but includes a screening process through a meeting with the relevant Technium manager and the completion of an 'expression of interest' form to sift out those who do not have a solid business idea. The applicant then goes on to submit an application form and a detailed business plan which is assessed by a panel made up of representatives from each of the Techniums in the South West (excluding Pembrokeshire). The panel assesses the extent to which the business meets the criteria listed above through scrutiny of the applicant's business plan. If the Panel approves the company for entry to the Technium the company has to undergo financial due diligence which is undertaken by the Welsh Assembly Government before they can sign the lease.

The application process in the South West is designed to be consistent and transparent. It should be noted that applicants do not have to completely meet all the criteria listed to be able to enter the Technium. The panel use their experience and judgement to determine the extent to which the criteria are met. For example, a company may not be engaged in R&D at the time of application however, they may have plans for R&D later in their business plan.

Amongst the remaining Techniums there are some variations in the application process in place. Pembrokeshire uses a similar approach to that described for South West Wales but applicants are assessed by a Steering Group made up of representatives from the Welsh Assembly Government, Pembrokeshire County Council and Swansea University and the Technium Manager. At Digital@Sony the assessment of applicants is carried out by the Digital@Sony Management Team.

Technium Aberystwyth, OpTIC and CAST do not use the standard entry criteria set out above and instead have developed their own criteria. These do include the key themes of growth, R&D, and operating in the knowledge economy. Further detail on the entry processes to each Technium can be found in Appendix 1.

[34] Technium Website http://www.technium.co.uk/server.php?show=nav.8410 Accessed 19th May 2009

Despite Technium being set up with the objective of creating high value added jobs in order to retain graduates within Wales, the entry criteria does not make any reference to employment creation.

The original Operational Strategy for the first Technium was clear that the model should retain its focus on growing technology based, high growth, high value added employment. The differing entry requirements across the network mean that there is a potential that this focus is not being maintained to the same level across the network. We have not assessed the different entry criteria to see whether they are maintaining the focus of Technium as part of this stage of the work. This is something that could be considered for the full evaluation.

3.2 Lease and Licence Arrangements

Discussions with Technium managers found that most Techniums are offering leases of between 2 and 3 years. The exceptions were OpTIC which operate on a licence basis and CAST which offers an agreement for a six month period. The managers of both of these Techniums reported that clients would be encouraged to move out of the Technium after three years.

In OpTIC, licences with clients are arranged on a rolling monthly basis with a maximum duration of three years. The manager of OpTIC believes that a three-year occupancy should allow the company enough time to have sufficient revenue to support itself or be able to leverage investment in order to grow and graduate from the centre.

The licensing approach gives OpTIC the flexibility to move clients around to best suit both their needs and the wider needs of the Technium. OpTIC also provide a range of services bundled into the licence which is not possible with a lease.

Although the Technium website and most Technium managers suggested that businesses should be encouraged to move on from the Technium after about five years, discussions with Technium Managers revealed that many managers were allowing clients to stay longer than this as there is spare capacity in the network.

The current arrangements between Technium and its clients is one where the business pays a rent in order to occupy space within the Technium building. This model puts an expectation of a landlord and tenant type property relationship where Technium provides the building and the client pays the rent. Therefore Technium has the potential to become focused on the property element of the provision and in particular, occupancy in order to maximise income. This means that if there is low occupancy there is currently no incentive for Technium to encourage companies to graduate, or there is a risk that companies that do not meet the entry criteria are allowed to enter Technium. The business survey has found some evidence of this. Despite the recommendation to encourage companies to graduate from Technium after a maximum of five years, four companies had been in Technium for longer than five years. Additionally, when asked when they expected to leave the Technium and move elsewhere eleven companies stated that they were not planning on leaving and want to stay as long as they can. A further four expected to move on in more than three years. This indicates that in some cases the concept of an incubator and the need for a ‘flow’ of clients through is not being adequately communicated to Technium clients, and that businesses have not been required to consider their exit plans from Technium.

Other models that better incentivise parties to develop and grow the business could be considered. It is understood that during the development of the Technium concept more innovative ideas were proposed, such as equity models, however, these did not come to fruition due to difficulties in setting up these models within the a public sector environment.

3.3 Rents

Rents across the Technium network have been determined by the Welsh Assembly Government Property Division and reflect prevailing market rates in the local area and the 'flagship', prestigious nature of the building. Rents need to be at local market rates to avoid State Aid issues. The table below illustrates the variability in rental levels across the Technium network.

Table 3.1: Rents Charged in each Technium

	Rent (per sq ft) per annum	Service Charge	Hot Desk Rate
Aberystwyth	£20.00	included	£10 per day
CAST	£20.00	included	£200 per month
Digital	£10.50	£5.00	£200 per month
Digital@Sony	£10.00	£3.50	n/a
OpTIC	TBC	TBC	TBC
Pembrokeshire	£14.00	included	n/a
Performance Engineering*	£14.50	included	£200 per month
Sustainable Technologies	£9.50	£5.00	£200 per month
Swansea 1 & 2	£10.50	£5.00	£200 per month

Source: Technium Website and Technium Managers

** Technium Performance Engineering also has workshops available to rent at £6.00 per sq ft.*

Some concerns were raised with respect to rents and whether Technium activities are competing with private sector business support initiatives. This is particularly apparent at Digital@Sony. Since Technium was established at the site, Sony set up its own Contract Manufacturing Services Group at the Pencoed site which provides entrepreneurial companies operating in the electronics sector with office units and the opportunity to utilise Sony's manufacturing services, procurement, circuit board manufacture, product assembly, product testing, logistics and after sales customer service expertise and facilities (all of which are available to Technium clients if they wish to contract directly with Sony for these services).

The office facilities available directly from Sony are identical to those provided by Technium but are provided at a rent of £13.00 per sq ft. Clients of Sony can access business support from the Welsh Assembly Government but would not have access to the Technium Manager or the Private Sector Providers (see section 4.3).

The Technium manager felt that Digital@Sony should align its rent[35] to those on offer through the Sony Contract Manufacturing Services Group, however, he had struggled to secure a meeting with the Property Team at the Welsh Assembly Government to discuss this. It is

[35] Rent and service charge

understood that Technium justifies higher rents to reflect the extra value through the Private Sector Providers and the Technium Manager.

The creation of the Contract Manufacturing Services Group by Sony is interesting and may be evidence of the public sector leadership resolving a market failure. Whilst further investigation of this point is required, if this is the case it may be appropriate for the public sector to retreat in order to channel resources into areas of continuing market failure.

The manager at Technium Performance Engineering reported that recently (April 2009) one client had moved from Technium Performance Engineering to ECM² in Port Talbot. The main reason for them re-locating was that the rental costs at ECM² were significantly less. It should be mentioned however that ECM^2 is not a business incubator and does not offer the business support provision that is provided within a Technium.

3.4 Summary

The Operational strategy for the original Technium concept emphasised the importance of maintaining the focus of Technium on high growth businesses operating in the technology and knowledge sectors. It recommended the use of entry criteria to ensure that the right businesses are supported in Technium. We have found that entry criteria are in use across the network, however, these often vary and different Techniums have different methods for assessing businesses against their criteria. This variability gives rise to the possibility that the focus of the Technium concept is not being maintained to the same standard across the network.

The lease or licences in use in the network put an expectation of a landlord and tenant type property relationship between the Technium and the client businesses. There is a risk that more importance is placed on the property element of the provision rather than focusing on growing client businesses. Other models that better incentivise both the Technium and the client businesses to work in partnership to grow the business could be considered although we recognise that these models could be difficult to implement within a public sector environment.

Rents vary across the Technium network. This reflects local market conditions, the whole Technium offer including service provision and the flagship nature of the Technium buildings.

It was noted during the course of this research that Technium activities may now be competing with private sector initiatives that have entered the market following the success of Technium in some areas, such as at Pencoed. This will need to be more fully investigated in the full evaluation and the responses to this success considered.

4. Technium Facilities and Support

Key Messages

- Technium was designed to be a business development initiative that provides high tech businesses with business facilities, business support and close links to academia.
- Technium clients can access support through any of the Welsh Assembly Government programmes, in many cases speed of access can be increased due to co-location within the Technium building. In addition to this support which is available to all businesses in Wales, Technium clients also have access to the Technium Manager and the Professional Service Providers (also known as the Stakeholder Programme) which provide bespoke support.
- The business survey identified that clients value the IT and telephony systems that are provided within the Technium network. It is less clear whether businesses are making use of the specialist equipment and facilities available in some Techniums
- The Technium Manager has a fundamental role to play in monitoring and supporting client businesses and brokering in specialist or technical support when needed. The majority of businesses surveyed were satisfied with the support provided by their Technium Manager. Areas for improvement were that more networking events and seminars needed to be provided, the Technium manager needed more autonomy to make decisions and more business advice should be available.
- Linkages to academic research centres were a key part of the original Technium concept. The network exceeded its target for the number of collaborative projects between companies and research institutions. Technium clients have collaborated with universities both within Wales and further afield. However, only one business reported that their linkage with a university came as a result of advice or assistance provided by Technium staff.
- A number of the businesses surveyed reported that through co-location of businesses at their Technium they had sought information or knowledge from other companies located in their Technium with four businesses reported that they had formally collaborated with other clients in their Technium. Four companies stated that co-location of similar businesses was an advantage of being in a Technium.

This section describes the facilities and business support available to Technium businesses and some of the key findings revealed through monitoring information and the business survey. This information has been sourced through consultations with Technium managers and information available on the Technium website.

4.1 Accommodation

Technium buildings are usually high quality buildings of flagship design. These give clients a prestigious business base. The Economic Strategy for Swansea emphasised the need for a business innovation centre in the area and recommended that the scheme should be centred on a physical building that offered flagship image and design. It was argued that a physical scheme would act as a magnet and symbol of knowledge driven approach. A physical scheme could be seen, photographed and promoted.

As a result Technium 1 was a flagship building and was the first development on the Swansea Docks site. The Operational Strategy stated that *"Technium would act as a catalyst for wider development of Port Tawe"*[36]. Subsequent Techniums were also designed to be flagship developments.

A flagship building has a cost premium associated with it due to innovative design or materials. The costs and benefits associated with a flagship building could be subject to further investigation in the Stage Two evaluation. We were not able to ascertain the value businesses placed on being in a flagship building during this stage of the research.

Since Technium 1 was built on the Swansea Docks site a great deal of investment and development has been carried out at the site. The Welsh Assembly Government has invested £38m and the private sector £150m at the SA1 Waterfront site.[37] Solicitors, Morgan Cole, located a new office at SA1 and the Ethos building has been developed next to Swansea Technium by four former Technium clients. Further research is required to establish to what extent this regeneration can be attributed to the Technium 1 development or other factors such as the wider investment programme of the WDA/WAG.

The number of incubator units available in each Technium varies. Some Techniums only provide incubator units whilst others offer other facilities such as hot desks and workshop units. In total the network has 181 incubator units, 34 hot desk spaces and 19 workshop units. Incubator units in many Techniums have been designed to allow flexible configuration so that the unit floorspace can be expanded or contracted using temporary partitions. In addition, incubator units in Technium are leased on flexible terms to allow Technium tenants to take more space as the company grows; in many Techniums there are companies that are occupying more than one incubator unit.

[36] DTZ Pieda Consulting (2000) *A New Business Innovation Centre for Swansea and South West Wales. NB Port Tawe is the Swansea Docks site now known as SA1*

[37] SA1 Swansea Waterfront Website http://www.sa1swanseawaterfront.co.uk/server.php?show=nav.8838 accessed 1 June 2009

Table 4.1: Total Technium Capacity

	Total Floorspace sq m	Incubator Units	Total Incubator Floorspace sq m	Hot Desk Spaces	Workshop Spaces
Aberystwyth	743	18	533	4	n/a
CAST[38]	6,500	24	1,459	4	n/a
Digital	3,500	15	540	5	n/a
Digital@Sony	610	8	523	n/a*	n/a
OpTIC	7,700	24	1,248	TBC	TBC
Pembrokeshire	6,500	18	797	n/a*	13
Performance Engineering	2,200	13	933	4	6
Sustainable Technologies	3,397	32	2,222	6	n/a
Technium 1	1,950	13	1,039	10	n/a
Technium 2	3,623	16	1,997	n/a	n/a
Total Capacity	**36,723**	**181**	**11,291**	**34**	**19**

Source: Technium Managers and information available on the Technium website.

** Hot Desk facilities not available at Digital@Sony or Pembrokeshire*

The table shows that often in Technium the incubator unit space represents a small proportion of the total floorspace of the building. Whist some of the remaining floorspace is occupied by shared facilities such as meeting rooms, kitchens, laboratories and so on, the flagship design of the Technium building also results in a lot 'dead space' such as central atriums. As part of Stage Two it may be beneficial to better understand the way space is used within the Technium buildings.

A number of businesses which took part in the pilot survey highlighted the quality of premises as an advantage. However, there is undoubtedly a substantial cost premium associated with such buildings and the corresponding reduction of floorspace available for incubation. The impact of the high specification flagship facilities is an issue to be considered as part of Stage Two.

As has been discussed there was no approved national strategy for the roll-out of the Technium concept and consequently there was no national analysis of demand or capacity needed. Decisions on capacity and operational models were left to individual project sponsors and we have not been able to source evidence of background research that justify all the decisions made.

We have also not seen evidence for every centre that justifies the size of incubator units within Technium given the types of businesses that would be occupying Technium. One Technium manager reported that most of his incubator units are quite large with the smallest office space being able to accommodate 6 – 7 people which is arguably too big for spin out or new companies. The Technium Manager was able to get two larger offices split into four smaller offices but he thinks that further smaller units will be needed in the future.

[38] Includes the 'Software Hotel' – a 744 sq m (8,000 sq ft) space which is configured into 8 units. The aim of the Hotel is to encourage businesses to interact with the CAST technical team, network with tenants and work on collaborative projects.

The table below sets out the range of unit size available in each Technium, the average unit size in each Technium and the average unit size that has been taken by clients (both current and graduates).

Table 4.2 – Average Floorspace in Technium

	Range of Incubator Unit Size (sq m)	Average Incubator Unit Size (sq m)	Average Floorspace taken per Business (sq m)
Aberystwyth	16 - 97	29.62	44.06
CAST (includes units in the Software Hotel)	15 – 105	61.30	82.87
Digital	30 – 63	38.59	n/a
Digital@Sony	37 – 95	65.38	63.67
OpTIC	52	52.00	n/a
Pembrokeshire	26 – 101	44.26	31
Performance Engineering	22 – 160	71.76	53.44
Sustainable Technologies	30 – 291	69.45	139.05
Swansea	36 - 242	108.43	142.22
Network	**15 - 291**	**63.14**	**85.38**

Source: Technium Website and Technium Managers

Occupancy rates are difficult to calculate for Techniums because of the flexible leasing arrangements which allow companies to take more than one unit. In addition, companies may be arriving into and leaving the Technium throughout the year. The table below shows an indication of the levels of occupancy (in terms of the amount of floorspace let) across the network in December 2008. A review of best practice in incubation identified the benchmark occupancy rate of 85% (see Table 6.1). The Technium network had an average occupancy rate in December 2008 of 46% which does not compare well to the benchmark level.

In occupancy terms, the strongest performing Technium is Technium Digital which is 81% occupied. The weakest is Technium Pembrokeshire with just 4% occupancy, although it should be noted that this is the youngest Technium in the network.

Table 4.3: Occupancy Levels at December 2008

	Total Incubator Floorspace (sq m)	Total Floorspace Let (sq m)	Occupancy
Aberystwyth	533	353	66%
CAST	1,459	1,160	80%
Digital	540	439	81%
Digital@Sony	523	191	37%
OpTIC	1,248	TBC	TBC
Pembrokeshire	797	31	4%
Performance Engineering	933	214	23%
Sustainable Technologies	2,222	556	25%
Swansea (1 & 2)	3,036	1,707	56%
Total	**11,291**	**4,650**	**46%***

Source: Technium Managers and information available on the Technium website

** Excludes OpTIC from the occupancy calculations as we do not know the floorspace let in OpTIC*

It may be possible to improve occupancy by relaxing entry and exit criteria; however, this will in turn diminish the role and function of the Technium concept. At present occupancy is relatively low in a number of the Techniums. Notwithstanding the expectation that it will take time to reach full occupancy, there may need to be questions raised in respect of both the capacity of the network and/or the ability to develop and attract a pipeline of future client businesses.

Information was sought on occupancy levels over time but has not been received. In order to draw any conclusions as to whether low occupancy is a permanent feature of the network there is a need to analyse a time series of occupancy data.

It is important to note that the objectives of Technium go beyond the provision of suitable business space, therefore it is inappropriate to just judge its success on occupancy levels. The success of Technium should be measured by the degree to which it has achieved growth in the businesses that it has supported.

4.2 Specialist Equipment

To enable clients to carry out their business, each Technium is equipped with:

- a resilient 20Mbps internet contended bandwidth[39]
- secure core networking
- individual Virtual Local Area Networks (VLAN's) for each company
- a telephone system

In addition, some of the Techniums have specialist equipment relevant to its sectoral focus. Some of this equipment has been provided by public funds whilst other equipment has been financed by private sector investors. Technium clients can use any of the equipment in

[39] Initially Technium was originally connected to the University network 'super JANET' however, super JANET did not allow commercial operations on the network so the Welsh Assembly Government was required to procure a new high speed IT network for Technium.

Techniums across the network. More information on the specialist equipment available in each Technium can be found in the Technium Case Studies in Appendix 1.

None of the businesses surveyed made specific mention of any specialist equipment within their Technium, however, the quality of the IT and telephony systems were frequently mentioned as a key strength of being located within a Technium.

4.3 Business Support

Techniums are a business development led initiative and the network is distinguished from managed office space by the provision of business support to clients.[40]

When the Technium concept was first conceived a key differentiator from existing technology transfer activities already in place in the Swansea area was the fact that both general business support and technical support would be available to Technium companies. Initiatives that were in place in Swansea prior to Technium tended to focus on providing companies with technical assistance on their product/concept through research groups and departments in the local HEI's. If companies needed more general business advice in areas such as finance, HR, marketing and so on, they were left to negotiate the often complex array of business support available in Wales by themselves.

The Technium looked to provide clients with easy, on-site access to both technical support and also general business support.

The Technium concept envisaged the Technium Management team playing a key role in the delivery of business support. Technium staff should support clients in their development through the provision of advice and guidance in the areas of business support available within Wales, and to a lesser extent the UK and EU. Many of the regional Welsh Assembly business support providers are accommodated within Technium buildings which should give Technium clients ready and easy access to advice and guidance.

The original concept defined a specific role for the Technium manager in mentoring businesses, monitoring their performance against key milestones in the company business plan, being aware of any potential problems, and brokering in advice and support when needed from Welsh Assembly Government programmes. The Technium Manager should be meeting formally with the business every quarter, although some Technium Managers have reported that in practice the review and monitoring process is often ongoing through informal interaction between themselves and their client businesses. Overall the role of the Technium manager should be as a broker and account/relationship manager for the client business. This allows the client to focus on developing the business.

Technium clients also have access to the Professional Service Providers (sometimes known as the Stakeholder Programme). These are professional consultancy organisations that provide bespoke advice in areas such as Financial Advice, Management, IT, Marketing, Product and Process Development, Law and HR. Technium companies can access a minimum of two hours of free consultancy support from providers on the panel. If companies

[40] Davies, S (2008) *Proposal to Maximise the Economic Impact of Technium*.

need support over and above the free advice offered, the Welsh Assembly Government can cover up to half the cost through the Flexible Support for Business Programme.

The majority of the businesses surveyed reported that they had received advice and support from their Technium Manager. Of these, over 50% reported that they were very satisfied with the help or advice received. The businesses reported a range of services that their Technium Manager provided which included:

- Providing equipment
- Organising networking events
- General advice on day-to-day issues
- Advice on funding and grant applications
- Advice on collaborative working within Technium and further a field
- Referral to other initiatives/support/contacts
- General monitoring of the business and making suggestions

Suggestions for improvement with regard to the support that the Technium Manager provides included: more networking events and seminars, more autonomy for the Technium Manager, more business advice and support and better day-to-day IT support.

Only four of the businesses surveyed had used the Professional Service Providers. In all cases the Technium Manager helped the businesses to get the right support from these providers. A further four companies have accessed support from elsewhere in the public sector, such as the Manufacturing Advisory Service, Finance Wales or their local authority. Only one of the companies reported that their Technium Manager helped them to find this support.

4.4 Academic Support

Technium was designed to focus on *"achieving improvements in products through the application of technology transfer from the Higher Education sector to SMEs"*[41] Technium differentiated itself from managed workspace through the provision of on-site business support (see section 4.3) and close links with academia.[42] The original Technium concept was based on linkages with centres of excellence in academic research. Technium linked into an initiative entitled The *Centres of Excellence for Technology and Industrial Collaboration* (CETIC). CETICs were a network of 20 centres that were recognised for their research, world class facilities and track record of success in industrial collaboration. Technium was designed to link directly into these centres to provide clients with easy access to high quality academic research and facilities.[43] The CETICs are no longer in existence however, they have now been replaced by Knowledge Transfer Centres (KTC). These centres look to turning technologies, know-how, expertise and skills into innovative, commercial products, processes and services through their in-house expertise and ability to collaborate with industry.

