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EFFECTIVE BUSINESS MODEL DESIGN AND ENTREPRENEURIAL SKILLS FOR ENERGY EFFICIENCY SERVICES

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Abstract

It is expected that as many as two thirds of the total potential for energy savings in 2035 will not be exploited. Worldwide, many studies are being conducted in order to understand what is causing this -apparent – lack of market uptake of energy efficiency and DSM. Energy services are increasingly considered to be a good delivery mechanism for Energy Efficiency. In the energy system we witness a transition from a system consisting of products, outputs, elements suppliers and transactions to a system consisting of solutions, outcomes, relationships, network partners and ecosystems, packaged as services. To bring these energy services to the market, the first step is a good business model. User-centred approaches to business model design are key as they are characterized by user involvement and interaction in different stages of the supply chain Business models and energy services focusing on the customer perspective and their unique buying reasons for energy efficiency are therefore the next step in creating a mass market for energy efficiency. A second element of importance to delivering effective energy efficiency services are the capabilities of business model developers and providers of services to focus on this customer perspective and tailor their services. These skills include sensing user needs, conceptualising, orchestrating, stretching and scaling. A third element of relevance to understanding how to deliver more effective energy efficiency is context. A business model design is strongly influenced by context. This paper discusses findings from the international task 25 project funded by the IEA. Task 25 performed a qualitative research to investigate the three elements discussed above.

1. INTRODUCTION

It is expected [1] that as many as two thirds of the total potential for energy savings in 2035 will not be exploited and in general energy efficiency businesses see only a modest growth of the energy efficiency market. Worldwide, many studies are being conducted in order to get a better understanding of what is causing this -apparent – lack of market uptake of energy efficiency and DSM [2][3]. Reasons for this are varied but include amongst others user acceptance problems because of a lack of focus on the needs of these users, a lack of viable business models, a lack of the necessary entrepreneurial capabilities to deliver services and finally restrictive policy contexts which all hinder the uptake and upscaling of energy efficiency.

In reaction to this lack of uptake of energy efficiency products many businesses and utilities are (intuitively) changing their business and turning towards a more service oriented model. We are witnessing a transition from a focus on delivering the physical goods needed to achieve energy efficiency to a focus on offering solutions including both goods and services.

2. FROM DELIVERING GOODS TO SERVICES: A TRANSITION

The Cambridge Service Alliance, a leading research-industry cooperation states that in many sectors we are indeed facing a transition from a system consisting of products, outputs, elements suppliers and transactions to a system consisting of solutions, outcomes, relationships, network partners and ecosystems, packaged as services [4]. Let us first define in more detail what a service is. Vargo and Lusch [5] define a 'service' as: "the application of competencies for and to the benefit of the receiver.…This service centred view of exchange implies that the goal is to customize offerings, to recognize the consumer is always co-producer [of value], and to strive to maximize consumer involvement in the customization in order to better fit his or her needs" [5].

Two key elements stand out in this definition of a service and resonate with the archetypical differences between goods and services as summarized in table 1. First, the role of goods change. In the goods delivery model, or the goods logic, delivering goods is centre stage and technology plays a key role in enabling production of competitive goods. This is what is referred to as a 'technology push' logic [6]. If services are added to the delivery their aim is to facilitate the sale of the goods, or to enable some minimal market 'demand pull' whereby customers can partially indicate their specific needs. When the service is centre stage however, the demand pull logic becomes dominant, and goods and technologies become mere enablers of the provision of valuable services [5]. For the case of energy efficiency, physical goods like smart meters, algorithms, smart home devices, appliances, solar panels etc., become enabling tools and assist in providing benefits, but the focus is on how they realize users' benefits. A second key element in this definition of services is that the role of the user is fundamentally different. One of the characteristics of service is that its value is experienced in use. The main goal of a firm is therefore to facilitate those outcomes that the user values. From this perspective, the user has a dominant role in the creation of value as well as in the creation of the business. This entails that user involvement is by definition more important in delivering a service. Co-creation and co-learning are key since the unit of exchange in the

supplier-user relation is the service itself rather than the physical goods. This implies that intangible assets like knowledge and skills are the fundamental source of competitive advantage for companies delivering services and therefore are the main driver of overall value.

