RENÉ BOHNSACK
PHILIPP KÖLLISCH

me²: internationalization and business model innovation of an energy platform

Abstract

me² – a result of a pan-European R&D project – is an online energy platform in which communities of electric vehicle owners and smart meter owners are brought together in local online communities. Within these communities, users can interact, compare and compete with each other in order to reduce the overall electricity consumption. During the development of the platform, two pilots, in Lisbon, Portugal, and Amsterdam, the Netherlands, had been successfully completed. As a result, several project partners developed a vital interest in commercializing the platform on an international level. Based on the results from the pilots, the academic research, and all partner's input, they faced the challenge to move the project from the R&D phase to an internationally viable business model. They knew they had to increase the perceived value, adapt the business model to different markets, especially from a cultural point of view, and build a business model that satisfied all project partner's needs and expectations. Therefore several strategic issues had to be considered. Those are different cultures, legal regulations, various technologies and different customer's perception. Furthermore, the competition with other companies, the transformation of the electricity industry's value chain and aligning the strategic intents of multiple parties were relevant challenges.

INTRODUCTION

After a long and demanding day of work on the European R&D project me²- a digital electricity platform – at the end of October 2017, Nuno Santos asks himself "We put so much effort into this project, our pilots went well, and the technology is robust. How should we take the next step? We need to find a way to commercialize me². Yet, this requires to go back to the drawing board and integrate the gathered experience from the project. We need to develop a compelling value proposition. Moreover, we need to align the business model to the different international settings". In the upcoming week, there was an important meeting with all project partners and he wanted to share his thoughts about the commercialization of the project.

At the meeting, after every project partner **(Exhibit 1)** presented his progress, Nuno Santos started to speak and questioned the audience "How can we take me² to the next level? The technology is working well but we need to make some changes if we want to commercialize it successfully." After a heated discussion between the partners Nuno Santos summarized on what steps they agreed: "The first thing we need to do, is to redefine our value proposition with the information we got from our pilots, afterwards we can adjust the business model and find a way how future tasks and revenues can be split." As an initiator, he was really happy about the reaction of the project partners and directly started to work on his ideas by reviewing every piece of information he could get.

ME²-PROFILE

At first, he was thinking about how the whole project started and which potential he saw in this new type of energy platform. In 2015, Nuno Santos and the partners in the project applied for a European call for proposals to develop novel smart city solutions that create more cohesion in cities. This call was supported by the European Commission and national foundations. The proposed project me² (mobility plus energy results in synergy²) represents an online platform in which a local community of electric vehicle (EV) users and local smart meter (SM) owners are brought together in a local urban online community. The mentioned technologies are used in a community to integrate mobility with electricity, to balance the grid by charging and storing energy anti-cyclically to the demand, to reduce electricity costs, and to enable a feeling of local belonging. The technology was validated and optimized in two pilots in Portugal and the Netherlands. More technically, the overall goal of the project was summarized in the following statement:

> "Develop and verify an urban marketplace that combines e-mobility-demand side management technology with smart meter automation options within an innovative business model. The project includes operational methods to encourage usage, to optimize resources, to balance both the

> fluctuating renewable electricity generation and the urban local grid. It further sets these operational measures within the larger regulatory contexts to derive effective policy implications. "

Nuno Santos and the whole project team worked hard on the goal to have a tested, validated and operational me²-platform **(Exhibit 2)** at the end of the project. Furthermore, everyone was interested in gaining an increased understanding and integration of e-mobility and electricity behavior by developing mechanisms that influence these behaviors. Nuno himself developed a passion in particular for gamification elements. They were based on smart algorithms, on an individual and community level with gamification triggers like the social comparison to influence energy consumption related behaviors. The project goals were to decrease energy peaks in the grid by 10% and energy costs for the customer by 10% as a result of enabling smarter, more economical energy usage patterns (me², 2017).

The first pilot study in Portugal tested and demonstrated the technical viability of the system in a small community. It combined 50 participants with smart meters and 12 with electric vehicles. The second pilot in the Netherlands comprised 52 participants, all of them with electric cars and some with solar panels on the roof.