[41] DTZ Pieda Consulting (2000) *A New Business Innovation Centre for Swansea and South West Wales*

[42] Davies, S (2008) *Proposal to Maximise the Economic Impact of Technium*

[43] Clement, M and Davies, S (2002) *Technium Concept*. Seventh International Conference on Education and Training in Optics and Photonics (Proceedings Volume) Proceedings of SPIE Volume: 4588

Each Technium manager reported that there are links between their Technium and local HEI's although it is not clear whether these linkages are with KTCs. All of the Techniums located in South West Wales have linkages to departments and research groups within Swansea University and Swansea Metropolitan University. Other Universities involved in the Technium network include: Bangor University (CAST), Glyndwr University (OpTIC), Aberystwyth University (Aberystwyth), Lampeter University (Aberystwyth).

Each Technium had a target for the number of collaborative projects between companies and research institutions. The total target across the Technium network was 110 collaborative projects, this was exceeded with 218 projects being carried out across the network. Swansea, Digital and OpTIC exceeded their targets. More detail on each Technium's targets and outputs can be found in Appendix 4.

Eight of the businesses surveyed in the pilot survey reported that they had formally collaborated with a university or other research institution. Most of the projects were research and development collaborations. Businesses had collaborated with Universities across both Wales and the UK including, Glamorgan, Glyndwr, Swansea, Bangor, Cardiff, Swansea Metropolitan and Aberystwyth in Wales and Edinburgh, University College London, Oxford, Solent, Newcastle, Sheffield, Bath, Paisley and Cambridge further afield. Only one business reported that the Technium Manager (or other staff at the Technium) had been involved in making the link between themselves and the university. Some collaborations could have been made prior to the business becoming a Technium client. It is understood that Academia for Business (A4B) Project Development Officers are responsible for brokering relationships between businesses and universities rather than Technium managers. A4B officers are typically located within a Technium giving Technium clients easy access to their expertise and services. The relationship between Technium Staff, A4B Officers and Technium Clients will need to be tested further to understand fully who is involved in brokering higher education links for Technium clients.

Of those who had not collaborated or sought information from HEIs, most stated that there was no reason or need for HEI support in their business. This is a potential area for further testing given the explicit aim of the Techniums to facilitate higher education collaborations with businesses and a specific requirement of entry to Technium is 'developing academic links'.

Seven of the companies had established links with further education colleges. The projects being carried out with the FEI's were mainly consultancy or training projects rather than R&D projects. Businesses were mainly working with FEIs in Wales. The Technium Manager was not involved in making the link between the business and the FEI in any of the cases reported.

4.5 Networking and Collaborations

As has been discussed in section 2, there are both generic and sector specific Techniums in the network. The sector specific Techniums tended to be developed in order to build on existing academic or industrial expertise in the regions and are an attempt to co-locate companies in specific sectors.[44] It is hoped that co-location will stimulate networking, collaboration, learning and development between Technium clients. Many Technium

[44] Davies, S (2008) *Proposal to Maximise the Economic Impact of Technium*

managers arrange networking meetings and business seminars to encourage networking and collaboration.

From the business survey twelve businesses had used other businesses based at their Technium as a source of information or knowledge, whilst three had used businesses in another Technium. Four companies had formally collaborated with other businesses within their Technium and one had formally collaborated with a business in another Technium. Nine businesses had collaborated with businesses that were not in a Technium.

Four companies stated the co-location of other businesses in the Technium was an advantage of being in the Technium. However, there were also a number of comments requesting that more networking activities should be organised by the Technium.

It is understood that there have also been collaborations through the Global Incubator Network (GIN) which was founded by Welsh Assembly Government and Scottish Enterprise. GIN is an online portal of business incubators committed to sharing the best practice and developing business opportunities. GIN provides a tool that can be used by incubating companies to win business and develop their own company. GIN also offers best practice information and up to date data that allows Business Incubators to offer the best service and facilitates to their companies.

4.6 Summary

There are four main elements to the Technium offer:

- the provision of high quality office space and sector specific specialist equipment (where appropriate);
- on site access to business support services from the Technium Manager, Welsh Assembly Government and Professional Service Providers;
- linkages to academic research institutions; and
- opportunities for networking and collaboration with similar businesses.

Technium buildings are usually of high quality flagship design. The costs and benefits associated with a flagship building could be subject to further investigation in the Stage Two evaluation. We were not able to ascertain the value businesses placed on being in such a building during this stage of the research. Technium 1 was the first building on the SA1 Swansea Waterfront site. Since the development of Technium 1 a significant amount of development and regeneration has occurred on the site with investment from both the public and private sector. Further research is required to establish to what extent this regeneration can be attributed to the Technium 1 and whether other Techniums have seen similar regeneration activity.

Occupancy rates across the Technium network are low at only 46%, this does not compare well to the best practice benchmark level of 85%. However, accessing occupancy rates is complicated due to the flexible entry and exit criteria used by Technium resulting in occupancy frequently changing. In order to draw conclusions on whether low occupancy is a permanent feature of the network there is a need to analyse time series occupancy data. However, it

should be noted that occupancy levels should be considered alongside a range of other measures of performance, the most important of which would be the performance of businesses within Technium.

The Technium Manager has a fundamental role in the Technium concept. The Technium manager should be mentoring businesses, monitoring their performance against key milestones stated in their business plan and aware of any potential problems before they arise. The Manager can also broker in support from other Welsh Assembly Government initiatives to support the business.

There are linkages between each Technium and their local university. Technium has exceeded its targets for the number of collaborations between businesses and research institutions. It is not immediately clear whether the Technium management team facilitated these collaborations as only one business in the business survey reported that Technium staff had been involved in making the link between themselves and the university. Some collaborations could have been made prior to the business becoming a Technium client.

About half of the businesses in the pilot survey had sought information from other Technium businesses and five businesses had collaborated formally with other Technium businesses. Nine businesses had collaborated with non-Technium businesses. More research is needed to establish whether these non-Technium businesses were part of the local cluster around the specific Technium or from further afield. Some collaborations have been achieved through the Global Incubator Network.

5. Technium Beneficiaries and Outputs

Key Messages

- A total of 145 businesses have been supported through the Technium network
- 87 are current clients of Technium
- 37 companies successfully graduated from Technium to grow on space
- 17 companies have failed, either within Technium or since graduation
- Broadly across the network activity targets have been met. The network was most successful in its provision of advice and information in R&D although we did find that this indicator was interpreted differently across the network. The network also exceeded the target for collaborative projects between companies and research institutions
- Technium has been less successful in achieving its results targets. Although the target for new patents and trademarks and jobs created was exceeded the network failed to meet targets for increases in turnover, new companies formed in high tech sectors and jobs safeguarded.
- A key aim of Technium was to create jobs that would help to retain graduates within Wales. Although graduate positions were not formally monitored our business survey found that two-thirds of employees in the Technium network are graduated to degree level or higher. This compares very favourably to the overall skills profile in Wales where only one-third of employees are graduates.

This section provides an overview of the achievements of the Technium network to date. More detailed information can be found in Appendix 4.

The information in this section has been gathered through consultations with Technium Managers, information provided on Objective 1 Funding documentation and information available on the Technium website (www.technium.co.uk).

5.1 Businesses Supported

Between 1999 and December 2008, 145 companies have been supported in Techniums across Wales, either in incubator units or hot desks. Of these, 87 are current clients, and 58 have left the Technium environment.

Table 5.1: Technium Clients as at December 2008

	Current incubator clients	Current hot desk users	Total number of companies that have moved on			Total companies supported since opening[45]
			Successful Graduates[46]	Failed Graduates[47]	Moved for other reasons	
Aberystwyth	8	4	2	3		17
CAST	14	4	10	6		34
Digital	8	3	0	1		12
Digital@Sony	3	0	2	0		5
OpTIC[48]	10	9	15	3	4	41
Pembrokeshire	1	1	0	0		2
Performance Engineering	4	1	0	0	0	5
Sustainable Technologies	4	0	0	1		5
Swansea	11	2	8	3		24
Total Occupancy	**63**	**24**	**37**	**17**	**4**	**145**

Source: Technium Managers

5.2 Graduated Businesses

A total of 58 Technium clients have left the Technium programme. Of these, 37 are deemed to be 'successful' graduations in that the company left Technium in order to move into larger premises or the company has been sold on, whilst 17 companies were unsuccessful as the companies have either been wound up or left Technium to go to smaller premises. A further four companies have become dormant.

Further information on graduated businesses will be collected as part of a Stage 2 full evaluation if commissioned.

It is understood that currently no data is currently collected on the performance of graduated businesses. A previous report into the impact of the Technium noted that *"the future envisaged benefits of Technium are contained within companies that graduate from the centres. Whilst future growth of these companies will be due to factors beyond their roots in Technium, it can be argued that much of this growth would not have occurred within Wales*

[45] Incubatees and Hot Desk Users

[46] A successful graduate is defined as one that has left Technium to move into larger premises (i.e. outgrown Technium) or that has been able to sell the business.

[47] A failed client is defined as one that has failed, closed down or gone into administration.

[48] Information regarding OpTIC should be read with caution as the evaluators would like to clarify some of the information stated.

had Technium not been there at their inception."[49] This suggests that in order to monitor the full benefits of Technium, efforts need to be made to collect business performance data from graduated businesses. As will be discussed in section 6.1, a review of best practice in incubation evaluation has identified the Incubator Support Programme in New Zealand as a best practice case study. In New Zealand there is a requirement for the Incubator Manager to continue to collect business performance data for five years after the company leaves the incubator. This makes it easier to assess the full impact of the incubator support.

5.3 Monitored Outputs

The outputs that are consistently monitored across the network relate to European Funding requirements. Table 5.2, Table 5.3 and Table 5.4 below sets out the targets and outputs achieved across the network. The targets and outputs for Technium 1 are presented separately as Objective 2 funding was used in this case and the targets used were somewhat different to those Techniums funded through Objective 1. The tables do not include data on Digital@Sony it did not receive European Funding. Outputs for Digital@Sony were recorded on a regional basis and formed part of the overall South East Wales region outputs for business support. It should be noted that we have not validated the information that was provided on the final monitoring form.

Table 5.2: Technium 1 - Targets and Outputs

Indicator	Target (1999)	Output (2001)
R&D centre created	1	4
Direct jobs created	6	6
No of SMEs contacted	600	450
New products and processes adopted	30	32
New products and processes developed	60	32
Jobs created within expanding SMEs	60	54
New linkages	90	102
% increase in turnover of assisted SMEs	15%	23%

Source: Technium 2 Objective 1 Application Form

[49] Davies, G and Abbey, J (2007) *Technium Pan-Wales: Impact Assessment*. Institute for Policy and Economic Development. IPED Technical Reports

Table 5.3: Whole Network - Activity Targets and Outputs

	Whole Network		
	Target	**Reprofile[50]**	**Achieved**
Companies receiving advice in innovation and R&D	649	722	1,148
Collaborative projects between companies and research institutions	110	138	218
New Incubator	7	6	7
Floorspace in incubator and R&D facilities (m^2)	33,643	30,129	33,651
No. of companies receiving financial support for R&D	255	6	4
Projects transferring environmental technologies to the business sector	18	12	1
No. hectares of direct land developed	14.02	5.52	5.76
No. hectares of indirect land developed	3.64	0	0

Source: Final Audited Objective 1 Claim Forms

The table shows that broadly across the network the activity targets set for the Techniums have been met. The network has been successful in the provision of advice and information about R&D; however we have found that this indicator is interpreted differently by different Techniums. Some use it to record instances when they have helped Technium clients with specific R&D issues e.g. assisting with applications for R&D funding; whilst other Techniums use this indicator to record general enquires to the Technium (i.e. what is Technium and how can a business enter it) or attendances at Technium events. The network has also exceeded its target with respect to the number of collaborative projects between Technium companies and research institutions. Areas of activity where the network has been less successful include companies accessing financial support for R&D and projects transferring environmental technologies to the business sector.

[50] After the initial project approval from WEFO most Techniums requested their application be're-profiled'. This occurs when it appears that targets will be over or under achieved. Target re-profiling happens when it becomes apparent that the project is unlikely to meet its targets (for a variety of reasons) and so targets are revised to more realistic levels. Most of the Techniums went through more than one re-profiling exercise. The targets from the latest re-profiling approval letter have been included in the tables to give an indication of how and where adjustments were made. Whilst the evaluators have not investigated the target re-profiling exercise in great deal at this stage it is an issue that could be picked up in Stage 2 linked to the lack of locally specific appraisal and feasibility work found by this scoping study.

Table 5.4: Whole Network - Results Targets and Outputs

	Whole Programme		
	Target	**Reprofile**	**Achieved**
Increase in turnover in supported companies	£111,711,000	£81,571,000	£26,038,000
Gross new companies in high tech sectors	250	133	86
Gross jobs safeguarded	850	600	399
Gross new jobs	503	35	178
Gross new jobs in high tech sectors	1,181	789	808
No. of new patents and trademarks	54	54	79
No. of jobs accommodated directly	188	188	188
No. of gross new indirect jobs	0	318	616

Source: Final Audited Objective 1 Claim Forms

With respect to the results targets the network has exceeded the target for the number of new patents and trademarks, with 25 more patents or trademarks being registered than the target. Reprofiled targets were also exceeded with respect to Gross New Jobs and Gross New Jobs in High Tech Sectors. However, most of the original results targets were not achieved. Supported companies only reported an increase in turnover of £26m when the original target was for £111.7m. It has been suggested that in hindsight the turnover targets within 2 years were too high. This would support the need for longer term monitoring in order to fully assess impact. The network also failed to meet targets with respect to new companies formed in high tech sectors and jobs safeguarded.

5.4 Employment Impacts

A key aim of the Technium concept was to increase the number of knowledge based jobs available in Wales in order to retain graduates from Welsh universities in the country. However, it is not clear that business incubation is the best way of directly creating a large number of jobs. Business incubation supports entrepreneurs to develop their idea into a viable business. Most entrepreneurs will be concerned with increasing turnover and making profit. Maximising profit does not directly correlate with maximising employment impact and the incentives for the entrepreneur are to limit the scale of employment growth. As employment was a stated aim of the concept it is right that it is measured, but other indicators that perhaps better align to the activities of Technium should be considered for the future monitoring of Technium and for the Stage 2 evaluation. This is discussed in more detail in section 6.

The monitoring data shows that across the network targets were reached for 'gross new jobs created' or 'gross new jobs created in high tech sectors'. The EU does not require information on the types of jobs created (i.e. whether they were graduate positions) to be collected. However, as a specific objective of Technium was to retain graduates within Wales it is recommended that future monitoring records the types of jobs that are being created by Technium clients and graduates. Through the business survey we established that, on average, the companies employed four people when they entered Technium, and they currently employ nine people. In total, the 25 companies surveyed[51] employed 103 people when they entered the Technium and they now employ 267 (a 160% increase).

[51] Results should be read with caution due to the small sample size from the pilot business survey

When the business entered the Technium nearly three quarters of employees were educated to degree/HND/HNC level or higher. This has fallen slightly to two-thirds of employees currently. Around one quarter of employees are educated to A level or equivalent, whilst just 5% have an educational attainment below this. This educational attainment is markedly different to the general Welsh population. Of those in employment in Wales, only a third is educated to degree level or higher. Nearly 50% of people in employment have GCSE/NVQ level 2 qualifications or below. Initial indications on salary levels also indicate higher than average salary levels across the Techniums than the Welsh average.

5.5 Summary

145 businesses have passed through the Technium network between 1999 and December 2008 – either as full incubator clients or by taking hot desk space. In this time 37 companies have successfully graduated to grow on space or have sold the company on, and 17 companies are deemed to have 'failed'.

Broadly across the network activity targets have been met. The network has been particularly successful in providing advice in innovation and R&D, although we have found that this indicator is interpreted differently across the network. The network also exceeded the target for the number of collaborations between companies and research institutions.

The network has been less successful in achieving its results targets. The network has exceeded the target for the number of new patents and trademarks and gross new jobs but has not met targets for key indicators such as turnover in supported companies, new companies created and safeguarded jobs.

There are issues with respect to the appropriateness of using employment as a key performance indicator as entrepreneurs will be concerned with growing a business and making profit. This will often mean employing the minimum number of people. However, employment generation was a key aim of the Technium network and so will need to be considered within the final evaluation. The business survey found that there had been employment generation and that around two-thirds of employees are graduated to degree level or higher. This is in contrast to the general Welsh population where only a third in employment is educated to degree level or higher.

A further issue relating to indicators is the variety of indicators used by what is supposed to be a national programme and the substantial reprofiling of targets which was required. This is an issue that warrants further investigation as part of Stage 2 to consider whether this is linked to the lack of locally specific feasibility and appraisal for some Techniums. There are potential questions as to whether the original investments would have been funded at the outset on the basis of the final reprofiled targets.

6. Data Requirements and Availability for Full Evaluation

Key Messages

- The European Commission highlights that incubators should be judged on the performance of the businesses they support. To carry out the full evaluation we would like to measure business performance using business value data as it captures the business performance of both pre-revenue and revenue generating businesses
- There is a need to continue to monitor supported businesses after graduation as growth often occurs after the business has left the incubator
- Incubators should be evaluated against the objectives under which they were established. As not all of the Techniums have an explicit rationale and objectives this could present difficulties for full evaluation
- The most comprehensive source of information was WEFO Objective 1 monitoring returns, however, these do not give the most up-to-date picture of performance as they are only available until the end of the Objective 1 funding period. There are also issues regarding a consistent time period for data, consistency of the monitoring data and how well the indicators align to the original objectives of Technium.
- The pilot business survey identified that most of the data needed for full evaluation can be obtained directly from client businesses. Unfortunately they were not able to provide information on business value (our preferred measure of business performance). Turnover and profit will need to be used as alternatives with the weaknesses of this approach acknowledged.

A key requirement of this study was the development of an evaluation methodology and identification of the data requirements for a full evaluation.

This involved a review of economic evidence from similar programmes operating elsewhere in the UK or globally to provide a benchmark for comparing the Technium programme performance, an assessment of the evaluation methodologies employed in evaluations of similar programmes to identify potential approaches for the Technium evaluation; a review of what data would be needed to carry out a full evaluation and to what extent this data is available and to identify any other issues that could be of importance. The findings from these stages are set out below.

6.1 Best Practice Incubator Evaluation

This section draws on previous work undertaken to monitor the performance of incubators and provides a summary of the benchmark indicators which the Technium network can be measured against. It looks at the range of criteria typically assessed in similar evaluation studies and outlines the key lessons to be learnt when developing a full evaluation methodology for the Technium network. Further details on the studies used to inform the chapter are contained in Appendix 5.

According to work published by Phan et al. in 2005[52], there is no clear standard when evaluating an incubator. Studies have tended to use a range of indicators to assess performance such as: jobs created, clients served, companies graduated, occupancy rates, length of tenancy and survival rates. These are all important indicators of an incubator's performance. A stated aim of the Technium concept was employment generation, particularly in the knowledge economy. As such, it needs to be considered. However, this may not be the most important factor to be analysed. An entrepreneur should be concerned with growing a business and making profit. This will often mean employing the minimum number of people.

Work published by the European Commission[53] highlights that, "*The performance of business incubators should be judged primarily in terms of the results achieved, i.e. the impact they have on businesses, wider economic development and other priorities*." The success of an incubator should therefore be judged on the success of the businesses which pass through it.

The issue of business success raises the question of measurement. Work by the European Commission has used the benchmark of average growth in turnover, however while it is an important indicator it will not be relevant to pre-revenue knowledge businesses. It may therefore be more appropriate to consider the overall business value.

A further issue which needs to be considered is the performance of businesses once they have graduated from the network. The European Commission [54] highlighted *"...the need to judge incubator performance in terms of the long-term impacts achieved rather than short-term measures."* Support in incubators is targeted at putting the foundations in place to allow strong growth which may occur after the business has moved into new premises. The best practice review identified an example from New Zealand (see below) where businesses are required to provide data on business performance for five years after leaving the incubator to allow for this impact to be considered.

In New Zealand, the Incubator Support Programme has been operating since 2001 and has eight facilities focused on high growth businesses. Discussions with UKBI have identified this as one of the leading examples of incubator best practice, particularly in respect to the long term monitoring of supported companies. All incubators are technology-focused operate according to strict criteria for businesses. In particular, companies must be high growth. High growth was originally defined as doubling the number of full time employees and:

1. Being able to generate NZ$500,000 (approximately £175,000) per annum during the incubator stage
2. Raising NZ$250,000 (approximately £88,000) equity during their time in the incubator
3. Displaying the potential to become a NZ$5 million (approximately £1.76 million) company within three years of leaving.

[52] Phan, P.H., Siegel, D.S., Wright, M. (2005) *Science parks and incubators: observations, synthesis and future research.* Journal of Business Venturing 20(2), 165–182

[53] Centre for Strategy and Evaluation Services (2002) *Benchmarking of Business Incubators – Final Report*. European Commission Enterprise Directorate General.

[54] Centre for Strategy and Evaluation Services (2002) *Benchmarking of Business Incubators – Final Report*. European Commission Enterprise Directorate General.