Table 1: the difference between goods and services. Based upon Miles, 1993

Goods	**Services**
Tangible: physical, can be touched and felt, can be stored and transported	Intangible: experienced, a process, task or action performed for the customer
Offer is stated in terms of product characteristics	Offer is stated in terms of experienced value
Capital-intensive production, highly standardized output, economies of scale	Labour-intensive production, highly customized output, no economies of scale
Technology-push logic: technology is key driver of production possibilities	Demand-pull: technology is only an enabler, customers' needs are key drivers
Production, distribution and consumption are separated	Production, distribution and consumption take place simultaneously
No customer involvement in production, low levels of customer interaction before and after production	Consumers are co-producers of services and of service innovation
Mass and global distribution	Localised distribution
Ownership transferred through sale	No ownership, user is experiencing value in use
R&D driven innovation	Service innovation as co-created with users

The key difference between delivering goods versus delivering services being that instead of a technology push market approach a demand pull market approach is taken entails gaining a real understanding of the end-user needs. And in particular understanding what keeps these end-users from investing in energy efficiency or behaving in a more energy efficient way. Many end-users -households, house owners, managers of businesses etc. intend to behave, manage, live or purchase more energy efficient. Despite their intentions, many of them however still have great difficulty identifying the opportunities they have to do so, let alone being able to decide if and which product or technology to choose or how to change their behaviour. Over the years, for example in the IEA DSM task 24 [8], we have learned that Energy Efficiency is a diverse and therefore complex value proposition that is very difficult to grasp, and in fact is not appealing to most customers.

There are many value propositions/energy services and accompanying business

models out there that focus on the savings generated by lowering bills, or that focus on providing insight in energy consumption patterns by means of monitoring. Although saving money on energy costs seems an easy proposition, in practice the majority of people and businesses seem little or less than interested in doing so [8]. As a consequence most of these services face great difficulty being up scaled to mass market. Despite various attempts to introduce elements to spur demand, such as labels, certification of products and providers, the present approach still is very much a technology push approach. There is an emerging need for services (enabled by technology) that take into account the fact that supplying energy is not the goal, but the function in everyday life that can be filled therewith [9] [10] [8]. This implies that businesses need to focus on delivering services that go beyond energy efficiency, or even put energy efficiency or energy savings as a secondary outcome and instead focus on needs or multiple benefits that are not necessarily directly linked to energy, e.g. health, employability, employer productivity, indoor climate, comfort, wellbeing.

In addition, more successful and innovative services being developed aim at empowering end-users by swapping complications of ownership, providing integrating platforms and help make choices between options, thus avoiding decision fatigue and aim at solving other more process related barriers. This is a clear difference compared to the business as usual often single technology or product push approach which until now was clearly not sufficient in unlocking the savings and investments. Previous research in the field of solar energy has shown that offering integrated services such as a combination of financing, vendor selection and installation, issues consumers find complicated, indeed help scale up the market [11]. And research and practice indeed demonstrates that when the users' perspective is centre stage right from the start in developing services, chances rise users will experience the services as valuable, with higher turnover, higher sales, and increased competitive advantage as results.

2.1 Energy service delivery: Being user centered is key

How end users (both consumers and businesses) can or should be involved in developing services and underlying business models is still a question to answer in the field of energy efficiency. End users can be passive informants in service and business development, or can actively co-create either individually or collectively engaged [12] [13]. Recent research in the field of end-user participation in the development of services identified four active and co-creation roles for the end user: the role of explorer, inventor, designer or distributor [14]. But. Although in many sectors co-creation and active engagement is becoming mainstream, Tolkamp [15] identified that this is different in the field of energy services and in particular the development of the business models underpinning these services. In the energy field, especially around residential energy visualisation technologies and community energy co-creation does take place, but little to none when it comes to the business model.