By looking at the feedback of the Lisbon pilot from July 2017 Nuno found some helpful insights for adjusting the value proposition. As a result of his analysis, the most important feature for users was the monitoring of the energy consumption, preferable per equipment, and total household, in 15 minutes intervals. Furthermore, the testers liked to access historical data to review their consumption and to implement measures to reduce them. An efficient, reliable, simple, fast and user-friendly system was named as one of the most important issues. People also liked to have the possibility to check their bills and being able to request an invoice correction in case the invoice is wrong. There were 25% of the interviewees that complained about the functionality of the physical metering devices **(Exhibit 3)** with regard to data communication from the meters to the platform, data accuracy or even the truthfulness of the energy saving tips in the platform. Another recommendation has been sending more e-mails and text messages with alerts and suggestions.

The survey also gave some insides relevant to the future business model. 30% of the people answered that they would pay up to €30 for a professional installation and 50% would pay up €80 for the needed equipment. For 60% of the testers savings of €15 per month would make the product interesting. One person precisely said that the investment needs to pay off after one year.

Last but not least it revealed the motivation of the participants regarding the environment, financial or competitive aspects of the platform. On average they responded that they are strongly motivated by

environmental issues, the possibility to save money and behavioral changes. They were less motivated by the competitive aspect of the community which could be explained by cultural idiosyncrasies.

Nuno Santos was positively surprised that only a few drawbacks were reported and many people mentioned only positive aspects. However, it was mentioned that the platform is at times not intuitive enough, some people missed using some functions, such as the data cannot be saved (e.g. as an Excel file) and that an initial training (introduction guide) was missing. Furthermore, some mentioned that the physical meters were not optimal to use because they emitted disturbing light or were too big to fit behind some embedded houseware like dishwashers or fridges.

STRATEGIC ISSUES OF THE MARKET FOR SMART ENERGY

Although the feedback from the survey is very valuable, Nuno Santos is aware of the fact that it needs more to set up a proper business model. Therefore, he analyzed the most important strategic issues of the industry they wanted to enter.

Visibility of Benefits

One of the most difficult tasks is to make the benefits of an energy saving product visible. People do not get an immediate payoff or see a positive impact straight away. If a customer is using the product in a right way, he or she will experience decreasing costs. However, the savings will become visible only up to one year later if there is no smart meter installed. The owner of the place has to pay a fixed fee each month and after a fixed period the real consumption will be charged. At this point, he usually sees his real overall consumption for the first time. If the bill is higher than expected, he will not trust me² anymore. The higher bill can have several reasons like changing behavior, working time, additional electronic equipment, increasing prices per kW/h and much more. Therefore, me² needs to find a way to directly and continuously showing how much and when the customer saves money. In this case, saving money is the value the customer gains from the product me². If the customer does not see what he is saving there will be little perceived value. Furthermore, customers are more willing to interact and participate on the platform if they have a monetary reminder. It can be seen as a reverse effect on the usage of a gym membership and the pay dates of the membership. If a customer has to do monthly payments s/he goes more often to the gym than a customer with an annual or semi-annual payment plan. This phenomenon is likely to be valid for the saving of money with the me² platform (Siemens, 2007).

Before customers invest in smart energy solutions they look at the potential savings and the point when it pays itself off. This means that the faster a product pays itself off the more people are willing to purchase it. However, a product does not need just to pay off as fast as possible. It is also important that the savings it provides are significant. Potential customers will not invest time and effort in something

which provides fewer savings than it costs in the effort. Therefore, it is essential that customers directly see what their potential savings will be and how they will cumulate until the investment pays for itself.

In addition, not only financial benefits motivate customers to purchase and use an energy platform. Reducing the environmental impact is also a good motivator. Therefore, also the reduced environmental impact should be promoted. For example, the amount of CO2 saved which corresponds to something a person can imagine. Furthermore, extra features that create value for customers can be added. A simple security system which notifies the user when there is abnormal energy usage, for instance when the owner is on holidays. Another benefit could be a sensor which tells the customer if an electric appliance (e.g. the stove) is really switched off when s/he is not sure about it but already arrived at work. Nuno Santos is sure that there are many ways to add value over time. Some features are easy to develop, to implement and less risky while other features may take more time.

Regulations within the Energy Sector

Another major strategic issue is regulations within the energy sector. If the government passes a law which prohibits energy suppliers to offer different tariffs to customers based on the time of the day, one benefit of the product may become less valuable. One of the strongest motivators, the monetary savings, will reduce and the product will become less attractive. However, it is unlikely that the government is going to pass a law like this because one of the municipals main interests is to relieve and balance the local grids. This can be done by giving energy producers the possibility to ask for different energy prices at different times and also by giving customers the incentives to participate (Craig, 2017).

