

# Capacity building for ecodesign in Wales – an innovation systems approach?

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## **Abstract**

Policies for sustainable development (SD) are generally formulated at a supra-national and national level but they are delivered at a regional level. The Welsh Assembly Government (WAG) has a statutory obligation to promote SD in the exercise of its functions. This obligation is evident in key strategy documents and action plans for economic development, environmental protection and innovation (WAG 2002, 2003, 2005, 2006). Sustainable consumption and production (SCP) has been identified by the Assembly Government (in partnership with the administrations of Scotland, Northern Ireland and Westminster) as a key approach to increasing resource efficiency and as a contributor to economic growth (DEFRA 2005). Innovation is central to the SCP agenda but aligning the competing policy rationales of environmental protection and economic growth is a key challenge. This challenge is mirrored in the EU Environmental Technology Action Plan (ETAP) which seeks to contribute to growth and competitiveness through eco-innovation<sup>1</sup>.

For regions such as Wales, SCP is a cumbersome and poorly defined policy agenda and to date most activity has focussed on end-of-pipe interventions and incremental process changes. Wales has numerous mechanisms for stimulating innovation and fast-growing company incubation (such as centres of excellence) and

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<sup>1</sup> This principle also relates to and builds on the Lisbon agenda, Cardiff Process, Gothenburg process and Integrated Product Policy.

an extensive network of business support with a high degree of regional penetration. There are opportunities within this institutional framework to stimulate high-risk and high-benefit (social and environmental) innovations. If Wales is to take the “lead-markets approach” to sustainable innovation they will need to develop design-led mechanisms for SCP. The provision of design support to small to medium enterprises (SMEs) as a strategic business tool for SCP has yet to be explored in full in Wales. While sustainable innovation systems or “lead-market approaches” to eco-innovation would be desirable long-term objectives, Wales must first build capacity for effective ecodesign support in SMEs<sup>2</sup>.

Capacity building is an iterative process in which a framework of interventions can be made. Often strategies for capacity building are focussed on company level mechanisms and linear models of innovation such as knowledge transfer and method demonstration. SMEs, and more acutely micro-SMEs, present a challenge in terms of delivering effective interventions for SCP. The reasons for this, such as idiosyncrasies of managerial practices, operational capabilities and financial resources, are well documented. Moreover, the gaps in data related to sectoral environmental impacts of SMEs makes policy resource allocation difficult. Internationally there have been numerous public sector interventions seeking to stimulate ecodesign in SMEs yet, while there are many individual successes, ecodesign or mechanisms for SCP in these businesses remains low.

There is an increasing academic interest in the application of systems of innovation theory as a bridging mechanism between the competing rationales of innovation policy and environmental policy (Anderson 2006, Foxon 2006, Rennings et al 2004). Much of the discussion rests on broad definitions of transition management of socio-technical regimes and mechanisms for radical sustainable innovation (Foxon et al 2004, Weber et al 2006, Geels 2006). Again, in the regional context this approach appears cumbersome for policy makers although useful for informing long-term objectives. Den Hertog emphasised the need to translate these complex and academic perspectives into useful approaches for policy development (den Hertog et al 2003). This assertion opens up opportunity for academic perspectives in innovation systems (IS) and sustainability to inform policy options for enabling ecodesign thinking and practice in SMEs as a mechanism for SCP.

This paper discusses public sector intervention and capacity building for ecodesign in SMEs. It presents some insights to why, following many public sector interventions, there is a lack of long-term and sustainable application of ecodesign by

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<sup>2</sup> Short-term capacity building activities should be oriented towards long-term targets.

SMEs. Drawing on IS theory, the paper proposes a number of policy actions towards effective capacity building for ecodesign in the regional context.

## 1 Introduction

At the 2002 Johannesburg summit, governments committed themselves to promoting systems of SCP. It was generally accepted that resource efficiency, economic development and social justice were requisite for SCP. The Welsh Assembly Government (in partnership with the administrations of Scotland, Northern Ireland and Westminster) also made this commitment to SCP. From a regional perspective the SCP policy agenda is cumbersome and poorly defined and to date most activity in Wales has focussed on end-of-pipe interventions and incremental process changes.

The role of innovation (product, process, institutional and system) is becoming increasingly important in the SCP debate. The development of coherent policy frameworks for innovation and SCP is often hindered by competing policy rationales, short-termism in resource allocation and fragmentation and segmentation of policy domains (OECD 2005). For example, policy strategies for innovation often contradict and discount strategies for the environment. Only recent policy developments such as the ETAP are beginning to place broader concepts of innovation within the environmental policy domain.