In the time which the incubators have been operating, New Zealand Trade & Enterprise have learnt that a lot of the growth in businesses actually happens after five or more years; therefore the criteria listed above do not necessary align to the high growth model. They have therefore started to focus on characteristics of high growth companies – including the governance structure, business plans for international markets and the product itself.

There have been around 150 graduates from the Incubator Support Programme since 2001 and the real impact of the programme has been easier to assess through graduate companies. Each incubator manager is responsible for collecting performance data for five years after a company leaves the incubator. A response rate of 50% is typically achieved and it is a contractual obligation for businesses to provide data for five years after they leave. The data includes information on: revenue generation (domestic/export); capital raised; and job creation).

The Incubator Support Programme in New Zealand is focused very much on the long term growth and sustainability of companies. The monitoring data collected on each facility reflects this, particular in relation to the amount of capital raised and number of jobs created.

When undertaking an evaluation of an incubator, the European Commission highlights the importance of obtaining feedback directly from client companies. In particular, this includes feedback on the quality of business support services provided to companies, which are becoming increasingly recognised as a key contributor to value added by incubator operations. Moreover both Martin (1997[55]) and Markley and McNamara (1994[56]) emphasise how important it is that incubators are evaluated against the objectives under which they were established. This will be challenging in this instance with limited documentation of rationale and objectives.

In addition, the role played by universities and research centres is recognised by iDISC[57] as an important indicator of incubator performance. For example, how many projects has a client company collaborated on with a higher education institution?

6.2 Best Practice Incubator Performance Indicators

Table 6.1 summarises the main indicators used in evaluations of incubators identified from a literature review. It draws on work published by the European Commission, iDISC and a number of academic studies undertaken in recent years and where possible, suggested outputs for each indicator are also provided. It is important to note that these represent averages and cannot be directly applied to any of the Techniums when assessing performance.

[55] Martin, Frank (1997) *Business Incubators and Enterprise Development: Neither Tried or Tested?* University of Stirling Conference Paper to the International Council for Small Business.

[56] Markley, Deborah M and McNamara, Kevin T. (1996) *Local Impact and Fiscal Impacts of Business Incubators* State and Local Government Review.

[57] The infoDev Incubator **S**upport Center (iDISC)– a virtual networking and knowledge-sharing platform for incubators and technology parks leveraging ICT to facilitate entrepreneurship and new business creation.

Table 6.1: Incubator Performance Indicators

Indicator	Suggested Benchmark Output	Comments
Number of tenants	20-30	Work undertaken by the European Commission suggests that a minimum of 2,000 sq m of space is needed (enough to accommodate 20-30 companies) to achieve economies of scale.
Occupancy rates	85%	This indicator is noted in a number of studies and provides an indication of how successfully an incubator is attracting its target client group.
Length of tenancy	3 years	Average tenancies can range from 3-5 years, although benchmarks for specialist incubators (including high-tech R&D and biotechnology incubators) may not necessarily be appropriate.
Survival rates of tenant companies	85%	The European Commission has found that the survival rates of firms supported in an incubator environment is higher is around 80%-90% over a 5 year period, compared to 30%-50% in the wider SME community.
Average growth in client turnover	25%	This indicator is an important measure of incubator performance as it can show the impact made towards wealth creation – i.e. to what extent has a business grown since it was located in the incubator? This indicator will not apply to businesses at the pre-revenue stage, however.
Cost per job	€4,000-€8,000	This indicator has been used by the European Commission in its incubator benchmarking work and it is important to note that a range is used to reflect the fact that incubators can receive wide ranging levels of support from the public sector.
Average jobs per tenant company	-	This is an important indicator and is recognised in a number of studies, however the EC states that it is not appropriate to set a benchmark. This is because the number of jobs created in an incubator will vary greatly depending on the type of companies being incubated, the number of tenants an incubator can accommodate and the amount of available space.
Capital investment costs & Operating costs	-	Costs relating to capital investment and operating costs will vary depending on the type of incubator.

Indicator	Suggested Benchmark Output	Comments
Number of incubator graduates/Number retained in the local area	-	This will vary depending on the size of an incubator and the sector within it is operating. However, it is an important indicator and can be used to identify whether an incubator is producing sustainable outputs in the area which is located in.
Number of projects with universities or research centres	-	These two indicators are both highlighted in best practice guidance produced by iDISC. Despite no suggested output benchmarks being available, they are extremely relevant to the Technium network, given the importance placed on developing linkages with Higher Education and the private sector when the network was first developed.
Number of research projects developed in partnership with a private initiative	-	

Source: European Commission*, iDISC, New Zealand Trade & Enterprise, Albert & Gaynor*[58]*, Aerts et al.*[59]

6.3 Lessons for Technium Evaluation Methodology

The importance of evaluating incubators against the objectives under which they were established has already been noted in the work by Martin (1997[60]) and Markley and McNamara (1994[61]). In many cases there is no explicit rationale and objectives for each individual Technium, which will present a challenge for full evaluation. One solution could be to evaluate all Techniums against the rationale and objectives for the first Technium. As discussed in section 2.5 most Techniums appear to have based their rationale on Technium 1 therefore it is reasonable to assume that the underlying aim is the same.

We understand the that Technium concept was to provide an environment which would help nurture and support the accelerated growth and development of technology and knowledge based businesses, with a key feature being direct links to Higher Education institutions. Taking this rationale into account and building on the literature reviewed above and the issues raised by UKBI, we outline below the potential suite of key indicators to be assessed as part of a full evaluation of the Technium network – under the objectives of: Business Growth; Knowledge Economy; and Higher Education Collaboration. These will need to be supplemented with qualitative information on the support provided to companies. It was

[58] Philippe Albert & Lynda Gaynor (2001*) Incubators – Growing Up, Moving Out: A Review of the Literature*

[59] Kris Aerts, Paul Matthyssens and Koen Vandenbempt (2007) *Critical role and screening practices of European business incubators*. Technovation 27(5), 254-267.

[60] Martin, Frank (1997*) Business Incubators and Enterprise Development: Neither Tried or Tested?* University of Stirling Conference Paper to the International Council for Small Business.

[61] Markley, Deborah M and McNamara, Kevin T. (1996) *Local Impact and Fiscal Impacts of Business Incubators* State and Local Government Review.

necessary to test whether data already exists for all of these proposed indicators or whether information will have to be collected directly from businesses in order to carry out the full evaluation.

Table 6.2: Objectives and Indicators

Objectives	Indicators
Business Growth	Turnover/Profit Business Value Employment (numbers and type)
Knowledge Economy	IP Generated Workforce Skill Levels Business to Business Collaborations
Higher Education Collaboration	Higher Education Collaborations Spin Out Companies

6.4 Data Availability

This section sets out the existing sources of data that have been explored in order to understand what data is available to carry out a full evaluation of the Technium network. The most comprehensive existing data source we have accessed is from WEFO returns linked to Objective 1 funding.

6.4.1 Technium Management Records

Each Technium manager was asked to provide information on their clients e.g. the number of current tenants, desk space users and graduates and more detailed information on employee numbers of their Technium clients at entry and currently, where the client came from (e.g. university spin out, inward investor etc), and the exit year and destination of graduates. All Technium managers were able to provide the basic client information – some with more detail than others. Only four Technium managers were willing/able to provide the more detailed information.

There is currently no contractual obligation for Technium clients to provide management with any information about their business performance. The best practice review, above, identified that incubators should be measured by the success of the businesses that they support. The business survey found that only one business stated that they provided their Technium Manager with information on their turnover and profit, a second only provided employment information and a third only provided information on their business value or assets. 19 of the companies stated that they did not provide their Technium Manager with any information about the performance of their business. Although this is only a small sample of the Technium clients this raises interesting questions as to how the Technium Managers collected and reported data on turnover and employment on their EU Monitoring claim forms (see section 6.4.2). This requires further investigation through discussions with Technium managers before any conclusions can be reached.

In order to monitor the future performance of Technium it is recommended that clients are obliged to provide key business performance data.

The best practice review highlighted the importance of continuing to monitor supported businesses performance after graduation in order to fully capture the impact of incubator support. Currently no monitoring of graduated companies from Technium takes place.

It appears that the monitoring data that was collected by Technium Managers was primarily for the purpose of complying with EU monitoring requirements. It is not clear what data (if any) is currently being collected by Managers given that the Objective 1 funding period is over.

6.4.2 EU Monitoring Returns

A requirement of the European Objective 1 programme was that the Techniums that had received Objective 1 funding had to submit quarterly financial and output returns to WEFO. We have reviewed the final audited claim form submitted to WEFO for each Technium that received Objective 1 funds[62].

This review found that these WEFO forms provided the most comprehensive data set on the outputs of the Technium network. The monitoring forms record detail on expenditure, funding and outputs achieved during the funding period.

However, there are some short-falls with this data set which means it may not be suitable for full evaluation.

Each Technium project was approved individually, therefore there is no common time period across the network over which data was collected. Some Technium targets were to be achieved in a two-year period, whilst others were over a five-year period. In addition, this data source does not give the most up-to-date picture of performance as data is only available until the end of the Objective 1 funding period. We have not been able to ascertain whether Technium managers have continued to monitor these outputs following the end of Objective 1 funding.

In addition, there appears to be variances in the indicators used for each Technium and in the targets set for a common indicator. For example, targets set for the indicator 'companies receiving advice and innovation' ranged from 30 to 300.

[62] Technium 1 and Digital@Sony did not receive Objective 1 funding and so are excluded from this analysis. Technium 1 was funded through Objective 2. We did not review the Objective 2 monitoring records. Digital@Sony did not receive European Funding.

Table 6.3 – Illustration of variability in targets between Techniums

	Companies Receiving Advice and Information - Original Target
Aberystwyth	57
CAST	144
Digital	200
OpTIC	30
Pembrokeshire	32
Performance Engineering	30
Sustainable Technologies	200
Swansea 2	300

Source: Final audited claim forms

Other targets appear to have been set without consideration of the operational aspects of incubation. For example, Technium 2 had a target of 50 gross new companies in high tech sectors. As Technium 2 can accommodate 16 companies (assuming no company occupies more than one unit) with each company envisaged to remain in the Technium for three years, there appears to be a conflict between the operational capacity of the Technium and the target of 50 companies in the four year funding period between January 2002 and March 2006.

It should also be noted that despite being final audited claim forms the evaluators have identified some anomalies in the data – particularly around the financial information.

Stakeholders have commented on the relevance of some of the indicators to the Technium programme as there is a view that the indicators do not always adequately match up to the objectives of the Technium programme. Although the EU are very prescriptive in the indicators that are used in EU funded initiatives, there is no reason why other indicators that better align to the objectives and activities of the Technium programme cannot be collected for the Welsh Assembly Government's own monitoring purposes.

In Table 6.2 we set out the indicators that we feel best align to the objectives to the Technium that we would look to measure in the full evaluation. Whilst a number of these have been collected on the monitoring forms there are some gaps in the data. For example, although one of the objectives behind the Technium concept was to create jobs to retain graduates in the area, the 'jobs created' indicator does not record the types of jobs created. A better measure of the Technium activity is to record information that relates to the skills levels of the jobs created, so that there is a record of whether the Technium network is creating graduate jobs. A more suitable indicator may be 'jobs created requiring NVQ level 4+'. Some Techniums did use an indicator 'gross new jobs created in high tech sectors' however, this records all jobs created in a high tech company, therefore an administrator position requiring only GCSE level qualifications would be recorded in this indicator.

Table 6.4 – Comparison between proposed indicators and WEFO indicators

Objectives	Proposed Indicators for Full Evaluation	Indicators Collected for WEFO Monitoring
Business Growth	Turnover/Profit	Increase in turnover in supported companies
	Business Value	Not Collected
	Employment (numbers and type)	Gross new jobs created/Gross new jobs created in high tech sectors
Knowledge Economy	IP Generated	No. new patents and trademarks
	Workforce Skill Levels	Not Collected
	Business to Business Collaborations	Not Collected
Higher Education Collaboration	Higher Education Collaborations	Collaborative projects between companies and research institutions
	Spin Out Companies	Not Collected

Further work needs to be carried out to ensure the target indicators are fully aligned with a clear set of objectives for the Network and that there is consistency in the targets set for each Technium and the way in which they are measured.

6.5 Business Survey

The review found that although some data currently exists on the Technium network it is not really suitable for a full evaluation due to issues around indicators not aligning to original objectives, data availability across the network and time periods for which the data is available. We therefore conducted a pilot business survey of 25 current tenants to test the potential of collecting the data required directly from client businesses. Further details of the pilot survey are included in Appendix 6. The survey asked businesses to provide a range of data, in particular details on:

- Business value
- Turnover
- Profit
- Employee numbers
- Skill levels of staff
- Wages/salary costs

The survey results showed that companies are able to provide employment numbers – both current and upon entering their respective Technium. In addition, companies were generally able to provide information on skill levels amongst their employees. When asked to state qualifications of employees upon entry to the Technium, 22 companies could do so. This rose to 24 when companies were asked to state qualifications of employees at the current time.

The benchmarking exercise identified business value as a key performance indicator by which to measure the performance of companies within the Techniums. The survey therefore explored whether businesses have the data available to measure business value. The findings showed that the indicator is not being commonly used by businesses. Businesses more commonly use the indicators turnover and profit to measure business performance.

The survey also explored the extent to which salary information is available from businesses. It did this in two ways. Firstly, companies were asked to outline total salary costs, and secondly they were asked to break down the number of employees falling within particular salary bands. Overall, businesses were able to outline salary costs (total and by band). There were a number of refusals, although this reflects the fact that companies were not willing to release such information – regarding it as confidential.

The survey showed that the information required to measure the impact of the Technium network should generally be available from businesses – including employee numbers and skill levels of staff. A number of refinements would need to be made, particular in terms of looking at how companies measure their performance and what they are required to report to Technium managers.

The business survey also collected a range of more qualitative data. Generally businesses were willing and able to answer questions asked. A total of 25 responses were achieved from a sample of 34 businesses of which only two companies refused to participate. This positive level of engagement is very encouraging.

6.6 Summary

The review of evaluations of similar incubator schemes stressed the importance of measuring the performance of the incubator through the performance of the companies that pass through it. The review also highlighted the importance of evaluating incubators against the objectives under which they were established. The lack of objectives across the network will therefore pose a challenge for full evaluation. It was also highlighted that it is beneficial to continue to monitor companies after they graduate as many businesses experience their strongest growth after graduation.

Technium Managers seem unable to provide detailed or consistent enough data that would be useful in carrying out a full evaluation. The most comprehensive existing data was obtained through Objective 1 monitoring records, however, as these were maintained only during the Objective 1 funding period they do not give the most up-to-date record of performance.

We have identified a set of indicators which align to the objectives of the Technium network. Most of these indicators have been collected through Objective 1 monitoring although there are some gaps. In addition there are problems around a common time period of data, the consistency of the targets and data collected and that relying on this data would exclude Technium 1 and Digital@Sony as they did not receive Objective 1 funding.

Objectives	Proposed Indicators for Full Evaluation	Existing Data Source
Business Growth	Turnover/Profit	WEFO Claim Form - Increase in turnover in supported companies
	Business Value	Not Collected
	Employment (numbers and type)	WEFO Claim Form - Gross new jobs created/Gross new jobs created in high tech sectors
Knowledge Economy	IP Generated	WEFO Claim Form - No. new patents and trademarks
	Workforce Skill Levels	Not Collected
	Business to Business Collaborations	Not Collected
Higher Education Collaboration	Higher Education Collaborations	WEFO Claim Form - Collaborative projects between companies and research institutions
	Spin Out Companies	Not Collected

The pilot business survey identified that most of the data needed for full evaluation can be obtained directly from client businesses. Although business value was identified as a key performance indicator through the best practice review, unfortunately few businesses in the survey were able to provide this data. Businesses do have data on turnover and profit which could be used instead of business value to measure performance. However, this will present problems for those businesses that are at the pre-revenue stage of development.

7. Key Findings

Below we set out the key findings from Stage One of the research. This is based on consultations with Technium managers, the data that they have provided and emerging results from the pilot business survey. Whilst it should be noted that the business survey sampled only 25 businesses and so no firm conclusions can be drawn from the results, the survey has highlighted some interesting areas for further consideration.

7.1 Technium Aims

From the research undertaken to date it is clear that at the outset there was an understanding of what outcomes were being targeted, namely, growth in the knowledge economy through high value job creation and creating an environment to support knowledge businesses by creating a platform for networking, linking to HEIs and access to high quality business support. In particular the aim was to foster this knowledge economy development in locations that were not delivering knowledge economy growth via the market. In essence there was a regeneration agenda associated with the original Technium concept.

In reviewing best practice business incubation and through discussions with UKBI as part of this research there could be questions as to whether business incubation per se will deliver the outputs and outcomes sought in this case. Business incubation should be focused on developing client businesses and this should be the primary aim of the incubator manager. Entrepreneurs will be concerned with growth in profit and as such, employment is a secondary output. If developing knowledge based businesses is the primary aim, upon graduation from the incubator the Technium manager should be seeking to facilitate a move for that business to the best available location. This may not necessarily be in close proximity to the incubator. As such, there are a number of questions as to whether business incubation in its purest form is actually an appropriate tool for economic regeneration.

7.2 Rationale

A key finding from the work to-date has been that there is a lack of a clear rationale and set of objectives and targets for the whole of the Technium network.

Section 2 set out the background and rationale for the first Technium in Swansea. The review process found clear evidence of a rationale for the intervention and stated objectives. However, this evidence base was not always found when reviewing documents relating to later Techniums.

It is understood that whilst a strategy for the national roll out of the Technium concept was drafted, it was never formally adopted. This has resulted in different partners developing each Technium which has subsequently impacted on the way that the concept has been interpreted.

From a review of the Objective 1 application forms it appears that many of the Techniums assumed that the rationale for intervention in their area was the same as the rationale behind Technium 1. There is often little evidence of project appraisal or business planning to determine the need for a Technium in each area.

Section 2 identified that there were particular circumstances in place in Swansea at the time of the development of the Technium concept, including local strategic planning identifying the need to develop the knowledge economy, and existing entrepreneurship and innovation activities at local HEIs stimulating the creation of spin out businesses. In addition the Swansea Innovation Centre at Swansea University was over-subscribed but the University also wanted to wind down activity to use the building for academic activities. Much of the initial success of Technium 1 was helped by a number of clients from the Innovation Centre transferring to the Technium.

By assuming that the rationale for each Technium in the network was the same as Technium 1 meant that local circumstances were not adequately considered.

Few of the Techniums have explicit, stated objectives, and where they are available they tend to differ between Techniums. As an evaluation is to evaluate progress against objectives the differing (or lack of) objectives will make it difficult to carry out an assessment of Techniums at an aggregate network-wide level.

The issue of a lack of appraisal and clear objectives is not unique to the Technium programme and has been observed in a number of business support evaluations. It is recommended that appraisal, business plan and funding documents are all kept together so that they are readily available not only for evaluation purposes but for Technium management to review periodically to ensure activities still align to the objectives of the programme.

7.3 Technium Delivery Models and Sectoral Focus

As a result of the lack of strategic planning for the roll-out of the Technium there is a great deal of variability between the Techniums. In South West Wales, due to the close links with Swansea University who co-founded the Technium concept, the Techniums are run in broadly the same way. However, even amongst these four Techniums there are differences e.g. in their ownership and management structures.

Although there is consistency across the Technium network in the Technium brand and some of the core services (IT, telecommunications etc) the process of producing case studies for each Technium (see Appendix 1) has identified that there is a great deal of variability between Techniums. This includes: the stage of development of supported businesses (pre-start, early stage etc), target markets (sectoral specialism or generic), management (Welsh Assembly Government, University, Local Authority), rental levels, rental agreements (lease or licence), entry criteria and exit criteria.

As a result this research suggests it would be inappropriate to state that there is a Technium Programme. It is more appropriate to describe a Technium Network, or even to consider a series of similar business incubation based centres which operate under a common brand.

This research has not considered whether the range of delivery models is a strength or weakness of the network. In consultations as part of this research there have been views expressed both for and against the lack of consistency and central control. There is certainly scope for local tailoring of solutions and allowing entrepreneurial management of the Techniums, but equally there could be risks to the brand if there are variable standards of service. Understanding in greater detail the implications of the variable models in operation

could be a feature of a full evaluation or a focus for further investigation by those tasked with managing the operations of the network. This issue is clearly understood and the evaluators are aware that potential responses to this issue are being considered.

A potentially separate, but clearly linked issue is that of sectoral foci for the Techniums. The evaluators understand that the concept for sectoral foci emerged at the request of WEFO to ensure some differentiation between the Techniums being developed. Although Techniums with sectoral foci do not preclude the acceptance of clients from other sectors, there is a view that branding a Technium with a sector – e.g. Technium Sustainable Technologies, could 'put off' potential clients that do not operate within that sector from enquiring about space within the centre. Although care is taken to ensure that all applicants that meet the entry criteria are welcome in any Technium, the sectoral branding could be putting off companies from making initial enquiries. Whether the adoption of a sectoral focus is an advantage or a disadvantage could be tested.

7.4 Occupancy

Occupancy across the Technium network is currently just 46%, this does not compare well to the best practice benchmark of 85%.