In general, the regulations end "before the meter", which means that everything that is directly connected to the grid is regulated and has to follow certain rules. Everything that is behind the meter, i.e. in the owner's home is not affected by regulations, e.g. the usage of smart devices or energy storage such as Tesla's Powerwalls. Depending on regulations and laws, me² can be developed to a trading platform that allows members of the platform to trade stored energy "off-market" among each other using a crypto-currency or in-app point system.

Regarding the Netherlands and Portugal, there seem to be no explicit regulatory barriers for introducing the business model. However, although the members of the European Union follow common goals in order to reduce negative impacts on the environment, most regulations and laws are national and differ from country to country. Since 1996 the European Union is trying to harmonize the electric energy market but widely local governments and the electricity industry tries to prevent that (Serrallés, 2006).

Technologies

Technological changes in the future may make it less necessary or maybe even completely unnecessary to balance the grid or store energy. However, technology is far away from a point where this becomes a serious strategic issue. However, technological changes or storage technologies can and will affect the attractiveness of the product, e.g. new Redox-Flow-Batteries (FAZ, 2017).

Changing Electricity Value Chain

Traditionally the value chain of the electricity industry followed the pattern: Generation, transmission, distribution, retail, devices and end-customer. Shifts in policies and technologies such as smart grids have led to fundamental changes **(Exhibit 4).** Value adding and informational services complement the traditional value chain. Furthermore, the increasing amount of prosumers forces that the flow within the value chain goes in both directions. The end-customer becomes a producer and feeds in electricity in the grid (IBM, 2010).

Demographics and Culture

Demographics and culture have a strong impact on every service or product. On the one hand, the product and its functional, as well as emotional benefits must fit the culture. On the other hand demographics of the users influence the product design. Age, education, income and political ideology are significantly related to the attitude towards nature and the role of the human in it. Young, educated and wealthier people are more concerned about the environment than older or less educated people (Scott & Kaley Willits, 1994). Furthermore, younger people are more comfortable with modern technologies. Therefore, it is easier to use and understand online applications for them. Elder people often hesitate to use modern technologies and therefore they refuse tools that could make their life easier (Niehaves & Platfaut, 2014).

Also, the cross-cultural differences in terms of acceptance are important to consider. For example, Portuguese people have an overall positive attitude towards smart meters that help them to monitor their energy consumption, but they are refusing a liberal energy market (Lopes, Antunes, Janda, Peixoto & Martins, 2016). Swiss people have a high-value perception of modern energy-related technology and a high willingness to pay for it (Kaufmann, Künzel & Loock, 2013). Germans and Austrians are more ambiguous and have less environmental concerns (Curtius, Künzel, & Loock, 2012).

Performing a cross-cultural analysis using Hofstede's 6-D Model for Portugal (PT) and the Netherlands (NL) provides a deeper insight into country-specific attributes that play an important role in commercializing the product. Using this model allows getting holistic and descriptive information (Cavusgil, Knight, Riesenberger, Rammal & Rose, 2014).

This analysis **(Exhibit 5)** shows that there are no significant differences to be expected based on the degree of masculinity or uncertainty avoidance. However, the other dimensions (power distance, individualism, long-term orientation, and indulgence) presented substantial differences between the countries. Looking at the power distance index (PT 68 – NL 38) allows to predict the success of elements like social comparison incentives. Due to a low score for the Netherlands and the perspective on power distribution among groups, the social comparison incentives might work really well. For Portugal, another approach might be needed and the social comparison incentives should be tested carefully. Another example would be the high indulgence score in the Netherlands compared to the low score in Portugal. Looking for fun and immediate gratification leads to the assumption that a gamification element would work better in the Netherlands than in Portugal (Hofstede Insights, 2017; Hofstede, 2011).