Much of the discussion and debate on innovation in the SCP context focuses on the role of radical and systems innovation, such as innovation in energy or mobility systems. While much of this debate is essential, the cumulative impact of incremental innovations on long term economic development and social change can be equal to or greater than radical innovations (Lundvall 1992).

Because of this the authors are focussing on the rationale for public sector interventions supporting ecodesign activities in SMEs. We believe that supporting ecodesign thinking and practice is an essential element of any strategy for SCP. A key element for discussion in this paper is whether or not a rationale for public sector intervention to support ecodesign in SMEs still exists and why there is still a low level of ecodesign activity in SMEs following numerous interventions. The Regional Innovation System (RIS)<sup>3</sup> framework will be used to examine these interventions and provide insights into possible future capacity building activities. It is important to note

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<sup>3</sup> There are different characteristics of Innovation Systems i.e. national, regional and spatial. Because this paper is oriented towards the case of Wales, the focus is on regional innovation systems.

for clarity that we see ecodesign being inextricably linked to the discussion on innovation.

## **2 Ecodesign and the SCP agenda**

Ecodesign has a key role to play in the SCP agenda. For the purpose of clarity, we define ecodesign as a strategic design management process that is concerned with minimising full life-cycle impacts of products and services (e.g. energy, materials, distribution, packaging and end-of-life treatment). In terms of mitigation or intervention, the further you move through the product life cycle the more difficult it becomes to improve the environmental performance of a product or service.

Ecodesign has the potential to deliver direct competitive benefits to business through reducing environmental management and production costs, increasing innovation, improving brand positioning and enhancing business communications. The improved business communication opportunities can be carried through branding, Corporate Social Responsibility and procurement strategies. As a percentage of overall investment, design costs are low compared to the capacity of design to determine environmental and social costs of a product or service.

Ecodesign can act as a bridging link between the supply and demand sides of the SCP agenda. It can drive eco-efficiency improvements on the supply-side while enhancing sustainable consumption through effective design and business communications. There are numerous indirect benefits from ecodesign through positive externalities, such as energy efficient products reducing the carbon footprint of a region.

Because the SCP agenda is focussed on supply and demand side issues the discussions on innovation should incorporate technological, organisational and presentational (design and branding) innovation. Ecodesign as a design management process has the opportunity to straddle these different domains of innovation – and therefore should remain central to the debate.

## **3 Public sector intervention for ecodesign**

For policy makers, two conditions must exist for public sector intervention to be warranted. The first being that market mechanisms must fail to efficiently (or effectively) deliver on public policy objectives and, secondly, that intervention must lead to an improvement of the condition. It is understood that any intervention should

provide “additionality” and not replace a market function that would occur without the intervention. Market failure is a necessary condition for intervention although it is not a sufficient condition in itself.

From a neo-classical perspective, the primary reasons for market failure include the provision of public goods<sup>4</sup>, externalities or spillover, imperfect information, imperfect competition and coordination problems (Greater London Authority 2006). The causes of market failure revolve around the principle of equilibrium and that the state should intervene to correct any imbalance.

Another condition for public sector intervention is system failure. This issue of systems failure is more embedded in the discussions on innovation and SCP. In the case of system failure, the process of intervention is similar to the case of market failure although it is not focussed on recreating market conditions or optimum economic efficiency. As identified by Smith, some of the areas of systemic failure include failures in infrastructure provision and investment, transition failures, lock-in failures and institutional failures (Smith 2000).

### **3.1 Rationale for ecodesign-led interventions in SMEs**

SMEs make a significant contribution to national economies but, while comprehensive data is often lacking, their aggregated environmental impacts are also significant. A number of factors contribute to these gaps in data but the evidence base for the cumulative environmental impact of SMEs grows each year. In addition to this, it is well documented that SMEs face significant barriers to adopting ecodesign thinking and practice. For the purpose of this paper we have classified the primary barriers on three levels;

#### **managerial barriers**

- lack of managerial and operational resources (including time, cost, skills)
- failure of managers to harness the strategic considerations (Millward and Lewis 2005)
- lack of top management commitment.
- lack of awareness, training, and motivation of employees
- fragmented product development process in SMEs

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<sup>4</sup> The term public goods refers to goods which have some specific characteristics which suggest the market will be inefficient or absent. These characteristics are referred to as non rival and non excludable.