We have identified above that there was a lack of an approved national strategy for the roll-out of the Technium network, as a result there was no national analysis of required capacity. Decisions on capacity were left to individual project sponsors and we have not been able to source evidence of background research to justify the amount of space provided, both in terms of total floorspace or the size of individual incubator units.

A number of the Techniums within the network have not reached full occupancy, and although it should be expected that it will take time to reach full occupancy the evidence would suggest that there are questions as to whether there is too much capacity in the network, or whether there are improvements required in generating a pipeline of client businesses.

The initial Swansea Technium was developed on the foundation of evidence of success from existing activity at the University of Swansea and SIHE and so was a natural progression. In other cases the evidence of demand does not appear to be so clear, and in many cases quoted the success of Swansea. However, the same foundations were not always in place.

7.5 Technium Services and Facilities

Technium goes beyond a managed workspace through the provision of business support and the close linkages with academia. The business survey revealed that businesses were using these services, although the take up was not always as high as one might expect given the aims of the network.

Two of the main services available exclusively to Technium clients are the advice and guidance that the Technium Manager provides and access to the Professional Service Providers. Further research will be needed to establish the extent to which these services are being taken up by clients and the value are placed on these services.

In addition to this support, key Welsh Assembly Government advisors such as the Innovation Manager and Academia for Business Manager are often located within a Technium building which gives Technium clients improved access to these advisors.

Based on the review undertaken to date it appears that many of the business support services offered to tenant businesses are also available to businesses outside a Technium through the Welsh Assembly Government's Flexible Support for Business Programme. Further work is needed in Stage 2 to test the additional value of Technium occupancy over and above the general business support landscape in Wales.

In best practice incubation there should be a clear role for the incubator manager to support the growth of client businesses. In some instances it is not immediately apparent that the Technium manager holds this role. There is also a need for further work to map the roles of the Technium managers across the networks and understand whether they are able to function in line with best practice incubation. In particular there could be a conflict with other means of 'relationship managing' businesses by the public sector.

7.6 Monitoring and Evaluation

Based on the research undertaken as part of this scoping and review stage it would appear that there may need to be further work done to ensure the target indicators for the Techniums are fully aligned with a clear set of objectives for the network. It is understood that the Technium programme has only recorded information to meet the requirements of EU monitoring. WEFO is very prescriptive about the indicators that can be used to monitor EU Funded projects due to the specific aims of the funding programmes. However, there is no reason why Technium cannot collect data that better align to the aims and objectives of the Technium for its own monitoring and evaluation requirements.

In addition there may need to be a clear requirement put upon client businesses to provide data on business performance to allow evaluation and monitoring of progress. The example of incubation in New Zealand appears to highlight best practice, where as a condition of entry the business must provide performance data whilst within the incubator, and after graduating beyond the incubator's premises.

There has been some criticism that this evaluation requires Technium clients to be surveyed. It is understood that there have been a number of studies and evaluations carried out which have often involved directly surveying Technium companies and there are some fears by Technium management that these businesses are 'over-surveyed'. In undertaking the pilot survey there was no evidence of survey fatigue and response rates were very high and there was a healthy willingness to participate.

However, to avoid the need for such regular surveying it is recommended that the Technium management consider developing a formal monitoring and evaluation strategy to help limit the demands on Technium companies. Consideration should be given to what information and would be needed for a full evaluation and this data should be collected routinely by Technium managers as a condition of being in a Technium. Researchers would be able to easily access the data they require directly from Technium management.

It should also be noted that this evaluation process has struggled to gather the information needed to carry out this study. Technium Managers should have key documents and monitoring data about their Technium available and to hand, not only to help future evaluation studies, but also so that they can review the documents periodically themselves to ensure that activities still align to the objectives of the programme

7.7 Data Availability

The study has found that most of the data required for full evaluation is available directly from Technium businesses. Businesses were unable to provide data on business value, but turnover and profit are alternative measures of business performance for which data is available. This does however, present problems for businesses that are currently at the pre-revenue stage of development. This issue highlights the importance of continuing to monitor supported businesses even after they have left the Technium. Much of the business growth may occur after graduation, by not monitoring these businesses Technium will not be fully aware of the impact it is having on businesses that it supports.

7.8 Collaborations, Networking and HEI Linkages

One of the key added value services to Technium clients is the ability to network and have access to HEIs with the aim of developing collaborations. Although the business survey has found that a substantial proportion of businesses have links to HEIs it is not immediately clear the extent to which this has been brokered through the Technium manager or has resulted from being located in a Technium. There is a need for further testing of the qualitative issues around both business to business and business to HEI collaborations which have taken place.

7.9 Regeneration Impacts

Technium buildings have been designed to provide state-of-the-art premises for Technium clients. The buildings are often a flagship design and convey a professional image for the Technium clients. The flagship design of the buildings and the associated cost premium in developing these buildings could be subject to further investigation in stage two if commissioned. This would need to consider both the costs and benefits of adopting this approach.

The value that businesses place on being located in a flagship building needs further testing as does the role of these buildings in stimulating regeneration. Technium 1 was seen to be the flagship development on the SA1 site[63] with the Operational Strategy for the Technium stating *"Technium will act as a catalyst for wider development of the Swansea Bay innovation Village"*. Since the construction of Technium 1, the Welsh Assembly Government has invested £38m in SA1, and the private sector £150m. The site is now home to a number of residential developments, businesses, restaurants and shops[64].

[63] Formerly known as the Swansea Bay Innovation Village

[64] SA1 Swansea Waterfront Website
http://www.sa1swanseawaterfront.co.uk/server.php?show=nav.8838

As a result of the success of Technium 1 and 2, the private sector, with the support of European funding, has recently built the Ethos building adjacent to Technium 2.

The regeneration effects of Technium need to be more fully tested. However, we are not aware that any of the other Techniums have had the same effects on their local area as Technium 1 in Swansea.

7.10 Incentives

There has been some criticism through the consultation process and in other research[65] that Techniums are perceived to be too focused on the property element of the provision. It is clear that the initial concept was not a property focused model. However, over time it is possible that the aims of the network in practice have become a little diluted and the need to manage the property assets effectively in the face of low occupancy has overtaken the pure business growth driven focus. Whilst the Welsh Assembly Government may be clear that Technium is a business development initiative, they need to be aware that perceptions and understanding of the programme in the wider market do not always share this clarity.

The review of the lease and licence agreements in use in the different Techniums found that the relationship between Technium and the client is very similar to that of a landlord and tenant in that Technium businesses pay rent to occupy space in the Technium buildings. This model may not be the most appropriate way of incentivising either the Technium or the client business to work towards achieving the Technium objectives.

It may be possible to develop stronger incentives in the management of the Technium network. Consultations as part of this research identified ideas at the outset of the development of the concept for more innovative activities which have not come to fruition.

With the current arrangement if the incubator has low occupancy there is no incentive to move a company on or alternatively there may be an incentive to accept a business into the Technium which does not meet the entry criteria. Nor is there any reason for the Technium to ensure that the company is performing well and accessing support where necessary, or for the client business to take up support that is available.

An alternative may be to consider an equity or royalty based payment system that incentivises effort in developing the business for both the business and the Technium management. Although this is a model which may not appeal to the private sector or appear logical from a property development based perspective, the public sector has an opportunity to take more innovative approaches. If business success determined income it would encourage acceptance of the best businesses and reduce the disincentives related to moving a company on (as income would continue to flow to the incubator). Issues related to public sector rules on State Aid and whether the public sector can take an equity stake in private businesses would need to be carefully researched before this option could go ahead. It has been indicated to the evaluators that such an approach is not possible and has been explored.

[65] Commercialisation in Wales, A Report by the Independent Task and Finish Group (2007).

8. Stage 2 – Full Evaluation

One of the key objectives for Stage One of the research was to identify an appropriate methodology for the second stage of the evaluation. A proposed methodology for Stage Two is summarised below and set out in more detail in Appendix 7. The methodology is based on the results of the research carried out for Stage One and draws on best practice evaluation guidance.

8.1 Objectives for Stage Two

The brief for this evaluation sets out broad objectives for Stage Two. These were initially set out in the introduction to this report but are repeated here for ease of reference.

1 Assess the extent to which the original stated aims and objectives of the Technium initiative are being/ have been met - considering outputs, outcomes and net impact;
2 Draw on comparisons with similar initiatives, identifying what has worked and under what particular circumstances, outlining lessons learned and options for achieving improvements;
3 Identify whether there's a 'Technium effect' on the performance of tenant and graduated businesses, and the extent to which supported businesses might be predisposed to growth;
4 Assess how successful the Technium programme has been in attracting additional resources/ leveraging investment into Wales or parts of Wales, and whether value for money is being achieved;
5 Consider the extent to which the Technium programme may have provided spillover benefits to the local / regional economy;
6 Consider the counterfactual i.e. what might have happened/ be happening had the Technium programme not existed (hence the nature of its net impact); and
7 Establish whether the diversity of supported businesses (type, age, technologies, markets) has influenced the extent and nature of any improvements in innovation performance.

As a result of Stage One research there is no cause for major revision of these broad objectives. In particular these objectives make explicit reference to the two key factors which need to be tested to ensure robust impact assessment, namely, the counterfactual and the potential predisposition to growth of Technium clients due to the nature of the intervention and the selection/entry criteria which are used.

8.2 Stage Two Evaluation Challenges

Whilst we believe that it is possible to carry out a full evaluation, Stage One of the research has identified a number of challenges and questions that need to be addressed or considered prior to the full evaluation being carried out.

8.2.1 Objectives

The most substantial challenge to tackle in developing an evaluation methodology is the lack a clear set of rationale, objectives, targets and appraisal for the network against which to

evaluate. Best practice evaluation methodology would ideally require an assessment against the original project appraisal and objectives. In order to test the net impact and provide lessons for the future there should also be consideration of other possible intervention options. No clear appraisal of alternative options has been identified for individual Techniums or for the network as a whole.

Where objectives are lacking we believe it is appropriate to assess each Technium against the original objectives for Technium 1, so that some assessment can be carried out. Many of the Techniums based their rationale on the success of Technium 1 therefore it is reasonable to assume that the underlying aims of each Technium were consistent even if the implementation method varied.

8.2.2 Commonality

A second challenge also relates to the lack of commonality across the network. It is possible to provide an aggregate assessment of impact for the Technium network based on reported outcomes from clients (current and former). However, due to the variation in offer across the Technium network, whilst this approach would provide an assessment of the return on overall investment it would not necessarily give a true picture of the individual performance of the Techniums within the network (i.e. not identify which models work and which do not). As such a series of case studies or individual Technium level assessments would be more appropriate. However, this will bring challenges to quantitative analysis in some areas, particularly where low numbers of tenants in some Techniums will create issues with disclosing data. Notwithstanding, we believe this is the most appropriate way forward and the limitations of data reporting will need to be accepted. Considering the Techniums individually will allow for identification of good practice and analysis of factors which underpin strong performance. Summing across the network will allow for an overall impact position to be stated, and will also allow for the inclusion of data from Techniums with lower levels of activity to date.

8.2.3 Operational Timescales

Consideration also needs to be given to the fact that the Techniums have been operating over different time periods. For example, Technium Pembrokeshire opened in December 2007 and so will have had less impact than Technium Swansea that has been operational for eight years. It may be that it is not appropriate to include some Techniums in the evaluation due to their infancy.

The Programme as a whole is relatively new and so there may be limited impact at this stage in the programme. In addition, our research has found that growth often occurs after a supported business has left the incubator. There is therefore a need to consider a longer term approach to monitoring and evaluation to ensure that the full impact of the programme is recorded. Evidence from New Zealand indicates a requirement for businesses to provide monitoring data for 5-years post graduation. This may therefore be a best practice approach to be considered.

8.2.4 Assessing the Counterfactual

Vital to assessing the net additional impact of the public expenditure on the Technium network is the assessment of the counterfactual. The counterfactual is concerned with how much of the impact of Technium would have happened anyway.

There are always uncertainties when considering the counterfactual as the evaluator is trying to ascertain what might have happened rather than what did happen. From a technical point of view it is therefore advantageous to use more than one measure of the counterfactual to try and get a more robust picture.

We suggest the following methods of assessing the counterfactual are considered:

1. Self Reported – businesses are asked to assess the impact of support they have received and comment on what would have happened in the absence of support. This has already been tested in the pilot survey. This approach has potential weaknesses where beneficiaries can under or over state the benefits they have received. However, it can provide useful insights into the scale of additional impact of the intervention. The survey has been designed to ensure that there are a number of survey questions investigating the counterfactual and other aspects of additionality from a number of angles. This allows some cross referencing within responses rather than relying on a single report of impact.

2. Control sample – a business survey of one or more control samples is undertaken. These samples would include businesses who have not received support from the Technium. In order to ensure that this approach was robust the profile of businesses would need to be as close to that of the profile of supported businesses. This would ensure we control for any potential pre-disposition to growth.

   Due to the selection criteria applied upon entry to the Technium network the client base is not typical of the whole business population in Wales. It is therefore not possible to compare impacts with benchmarks for average business performance. Benchmark data will therefore be used from other incubator evaluations and from a stratified counterfactual sample of non beneficiary businesses. We would suggest a control sample is stratified by:

   - Ages of business – the vast majority of businesses in the Technium network pilot survey were created from 1999/2000 onwards. We would suggest sampling a similar age profile of businesses.
   - Sector – to focus on knowledge economy sectors. This is a tricky exercise to undertake but would avoid the sampling of companies in sectors which are highly unlikely to be suitable for Technium support.
   - Geography – to consider only businesses operating in similar market conditions. We would propose to consider either the West Wales and the Valleys region or alternatively a narrower definition more closely linked to the spread of the Technium network (i.e. excluding much of the South East Wales Valleys areas).
   - Other Characteristics - to ensure that any control sample is comparable with the Technium client base we propose to include a short introductory section to the questionnaire to profile the business based on criteria determined from the

Technium client base. It is possible that fieldwork could be staggered to allow the Technium client survey (current and former clients) to be completed. This would allow for any control sample criteria to be confirmed. Potential controls would be the ambition of the business and potentially the qualifications of the business owner/manager. The pilot survey as part of this stage one research confirmed that Technium businesses entered the Technium network with medium-high growth aspirations. From DTZ's previous evaluation of business support programmes in Wales we are well aware that there are many lifestyle businesses which are not targeting growth explicitly.

An initial investigation[66] with the business database company Experian has indicated 1,845 relevant companies in West Wales and the Valleys and 1,348 when the South East Wales Valleys areas are excluded. This would provide a substantial population from which to secure a control sample when profiling for business characteristics.

Other potential sources of control group businesses could be:

- businesses that turned down an offer of space at a Technium;
- businesses that are located within a non-Technium incubator; and
- businesses that are registered as medium-high growth businesses through Business Eye or Knowledge Bank for Business (but which do not locate in an incubator)

3. IDBR Tracking – it may be possible as an alternative to a control sample to track the performance of a similar cohort of businesses through the IDBR. This option would need to be tested further to ascertain whether an appropriate cohort of businesses can be identified. If possible, this would reduce the survey burden on the general business population.

The extent to which measurement of the counterfactual is possible through a control group will depend on the quality of the data available, and whether the sample of control businesses is large enough to be statistically significant. This will need to be investigated in Stage 2 of the evaluation.

8.3 Key Questions

In undertaking this review we have identified a number of issues which the Welsh Assembly Government may want to consider in developing the Technium network:

- Should Technium be a programme, a network or a series of independent incubators?
- If it is a programme – what is the programme rationale? Is there a current consistent rationale for all the Techniums? Should Techniums that do not fit with the rationale be removed from the programme?
- Should the rationale and objectives be the same for each Technium? Or should the concept be flexible to allow Technium to adapt to local conditions and circumstances?
- If it is a programme – what needs to be done to bring the Techniums together into a programme that ensures consistency of objectives, delivery and management?

[66] Based on SIC codes 30.02, 33, 40, 72, 73, 74.14, 74.2

- Should we require consistent monitoring data across all Techniums and their tenants? Should this include requiring supported businesses to provide Technium management with key performance data – including information on business value both during their time in Technium and after graduation?
- How can Technium be structured to incentivise both the client and Technium management to enter into a partnership to grow the client business?
- How can we ensure that the Technium network maximises the opportunities for client businesses to collaborate with HEIs?

8.4 Approach

Our approach to the evaluation is briefly summarised here. Further details are presented in Appendix 7.

Inception	– Agreement of terms of reference, objectives, approach, etc for second stage of study
Background Research	– Further best practice and case study reviews – Analysis of monitoring data – Research whether a suitable control group can be identified to assess the counterfactual
Business Survey	– Survey of the full population (current and graduated businesses) – Collection of data on key indicators that align to the objectives of the Technium Programme – Collection of opinions on the counterfactual and attribution of impact
Business Case Studies	– Minimum of 20 case studies carried out with current and graduated businesses – Allow for more in depth investigation into businesses experiences of being located within a Technium
Control Group Business Survey (If a control group can be identified)	– Business survey for non-Technium businesses (of similar design to the business survey for Technium Businesses). – Control group would be stratified to be as similar as possible to the Technium businesses – Will provide an alternative measure of the counterfactual and attribution to triangulate against survey data.
Consultations	– Consultations with key individuals from the Welsh Assembly Government, Academia and Local Authorities to test particular issues arising through the study.

	– Particular focus will be on wider impacts, governance, accountability and monitoring and evaluation procedures.
Analysis	– Will set out the gross and net outputs and outcomes of the individual Techniums and also aggregated results across the network. – Each Technium and the network would be assessed against the original Technium concept (as set out for Technium 1) – Estimation of value for money indicators which can be benchmarked against other interventions. – VFM indicators will need to take account of time frames for counting business benefit and length of operation
Workshop	– Up to 5 workshops with key stakeholders including ○ Technium Beneficiaries ○ Technium Managers ○ Senior Welsh Assembly Government staff – Workshops will be used to discuss emerging findings, refine thinking and develop clear lessons for the future and recommendations for action
Reporting	– We would provide evaluation reports setting out details of the methods, results, analysis and recommendations from the Stage Two evaluation.

9. Next Steps

A number of questions have been raised through the process of carrying out Stage 1 of this project. In order to get the most out of the evaluation we need to achieve consensus on the questions raised in section 8 above and the following key points:

- We need to understand where the Welsh Assembly Government want to take the Technium network
  - Improve what is there?
  - Continue operating as it is?
  - Grow the network?
  - Shrink the Network?
- We need to understand what the Welsh Assembly Government is trying to achieve through the Technium Programme? Is incubation the most appropriate tool to achieve this? What is the rationale behind Technium?
- We need to agree whether the Techniums have had enough time to make progress, for an evaluation to be sensible. Should the evaluation exclude those Techniums that have not been open very long?

Answering these, and the questions raised above, will provide a clear framework and terms of reference for the second stage of the evaluation.

Appendix 1 – Technium Case Studies

See separate report

Appendix 2 – Policy and Strategic Context

Policy Agenda, 1998-2001

The first main policy document relating to the development of the Technium network was the **Regional Technology Plan** (RTP), published in 1998. It was designed to develop a consensus through extensive consultation on a strategy to improve the innovation and technology performance of the Welsh economy. The RTP was funded by the European Commission and the Welsh Development Agency but managed by the latter.

The RTP identified the main innovation issues for Wales and developed priority areas and actions for organisations working in partnership to implement. This included: the development of an innovation culture; profiting from global innovation and technology; and high quality business and innovation support. Of significance to the Technium network, the RTP identified a further 18 areas for action and a total of 66 projects and initiatives which could be put into action. One of the projects was associated with 'high quality business and innovation support' and aimed to establish pilot "incubator corners" to allow graduates the opportunity to establish new technology businesses.

Also in 1998, the DTI published **Our Competitive Future**, a White Paper setting out: the competitive challenge facing the UK; a new model for how public policy can help business meet the challenge; and flagship programmes to promote entrepreneurship, innovation, business learning and modern, competitive markets. In particular, the White Paper highlighted the importance of entrepreneurship in both small and large companies – to create the businesses on which the future prosperity of the UK will depend.

The next key policy document which is relevant to the Technium network is the **WDA Corporate Plan for 1999-2002**. Published in 1999, it outlined how the Welsh Development Agency would deliver its services through four Key Programmes: New Business Creation; Supporting Existing Business; Business Infrastructure; and Community Regeneration. Important initiatives developed under these programmes included:

- Embedding investors into the local business community by creating strong networks which will spin-off more new businesses
- Researching markets to identify sectors and markets capable of meeting the strategic needs of Wales particularly high-value products and services
- Developing the Wales Entrepreneurial Action Plan.