3 NEW BUSINESS MODELS TO DELIVER SERVICES WITH MORE VALUE TO CUSTOMERS

Having established that energy services are increasingly considered to be the next step in

creating a mass market for energy efficiency the market also need to understand what business models that enable the delivery of services look like in contrast to those delivering goods. We build on the definition of a business model as: 'a strategy to invest in EE and DSM, which uses services as delivery mechanisms to create value and to lead to an increased penetration of EE and DSM in the built environment.' [16] Many authors state that we indeed need new business models to develop the market for sustainable services, to change our current energy production and consumption system and thus to achieve sustainability and energy savings goals [17] [18] [19] [20]. Essentially business models are a way of creating value for various stakeholders, including end users [19] [21]. Osterwalder, Pigneur and Clarck [21] state that a business model consists of nine building blocks to ensure a good market delivery: partners; activities; resources; value proposition; customer relationships; channels; customer segments; cost structure; revenue streams. Research, including that by IEA DSM Task 25 found that a business model for delivering goods into the market demonstrates significant changes compared to a business model delivering services into the market. In Tables 2 and 3 below we highlight these changes.

Table 2: a goods focused business model. Canvas template based on Osterwalder and Pigneur (2010)

<table>
<tr><th colspan="5">A Goods focused business model</th></tr>
<tr>
<td rowspan="2">Partners
Supply chain partners
Vertical cooperation</td>
<td>Activities
Focus on short term
Focus on predictability
Management
Technological process efficiency
aspects of the delivery or cost-structure
process innovation follows product innovation</td>
<td rowspan="2">Value proposition
A thing that can be felt, touched
Can be standardised
Tangible goods
Stockable
Stated in outputs and product characteristics
The product or good is used by the user to satisfy needs
Possession
Offer is non-negotiable
Value is destructed as soon as transactions has taken place
Value creation only between company and customer</td>
<td>Customer relationship
Customer relationship is one-off in terms of transaction
Low customer involvement
Low customer contact</td>
<td rowspan="2">Customer segment
All</td>
</tr>
<tr>
<td>Resources
Economic
Labour
Commodity
Codified knowledge</td>
<td>Channels
Mass distribution
One-off
Distributors
Traditional marketing</td>
</tr>
</table>

Costs	**Revenues**
Price of labour or natural resources Can be low labour intensive due to standardisation	Incidental payments payment per hour/unit

Table 3: A service focused business model. Canvas template based on Osterwalder and Pigneur (2010)

A Services focused business model				
Partners Many /different type of partners Multiple value creation Collaborative approach More ecosystem approach to partners Customers as partners Involvement of professionals delivering the service (front desk employees, consultants, distributors etc.)	**Activities** Long-term relationship building Produced in buyer-seller interaction Consumers are co-producers Provided and experienced at same time Improvement of delivery or cost-structure Product innovation often follows process innovation Training or education of customers to maximise value Training of seconders and intermediaries Renewal in internal competences, skills and culture to fulfil the services guaranteed	**Value proposition** Delivering both a product and process at the same time. Tailor made, customised Actual experience is the value An activity solving a problem or a need Immaterial fuzzy nature Non stockable Stated in outcomes of experience Focus on usability Coproduced with clients Focus on Adoption Process Technology is enabling the service-offer	**Customer relationship** Focus is on maximising customer (user) experiencing value in use	**Customer segment** All
	Resources High share of tacit knowledge (Social) Capabilities People Enabling technology Deep customer		Channels Localised distribution Social marketing Peer to peer Use of ICT and (big data) in	

	understanding		delivering the service	
Costs Price of knowledge Can be high labour intensive due to customisation		**Revenues** Continuous payments Monthly fees		

4. BARRIERS TO THE ENERGY EFFICIENCY SERVICES BUSINESS MODEL: CAPABILITIES AND CONTEXT

Most of the new business models in the Energy Efficiency sector are delivering goods with add-on services. The truly service oriented types of businesses are actually struggling in the market. Several reasons explain this struggle: competition with old business models, insufficiently putting the user centre stage, context barriers such as regulations. Overcoming these barriers requires two key characteristics from the service oriented businesses: very specific organizational and or entrepreneurial capabilities and business model innovation to deal with regulatory and political factors.