### **process barriers**

- ecodesign is a systematic, interactive and strategic process
- fragmented product development process in SMEs

### **system barriers**

- competing policy rationales (e.g. environment and innovation)
- government information asymmetries (related to interventions)
- actors “can’t or won’t act” - i.e. uncertainty / poor appropriability
- “public-good” nature of investment (Rennings et al 2003)

The mix of these barriers suggests that through a combination of system and market failure the public policy objectives of environmental protection and innovation have failed to be delivered. As the evidence base for the environmental impact of SME activities increases it would suggest that a rationale for intervention still exists.

## **3.2 Previous ecodesign-led interventions**

There have been numerous public sector interventions and initiatives to support ecodesign activities in SMEs. The majority of such initiatives ran throughout the mid-late 1990’s and were primarily concentrated in Germany, the Netherlands and Scandinavia. Recently other European countries such as Ireland have begun to address the implementation of ecodesign in SMEs. While the initiatives took many forms, the primary forms of intervention included;

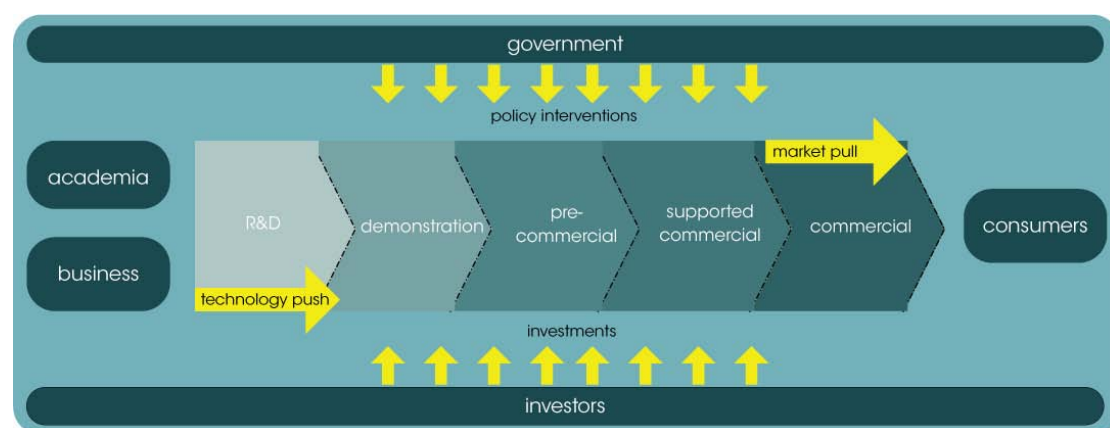
- information services
- demonstration projects
- R&D financing
- grants
- establishing co-ordination bodies
- ‘brokering’ services

While many of these initiatives and programmes met their targets and produced excellent case-studies, there is little evidence of a long-term diffusion or retention of ecodesign practices in SMEs. Through a previous study the authors identified a number of possible issues that contributed to this poor uptake such as; a focus on supply-side activities, a failure to engage with the indigenous design sector, a failure to embed ecodesign and life cycle thinking in higher education (HE) and the wider

business and environment support network, a lack of clear market signals and fragmented post initiative support mechanisms (O'Connor and O'Rafferty 2005).

It is also reasonable to suggest that many of these interventions were rooted in neoclassical economic theory and based upon contested linear models of innovation (Figure 1). Neoclassical economic theory assumes that knowledge is generic, codified, immediately accessible and directly productive and that there is no difference between capabilities, knowledge and information – this is also known as the “Arrow-Nelson argument” (Norgren and Hauknes 2000). Quite often interventions occurred without consideration of the wider institutional context such as other business support organisations or the indigenous design sector. When developing interventions it is becoming increasingly important to understand the institutional context in which SMEs operate.

**Figure 1: linear, push & pull model of innovation: adapted from Carbon Trust (Foxon et al 2003)**



This linear model of innovation is largely contested in academic and some policy circles and has given way to the recognition that innovation is a more dynamic and non-linear process. It is therefore important, when discussion interventions or capacity building, to establish a framework of analysis that can incorporate the richness and interactivity of innovation.