The final point outlined above saw the creation in 2000 of an **Entrepreneurial Action Plan** (EAP), which was established to boost the creation of new businesses in Wales. Six key actions were proposed in the EAP to meet the challenges of creating a greater number of sustainable start-up businesses in Wales and increasing the number of businesses in Wales that grow:

1. Change attitudes in Wales towards entrepreneurship by a continuous National Awareness Campaign
2. Embed entrepreneurship education throughout the whole educational process
3. Widen the horizons of potential and actual Welsh entrepreneurs, exposing them to new ideas within and beyond their local communities

4. Stimulate entrepreneurial behaviour and encourage participation from all part of society
5. Ensure a co-ordinated national programme of start-up support based on 'best practice' that reflects the actual types of support required by different types of businesses
6. Launch specific initiatives in the areas of funding and advice which are tailored to the explicit needs of growth orientated businesses in Wales

The policies outlined so far were focused at a UK/Welsh level. However, it is also important to recognise that a number of European-wide polices have been implemented which are relevant to the creation of the Technium network. The first of these, the **Lisbon Treaty**, was produced in 2000 and set a target for the European Union to become *"the most dynamic and competitive knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion, and respect for the environment by 2010."*

The treaty set the target of 3% annual growth and the creation of 20 million jobs by 2010. The 'Lisbon Agenda' set out the way to achieve this with a series of goals in areas such as employment, innovation, enterprise, liberalisation and the environment:

- Employment – raise employment rate to 70% of population by 2010, increase number of women and older people in work.
- Innovation – increase expenditure on R&D.
- Enterprise – countries asked to do more to support small business and reduce regulation.

Policy Agenda, 2002-2005

Following the opening of the first Technium in Swansea in 2001, the policy agenda evolved further. In 2002, the **Welsh Economic Development Strategy – A Winning Wales** was published. Two of the major focus areas were to encourage innovation and entrepreneurship. The Welsh Assembly planned to encourage innovation by boosting the number of incubator facilities across Wales for innovative businesses, in addition to increasing links between education institutes and companies in Wales.

In the same year as A Winning Wales was produced, **Wales for Innovation** was published – forming the action plan for the innovation element of the Welsh Economic Development Strategy. The plan set out five action areas to boost Welsh innovation:

1. Communicating what can be achieved through more innovation
2. Developing more high growth potential businesses
3. Better equipping people to innovate
4. Simpler, more effective, business innovation support
5. Maximising the economic development impact of our universities & colleges.

The Welsh Economic Development Strategy and resulting Action Plan both highlighted the next to develop linkages between business and education institutes across Wales. Also in 2002, the Welsh Assembly Government published **Reaching Higher – A Strategy for the Higher Education Sector in Wales**. Covering the period up to 2010, the strategy highlighted the importance of the contribution of Higher Education to the prosperity of Wales and how no European country 'can nurture the best possible prospects for its people without strong,

entrepreneurial and successful institutions of higher education playing a major role in the development of the knowledge economy.'

One of the major challenges identified by the strategy was the relationship between higher education and the private sector and how this could be developed. The commercialisation of knowledge and the spinning out of companies and patent rights using leading edge technologies was a key priority in 'A Winning Wales' and was highlighted in Reaching Higher as an area to be advanced.

Other relevant policy documents produced between 2002 and 2005 included the **DTI's Innovation Report** (published in 2003) and the European **Entrepreneurship Action Plan** (published in 2004). The DTI report outlined a vision for the UK *"to be a key knowledge hub in the global economy, with a reputation not only for outstanding scientific and technological discovery, but also to be a world leader in turning that knowledge into new and exciting products and services. In terms of business R&D and patenting we will aim to be the leading major country in Europe within ten years."*

The Entrepreneurship Action Plan was adopted in February 2004 and set out the aim for the European Union of becoming *"the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion"* by 2010. The Action Plan suggested that, to further the entrepreneurship agenda, the Commission would act in five strategic policy areas. This included encouraging more people to become entrepreneurs and gearing entrepreneurs for growth and competitiveness.

2004 also saw the publication of the **West Wales and the Valleys Objective One Programme**, **Knowledge Economy Nexus: Role of Higher Education in Wales** and the **WDA Corporate Plan for 2004-2007.** The former document included a focus on developing innovation and the knowledge based economy in West Wales, while the Knowledge Economy Nexus report highlighted the important role that universities play in a knowledge-driven economy, and the important links between university excellence and company added-value. The final document, the WDA Corporate Plan, included a focus on targeting individuals who were prospective entrepreneurs with pre start-up support.

In 2005 the WDA published its business plan for 2005-2008 – entitled **Creating Success Together.** Significantly, this highlighted the role of the Technium network in helping to drive innovation and entrepreneurship in Wales and in acting as a central focal point for public and private sector business support for knowledge based companies.

In addition to the WDA business plan for 2005-2008, in 2005 the Welsh Assembly Government published **WAVE – Wales: A Vibrant Economy**. This set out the vision of 'a vibrant Welsh economy delivering strong and sustainable economic growth by providing opportunities for all.' Moreover, it aimed to support for key drivers for growth for individual businesses and specifically highlighted the Technium network as one of the main drivers of innovation in the Welsh economy.

Policy Agenda, 2006 onwards

There are a number of policy documents which have been produced since 2006 and add further context to the strategic environment within which the Technium network has evolved. For example, in 2006 the Welsh Assembly Government published **A Science Policy for Wales**. This includes an emphasis on the role that Higher Education (HE) institutions have in delivering the science, innovation and skilled people which are important in enabling economic, social and cultural success.

Following publication of the Welsh Science Policy and following on from the Welsh Assembly Government elections in 2007, **One Wales** was produced – outlining a vision for Wales where there is a strong and enterprising economy and full employment based on quality jobs. This includes creating and developing links between education and entrepreneurship.

Further policy has been developed at a European level since 2006, with the creation of the **Competitiveness and Innovation Programme** which runs from 2007-2013. Adopted by the EU, this seven year framework programme aims to enhance competitiveness and innovation which merges several already existing measures into one comprehensive programme.

As part of the agreement of the European Council and the European Parliament on the EU budget for 2007-2013, West Wales will receive **"Convergence" funding** – the highest level of support under the next round of Structural Funds. This programme of support will be implemented through a simplified structure comprising of five priorities, including: building the knowledge based economy; improving business competitiveness; and creating an attractive business environment.

East Wales also qualifies for support under the most recent round of EU funding for 2007-2013. A programme of support will be implemented through a simplified structure comprising four main priorities, including: knowledge and innovation for growth; and business competitiveness and growth. These priorities fall under funding attributable to the **European Regional Development Fund**. In addition, East Wales qualifies for support under the **European Social Fund**, with priorities targeted towards increasing employment and improving skill levels within the workforce.

The most recent document which is relevant to the Technium work was published in 2008 by the Department for Innovation, Universities and Skills and is entitled **Innovation Nation**. This White Paper highlights the importance of innovation to the UK's future economic performance and the quality of life of its citizens. It recognises that, *"To raise productivity, foster competitive businesses, meet the challenges of globalisation and to live within our environmental and demographic limits, the UK must excel at all types of innovation."* The White Paper also highlights the need to maximise the innovative capacity of the UK's people by investing in skills as well as identifying skill gaps which inhibit innovation.

Appendix 3 – Technium Rationales

Nine further Techniums have been developed since the first facility was established in Swansea in 2001. Based on a review of the information received as part of this Stage 1 evaluation, the specific rationale (in addition to the overarching EU Structural Funds Programme and policy commitments) as stated on the Objective One application form submitted to WEFO for each of the nine subsequent Techniums can be summarised as follows:

Technium	Opening Date	Rationale
Digital	2003	No explicit rationale was stated on the application form. It was stated that the Digital Technium will form an integral part of the emerging network of Techniums across the South West Wales region. The application commented that the Technium will operate exclusively in digital technology in order to support the ongoing growth of this sector in Wales. The application form stated the original aims of the Technium 1 project and the targets that this project had been set. It commented that the Technium 1 project was likely to achieve its aims and deliverables and was fully occupied. It stated *that "Technium 1 was envisaged as the first phase of a clearly defined strategy. As part of that strategy a network of sector specific Techniums are to be developed. The Digital Technium will be one of those."* The Digital focus for the Technium came about through the demonstration of the possibilities of this sector as a result of investments in excess of £50m in the area from companies such as Pure Wafer, ICN Photonics, Agilent and International Rectifier because of the research at Swansea University.
Swansea 2	2003	The stated objective for Technium 2 was to *"help satisfy the demand that has been created by the Technium 1 project"*. The application form stated that the *"Technium 1 project is well on the way to achieving its aims and deliverables. The building is fully occupied with a healthy cross section of companies, all in the knowledge economy and satisfying the original objectives of the project. Technium 1 was envisaged as the first phase of a clearly defined strategy. It facilitated a high quality environment to assist its tenant companies in the early days of their development. Tenants are allowed a maximum of two years tenancy in Technium 1. At the end of that period, a Technium 2 was envisaged in which the expanding companies could secure a medium term location."*

Technium	Opening Date	Rationale
OpTIC	2004	The aim of OpTIC was to establish itself as a powerful engine for growth in the Welsh economy. OpTIC was stated to continuously generate new, high technology business and quality jobs and play a major role in sustaining and growing the existing Welsh Opto-electronics companies in North West Wales. The Opto-Electronics Sector was chosen as the sectoral focus for this Technium as the Welsh sector was an important player in the global market with turnover of £318m and employing 3,100 people. There was a particularly strong cluster in North West Wales which has an estimated turnover of £194m and employs 1,900 which resulted in the decision to locate OpTIC in North Wales in St Asaph. The core objectives of OpTIC were to provide a new and more efficient environment for business generation and growth and to strengthen the image and technical capability of the existing cluster. The business plan produced for OpTIC highlighted the lack of new business starts coming from ideas generated in universities. OpTIC aimed to develop and maintain the health of the sector through improving collaboration between academia and industry to encourage the creation of new enterprises.

Technium	Opening Date	Rationale
Aberystwyth	2004	No specific rationale was stated in the Objective 1 application form. Section 16b of the application form stated that the Technium will *"aim to address the lack of technical, organisational and administrative competences which limit firms' abilities to make use of new technologies which in turn is having an adverse effect on productivity and growth"* A study into the development of the Technium Aberystwyth[67] identified that Mid Wales lacks a strong unified base of commercial activity within the region and a lack of any large scale employers. In addition, there was no strong knowledge/technology based business start-up record for the area: only 6 spinout/start ups were recorded in the three years prior to the study. However, the study also identified five 'knowledge centres' (universities and research centres) and an increased focus on entrepreneurialism at Aberystwyth University. The purpose of the Technium was to encourage more high growth start up companies in the region through building on the existing knowledge centres and growth sectors and supporting more commercialisation of research activities into spin out companies. The Technium would support companies to produce innovative, high value added products and services for both internal and external markets. It was hoped that this would result in the creation and growth of high margin jobs, increased wealth and GDP and the initiation of an entrepreneurial culture and climate within rural west Wales.
Digital @Sony	2005	Digital@Sony did not receive Objective 1 funding therefore the evaluators have been unable to source documentation on the background to the project. Information gathered through consultations as part of this research indicate that the Digital@Sony Technium was developed in response to an opportunity for the Welsh Assembly Government to take-up vacant space at Sony, Bridgend and link a Technium to Sony's own research and development activity.

[67] Angle Technology (2002) Market Research & Development for Specialist Business Support and Innovation Centres. Report for the WDA Mid Wales Division

Technium	Opening Date	Rationale
CAST	2005	Technium CAST (Centre for Advanced Software Technology) was established to optimise the benefits to the North West Wales economy of the niche international computing specialism's of the University of Wales, Bangor. The project looked to develop and strengthen the existing software cluster in North West Wales, facilitate new job creation, embed a culture of ICT innovation and entrepreneurship and to improve the international business competitiveness of the region through strengthening links between industry and academia.
Sustainable Technologies	2006	No specific rationale was stated in the Sustainable Technologies application form. The application did state that the original Technium 1 in Swansea was fully occupied. It goes on to say *"Technium 1 was envisaged as the first phase of a clearly defined strategy to develop a network of Techniums and demonstrated the need for further sector specific Techniums in the region. The Sustainable Technologies Technium will help satisfy demand and will be directly linked to Technium 1 as the 'hub' of the Network".*
Pembrokeshire	2007	Pembrokeshire had high levels of business starts relative to population; however, many of these businesses were small lifestyle enterprises that had minimal impact on GDP. The Technium was Pembrokeshire's response with the aim of boosting business innovation. It was hoped that the Technium may act to increase business productivity and competitiveness and improve levels of GDP per capita in the County. The project plan supporting the objective 1 application stated that the Technium will accommodate dynamic, high growth SMEs, primarily (though not exclusively) those working in fields related to power and energy.

Technium	Opening Date	Rationale
Performance Engineering	2007	The application form stated that the Technium in Llanelli would have a focus on the automotive sector. The application form highlights that this sector is important for Wales, employing 25,000 people in 200 companies with an estimated turnover of £2bn. The aim of the Technium was to maintain and expand the level of economic activity in the sector. The application form quoted findings from a WDA commissioned appraisal of employment land and premises in Wales. Key points highlighted were: - Major weaknesses in the provision of 'quality' sites and buildings to meet the requirements of the new service (especially ICT) and financial services industries, and high tech manufacturing. - A relatively weak supply of buildings to respond to the new and traditional economy requirements and to simulate demand, especially in the disadvantaged parts of Wales. The application says that the Performance Engineering Technium will address these points and as it is part of the *"live and ongoing strategy for the roll out of the Technium philosophy"* there is "*additional ample and tangible evidence underlying the need for this project".* The application also highlighted that Technium 1 is fully let and phase 2 (Technium 2) is also likely to have high levels of take up. It also states that there is good demand for companies wishing to relocate into the vacated Technium 1 units. *"AutoTechnium will provide a much needed high quality business innovation centre in Carmarthenshire. The experiences from the Swansea development support the demand for this facility".* The focus of the Technium was broadened from Automotive to Performance Engineering at a later date. This wider focus was believed to offer a more sustainable model with Automotive being too narrow to attract sufficient demand (*source: consultation with Technium manager)*.

Appendix 4 – Technium Targets and Outputs

The tables below set out the original targets that were set for each Technium and the outputs that were achieved. The table also includes revised targets following the last re-profiling exercise. Re-profiling occurs after a project has been approved by WEFO. If the project sponsor feels that the project its unlikely to meet its targets he can apply to WEFO to raise or lower the targets for the project. The targets from the latest reprofiling approval letter have been included in the table below.

Individual Technium Activity Targets and Outputs

	Funding Period		Companies receiving advice in innovation and R&D	Collaborative projects between companies and research institutions	New Incubator	Floorspace in incubator and R&D facilities (m^2)	No. of companies receiving financial support for R&D	Projects transferring environmental technologies to the business sector	No. hectares of direct land developed	No. hectares of indirect land developed
Aberystwyth	Feb 04 – June 08	Target Feb 04	57	8	1					
		Reprofile Feb 08	75	12	1					
		Achieved June 08	57	7	1					
CAST	April 03 – June 08	Target	144	32		6,726				
		Reprofile July 07	144	32		6,726				
		Achieved Aug 08	149	32		6,726				
Digital	Aug 02 – Sept 05	Target	200	36	1	3,500		5		
		Achieved Sept 05	215	39	1	3,500				
OpTIC (Construction Bid)	Nov 02 – Dec 04	Target Aug 02			1	7,678[68]			2.02	3.64
		Reprofile July 03			1	7,678			2.02	
		Achieved June 03[69]			1	7,678			2.02	
OpTIC (Fit Out and Revenue Bid)	Feb 03 – June 08	Target Aug 02	30	20			30			
		Reprofile Dec 07	30	20						
		Achieved May 08	32	29			0			

[68] The indicator for the OpTIC Construction Bid was 'Number of m^2 of floor space made available/improved'

[69] The final audited claim form was requested from WEFO. They provided the claim form for the situation as at 30 June 2003 which stated the end of the project would be in December 2004. When queried WEFO confirmed that the June 2003 claim form was the final claim form, however this raises questions as to why a re-profiling letter was issued in July 2003.

	Funding Period		Companies receiving advice in innovation and R&D	Collaborative projects between companies and research institutions	New Incubator	Floorspace in incubator and R&D facilities (m^2)	No. of companies receiving financial support for R&D	Projects transferring environmental technologies to the business sector	No. hectares of direct land developed	No. hectares of indirect land developed
Pembrokeshire	Mar 05 – Mar 08	Target March 05	32	11		6,500		11	12	
		Reprofile April 08	32	11		6,486		11	3.5	
		Achieved Sept 08	64	2		6,508		1	3.74	
Performance Engineering	Oct 02 – Sept 05	Target	30	6	1	2,200	225	1		
		Reprofile Nov 08	15	5	1	2,200	6			
		Achieved Dec 08	24	7	1	2,200	4	0		
Sustainable Technologies	Dec 03 – Nov 08	Target Dec 03	200	35	1	3,400				
		Reprofile	126	8	1	3,400				
		Achieved Nov 08	137	10	1	3,400				
Swansea 2	Jan 02 – Mar 06	Target July 02	300	50	1	3,639		1		
		Reprofile	300	50	1	3,639		1		
		Achieved Mar 06	470	92	1	3,639		0		

Individual Technium Results Targets and Outputs

			Increase in turnover in supported companies	Gross new companies in high tech sectors	Gross jobs safeguarded	Gross new jobs	Gross new jobs in high tech sectors	No. of new patents and trademarks	No. of jobs accommodated directly	No. of gross new indirect jobs
Aberystwyth	Feb 04 – June 08	Target Feb 04	£3,300,000	11		34.5		4		
		Reprofile Feb 08	£3,300,000	11		34.5		4		
		Achieved June 08	£738,000	7		31		3		
CAST	April 03 – June 08	Target		15	50		528			
		Reprofile July 07		15	50		264			
		Achieved Aug 08		18	70		256			
Digital	Aug 02 – Sept 05	Target	£40,000,000	25	200	150	150			
		Achieved Sept 05	£5,000,000	12	46	130	113			
OpTIC (Construction Bid)	Nov 02 – Dec 04	Target Aug 02							144	
		Reprofile Dec 07							144	
		Achieved May 08							144	
OpTIC (Fit Out and Revenue Bid)	Feb 03 – June 08	Target Aug 02	£13,876,000	30	1,155	318	318	30		
		Reprofile Dec 07	£13,876,000	30	50		318	30		318
		Achieved May 08	£15,524,000	32	68		220	48		616
Pembrokeshire	Mar 05 – March 08	Target March 05	£4,500,000	9			35	5	44	
		Reprofile March 05	£4,500,000	2			35	4	44	
		Achieved Sept 09	£0	2			10.5	4	44	

			Increase in turnover in supported companies	Gross new companies in high tech sectors	Gross jobs safeguarded	Gross new jobs	Gross new jobs in high tech sectors	No. of new patents and trademarks	No. of jobs accommodated directly	No. of gross new indirect jobs
Performance Engineering	Oct 02 – Dec 08	Target	£35,000[70]	125	150		125			
		Reprofile Nov 08	£35,000	4	19		22			
		Achieved Jan 09	£220,000	3	12		26			
Sustainable Technologies	Dec 03 – Nov 08	Target Dec 03	£40,000,000	25	200	150	150			
		Reprofile	£9,860,000	14	0	20	120			
		Achieved Nov 08	£4,556,000	5	72.5	16.5	72			
Swansea 2	Jan 02 – Mar 06	Target July 02	£50,000,000	50	500		150	15		
		Reprofile	£50,000,000	50	500		150	15		
		Achieved Mar 06	0	12	130		110	24		

[70] This target was originally recorded as £35,000,000 on the original application form. On the WEFO approval letter this was recorded as £35,000.

Appendix 5 – Benchmarking and Performance Indicators

This appendix draws on evidence from a number of studies/organisations to outline the main indicators generally assessed when undertaking an evaluation of an incubator.

iDISC – infoDev Incubator Support Center

iDISC - the **i**nfo**D**ev **I**ncubator **S**upport **C**enter - is an outcome of *info*Dev's Incubator Initiative, an Initiative started in 2002 to support organizations promoting ICT-enabled innovation and entrepreneurship. It is focused on developing countries, however it has produced guidance on monitoring/evaluating incubators which is highly relevant to the developed world.

iDISC references work published by the European Commission in 2002 (Benchmarking of Business Incubators) which notes that, "the performance of business incubators should be judged primarily in terms of the results achieved, i.e. the impact they have on businesses, wider economic development and other priorities. An important lesson to be learned is that an incubator can only be assessed by obtaining information from companies. Feedback from companies is also important from a more practical point of view, i.e. client management and networking with graduates".

According to iDISC, the key issue when evaluating an incubator is the development and adoption of an incubator performance evaluation system. Such a system must be useful for the program coordinator, managing entity and supporting bodies (partners). A performance evaluation system should also consider development of each economic segment of the incubator and any regional peculiarities.

A performance evaluation system which collects and analyses quantitative and qualitative data is preferable. A system which considers only success/failure or negative/affirmative answers should be avoided.

Generally, an evaluation system includes assessment of the following four components:

- Results or outputs of companies and incubators;
- Resources used by the incubators - financial, technological, material, human;
- Organizational processes; and
- Socio-economic, political and cultural context of institutions most directly involved in the incubation process.

The basic steps to an incubator evaluation system are:

- Identify relevant incubator partners/stakeholders who want to be informed of evaluation results
- Identify and characterize major benefits expected by partners/stakeholders
- Define indicators that relate to benefits expected by partners/stakeholders
- Define indicators that relate to the needs of the incubator
- Establish and adopt indicators and their goals
- Define a clear system for collecting data for the indicators

- Prepare a six monthly report documenting results
- Seek partner/stakeholder input to identify weaknesses and discuss progress, holding meetings where possible
- Develop and implement an Improvement/Corrective Action Plan for the next period.