Prosumption

The term prosumer is derived from prosumption and is defined as the process where production and consumption are hardly or even impossible to separate. Especially, within the electricity sector, the prosumer becomes more and more important (Ritzer, 2015). Traditionally, the consumer bought electricity from the local electricity provider. Nowadays, the consumer also produces energy by integrating, for example, solar panels into the grid. He relies on smart meters and electricity producing technologies in combination with home energy management systems, energy storage and electric vehicles. Many countries are studying optimal solutions or models of prosumption in the order to build up a low-carbon energy system. One system to consider consists of prosumers that live autonomously from their own produced electricity. Due to geographic, financial and economic constraints, this segment will be comparably small. Another system is prosumer who are producing and/or storing energy within the grid without having the ability to run a completely autonomous system to cover their energy needs at all time. Having prosumers rather than consumers offers the compelling possibility to build decentralized, more flexible, local networks of electricity producers that interact with each other in virtual communities. The prosumer in these communities competes with traditional electricity suppliers (Parag & Sovacool 2016).

STRATEGIC ISSUES FOR MANAGING MULTIPARTY PROJECTS

Nuno Santos is aware of the issue that multiparty projects are complex social and economic undertakings that need to be planned really well in advance. It is important that every project partner has a clear idea about his role, the objective and what will happen after the project. Nuno Santos is aware of the fact that he has other objectives than the other project partners **(Exhibit 1)**. In the case of me², the question is mainly who will be responsible for the platform after the project and how the revenue will be distributed. Not only transnational R&D projects involve several partners, institutions, and businesses, multiparty projects are also very common in other industries, such as the IT and construction industry. Therefore it

is useful to look how multiparty projects are carried out in these industries. To avoid the common mistakes Nuno Santos analyzed why multiparty projects often fail and found as main reasons (Lahdenperä, 2012):

- Underestimation of complexity, cost and time
- Missing control
- Lack of communication
- Missing link to stakeholders
- Different cultures within the project
- No efficient risk management
- Poorly planned or managed

Out of these common mistakes in managing multiparty projects, Nuno Santos derives communication, culture, and control as the most important issues to observe. Furthermore, critical issues that needed close attention are mainly the contractual structure, the distribution of risk and revenue, financial transparency and joint-decision-making. These elements are critical for the project because every party has a clear idea of what he can expect and who has which responsibilities. The clearer these points are written down in an agreement or contract the fewer problems due to misunderstandings or wrong expectations will occur.

BUSINESS MODELS AND PLATFORM ECONOMICS

Next to the strategic considerations, Nuno Santos was pondering about the setup of the business model. He was questioning whether a classical business model or a platform business model will be the best for the business **(Exhibit 6)** (Baden-Fuller, Guidici, Haefliger & Morgan, 2017). In general, he does not want to miss out the possibility to find a suitable business model which respects the platform construction of me². However, he is also aware of the fact that a platform business model must not be the most appropriate in this case. He sees that me² is defined as an integrated platform because it combines the elements interaction (electricity usage) and communication (competition).

Platform Types

Platforms create value by matching decentralized demand and supply, provide space for interaction, complement services or products or build up whole ecosystems. Based on the way value is created platforms can normally be classified as "Transaction", "Innovation", "Investment" or "Integrated"-platform. An important characteristic of all platforms is the presence of network effects. Transaction platforms are intermediaries that facilitate, speed up or pool transactions/ exchanges between users, sellers or buyers. Innovation platforms are defined as a technology, software or service which offers external partners to participate in the innovation and product development process of a company. Investment platforms consist of a company or a group that holds a portfolio of the company as a holding or active investor.

Lastly, a mixture of all kinds of platforms results in a so-called integrated platforms (Evans & Gawer, 2016).

Platform Business Models

The difference between traditional business models (e.g. selling a product or providing a service) and platform business models is that platforms create a market for supply and demand which is brought together. An example is AirBnB which matches flat owners and travelers. It minimizes the marketing and sales efforts of the supplier and at the same time, it reduces the search efforts of the buyer. Uber even goes one step further and balances demand and supply by adjusting the prices in real-time. If demand is high Uber will increase the price which makes it attractive to drive for Uber and more cars get on the road. At the same time demand decreases because price-sensitive customers decide to take a walk or the public transport (Saeed, 2017). Most modern commercial platforms are an aggregator business model because they aggregate all individual demand, all individual supply and bring it together.