## 4 Models of innovation for SCP

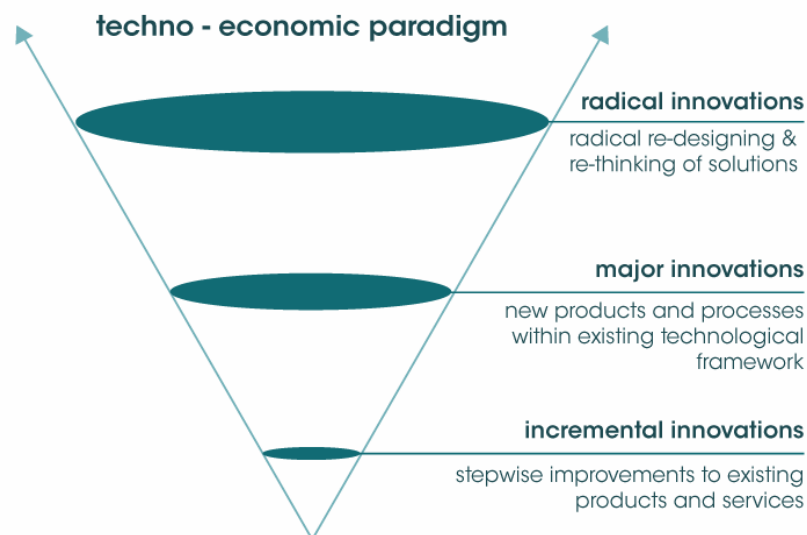
Innovation can be defined as "the introduction of a new product, process, method or system into the economy" (Freeman 1987). This is generally assumed to mean the commercial exploitation of the new ideas but innovation occurs at the research

stages of innovation cycles. In general terms the literature identifies three different forms of innovation;

- **Process innovation** is regarded as the production of goods or services with less input.
- **Product innovation** is improvement or enhancement of existing goods or services or the development of new goods.
- **Organisational innovation** generally infers new forms of management but it may extend to include new business models.

In the literature, the above forms of innovation are generally classed on three levels. These are (i) radical innovations, (ii) major (or adaptive) innovations and (iii) incremental innovations (Figure 2). There is much debate on the importance of radical innovation versus incremental innovation. While long-term strategies for radical innovation are useful, it has been suggested that the cumulative impact of incremental innovations on long term economic development and social change can be equal or greater than radical innovations (Lundvall 1992).

**figure 2: three layers of innovation (adapted from Anderson 2000)**



Innovation is central to the SCP agenda and therefore is a critical dimension of SD. While there is no hard definition of sustainable innovation it is fair to say that it lies somewhere between eco-innovation and system innovation.

- **Eco-innovation** is generally new or enhanced products, processes and systems that reduce environmental impact. Often eco-innovations are born out of “standard” innovation process – such as product light weighting, enhanced durability or optimised manufacturing.
- **Sustainable innovation** is less defined but is generally accepted to incorporate the 3 pillar principles of SD in the innovation process. There are often conflicts and trade-offs with significant barriers to implementation. These barriers include technological lock-in, path dependency, institutional silos and a lack of tools (Alakeson and Sherwin 2004).
- **System innovations** are more orientated to the novel delivery of services or combination of services. As innovations they may consist of new norms, procedures and principles. In terms of SCP, system innovations may improve eco-efficiency while offering social and economic benefits.

It is important to consider these different domains of innovation when considering interventions for ecodesign.

#### 4.1 Regional innovation systems

An important point of departure in any discussion on innovation and SCP is the role of IS - more specifically RIS - and the role they can play in the development and diffusion of sustainable innovations. Although IS theory is a much debated topic and has been developed in academic circles the principles are being developed and applied by organisations such as the OECD and European Commission. A number of economists and researchers have developed the concepts (Lundvall 1992, Freeman 1995, Nelson 1993, Edquist 1997, OECD 2002, European Commission 2003) and the most widely used definitions are;

*“...a system of innovation is constituted by the elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge..”, (Lundvall, 1992)*

*“...a system of actors (firms, organizations and government agencies) who interact in ways which influence the innovation performance..”, (Gregersen & Johnson, 1996)*