4.1 Dynamic capabilities to deliver services

There are many possible ways to provide services on energy efficiency: new forms of cooperation; alternative 'roles' for end users or new revenue models. Unfortunately, many suppliers of energy efficiency services do not possess the capabilities to put together a viable business model. Research on service delivery proposes several key capabilities necessary for designing and implementing services. Often, these capabilities require the companies to completely switch their mind-set from a goods-based to a service-based logic. In particular, service developers face challenges in understanding what Unique Buying Reasons users have, since they are focused on the Unique Selling propositions and technical possibilities [22]. Buying reasons are hard to grasp because value can be financial, but is most likely related to intangibles like wellbeing, status, comfort, health, knowledge or skills [23] [24]. For the delivery of a service to work, the service provider needs several dynamic capabilities that have to do with the ability of the company to realize new solutions and respond to changes in the environment where they operate [25]. Four sets of capabilities turn out to be particularly significant:

1. Sensing user needs and (technological) options: this capability is about engaging in a meaningful interaction with users and other stakeholders to extract relevant information for fitting the service to the expressed needs. This interaction can be about co-learning, by sharing knowledge from both sides, or about contextualizing, by making efforts to match service offerings with actual needs.
2. Conceptualizing: engaging in service provision often means that the companies experience frequent interactions with users and stakeholders. Yet, the same companies

might not always be able to take a step back and uncover general patterns in the rich variety of context-dependent needs. Service providers able to conceptualize have strong induction capabilities and they are engaged in innovation on a regular basis.

3. Co-producing and orchestrating: services often require the alignment of several different actors as they bridge for instance several physical inputs providers to create the end experience. Companies able to co-produce have developed capabilities for working together seamlessly with different partners, have strategies on how to create consistency and smooth procedures for interaction, particularly in the case of diverging incentives.
4. Scaling and stretching: a final key capability relates to the marketing skills of service providers and their ability to package their offerings in a way that large user groups will recognize the value of those offerings. This capability is about finding and promoting a general formula for value creation.

The importance of in particular sensing and orchestrating is further increased with the shift discussed above within the field of energy services towards the provision of bundled services. Visnjic and Neely [26] state that service providers are shifting from being 'doers' to becoming 'problem solvers', capable of orchestrating the delivery of complex services. We have empirical evidence that these capabilities indeed help companies pursuing the development of new service solutions [25]. In particular, both sensing user needs and conceptualizing capabilities are found to be positively correlated both with higher than average profits and with the innovativeness of companies, as measured by the share of turnover they get from improved rather than existing products (goods and/or services). It should be noted that these capabilities are not independent from each other but they form instead a coherent set of elements reinforcing each other. Conceptualizing plays in fact a key central role, being at the intersection of the sensing capabilities on one hand, and the capabilities more related to implementation at the other hand. When it comes to the relation of capabilities with the ability to gain a higher than average market shares, it is the sum of all capabilities that is strongly correlated to companies' performance [25].

4.2 Hindering regulatory and political frameworks

A business model design is strongly influenced by context, e.g. existing legislation and available subsidies, other bottlenecks and constraints, and various players within the current energy production and consumption system and consequently some type of business models are encouraged, others are hindered [28][29][30][11][31]. If we want to create markets for energy efficiency services we need to consider current energy markets infrastructures, regulation and support mechanisms in place (both for old and new technologies) since these directly influence the business model opportunities in a country [11]. Business models thus reflect and reproduce the social and political organisation of state and market action, ideas about energy (as a resource or as service), interpretations of public and private space and responsibility and ideas about the role of consumers and providers in constituting demand

[32]. These institutions not only influence the way business models are being created, but also the way they are being studied, monitored and evaluated (by, for example, policy makers).