Technological Benefits

iDISC notes that an evaluation must be structured to provide results that objectively demonstrate whether an incubator is contributing to technological development in the region. It is important that the evaluation is consistent with the incubator's mission and objectives.

Evaluation of technological benefits must include the range of incubator functions in the network of people, ideas and objects. The evaluation can be grouped in the following categories:

- **Internal evaluation** of the competencies and products developed by incubator companies. The focus should be how incubator activities support development of innovative products and services. Indicators could include number of products generated, number of patents registered, number of books published.
- **External evaluation** of the effects of incubator companies' products and services on already established companies (industry, commerce and services). Indicators could include number of clients served, percentage cost reduction as a result of technology developed through the incubator.
- **Academic evaluation** of the results of incubator activities on creation and/or development of research groups and the number of research projects transformed into products or services. Indicators could include number and diversity of research groups, number of research projects transformed into business opportunities.
- **Integration evaluation** of the effect and interaction of incubators on universities/research centres. Indicators could include number of research projects developed as a result of incubator company demands, number of companies that utilize products generated from university research.

Evaluating incubator technological benefits can be outlined in the following steps:

- Identify interested parties in the incubator's network
- Gather information on technological developments relevant to interested parties
- Define indicators and targets with which to evaluate technological developments
- Define time periods for obtaining information relevant to the indicators and targets
- Define a system of periodically obtaining the information
- Define a process to disseminate evaluation results
- Using the results, and in cooperation with interested parties, prepare an Action Plan to correct problems, improve results and take advantage of the opportunities identified.

Indicators

- Number of products generated
- Number of patents registered
- Number of books published
- Number of clients served
- Percentage cost reduction as a result of technology developed through the incubator

- Number and diversity of research groups
- Number of research projects transformed into business opportunities
- Number of patents generated
- Number of projects with universities or research centres
- Number of research projects developed in partnership with private initiative
- Volume of royalties obtained by the incubator, university or research centre, as a result of projects supported by the incubator.

Evaluating technological benefits can provide information required to broaden university-company interaction and also serve as an efficient marketing instrument for the incubator and its partners.

Benchmarking of Business Incubators – European Commission

In 2002 the European Commission published a document looking at how to benchmark incubators. The project was undertaken for the EC by the Centre for Strategy & Evaluation Services (CSES) and the main objectives were to:

- Define 'headline' benchmarks for business incubators relating to their performance with regard to management and promotion
- Support this with 'operational' benchmarks' that define the means of achieve the 'headline' benchmarking performance
- Provide assistance to business incubators that participate in the exercise to implement operational improvements by, amongst other things, producing guidance on achieving benchmarked performance and examples of best practice.

A number of key messages were identified by the study (which included a survey of 77 business incubators in Europe) and the main findings of relevance for the Technium evaluation are outlined below:

1. ***Adopting exit criteria that ensure a turnover of client companies is desirable even if the turnover of firms makes revenue levels from rental income and other services less certain.*** Similar considerations apply to the question of exit rules. The research suggests that most incubators do, in fact, limit the length of time companies can remain as tenants (typically to around 3 to 5 years). Moreover, in many cases, companies move on to new locations because they need more space to grow. Graduated rentals rising to above market rates after a given period of time is another method that a number of incubators (24% of the sample) adopt to encourage firms to move on. At the same time, highly specialised incubators – e.g. biotechnology incubators – may have longer tenancy periods for their clients reflecting the nature of business activities.

2. ***The quality of the management team, and adoption of a business-like approach to running incubators and monitoring clients, is crucial to performance and best practices in this field are becoming standardised.*** European incubators typically have around 5 to 6 staff (half of whom are managers) with senior personnel coming from a business background. A key efficiency indicator is the ratio between staff and companies. Based on this research, the ratio would appear to be 1: 3.2 (tenants) or 1:5.0 (tenants plus other clients). New economy incubators have an even higher ratio than this.

3. ***The performance of business incubators should be judged primarily in terms of the results achieved, i.e. the impact they have on businesses, wider economic development and other priorities.*** A key message to emerge from the project is the need to judge incubator performance in terms of the long-term impacts achieved rather than short-term measures such as occupancy rates or failure rates. The report contains an assessment of incubator impacts suggesting that in terms of employment effects (a key indicator for public authorities and a proxy measure for a range of other impacts); European incubators are generating around 30,000 gross new jobs per annum. If indirect effects are taken into account – the higher spending in local economies brought about by additional direct employment and new jobs created in local supply chains – then this figure increases to around 40,000 net jobs per annum. Moreover, these results are being achieved at an average gross cost per job to public authorities of around €4,500 (€4,000 net).

4. ***In assessing the impact of incubators, there is a need to obtain feedback directly from client companies and greater priority should be given to this than has hitherto been the case.*** An important lesson to be learnt from the project is that incubator impacts can only be properly assessed by obtaining information from companies. Previous research has tended to rely on survey data from incubator managers alone. Whilst this provides good insights to the 'input' and 'process' aspects of their operations, it does not provide the basis for an in-depth understanding of 'outputs' and impacts. Feedback from companies is also important from a more practical point of view, i.e. client management and networking with 'graduates'.

5. ***Business incubators should be encouraged to benchmark themselves against best practice standards and to take the steps required to achieve them.*** The report contains a range of benchmarks relating to setting up and operating business incubators. In some cases, these can be quantified and a summary of the key benchmarks is provided at the end of this summary. However, it is important to stress that the benchmarks will not apply to every type of incubator.

6. ***Benchmarking and best practice sharing should focus on the four key incubator service areas of entrepreneur training, business support, financing and technology support. P***ractices are now more or less standardised with regard to the provision of incubator space and the challenge facing incubators is more to focus on developing first-class business support services, including a virtual dimension for firms not located in incubators.

Table I provides a summary of key averages, ranges and benchmarks that can be quantified based on the findings of the study. The values are based on an analysis of the CSES survey data and discussions with incubator managers on best practice standards. It should be stressed that given the diversity of incubator operations and objectives, the benchmarks will not apply universally. Similarly, it is not possible to quantify benchmarks for many aspects of incubator operations.

Table I: Summary of Key Incubator Performance Statistics and Suggested Benchmarks

Setting up & Operating	**Average**	**Range**	**Benchmark**
Average capital investment cost	€3.7 million	€1.5-€22m	N/A
Average operating costs	€480,000 p.a.	€50,000-€1.8m	N/A
% revenue from public subsidies	37%	0%-100%	25%
Incubator space	3,000 sq m	90 – 41,000 sq m	2,000 – 4,000 sq m
Number of incubator tenants	27 firms	1-120 firms	20-30
Incubator Functions	**Average**	**Range**	**Benchmark**
Incubator occupancy rates	85%	9%-100%	85%
Length of tenancy	35 months	6 months-no max	3 years
Number of management staff	2.3 managers	1-9 managers	2 managers min.
Ratio of incubator staff: tenants	1:14	1:2 – 11:64	1:10 – 1:20
% managers' time advising clients	39%	5%-80%	50%
Incubator Functions	**Average**	**Range**	**Benchmark**
Survival rates of tenant firms	85%	65%-100%	85%
Average growth in client turnover	20% p.a. (2001)	5%-100% p.a.	25%
Average jobs per tenant company	6.2 jobs per firm	1 to 120	N/A
New graduate jobs per incubator p.a.	41 jobs	7 to 197	N/A
Cost per job (gross)	€4,400	€124-€29,600	€4,000-€8,000

Source: European Commission, February 2002

The points below outline a number of important issues relating to the data in Table 1.

Capital investment and operating costs: It is inappropriate to set benchmarks for incubator capital investment and operating costs because these will vary widely depending on the type of incubator. For example, a biotechnology incubator requires dedicated laboratory space as well as office space, whereas an incubator providing just office to new start-ups will require less capital investment.

Proportion of revenue dependent on public subsidies: Whilst the public funding requirements of incubators will inevitably vary depending on location-specific factors such as the dynamism of the regional economy and the extent of market failure, the study assumed that incubators should try and increase the proportion of operating costs derived from their own activities (rent, advisory services, etc).

Incubator space/number of tenants: The average incubator space in the survey was 3,000 sq. m. There is a good deal of evidence to suggest that a minimum of 2,000sq m space is needed (enough to accommodate 20-30 companies) to achieve economies of scale. The study suggests a range of between 2,000 sq. m to 4,000 sq. m as a benchmark depending on the type of incubator.

Length of tenancy: A benchmark of 3 years is suggested. It should be noted that the benchmark applies to the average incubator and would not be appropriate for some specialist types of incubators, for example biotech incubators, high-tech R&D and high-tech

manufacturing because of the longer product development lead times associated with those business sectors, amongst others.

Number of Managerial Staff/Ratio of Staff: Tenants: The benchmark of at least two managers assumes an average of 20-30 tenants and allows sufficient flexibility to cover absence (training and professional development, conferences, holidays, sickness etc.) while still ensuring that tenant firms have permanent access to managerial-level advisory support at all times. Given that the real added value of incubation lies not in real estate aspects but in the quality, relevance and utility of business advisory, the ratio of incubator managers to incubator tenants should ideally not exceed 1:20.

Proportion of Management Time Advising Clients*:* The proportion of management time spent advising clients based on the survey was 39%. The study assumed that, ideally, it should be possible to 'free-up' management so that more time is spent advising tenants and less on administrative matters.

Survival rate of tenant firms: The survey revealed that the survival rate of firms reared in an incubator environment was significantly higher than the business success rate amongst the wider SME community, estimated at 30-50% (over a 5 year period). In the survey, there was a notable clustering of incubators reporting a survival rate amongst tenant firms of 80-90% and the benchmark is based on this. The survival rate of incubator tenant firms operating in more high-risk sectors such as high-tech industry may well be lower. Survival rates are one indicator of the performance of incubators, of more importance is the extent to which incubators can contribute to the accelerated development of innovative, high-growth firms and their capacity to create new jobs.

Job creation – average jobs per tenant company/new jobs per incubator: Whilst employment creation is one of the key objectives of business incubators, setting a benchmark for the number of jobs created per firm or per incubator would be inappropriate because the number of jobs created will vary greatly depending on the type of companies being incubated, the amount of tenants the incubator can accommodate and the amount of available space. The number of jobs generated by a typical tenant company will vary immensely depending on the type of industry the firm specialises in, the extent to which industry is technology-intensive as opposed to labour intensive. Similarly, the total number of graduate jobs created per incubator will vary because the total aggregate number of firms varies widely between incubators specialising in different types of industries.

Cost per Job*:* The average gross cost per job according to the incubator survey was €4,400. When set-up costs and the amortisation of capital are taken into account, the figure rises to €6,700. Rather than setting a benchmark, the study set a range, which was felt to be more appropriate given that incubators receive widely differing levels of support from the public sector/ EU depending on location-specific factors.

Incubators – Growing Up, Moving Out: A Review of the Literature

In a report published in 2001, Albert and Gaynor reviewed almost 200 bodies of work on incubators. The points below summarise the main points relating to incubator evaluations:

- In a different approach, based on feedback from incubator managers, the National Business Incubation Association 10th Anniversary Survey (1996) identified the most important measures in evaluating performance as: **number of jobs created, clients served and companies graduated.**
- Economic impact continues to be an important method of evaluation. Markley and McNamara (1996) published an analysis of the economic and fiscal impacts of some US incubation programs on their local and state economies taking into account the **economic activity generated (sales, payroll, cost of goods, taxes paid** etc.) as well as **secondary benefits in terms of jobs and income as a result of multiplier effects in the economy.**
- While studies have separately been done on the impact of incubators on the local economy or tenant firms, it is only relatively recently that attempts have been made to assess incubators based on the combined **impact on multiple stakeholders – sponsors, local economy and tenant firms.**
- Two leading works in this area, both focusing on technology incubators, are by Mian (1997) and Lalkaka and Shaffer (1998). Mian proposed a model for assessing university technology business incubators in terms of an 'integrative framework'. This framework examines **performance outcomes** (programme sustainability and growth, tenant firm's survival and growth, contributions to the sponsoring university's mission), **management policies and their effectiveness** (goals, organisational structure and governance, financing and capitalisation, operational policies, target markets) and **services** (provided by both the incubator and the host university) and their **value added**.
- Similarly, Lalkaka and Shaffer broadened measures of performance of incubation systems to encompass **'the medium-term benefits accruing to small businesses, sponsors, local community, region and nation'**. Lalkaka and Shaffer evaluate programmes based on their ability to become **financially sustainable over 5 years**, their **effectiveness** (the benefits derived and the overall satisfaction of those involved relative to the level of resources used), **their outreach potential** i.e. the replicibility of the embodied concept and the means of reaching larger numbers of enterprises and sustainability – the ability to continue achieving positive cash flows and the durability of the benefits achieved.
- Both Martin (1997) and Markley and McNamara (1994) emphasise how important it is that incubators are **evaluated against the objectives under which they were established**. Incubators with similar configurations can have different objectives and hence cannot be evaluated using the same criteria.

Critical Role and Screening Practices of European Business Incubators

In an article published in 2007, Aerts, Matthyssens and Vandenbempt analysed the European business incubator landscape and compared it to the situation in the United States. The main findings from their review of the literature are summarised below:

- There is no clear cut standard to measure incubator performance (Phan et al., 2005). Allen and McCluskey (1990) extract different measures from their literature review: tenant

employment, incubator period, tenant success rate, local retention of graduates and added value of incubator services. In their study they evaluate incubator size and occupancy rate, jobs created and firms graduated. Mian (1996) assesses university technology business incubators in the US by exploring their value-added contributions to technology-based start-ups. Mian (1997) groups incubator assessment research around four approaches in the management literature: (1) goal approach, (2) system resource approach, (3) stakeholder approach, (4) internal process approach. He introduces four dimensions in his assessment framework on the performance of university technology business incubators: (1) program growth and sustainability, (2) tenant survival and growth, (3) contributions to sponsoring university's mission and (4) community-related impacts. Also the scope and effectiveness of the facility management policies and the provision of services are assessed.

- The European Commission (2002) emphasises that survival rates are one indicator of the performance of incubators but that the extent to which incubators can contribute to the accelerated development of innovative, high-growth firms and their capacity to create new jobs are of more importance. Löfsten and Lindelöf (2002) examine the added value of science parks to tenant performance by employment growth, sales growth and profitability. Bhabra-Remedios and Cornelius (2003) urge for the incorporation of organisational theory concepts in the evaluation of incubators and propose a framework that incorporates both the actors (incubator sponsors, managers and tenants) and the earliest stages of new firm development from idea to start-up.
- Abetti (2004) bases his performance evaluation research on the elements that Molnar published and evaluates new venture creation, job creation, cost effectiveness, growth and regional unemployment. Ferguson and Olofsson (2004) analyse science park performance based on survival and growth of the tenants compared to non tenant new technology-based firms. Survival is measured as continued legal existence of the firm; growth is based on changes in employment and gross sales. Rothaermel and Thursby (2005) assess the impact of university–incubator firm knowledge flows on tenant performance, measured by revenues, total funds raised, venture capital funding obtained and whether the firm graduated, failed, or remained in the incubator.

The authors of the report also conducted a survey of incubators in Europe, which identified the following:

- The average European incubator is operated by twelve full time equivalents and covers about 7,000 sq. m – enabling the incubator to support about 220 tenants. Most incubators have a very high occupancy rate: 48% of the incubators surveyed were occupied for 90% or more; only 13% were less than 70% occupied.
- The majority of the European incubators (70%) were established between 1990 and 2000. Since 2000, there had been a sharp decline in the number of new incubators – only 7% of the present incubator population was founded after 2000, suggesting that the incubator sector was severely damaged by the weakened economic situation.
- Most of the incubators surveyed specialised in one or a limited number of sectors. The most common sector was ICT/business, with 75% of respondents operating in this sector. Other key sectors identified were the knowledge-based industries - new economy industries such as e-commerce and B2B services- (59%), R&D (52%) and the financial sector (44%).

Another key finding from the study was that the most important institutions that have given rise to European incubators are national and regional governments, with 71% of the

respondents having received support from a government body. For 62% of those surveyed, universities or other R&D organisations were fundamental in the incubator set-up process. Enterprises, banks and other private institutions supported 54% of the incubators in their start-up phase. A minority of the European incubators (merely 29%) works for profit. Nevertheless 80% of the incubators surveyed were self-sufficient.

The most important income source for the incubators in the survey came from the tenants themselves: 81% of the incubators raised its funds from the rent and the tenant service fees. Both national and regional governments covered a great deal of incubator costs: they were financially supporting 63% of the incubators at the time of the survey. One third of the incubators were sponsored by the EU or other international organisations. It was also found that universities and other R&D organisations rarely participate in incubator sponsorship (13% of the incubators), though they play a decisive role in the establishment process.

Another interesting finding was that seemingly few incubators believed fully in their tenants' potential: Less than 25% possessed tenant shares and only 17% of the incubators indicated that tenant dividends and royalties were a source of income.

New Zealand Trade and Enterprise – Incubator Support Programme

Working closely with UKBI, the Incubator Support Programme run by New Zealand Trade and Enterprise was identified as a best practice example of providing support to businesses. A telephone consultation was undertaken with the Programme manager in December 2008 and the main findings are summarised below:

- In 2000 the New Zealand Government decided that incubation was an effective tool and put money aside to build the programme. The first incubator opened in 2001 and they now have 8 facilities, focussed on high growth businesses. They have supported more in the past, but they now focus on a smaller number (who are doing better).
- The incubators are all independently owned and operated. They are generally affiliated to university institutes/economic development councils. They are also connected to the private sector. The programme provides operational support to each incubator (around 50%) and ultimate aim is to get the incubators moving towards financial sustainability.
- There are currently around 120 incubatees and a few more that are at the pre-incubatee stage. The most common length of tenancy is 2-3 years. All incubators are technology-focused. One is biotechnology-focus, and most are heavily involved in ICT.
- The incubators operate according to strict criteria for businesses. In particular, companies must be high growth. High growth is defined as:

    1. Being able to generate NZ$500,000 per annum during the incubator stage.
    2. Raising NZ$250,000 equity during their time in the incubator.
    3. Doubling FT employees.
    4. Displaying the potential to become a NZ$5 million company within 3 years of leaving.

- NZ Trade & Enterprise have learnt that a lot of the business growth happens after 5 or more years, therefore they found that the criteria listed above don't really meet the high growth model. They have therefore started to look at other characteristics of a company,

such as the governance structure, business plans for international markets and the product itself.

- One the aims of the Incubator Support Programme has been to get businesses working with universities. However, engaging with the universities has been a difficult exercise – an elements of trust needs to be built up between respective parties and businesses need to show what they can bring to the table. However, there are examples of such partnerships and the incubators are now working with researchers at the universities and there is also the opportunity to get students involved with some of the work (including internships/providing work experience).
- There have been around 150 graduates since 2001. The real impact of the programme is easier to assess through graduate companies and each incubator manager is responsible for five years after a company leaves for collecting performance data. They get around a 50% response rate and it is a contractual obligation to provide data five years after a business leaves. The data includes information on: revenue generation (domestic/export); capital raised; and job creation.
- The programme operates by having a call for funding, where the incubators bid for funding to help their operating costs (around 50%). From 2009 the funding is being done on a 3 year basis – in order to provide a more certainty to the programme.
- In terms of monitoring performance, the Incubator Support Programme manager has developed an assessment methodology, allowing him to conduct capability assessments of each incubator and then produce a weighted score out of 10 for each one. This is based on a questionnaire around a series of best practice examples and the Programme manager then sits down with each incubator manager to go through the results and this process is done annually.

Appendix 6 – Business Survey

A critical part of stage one was a survey of current businesses within each of the Techniums across Wales. The aim of the survey was to identify emerging issues which could be explored further as part of a full evaluation, in addition to assessing whether businesses were able to provide key performance indicators such as employee numbers, skill levels, turnover, profit and business value. This appendix summarises the process undertaken to carry out the survey and outlines the key issues which need to be considered in a full evaluation of the network.

Survey Process

- Contact details were obtained from each Technium manager and any missing information was completed using the website for each respective Technium. Business details for Technium OpTIC were provided directly by the Welsh Assembly Government.
- Initially, ten businesses were selected at random from across the Technium network to test a pilot of the survey. Each company was sent a letter outlining the work in more detail, in addition to a data collection sheet to complete prior to the survey.
- Two companies from the ten selected undertook the pilot survey. The length of the survey was deemed too long and was revised. 23 businesses then undertook the revised version of the survey – a copy of which is provided at the end of this appendix.

Sample Numbers

The 25 interviews outlined above were achieved through contacting 34 businesses:

	Number
Interviews	25
Gone away/closed	3
Hard to contact	3
Refused	2
Switchboard block	1
Total	**34**
Response rate	**81%**

The spread of interviews by Technium is outlined in the table below.