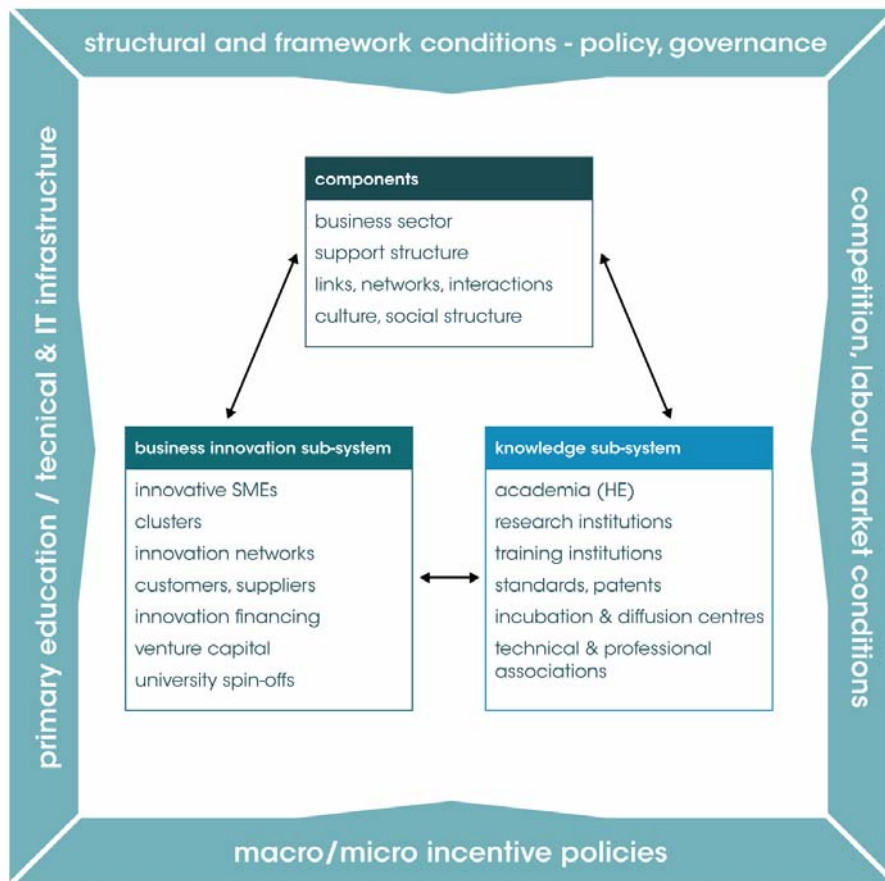
The RIS concept is born out of evolutionary economic theory and as such it sets itself against neoclassical economic theory. As the name suggests, it is concerned with the systemic nature of innovation and focuses on the institutional set-up in which a company operates. The RIS approach provides a framework through which the co-evolution of technologies, institutions and organisations can be analysed (Nelson 1993). Most importantly, the IS approach recognises that innovation is dynamic process born out of interactions between different actors, knowledge flows and market conditions.

Figure 3 represents the main elements of an innovation system. Key components include the actors (e.g. companies, people), business innovation sub-systems and knowledge sub-systems. This representation highlights the role of the institutional or structural framework of a region, the companies of that region (including knowledge structures) and the public and semi-public knowledge institutions. It also highlights the role of clusters, networks, incubation centres with the arrows representing the interaction between the various actors and components.

Although only a small number of regions have set out policy mechanisms explicitly orientated towards IS, the characteristics are present in varying levels in all regions. Most of the research on innovation systems is orientated towards innovation policy and only a handful of researchers have applied the principles to SD and SCP (see Andersen 2004, Foxon 2006; 2004, Rennings 2003). A number of these researchers have highlighted the potential opportunities of embedding sustainability into policy mechanisms for innovation. These opportunities include;

- bridging the trade-off between (urgent) environmental goals and aiming at building up a (long term) eco-innovative capacity
- aligning competing policy rationales (innovation and environment)
- developing a long-term strategic framework for effective policy-making
- enhancing policy-making by taking into account the richness and complexity of innovation processes
- recognising the role for stakeholders and 'enablers' to advance sustainable innovation throughout the policy-making and implementation process
- allowing for a learning approach to policy-making may help to produce a better mix of policies

**Figure 3: Regional Innovation System, adapted from (Andersen 2004) and (UNIDO 2005)**



## 5 Regional innovation systems and ecodesign intervention

The main difficulty of the RIS approach is the complexity of the framework and the lack of definition in many areas. There is still much debate about the usefulness of the approach from a policy development perspective. Some countries are driving forward the RIS (and national IS) approach within broader innovation and economic development strategies.