The current climate and energy policies reflect the interests of established stakeholders and potentially allow for low-hanging fruit type of changes and inhibit more radical type of changes. A clear tension exists between the established energy regime and new service oriented business models that aim to transform the system [28]. Findings from our Task 25 context analysis being performed in the different participating countries indeed is that the current energy efficiency market still is being defined in terms of technological, subsidiary or legal possibilities targeting product and goods innovation and less so services. The tech-push perspective is centre stage in many framework conditions. In this perspective, the basis of economic activity is the making and distribution of goods (output). The main goal of a firm is then to maximise profit margins through efficient production and distribution. Consequently, in this framework, the user has a passive (consuming) role and service is an add-on, with the main purpose to increase the output (of goods). The traditional financing models for these product oriented business models is up front financing to fix the market failure of the valley of death, thus reiterating the existing system and encouraging business models to work with this upfront financing, and develop technical and contractual constructions around the delivery of goods, with resources and processes are built and managed solely within the firm. The public sector in many countries is very reluctant to provide financial support to services because they do not want to disturb the market, however, they start from the assumption that there is a well-functioning energy efficiency market. However, the current market for energy efficiency is a strongly regulated construct that does not comply with the laws of market. In particular, the supply side or the demand side is stimulated by subsidies and campaigns etc. As a result the energy efficiency market is dominated by limited types of business models mainly focused on delivering goods and given the established framework conditions only incremental innovation of business models occurs in the energy regime [28]. Because of that business models that challenge or stretch the existing framework, i.e. servitisation business models have a difficult time emerging [33].

5 CONCLUSIONS AND OUTLOOK

To actually generate a change towards the much needed more user centered energy efficiency services we need to learn from and experiment with business models that challenge the existing framework conditions, learn to deal with the constantly changing and inherently complex and uncertain framework conditions, and to overcome internal organisation barriers [34][17][19][27]. A business model is already an ongoing experiment, considering that successful business models reinvent themselves constantly in response to changing frameworks [27][35][36]. This experimentation is however not facilitated sufficiently by existing framework institutions such as public authorities. These kind of institutions could contribute to this experimenting by for example creating a platform or meeting point between the supply and demand side, functioning as intermediaries in allowing for the development of more balanced goods and services and business models could meet. Another way of facilitating this kind of business models is to subsidise the development of services and systems focused on delivering multiple value.

In addition, stimulating the incorporating and delivery of multiple value would lead to the development of more user and stakeholder centered approaches and built up of knowhow and entrepreneurial capabilities focused on user centered design. Such learning can be accomplished both within an organization and between different organizations and on societal level [37]. It can furthermore be argued that learning about and experimenting with the development of these capabilities to deliver energy efficiency and services more effectively is the responsibility of national frameworks (regulatory and political) and innovation policies. As discussed above, experimenting and reflective learning are necessary elements of this journey towards developing a more service oriented energy efficiency sector. Metcalfe and others have stated that (innovation) policy is about creating conducive context for organizations to engage in experimentation [38][39][40]. Janssen [25] makes an even stronger statement and states that: "In this respect, one cannot assume this is simply a matter of having the right funding instruments and framework conditions in place; weak innovation capabilities constitute a systemic failure that is detrimental for the processes of novelty creation within markets….The observation that many firms lack skills and competences to realize new services, can be regarded as a strong justification for policy intervention." Policy interventions such as the provision of business services aimed at enhancing these entrepreneurial capabilities of sensing user needs, orchestration, conceptualising, scaling and stretching would therefore we appropriate policy responses [25][41].

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