COMPETITION

One day Nuno Santos found an advertisement from EDP in his mailbox, telling him to use their new mobile application to monitor his energy consumption. He has not expected to find an advertisement in his mail which is so close to the me²-project he is currently working on. However, a clear definition of competition is difficult by looking at the project me². Therefore, Nuno concentrated his analysis on a couple of European competitors **(Exhibit 7)**, especially from Portugal and the Netherlands who have a competing or substituting product.

EDP

Energias de Portugal is Portugal's major electricity operator as well as one of the largest companies in the country. Its core business is energy supply to private and business customers. The company's product: EDP re:dy, allows its customers to measure, observe and to control their energy usage and production. The customer has to plug an edp re:dy plug between the socket and the product he wants to use. Those plugs can be controlled by a mobile application which allows the customer to switch on or off certain electronics like the AC, the pool heater or the washing machine. Using the app, the customer always knows what consumes how much energy and when. For the starter kit, EDP asks for € 102 and a monthly charge of € 3.90 (EDP, 2017).

Iberdrola

Iberdrola is a Spanish electricity operator and as a member of the Euro Stoxx 50, it is also one of Europe's largest enterprises. Its core business in Portugal is also defined by the supply of energy to private and business customers. Furthermore, Iberdrola offers a capacity bank which allows homeowners to store energy that is purchased cheaper during low demand hours. Therefore homeowners can install such

a capacity bank at their house (Iberdrola, 2017). However, the installation and acquisition costs of a capacity bank are high and the amortization will take far longer.

Endesa

Endesa is Spain's largest electric energy provider. Like EDP and Iberdrola, Endesa supplies energy to private and business customers. Different from its competitors it does not offer any products to reduce monitor or control the energy consumption. Although the company does not offer such products, it is referring to energy saving strategies (Endesa, 2017). Furthermore, it is referring to Domotica which are intelligent energy consumption control platform for smart homes which can help to save energy. Domotica is not a system that can be easily equipped in any house or flat because it is not based on a mobile interaction platform (Endesa Educa, 2017).

Tesla

Tesla as a pioneer in the field of electronic vehicles provides a combination that makes the home autonomous from electricity providers. The combination of the Solar Roof (solar panels in form of roof tiles), the Powerwall (energy storage) and the car itself create a completely autarkic system (Tesla, 2017).This value proposition makes customers largely autonomous from energy providers and therefore a platform like me² would not be necessary anymore. However, this is connected with a big investment for homeowners and takes a long time to amortize.

Edimax

Edimax is a Taiwanese enterprise which concentrates on abroad range of network solutions. One product line consists of smart plug switches that measure energy consumption and sends the data to an application. Basically, it offers the same service like me² with its smart devices. The customer can control the plug with a Smartphone. They can switch it on and off, set a maximum for the energy consumption, use a timer and more. Compared to me², Edimax is missing an open platform. The customer using the product is using it within a closed system and without any connection to other users. Furthermore, it only offers the possibility to monitor and control the energy consumption. It cannot be connected to other systems (Edimax, 2017).

Smappee

The Belgium company smappee, founded in 2012, develops innovative solutions that foster sustainable energy consumption similar to me². Depending on the purchased product, customers can monitor and track their use of solar energy (from own solar panels), gas, water, and electricity. Furthermore, they are able to break down the consumption to every connected device. The company wants to change the users' energy consumption habits without compromising on comfort. The company promotes the possibility to track real-time data and to see always what is consumed at home. Furthermore, they promise savings

up 30%. The basic product only allows measuring and tracking energy consumption. If the customer wants to control his devices remotely he has to buy extra equipment, comparable to the me² smart meter devices (Smappee, 2017).

LATEST DEVELOPMENT

Nuno Santos was aware of the fact that at this stage of development me² had more a physical product business model by providing the hardware and the platform to its customers than a platform business model that aggregates demand as well as supply and facilitates transactions. However, the platform already allowed its users to compare themselves with others within their community and to plan energy consumption regarding peak demand hours and different prices. Considering that no legal regulations were violated, the next development stage for me² would be the transition from a product business model to an aggregation platform business model. Taking into account that the market will be dominated by prosumers there are basically three prosumer market models. The peer-to-peer market would allow prosumers to trade energy among each other without feeding the grid. A prosumer-to-grid market would enable prosumer to feed the grid with their produced electricity and get revenues from it. The market for organized prosumer groups is the closest to me². The produced electricity would be distributed, stored, sold and bought among organized groups such as local communities. Therefore these groups can be considered as virtual power plants, producing and distributing electricity over the grid to each other, while using a software platform and smart meters to keep track of production and consumption (Parag & Sovacool 2016). This becomes possible because many economies are reaching the point where the technological development allows individuals and businesses to install solar-energy producing technologies, without governmental subsidies, and producing electricity below the market price (Schleicher-Tappeser, 2012).