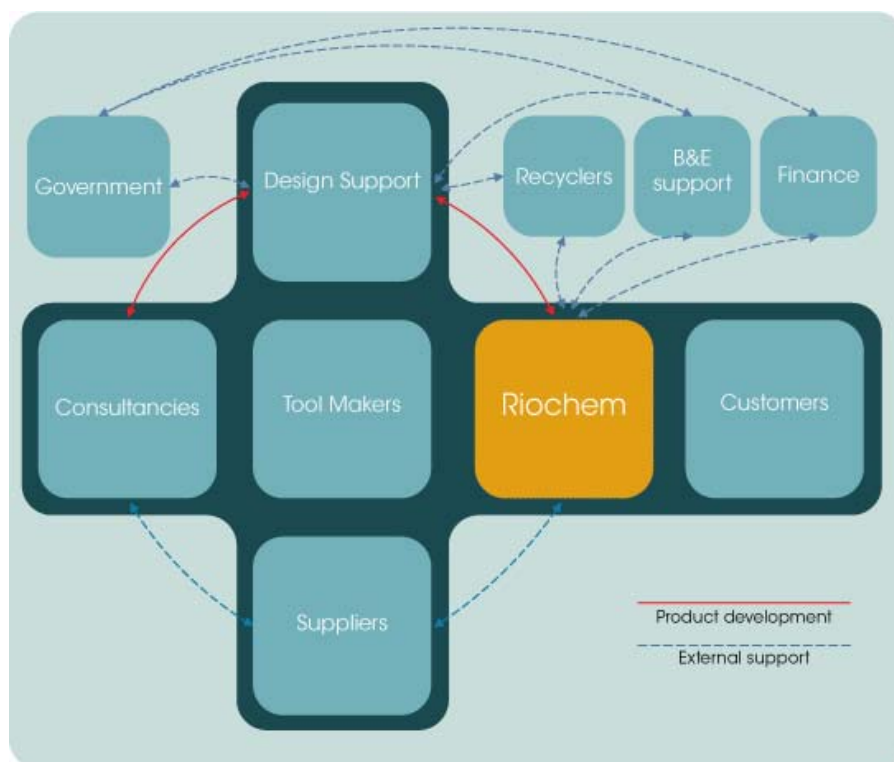
There are a number of key benefits of taking an RIS perspective when developing strategies for intervention for ecodesign. The primary and most practical reason being that processes of ecodesign in SMEs are systematic, non-linear, and interactive (dependant on internal and external stakeholders). To develop policies or intervention strategies to support ecodesign in SMEs these interactions, networks and processes of learning should be considered (or enhanced). Figure 4 outlines a

basic model of the main stakeholders involved in the development of the TinyLab™ (an award winning product from a Welsh Micro SME)<sup>5</sup>.

The model allows for quick identification of those stakeholders directly and indirectly involved in the development of the product. This model can be viewed from the RIS perspective with a view to understanding the knowledge structure, inter-firm learning, networks and spheres of co-operation in the ecodesign process in SMEs.

An IS approach makes no assumptions that greater support for R&D will result in market capitalisation or, in this case, ecodesign implementation. By their nature, interventions born out of an IS framework will have to be diffuse and have degrees of uncertainty. Den Hertog emphasised the need to translate these complex and academic perspectives into useful approaches for policy development (den Hertog et al 2003).

**Figure 4: basic interactive model of eco-product development in SME**



<sup>5</sup> See [www.riochem.com](http://www.riochem.com)

## **6 Capacity building activities in Wales**

### **6.1 Capacity building**

Capacity building is an iterative process in which a framework of interventions can be made. Often strategies for capacity building are focussed on company level mechanisms and linear models of innovation such as knowledge transfer and method demonstration. Norgren and Hauknes assert that “policy is no longer only about correcting imperfect incentives for private agents but rather about facilitating the emergence of new opportunities by building innovation infrastructure” (Norgren and Hauknes 2000).

Therefore, if we place capacity building in the IS context we should look to interventions that facilitate the desired change in the direction of innovation, as opposed to focussing on specific models of innovation. Capacity building activities for ecodesign in SMEs should drive processes of network and skills development through shared learning. It is also important to create the platforms on which this shared learning can occur. This framework of interventions, while aligning competing policy rationales, could facilitate broader system innovation and transitions to radical eco-innovation.