Technium	Number of Businesses Interviewed
Aberystwyth	3
CAST	5
Digital	4
Digital@Sony	1
OpTIC	2
Pembrokeshire	1
Performance Engineering	1
Sustainable Technologies	2
Technium 1	3
Technium 2	3
Total	**25**

Reaction to Survey Invitation

A positive finding was that the sampled contacts were happy to participate in the survey process, with many keen to help the evaluation. However, it is important to note that given the small size of many businesses, it will be necessary to allow sufficient time for a further stage of interviewing in order to achieve similar response rates as part of a full evaluation of the Technium network. In a small company there may only be one or two suitable interviewees and they can often be out on business, which results in long lead times for interview appointments. As part of any full evaluation, time will also be required to enable businesses to locate the financial information sought as part of the survey.

Questionnaire Length and Reaction

There were two questionnaires used in the pilot – the first two interviews used a longer version and the remaining 23 all used an amended/shortened version. The average questionnaire length across the first two interviews was 72 minutes. In comparison, the revised questionnaire was shorter with an average of 40 minutes. Taking this into account, the longest interview with the revised questionnaire was still over an hour (65 minutes) and the shortest was 18 minutes.

Respondent reaction to the interview length was somewhat critical, with a general feeling that there was some repetition in the questions. It is therefore recommended that further questions be removed for a full stage evaluation, if possible. However, it should be noted that a form of repetition is deliberately included to test consistency of responses.

Potential Question Deletions/Amendments

Analysis of the survey results revealed a number of questions which respondents consistently did not answer, including:

- Providing details on other sites a business is based at
- Sources of external investment
- Details on linkages with Higher Education – this is an important issue to consider in the evaluation; however the survey asked six questions on the subject. Further refinement is needed to ensure a good response rate

- Similar to the issue identified with Higher Education, linkages with Further Education need to be explored; however the number of questions may need to be reduced.
- Information on salary bands was refused by four of the respondents, although it was recognised that this would be useful information for a full evaluation where respondents are willing and able to provide it.

In general these areas of questioning may not be relevant to some businesses in which case they are skipped over in any event. Part of the questionnaire was used to test data availability. Based on the results the evaluation methodology has identified key impact criteria. This will allow for some trimming of the questionnaire. However, there will be an opposite impact where actual impact information needs to be collected. In short, there will be a need to revisit the questionnaire to shorten its length before a full survey is commissioned.

Financial Information

A number of respondents had necessarily sourced the data on company performance prior to the survey, preferring instead to answer it from memory. This was particularly the case with smaller companies, for which data on employee numbers characteristics was thought easily given from memory. This raises the possibility of cutting back the advance data collection as part of any survey for a full evaluation – helping to reduce the apparent burden on companies.

Overall Feedback

Taking into account all findings from the survey, it is clearly feasible to gather the required data for the evaluation and businesses appear willing and able to participate in the process.

Technium Evaluation – current clients

Second Pilot Questionnaire

SECTION 1 – BUSINESS BACKGROUND

1.1 **In what year did the business start operating?**

1.2 **What is it the business does?**

1.3 **Which of the following best describes the current stage of the business operation?** READ OUT AND CODE ONE ONLY

Initial business planning
Pre-revenue, for example doing R&D
Revenue generating
Something else – WRITE IN

……..
(Don't know)

1.4 **And is the establishment based at** (READ OUT TECHNIUM NAME) **….** READ OUT AND CODE ONE ONLY

The only site for the company with no other establishments elsewhere
A headquarters with other parts of the operation elsewhere
A branch or division with headquarters elsewhere in the UK
A branch or division with headquarters outside the UK
Something else – WRITE IN

……..
(Don't know)

1.5 **Can you very briefly tell me about your other sites – where are they and what do they do?** WRITE IN

(Don't know)

SECTION 2 – JOINING THE TECHNIUM

2.1 **When did you enter the** (READ OUT TECHNIUM NAME)**?**
ENTER MONTH AND YEAR IF ABLE TO RECALL, OTHERWISE JUST YEAR

2.2 **What attracted you to locate at the** (READ OUT TECHNIUM NAME)**?**
WRITE IN

2.3 **And why did you choose to locate in** (READ OUT NAME OF TOWN)?
PROMPT: **Why else?** CODE ALL MENTIONS

Always lived in area
Business already based here
Wanted to locate in the Technium
(Good) business or market opportunity
Other – WRITE IN

……

(Don't know/not sure/can't remember)

2.4 **Can you briefly tell me about the entry or selection process you went through for the** (READ OUT TECHNIUM NAME)**?** WRITE IN

2.5 **And which of the following best describes the origin of the business?**
READ OUT AND CODE ONE ONLY

A spin-out from a Higher/Further Education Institution
A spin-out from an existing company
A new business started independently
Something else – WRITE IN

……..
(Don't know)

2.6 **Was the business already up and running at this time, or did it effectively start when it entered the** (READ OUT TECHNIUM NAME)**?**
CODE ONE ONLY

Already up and running
Effectively started when joined the Technium
Something else – WRITE IN

……..

(Don't know)

2.7 **Where was it based previously?** CODE ONE ONLY AND WRITE IN DETAILS AS INDICATED

At home
In pre-incubator unit – WRITE IN
……..
In other business unit – WRITE IN
……..
Somewhere else – WRITE IN
……..
(Don't know)

ASK ALL

2.8 **Could you please tell me a bit about yourself so that we can understand the type of people that start up businesses that locate in units like** (READ OUT TECHNIUM NAME)? **What is your highest level of educational qualification?** CODE ONE ONLY

Postgraduate qualification (e.g. PhD)
Degree
A Level
GCSE/O Level or below
Something else – WRITE IN

……..
(Don't know)

2.9 **And have you ever started or managed your own business before?** NOTE CONTEXT FROM 2.5 AND WRITE IN AS NECESSARY

Yes
No
Other comment – WRITE IN

……..
(Don't know)

2.10 **Thinking back to the time the business entered the** (READ OUT TECHNIUM NAME), **what was your ultimate aim for the business?** CODE OR WRITE IN OTHER

High growth – rapid growth
Medium growth – sustainable company with a steady income
Low growth – happy as are, not to fussed about growth
Other – WRITE IN

……
(Don't know/can't remember)

SECTION 3 – COMPANY DEVELOPMENT TO DATE

3.1 **Has the business acquired any of the following intellectual property assets?** READ OUT LIST AND CODE ALL ACQUIRED

Patents
Licences
Other – WRITE IN

……
(Don't know)
(Refused)

3.2 **Has there been any external investment into the business since it was formed?**

Yes
No
(Don't know)

3.3 **Where has the investment come from?** PROMPT: **Where else?** CODE ALL MENTIONS

Family
Bank
Venture Capital
Other private investor
Flotation
Other – WRITE IN

……

(Don't know/not sure/can't remember)
(Refused)

ASK ALL

3.4 **Has the business used any of the following as a source of knowledge or information to support innovative activity?** READ OUT LIST AND CODE ALL THAT APPLY IN FIRST COLUMN

3.5 **And has the business formally collaborated with any of these organisations?** READ OUT LIST AND CODE ALL THAT APPLY IN FIRST COLUMN

	3.4 Source	3.5 Collaborated
Technium manager/staff	1	1
Other businesses based at the same Technium	2	2
Other business based in different Technium	3	3
Other business not in a Technium	4	4
Commercial laboratories/R & D enterprises	5	5
Private research institutes	6	6
Universities or other higher education institutes	7	7
Government research organisations/Public Sector	8	8
Participation in Government/EU funded programmes	9	9
Other – WRITE IN	77	77
None used	0	0
(Don't know)	88	88

ASK ALL THAT MENTION HE SECTOR AT 3.4 OR 3.5 (CODE 7).
REST, SKIP TO 3.13.

3.6 **Can you please tell me a bit more about your links with universities and other higher education institutions? Which are you linked with?** WRITE IN

ASK ALL WITH LINKS TO TWO OR MORE UNIVERSITIES/HEI.
REST, SKIP TO 3.8

3.7 **Which one of these would you say is the most important?** WRITE IN ONE BELOW

ASK 3.8 – 3.12 ABOUT LINK AT 3.6 OR MOST IMPORTANT LINK AT 3.7

3.8 **What is the link with** (READ OUT NAME OF INSTITUTION) **for – what are you doing with them?** PROMPT: **What else?** CODE ALL MENTIONS

Research and Development
Other consultancy
Management
Recruitment
Training
Other – WRITE IN
.....

(Don't know/not sure/can't remember)

(Refused)

3.9 **Is the link with formal or informal?**

Formal
Informal
(Don't know)

3.10 **And is the link long-term or short-term?**

Long-term
Short-term
(Don't know)

3.11 **And would you say the link is significant for the future of the business or not?**

Yes, significant
No, not significant
(Don't know)

3.12 **And has the manager, or other staff of the** (READ OUT TECHNIUM NAME) **been involved in making these links?**

Yes
No
(Don't know)

ASK ALL THAT DID NOT MENTION HE SECTOR AT 3.4OR 3.5 (CODE 7).

3.13 **Are there any particular reasons why you have not looked to universities or other higher education institutions for information or collaboration?** WRITE IN

ASK ALL

3.14 **Has the company established any links with Further Education Colleges?**

Yes
No
(Don't know)

3.15 **Which FE Colleges are you linked with?** WRITE IN

ASK ALL WITH LINKS TO TWO OR MORE FE COLLEGES. REST, SKIP TO 3.17.

3.16 **Which one of these would you say is the most important?** WRITE IN ONE BELOW

ASK 3.17 – 3.21ABOUT LINK AT 3.15 OR MOST IMPORTANT LINK AT 3.16

3.17 **What is the link with** (READ OUT NAME OF INSTITUTION) **for – what are you doing with them?** PROMPT: **What else?** CODE ALL MENTIONS

Research and Development
Other consultancy
Management
Recruitment
Training
Other – WRITE IN
……

(Don't know/not sure/can't remember)
(Refused)

3.18 **Is the link with formal or informal?**

Formal
Informal
(Don't know)

3.19 **And is the link long-term or short-term?**

Long-term
Short-term
(Don't know)

3.20 **And would you say the link is significant for the future of the business or not?**

Yes, significant
No, not significant
(Don't know)

3.21 **And has the manager, or other staff of the** (READ OUT TECHNIUM NAME) **been involved in making these links?**

Yes
No
(Don't know)

SECTION 4 – ROLE OF THE TECHNIUM

4.1 **What do you see as the <u>advantages or strengths</u> of being located in** (READ OUT TECHNIUM NAME)**?**

USE PROMPTS BELOW, ONLY IF NECESSARY:

Access to Expertise (HE, Private Sector, Non Exec Directors)
Access to finance, VC, Angels
Access to specialist equipment, software etc
Co-location with other businesses/networking opportunities – not just in their respective Technium, but with the other Techniums as well
Property/Facilities

4.2 **And what are the disadvantages or weaknesses?** PROBE FULLY

4.3 **How satisfied or otherwise are you with each of the following aspects of your rental agreement. Please choose one of the following four answers: very satisfied, fairly satisfied, fairly dissatisfied or very dissatisfied.** READ OUT EACH FACTOR AND CODE ONE OPINION FOR EACH

	Opinion				
	Very satisfied	Quite satisfied	Dissatisfied	Very dissatisfied	(Don't know)
Entry criteria	1	2	3	4	88
Cost	1	2	3	4	88
Flexibility	1	2	3	4	88
Suitability of premises	1	2	3	4	88
Exit criteria	1	2	3	4	88
Length of agreement	1	2	3	4	88
Other terms and conditions	1	2	3	4	88
Overall	1	2	3	4	88

PROBE REASONS FOR STRONG OPINIONS WITH EACH FACTOR CODED 1 OR 4:

ENTRY CRITERIA
COST
FLEXIBILITY
SUITABILITY OF PREMISES
EXIT CRITERIA
LENGTH OF AGREEMENT
OTHER TERMS AND CONDITIONS

4.4 **What kind of help, support or advice have you received from him/her/them?** WRITE IN AND PROBE WHETHER HELP/SUPPORT/ADVICE WAS PROACTIVE OR REACTIVE

4.5 **How satisfied or otherwise have you been with the help and advice received?** READ OUT AND CODE ONE ONLY

Very satisfied
Fairly satisfied
Fairly dissatisfied
Very dissatisfied
(Don't know)

4.6 **Why do you say that – why have you been** (READ OUT ANSWER FROM 4.5)**?** PROBE FULLY

ASK ALL

4.7 **What (other) help or advice, if any, could be provided by** (READ OUT NAME OF TECHNIUM MANAGER) **and his/her staff** (IF ANY) **that would help the business?** WRITE IN

4.8 **Have you had, or do you currently have, any help or advice on running the business provided by anyone in the Technium Professional Services panel?**

Yes
No
(Don't know)

4.9 **Who provided the help and advice?** WRITE IN

4.10 **Did** (READ OUT NAME OF TECHNIUM MANAGER) **help you find this help and advice?**

Yes
No
(Don't know)

4.11 **How satisfied or otherwise have you been with the help and advice received from** (READ OUT SOURCE AT 4.9)**?**

Very satisfied
Fairly satisfied
Fairly dissatisfied
Very dissatisfied
(Don't know)

4.12 **Why do you say that – why have you been** (READ OUT ANSWER FROM 4.11)**?** PROBE FULLY

ASK ALL

4.13 **Have you had, or do you currently have, any help or advice on running the business provided by anyone else in the public sector?**

Yes
No
(Don't know)

4.14 **Briefly, what kind of help, support or advice have you received and from whom?** WRITE IN AND PROBE:

Whether the company has a WAG relationship/account manager?
Is this the same person as the Technium manager?
Did the help/advice/support complement or conflict with advice from Technium?

4.15 **Did** (READ OUT NAME OF TECHNIUM MANAGER) **help you find this help and advice?**

Yes
No
(Don't know)

ASK ALL

4.16 **Has** (READ OUT NAME OF TECHNIUM MANAGER) **helped you find any other support and advice that we have not already discussed?**

Yes – WRITE IN BRIEF DETAILS BELOW
No
(Don't know)

ASK ALL

4.17 **I would now like you to assess the impact of being in the** (READ OUT NAME OF TECHNIUM) **in respect of a number of factors. Can you simply answer yes or no for each of the following possible impacts. To begin with, has being in the** (READ OUT NAME OF TECHNIUM) **impacted positively upon ……** READ OUT EACH AND CODE YES OR NO FOR EACH

	Yes	No	(Don't know)
your business' chance of survival?	1	2	88
the speed of growth in your business?	1	2	88
the scale of growth of the business?	1	2	88
your ability to network with other businesses?	1	2	88
your ability to access finance?	1	2	88
developing your business' management team (e.g. introductions to Business Angels or Non Exec Directors)?	1	2	88
your ability to access knowledge expertise (e.g. Universities)?	1	2	88
your ability to access other external expertise?	1	2	88

4.18 **Overall, how satisfied or otherwise have you been with** (READ OUT TECHNIUM NAME) **as a location for your business?** READ OUT AND CODE ONE ONLY

Very satisfied
Fairly satisfied
Fairly dissatisfied
Very dissatisfied
(Don't know)

4.19 **What do you think would have happened if you had <u>not</u> located your business in** (READ OUT TECHNIUM NAME)**?** READ OUT AND CODE ONE ONLY

We would not have started the business
We would have started the business, but at a later date
We would have started the business, but on a smaller scale
We would have started the business over the same timeframe, to the same scale
(Don't know)

SECTION 5 – COMPANY PERFORMANCE AND IMPACT OF TECHNIUM

5.1 **To begin with, which of the following measures of business performance do you use to assess progress of the business?** READ OUT LIST AND CODE ALL USED

Business value or assets
Turnover
Profit
Employment
Other measure – WRITE IN

……
(Don't know)
(Refused)

5.2 **And which, if any, of these measures do you provide to** (READ OUT NAME OF TECHNIUM MANAGER)?

Business value or assets
Turnover
Profit
Employment
Other measure – WRITE IN

……
(Don't know)
(Refused)

5.3 **If we progress to a second stage of this evaluation and we need to assess the impact of the Technium programme would you be able to provide information to us on your business performance using the measures you collect. This will be anonymised and aggregated so your own business performance would not be identifiable.** PROMPT IN RELATION TO PRE-CODES

Yes – able and willing
Able, but not willing
Not able
(Don't know)
(Refused)

I am now going to ask you some summary questions about the impact of the (READ OUT TECHNIUM NAME) **on your business performance to date.**

ASK ALL THAT MEASURE BUSINESS VALUE OR ASSETS AT 5.1

5.4 **Do you think the value of the business would have been worth more or less**

A **now if you had <u>not moved into</u> the** (READ OUT TECHNIUM NAME)**, or has it made no difference?** PROMPT IN RELATION TO PRE-CODES

More than 25% higher
Between 10% and 25% higher
+/- 10% - i.e. no major difference
Between 10% and 25% lower
More than 25% lower
(Don't know/too difficult to say)

ASK ALL THAT MEASURE TURNOVER AT 5.1

5.5 **Do you think you would have had any more or less turnover in the last full financial year if you had <u>not moved into</u> the** (READ OUT TECHNIUM NAME)**, or has it made no difference?** PROMPT IN RELATION TO PRE-CODES

B

More than 25% higher
Between 10% and 25% higher
+/- 10% - i.e. no major difference
Between 10% and 25% lower
More than 25% lower
(Don't know/too difficult to say)

ASK ALL THAT MEASURE PROFIT AT 5.1

5.6 **Do you think you would have made any more or less profit in your last full financial year if you had <u>not moved into</u> the** (READ OUT TECHNIUM NAME)**, or has it made no difference?** PROMPT IN RELATION TO PRE-CODES

C

More than 25% higher
Between 10% and 25% higher
+/- 10% - i.e. no major difference
Between 10% and 25% lower
More than 25% lower
(Don't know/too difficult to say)

I would like to ask some more detailed information about the number of people you employ. All responses you give will be anonymised and aggregated.

5.7 **Including yourself, how many employees were there when you moved into the** (READ OUT TECHNIUM NAME)**? Please include yourself, all full time and part time employees, including partners and directors. Please also include those on temporary and fixed term contracts that have lasted for more than a year.**

D

WRITE IN ABSOLUTE FIGURE – PROMPT FOR APPROXIMATION IF NECESSARY

Full-time (30+ hours)	
Part-time (less than 30 hours a week)	
Total	

(Don't know/can't remember/refused)

5.8 **And how many employees are there <u>currently</u>?** WRITE IN ABSOLUTE
E FIGURE – PROMPT FOR APPROXIMATION IF NECESSARY

Full-time (30+ hours)	
Part-time (less than 30 hours a week)	
Total	

(Don't know/can't remember/refused)

5.9 **And do you think you would have had any more or less employees now if you had <u>not moved into</u> the** (READ OUT TECHNIUM NAME)**, or has it made no difference?** PROMPT IN RELATION TO PRE-CODES

F

More than 25% higher
Between 10% and 25% higher
+/- 10% - i.e. no major difference
Between 10% and 25% lower
More than 25% lower
(Don't know/too difficult to say)

REFER BACK TO 2.6 – IF BUSINESS ALREADY RUNNING THEN ASK 5.10.

OTHERWISE, SKIP TO 5.12

5.10 **And do you think that locating in the** (READ OUT TECHNIUM NAME) **has enabled jobs to be safeguarded?**

Yes
No
(Don't know)

5.11 **Are you able to estimate how many jobs have been safeguarded?**

WRITE IN NUMBER OR ANY OTHER RELEVANT COMMENT

ASK ALL

5.12 **How does the current number of employees divide between those from white and non-white ethnic backgrounds?**

G WRITE IN SPLIT

White	
Mixed	
Asian or Asian British	
Black or Black British	
Chinese or other ethnic group	
Prefer not to say	
Unknown	
Total = 5.7	

5.10 **How does your current workforce breakdown by gender?** WRITE IN SPLIT

H

Male	
Female	
Prefer not to say	
Total = 5.7	

5.11 **How many of your staff are registered disabled?**

J

Registered disabled	
Not registered disabled	
Prefer not to say	
Total = 5.7	

5.12 K **How does the total divide between those with varying qualifications in terms of the highest qualification achieved?**
WRITE IN SPLIT WHEN JOINED TECHNIUM AND CURRENTLY

	At entry	Current
Degree/HND/HNC or higher (Level 4+)		
A levels/Modern Apprenticeship (Level3)		
GCSE/NVQ2 or below (Level 2 & below)		
Total = 5.7		

5.13 L **And what are your current salary costs across the business? Please include all aspects, so salary, National Insurance, pension contributions and so on. You can give me a weekly, monthly or annual figure, whichever is easiest.**

WRITE IN AMOUNT → £ ……

OR CODE BAND:
Nothing
£1 - £2499
£2500 - £4999
£5000 - £9999
£10000 - £24999
£25000 - £49999
£50000 - £74999
£75000 - £99999
£100000 - £149999
£150000 - £199999
£200000 - £299000
£300000 - £399000
£400000 - £499999
£500000 or over
(Don't know/can't remember/refused)

IF FIGURE OR BAND GIVEN → CODE PERIOD:

Week
Month
Year
Other period – WRITE IN

……

5.14**Please can you profile your current workforce against the following <u>annual</u> pay scales?** WRITE IN NUMBER IN EACH BAND

M

Full Time/£		**Part Time/£**	
Less Than 12,708		Less than 2,906	
→15,064		→4,608	
→17,020		→5,696	
→19,258		→6,938	
→21,831		→8,098	
→25,278		→9,367	
→28,752		→10,918	
→33,687		→13,494	
→41,262		→17,704	
More than 41,262		More than 17,704	

SECTION 6 – FUTURE DEVELOPMENT OF BUSINESS

In this final section of the questionnaire I would like to look ahead to consider how the business will develop over the <u>next two to three years</u> ….