### **6.2 Existing infrastructure in Wales**

The Assembly Government has a statutory obligation to promote SD in the exercise of its functions. While Wales has no formal product oriented policy, there are a number of action plans that seek to stimulate economic growth through innovation and environmental best practice. The ‘Living Differently’ theme of the SD Action Plan seeks to address the structural aspects of SD while the Business and Environment Action Plan (BEAP) sets a strategic vision for environmental best-practice as a competitive device. Following the development of the economic strategy for Wales, “A Winning Wales”, the Assembly Government set out the strategic vision of transforming the Welsh economy through innovation. Supporting this, the Innovation Action Plan (IAP) establishes a vision for the successful exploitation of knowledge and creative ideas through wide-ranging programmes. These policy objectives are supported by a number of delivery mechanisms, including;

- an extensive network of Business & Environment support organisations

- financial support programmes available to businesses e.g. single innovation and R&D grant scheme
- mechanisms for stimulating innovation and fast-growing company incubation
- design and manufacturing support services (including ecodesign)
- centres of excellence (facilitating sectoral clustering)
- enhanced business support (including mentoring, coaching and leadership development)
- a “Knowledge Bank for Business” for supporting high-growth potential companies

### **6.3 New approaches to intervention for ecodesign in Welsh SMEs**

Following a sustained programme of ecodesign activity in Wales and an international best practice study<sup>6</sup>, Ecodesign Centre Wales (EDC) was established through funding from the Assembly Government in September 2006<sup>7</sup>. EDC focuses on building capacity and capabilities in industry, public sector organisations and HE so that effective ecodesign can happen in Wales. EDC will aim to build upon existing strengths and encouraging growth and innovation in competitive, added value sectors.

EDC is taking a partnership approach to capacity building with key stakeholder groups including; government, business support, industry and education & research. This partnership approach has been enhanced by the setting up of an advisory panel of representatives from these key stakeholder groups. The panel also act as a communication tool for the centre, ensuring that the activities are disseminated as widely as possible.

Although the capacity building activities are predicated on the open sharing of knowledge and experience, there are a number of key interventions being delivered by EDC. These include industry demonstration projects, industry workshops and seminars, knowledge transfer activities, embedding ecodesign in mainstream design degrees, workshops for public sector organisations, and policy and resource allocation recommendations.

Prior to conducting any industry related activities EDC conducted a research project to identify SMEs in Wales that have high growth potential, see environmental

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<sup>6</sup> This international best practice study looked at a number of previous ecodesign initiative and programmes over the last decade. The findings supported the development of a feasibility study for ecodesign interventions in Wales.

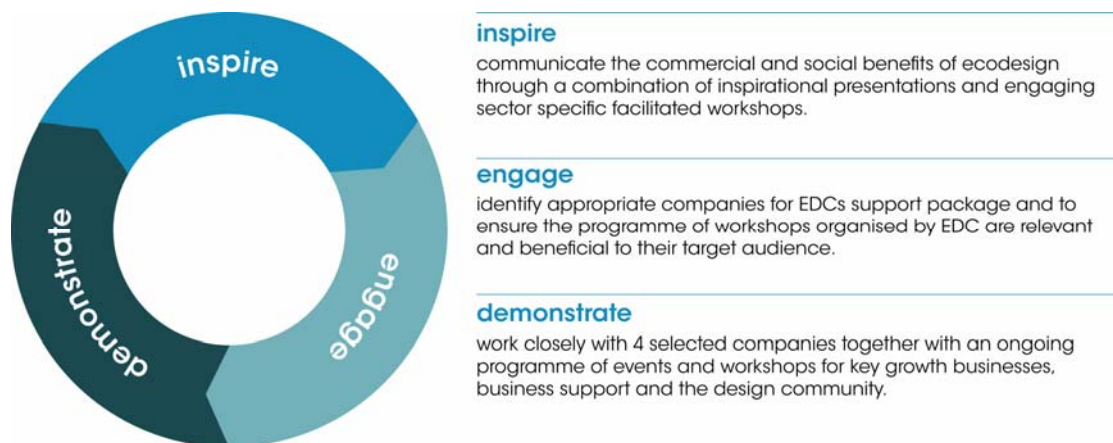
<sup>7</sup> Staff at EDC are employees of the University of Wales Institute, Cardiff (UWIC) who manage and administer the MAP funding.

and social responsibility as important for their business and have a self-specifying capacity for design<sup>8</sup>. This allowed EDC get a clearer picture of the companies that would benefit most from any interventions in the short to medium term. In the short term EDC is concentrating on four key areas of activity.

### 1) Industry: enabling ecodesign

EDC have designed a three-phase process to enable effective ecodesign in Welsh industry (Figure 5). To assist this process, EDC will offer a novel support package creating a unique opportunity for Welsh companies to develop more environmentally conscious products and services. It addresses the practical implementation of ecodesign whilst refining tools and methodologies for the Welsh business environment. This will provide a platform for wider implementation in the following years.