6.1 **What are your major objectives/aspirations for the business over this period?** PROBE FULLY AND WRITE IN

6.2 **And are you getting the appropriate support through the** (READ OUT TECHNIUM NAME) **to achieve this?** PROBE FULLY

6.3 **When do you expect to leave the Technium and move elsewhere?**

Within the next years
Within the next 1 to 2 years
Within the next 2 to 3 years
In more than 3 year's time
Other comment – WRITE IN

……

Not planning on leaving/want to stay as long as we can
(No real objectives/play it as we go/see what happens)
(Don't know)

SECTION 7 – CLOSING DETAILS

That's all the questions I have got – can I just finish by thanking you on behalf of the Welsh Assembly Government for the time you have taken to help with this survey.

7.1 **Is there anything else you want to add about the** (READ OUT TECHNIUM NAME) **that we haven't covered in the interview?** PROBE FULLY

7.2 **We may want to contact some of the businesses we have interviewed to ask them a few more detailed questions, perhaps as a case study or to collect more detailed impact information as part of the second stage of the evaluation – either by phone or in person. Would you be willing to help us again?** CODE PREFERENCE

Yes – prefer phone
Yes – prefer face to face
Yes – no preference
No, would rather not

Could I just re-iterate all the answers you have provided in this interview will be treated in the strictest confidence. No one at the Welsh Assembly Government or the (READ OUT TECHNIUM NAME) **will <u>ever</u> see your questionnaire, nor will any of your replies be identifiable in any of the reports of the study.**

CLOSE INTERVIEW**: So, can I just again thank you for your time.**

FINISH TIME OF INTERVIEW → …….. LENGTH → …… mins

INTERVIEWER DECLARATION:

I declare that this interview has been conducted in accordance with the Instructions and with someone unknown to me.

Name : …….. Date: ……

Appendix 7 - Evaluation Approach

Below we provide an overview of the proposed evaluation approach.

Inception

If commissioned there will be a need for an inception stage to build on this proposed methodology. Through the inception stage we will agree the terms of reference, objectives, methodology and fees for the Stage Two work. This will be documented in a Project Initiation Document which will become the key project management document for the work. This would need to be agreed and signed off by both you (the client) and DTZ (the evaluator).

Background Research

The requirement for background research is relatively light given the use of a two stage process. However, there will need to be some provision for undertaking further best practice case study work and potentially to gather and analyse additional monitoring information.

Impact Assessment

In order to provide a full impact evaluation there is a need to focus on outputs and outcomes. To date the stage one research has involved testing appropriate indicators and data availability with regard to this. In order to test value for money, which can be sub divided into the three components of economy, efficiency and effectiveness, we will need to undertake more detailed research which will be the subject of the Stage Two evaluation.

Figure II sets out the overarching evaluation approach when considering impact.

Figure II Evaluation Approach

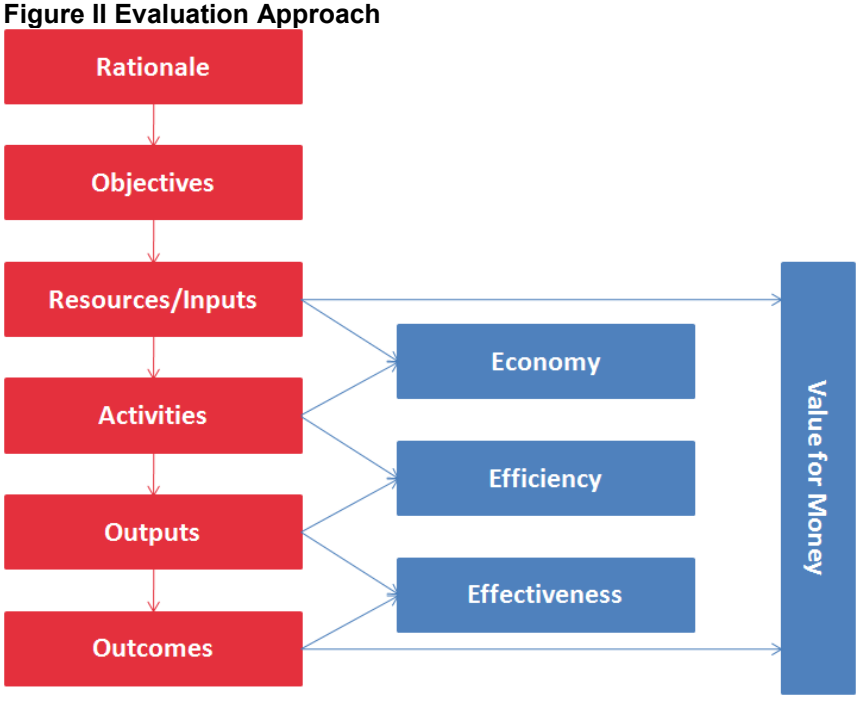
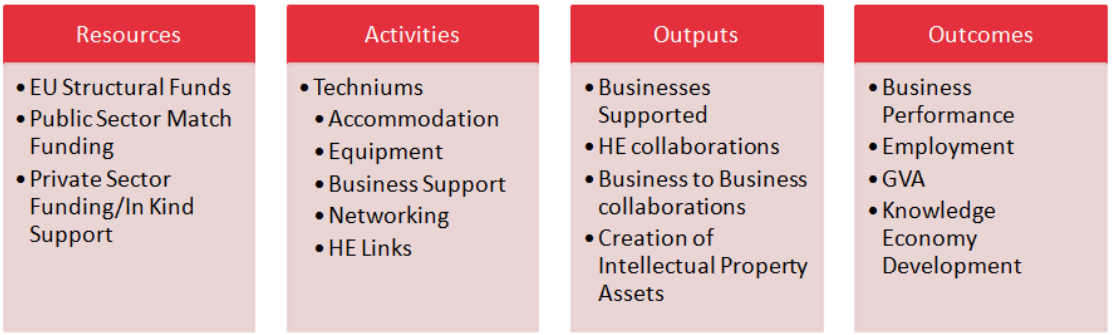


Figure III sets out further details on the resources, activities, outputs and outcomes boxes based on the research undertaken to date.

Figure III



Value for money can be assessed in three ways: economy, efficiency and effectiveness. We set out below how we will look to measure these three effects.

Economy

We do not propose to undertake a detailed financial audit of the Technium network expenditure to date. We understand that internal audit reports have already been undertaken. However we will seek opinions through consultations and the impact assessment work on some key evaluation questions which relate to the economy of service delivery. These questions would include:

- Were the Techniums delivered at competitive cost?
- Was private sector finance maximised in delivering the Techniums, thus reducing the burden on public funds?[71]
- Is ongoing service delivery competitively costed?
- What would have been the implications of delivering lower cost solutions (e.g. lower specification buildings)?

Efficiency

Testing efficiency will be largely qualitative and will involve consultations with those closely involved in the Technium operations, case studies and surveys of beneficiaries and comparison against benchmarks and best practice. This will allow an assessment of whether the operational models adopted are successful in delivering the outputs they are targeting.

[71] This will be difficult to test. But as many Techniums had to reprofile funding due to a failure to secure private investment there is value in testing the reasons why this was the case.

Effectiveness

Whether the Techniums deliver positive outcomes in terms of economic growth is the ultimate test of success and value for money. The key evaluation questions will therefore be:

- Have the Techniums delivered net positive outcomes in the economy in terms of business performance, GVA and jobs?
- Has the knowledge economy developed in the areas where the Techniums are located?
- Have there been spillover impacts such as on physical regeneration, enterprise culture and HE/Business interaction?

Value for Money

The ultimate test of programme performance is a comparison of the monetised value of inputs against the quantitative and qualitative measures of final outcomes. Common measures include:

- cost per job created; and
- net increase in Welsh GVA as a ratio of programme cost.

Additionality

It is vital that we are able to measure the net additional impact of the Technium network and not just the gross impact. Our approach is based on the additionality logic chain as set out in DTI guidance published in 2006[72]. Allowance will need to be made for deadweight (the reference case, what would have occurred in any event), leakage, displacement, substitution effects and multipliers. We have also considered the need to take account of other unintended impacts, spillovers and potential crowding out/crowding in effects.

The following sub-section sets out specific details on assessing the counterfactual as part of identifying deadweight. Brief summaries of the other factors are included here:

Leakage - We will need to understand how much of the benefit leaks out of the target area. At the point of delivering to beneficiaries this is likely to be minimal. However, there are potential areas of leakage such as:

- Employees travelling from outside Wales (this is unlikely to be a major issue due to the locations of many of the Techniums away from the Welsh border).
- Graduating businesses relocating outside Wales (this could be a factor when considering the longer term impacts of Technium support).
- Profits of firms with HQs outside Wales being repatriated to the parent company (there are examples of such businesses in the network).

We will need to agree with you whether the impact assessment measures impact at the Wales level or below. As substantial funding has been provided through Objective One it may be

[72] Evaluating the impact of England's Regional Development Agencies: Developing a Methodology and Evaluation Framework, DTI Occasional Paper No. 2, February 2006.

worthwhile testing impact at the West Wales and the Valleys area level as well as the all Wales level.

Displacement – we will need to make an assessment of how much of the economic benefit has been displaced. For example, we will be considering whether increased sales for a business supported at one of the Techniums has displaced sales from other businesses in the region. We will need to test this with questions about locations of competitors in the business survey. A further area which will need to be considered is the extent to which a business locating in a Technium has been displaced from another similar scheme. This is partly deadweight and partly displacement. One prime example which will need to be investigated is the Digital@Sony which is immediately adjacent to a private run 'new business centre' operated by Sony.

Substitution – when a firm substitutes one activity for another. We do not believe that in the case of the Technium intervention that substitution will be a major issue. However, we will explore the potential switching of activity with beneficiaries through the business survey and case studies.

Multiplier Effect – the multiplier effect accounts for the indirect and induced economic benefits arising from the direct activities of Techniums and their clients. Multiplier effects can be due to supply chain linkages or the effect of increased income in the target group. We will test for the strength of local and regional supply chain effects through the business survey. We will use this to guide our assumptions on appropriate multipliers in this instance.

Crowding Out/In – the tendency for outputs to be entirely offset because of macroeconomic adjustments. Best practice guidance suggests that crowding out and crowding in effects are not considered for interventions of this scale which affect a relatively small proportion of the national population.

Spillovers – a number of potential spillover effects have been highlighted through this scoping stage and these will be tested through the consultation and case study work proposed. These include the impacts of the Techniums on:

- Physical/ area regeneration
- Enterprise culture
- R&D and innovation activity
- Improvement in HEI ability to work with business
- Business networking

Counterfactual

Vital to assessing the net additional impact of the public expenditure on the Technium network is the assessment of the counterfactual. Best practice guidance indicates that this could take the form of assessing both what would happen with no intervention at all and alternative intervention options. As no options appraisal was carried out for the Technium network prior to its development there is no ready list of alternative intervention options to consider. We would need to discuss with you whether alternative intervention options need to be tested in this case. One option which we may want to consider would be the potentially different outcomes if lower specification buildings had been developed.

There are always uncertainties when considering the counterfactual as the evaluator is trying to ascertain what might have happened rather than what did happen. From a technical point of view it is therefore advantageous to use more than one measure of the counterfactual to try and get a more robust picture.

We suggest the following methods of assessing the counterfactual are considered:

1. Self Reported – businesses are asked to assess the impact of support they have received and comment on what would have happened in the absence of support. This has already been tested in the pilot survey. This approach has potential weaknesses where beneficiaries can under or over state the benefits they have received. However, it can provide useful insights into the scale of additional impact of the intervention. The survey has been designed to ensure that there are a number of survey questions investigating the counterfactual and other aspects of additionality from a number of angles. This allows some cross referencing within responses rather than relying on a single report of impact.

2. Control sample – a business survey of one or more control samples is undertaken. These samples would include businesses who have not received support from the Technium. In order to ensure that this approach was robust the profile of businesses would need to be as close to that of the profile of supported businesses. This would ensure we control for any potential pre-disposition to growth.

   Due to the selection criteria applied upon entry to the Technium network the client base is not typical of the whole business population in Wales. It is therefore not possible to compare impacts with benchmarks for average business performance. Benchmark data will therefore be used from other incubator evaluations and from a stratified counterfactual sample of non beneficiary businesses. We would suggest a control sample is stratified by:

   - Ages of business – the vast majority of businesses in the Technium network pilot survey were created from 1999/2000 onwards. We would suggest sampling a similar age profile of businesses.
   - Sector – to focus on knowledge economy sectors. This is a tricky exercise to undertake but would avoid the sampling of companies in sectors which are highly unlikely to be suitable for Technium support.
   - Geography – to consider only businesses operating in similar market conditions. We would propose to consider either the West Wales and the Valleys region or alternatively a narrower definition more closely linked to the spread of the Technium network (i.e. excluding much of the South East Wales Valleys areas).
   - Other Characteristics - to ensure that any control sample is comparable with the Technium client base we propose to include a short introductory section to the questionnaire to profile the business based on criteria determined from the Technium client base. It is possible that fieldwork could be staggered to allow the Technium client survey (current and former clients) to be completed. This would allow for any control sample criteria to be confirmed. Potential controls would be the ambition of the business and potentially the qualifications of the business owner/manager. The pilot survey as part of this stage one research confirmed that Technium businesses entered the Technium network with

medium-high growth aspirations. From DTZ's previous evaluation of business support programmes in Wales we are well aware that there are many lifestyle businesses which are not targeting growth explicitly.

An initial investigation[73] with the business database company Experian has indicated 1,845 relevant companies in West Wales and the Valleys and 1,348 when the South East Wales Valleys areas are excluded. This would provide a substantial population from which to secure a control sample when profiling for business characteristics.

3. IDBR Tracking – it may be possible as an alternative to a control sample to track the performance of a similar cohort of businesses through the IDBR. This option would need to be tested further to ascertain whether an appropriate cohort of businesses can be identified. However, if possible this would reduce the survey burden on the general business population.

Data Collection

Business Survey

The above discussion has highlighted that there are a number of issues with regard to robustly measuring the impact of the Technium Programme. In order to ensure the results are as robust as possible we propose using a combination of data collection methods.
We have already piloted a survey of current Technium tenants. This has tested data availability and has also gathered data which will contribute to the full impact assessment. We propose to extend this survey to cover all current tenants and all previous tenants (around 150 companies) for which contact details are available.

The beneficiary survey will test a range of impact indicators which align with the outputs and activities shown in Figure III. Unfortunately the evidence gathered through the pilot survey suggests that business value is not an indicator for which adequate data is available. This would have helped to overcome some of the problems that result from early stage technology businesses which have developed IP but are not yet generating substantial turnover.

We therefore suggest the following key indicators are used:
- Turnover
- Profits
- Wages
- GVA (based on profit and wage data)
- Employment (including equal opportunities data)
- Qualifications and Earnings of Workers (as indicator of knowledge economy)
- Business to business collaborations
- Business to higher education/Research institute collaborations
- IP developed (Patents, Licenses and Trademarks)

The business survey will also collect data on the counterfactual. Businesses will be asked to self report their views on their business performance had they not had the support of Technium. Whilst this approach has its flaws in that businesses may over or understate the

[73] Based on SIC codes 30.02, 33, 40, 72, 73, 74.14, 74.2

impact of the Technium on their business, the survey has been designed to ensure that the counterfactual is explored through a number of survey questions. This will allow some cross referencing within responses to check for consistency in the results rather than relying on a single report of impact.

In addition the counterfactual results from the survey will also be cross-referenced with survey results from a control group.

A specific objective related to assessment of the impact across disadvantaged and ethnic groups. We have tested the availability of such data in terms of employment and this has been made available. This would therefore feature in the full survey as an indicator of the level of impact on these groups.

The survey will also gather further information on a range of qualitative factors. The pilot survey has already tested data collection on issues relating to the services received in the Technium.

One area of impact which will be difficult to test is that of business survival rates. Although we can use monitoring data to assess business failure rates within the Technium network, it will be almost impossible to provide comparable data outside the network. Due to the selection criteria the general business failure rate is unlikely to be appropriate. It may be possible to use benchmark data from other incubators, however, due to differing economic conditions in different locations and in different time periods there are limitations to using this data.

Business Case Studies

In order to explore the outputs and outcomes of the Technium programme in more detail, the survey will be supplemented with qualitative interviews/case studies with a sample of beneficiary businesses (both current Technium clients and graduates). We propose to carry out a minimum of 20 case studies to provide additional detail on experiences. These would not be statistically robust and must be understood as so. However, the case studies would allow some further testing of additionality factors to appreciate the extent and value of support received. The case studies would also allow for deeper investigation of the experiences of businesses in different Techniums.

Consultations

As part of Stage One a series of consultations were undertaken to understand the background to the Technium network. Further consultations would be required to test particular issues (such as those highlighted in section 7 of this report). Consultations would also allow for explicit testing of spillover effects. Consultees would therefore need to be selected from the following areas:

- Property Development and Regeneration
- Higher Education/Research Institutes
- Local Economic Development Officers
- Technium Managers
- Other Welsh Assembly Government personnel

The consultation process, particularly with Technium managers would also allow for further investigation of operational and governance issues. These would enable supplementation of the case studies attached at Appendix 1 to this report.

Analysis

Results will be presented at the individual Technium level (where data disclosure allows) and also at an aggregate level across the Technium Programme. Individual Technium's will be evaluated against the original concept of Technium and what it was looking to achieve.

We will bring together the results to provide an impact assessment which will set out the gross and net outputs and outcomes of the Technium network. This will provide data at the individual Technium level where possible. Based on the analysis we will provide value for money indicators which can be benchmarked against other interventions and comparable incubators. However, this will need to be done appropriately, particularly for example where cost-per-job indicators are used. It is vital that the value of employment is reflected.

Value for money indicators also need to take careful consideration over the appropriate timeframes for counting business benefit and for length of operation. A substantial proportion of costs incurred to date are capital costs and can reasonably be expected to deliver returns over a long time scale. It is not therefore appropriate for example, to calculate cost per output delivered over a two or three year time horizon. Also, where business benefits from incubation are felt in the years after graduating from the incubator this needs to be accounted for. There is no clearly defined method to address this, although the evidence from New Zealand indicates a requirement for businesses to provide monitoring data for 5-years post graduation. This may therefore be a benchmark level to adopt.

Workshops

A key feature of any successful evaluation is using the findings to inform development and to learn lessons. Much of the role of dissemination of results will fall to the client group rather than the evaluators. However, we propose a series of workshops to discuss emerging findings, refine thinking and develop clear lessons for the future and recommendations for action.

We would propose holding workshops with:

- Technium beneficiaries
- Technium managers
- Senior Welsh Assembly Government staff

In particular, holding meetings in the Technium buildings to engage with current clients will be helpful to uncover potential issues which may not arise through individual survey and case study work.

Reporting

We would provide evaluation reports setting out details of the methods, results, analysis and recommendations from the Stage Two evaluation.

Appendix 8 - Individuals Consulted for Stage One

The following people have been directly consulted as part of Stage One. The following key notes the highest form of consultation undertaken:

☺ face to face
✆ telephone
email

Virginia Chambers	☺	Director, Technology and Innovation, Welsh Assembly Government
Prof. Marc Clement	☺	Vice Chancellor, University of Wales
Ian Courtenay	☺	TM Communications and Media
Steve Davies	☺	Technium Programme Director
Mike Day		Commercial Manager, Institute of Innovation (Institute of Life Science/Technium Digital)
Louisa Huxtable	✆	Former Manager, Technium Sustainable Technologies
Wayne James	☺	Manager, Technium Swansea
Eleri Jones	☺	Technium Project Co-ordinator and Interim Manager, Technium Sustainable Technologies
Eleanor Marks	☺	Regional Director, South East Wales, WAG DE&T
Chris Munday	☺	Head of Funding Solutions, WAG DE&T
Jon Parker	☺	Manager, Technium Aberystwyth
Andrew Phelps	✆	Manager, Technium Performance Engineering
Sue Price	☺	Welsh European Funding Office, WAG
Dave Rimmer		Manager, Technium OpTIC
Carl Shipton		Manager, Technium CAST
David Thomas		Manager, Technium Pembrokeshire
Caroline Thompson		Business Services Manager, Technium CAST
Brian Thorne	☺	Senior Innovation Manager, Welsh Assembly Government
David Warrender	☺	Director, Technology, Innovation & Relationship Management, WAG DE&T
Gary Williams	☺	Manager, Technium Digital@Sony

The evaluators met briefly with the WAG DE&T Senior Management Team including Gareth Hall (Director, Economy & Transport), Tracey Burke (Director, Policy & Strategy) and Sharron Linnard (Director, Operations).

The steering group for this project have also been actively involved in directing the research. The steering group consisted of:

Gareth Edwards, Economic Advice Division, WAG
Ed Sherriff, Economic Advice Division, WAG
Huw Owen, DE&T, WAG

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