Figure 5: three phase process to enabling ecodesign (short-term)



### 2) Education: embedding ecodesign

Providing ecodesign support to the HE institutions is a key component of long-term capacity building for ecodesign. EDC is working with the four universities in Wales that offer product design degrees to embed ecodesign and life-cycle thinking in mainstream design degree courses. This is to ensure that in the medium to long-term all design graduates in Wales are “literate” in the issues of sustainability and ecodesign.

<sup>8</sup> This survey of over 2000 businesses generated an overall response rate of 26 percent, with 39 percent of those indicating that they have a self-specifying design capacity.

### **3) Research: international best-practice**

To inspire wider industry, educational establishments and influence future policy a programme of continuous research has been embedded in all EDC activities. The applied research provides support to the capacity building activities of EDC through tracking and measurement – using a ‘toolbox’ of qualitative and quantitative KPIs. This will assist with the development of an “evidence base” on which to make recommendations and future enhancements.

### **4) Communication: positioning and promoting ecodesign**

Communication is a key function of EDC. It is primarily focused on the promotion and positioning of ecodesign to the key stakeholder groups. This is delivered through the development of clear, relevant and robust information.

## **6.4 An innovation systems approach?**

If we look to the capacity building activities of EDC through the lens of the innovations systems framework we can see some convergent properties. It is not in the scope of this paper to detail all of the properties but from an IS perspective the main properties are;

- emphasis on the role of learning (policy learning, inter-firm learning, education, training)
- a holistic and inter-disciplinary framework
- inter-dependency and non-linearities in the development of innovation and ecodesign capability
- emphasis on the role of organisations and institutions
- emphasis on particular regional technological and economic characteristics

How these properties are established is through the cross-cutting nature of EDC activities. We have identified some key activities that are of interest from an RIS perspective. The list is not exhaustive and is orientated towards the case of Wales.

- identification of focus areas for intervention – from a life cycle perspective (mapping exercise)<sup>9</sup>
- market analysis (“design for growth” survey)

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<sup>9</sup> This mapping exercise was conducted at the beginning of the international best-practice study. It involved the identification of the existing business support and knowledge creation bodies within Wales

- creation of platforms for the open sharing of knowledge and experiences
- industry focus but environment driven - key growth businesses from the priority sectors (horizontalisation)
- capacity building in existing business support infrastructure
- embedding ecodesign in HE (mainstream design degrees)
- capacity building in the indigenous design sector
- establishing commercial support partners (creating linkages within industry)
- conducting research - basic, strategic and applied (knowledge creation and transfer)
- establishing learning processes (monitoring and evaluation)
- tracking and measurement of activities to establish an evidence base (using hard and soft metrics)
- making policy and resource allocation recommendations

As a basis for future capacity building activity EDC have identified priority focal points within the innovation system framework to embed ecodesign skills and awareness. Some of the key steps to developing further strategies for capacity building will be;

- recognise system characteristics (strengths, weaknesses, problems, development potential)
- define the focus and the topics for action (agenda setting)
- support stakeholders to co-ordinate their activities in and beyond their policy field (horizontalisation)
- learn from previous experience (e.g. from evaluation results)
- enhance interventions by taking into account the richness and complexity of innovation processes

## **7 Conclusions**

The IS perspective provides a useful analytical framework when assessing regional capacity for eco-innovation and ecodesign. It suggests that capacity building is not simply about developing resources for education and R&D but about reshaping interactions, networks and processes of learning. Therefore capacity building activities for ecodesign in SMEs should drive processes of network and skills development through shared learning.

This paper highlighted that there is still a rationale for supporting ecodesign activities in SMEs. The long-term benefits of incremental innovations should not be discounted. The framework of interventions for ecodesign, while seeking to align competing policy rationales, could facilitate broader system innovation and transitions to radical eco-innovation.

Much of the work on IS has either been academic or firmly rooted in policy mechanisms for innovation (without consideration of sustainability). This paper sought to highlight, by using Wales as a case example, that the IS approach can be used to inform and enhance strategies for capacity building. As Den Hertog noted, if we are to improve upon the situation we must translate the complex and academic perspectives into practical frameworks for policy makers (den Hertog et al 2003). We hope that some of the issues highlighted in this paper will stimulate further discussion and debate, thus advancing an IS perspective on interventions for ecodesign.

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