TIME TO ACT

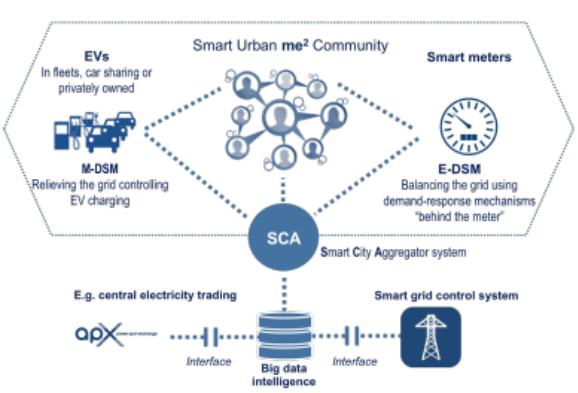
After these reflections, Nuno Santos faced several questions: What could be an attractive value proposition for consumers? How can we position me² in the market and what would be a suitable and sustainable business model for it? Also, were there cultural differences one should be aware of between the Netherlands, Portugal and other countries? Generally spoken, how can a company include cultural differences in their business models? What would be the impact of these differences? How could we split the tasks and distribute the revenue among each other?

Exhibit 1: Project Partners

Company	Company Description	Strategic intention
Amsterdam University of Applied Sciences	The Urban Technology Research programme of the University of Applied Sciences Amsterdam (Hogeschool van Amsterdam - HVA) carries out applied research in the field of sustainable energy, smart mobility, urban design and circular design. Electric mobility and smart grids are among the research priorities of the programme, with a focus on monitoring, modeling, and simulation of charge behavior of electric vehicle users. HVA brings in knowledge of applied mathematics, urban analytics, energy modeling and business modeling.	Most important issue is research. Commercialization becomes interesting from a research perspective.
CATOLICA LISBON SCIL smartcityinnovationlab	The Smart City Innovation Lab (SCIL) develops and disseminates knowledge related to urban technologies on a firm, consumer and policy level. They believe that smart city technologies should create well-being for its citizens. The interdisciplinary research team unites the fields of business model innovation, behavioral change mechanisms, market strategies and national and international policy analysis.	Most important issue is research. Commercialization becomes interesting from a research perspective.
LISBOA e·nova	LISBOA E-NOVA is a non-profit association operating under a private law that seeks to contribute to the sustainable development of the city of Lisbon through mainstreaming good practices in urban planning, construction, urban management, and mobility, involving all the city's key stakeholders. LISBOA E-NOVA is responsible for the development and monitoring of Lisbon's Energy-Environment Strategy, signed by the Lisbon Municipality in 2008.	Wants to contribute to the sustainable development of Lisbon through mainstreaming good practices in e-mobility and others
MEDIAPRIMER design digital media software	MediaPrimer – Tecnologias e Sistemas Multimédia, Lda. is a SME founded in 2000 by Nuno Carlos Santos, certified by two standards (NP4457 - Management of Research, Development and Innovation and ISO9001 – Quality Management), with two functional areas: Software and Data Management and Graphic Design and Digital Media.	High importance of the project. Objective is the commercialization of the project across Europe.
MOOSMOAR ENERGIES OG	MOOSMOAR Energies OG is a SME providing consulting services for development, management, processing and dissemination of projects in the field of energy systems, energy economics Smart Cities and Smart Grids. The focus lies in future developments towards a more renewable-based energy system design as well as corresponding economic value proposition analysis.	Is contractor in this project and does not have special interests in the commercialization
VPS Virtual Power Solutions	VPS Virtual Power Solutions is a SME dedicated to the energy, water, and environment sectors. VPS develops and implements integrated monitoring, alarm, control, and management software solutions. VPS is one of the main players in the market of M2M technology for Smart Cities, in the energy efficiency, water, and environment segments. VPS uses its experience, technology, creativity and excellent customer service for cities, companies, and citizens to enjoy natural resources in the most efficient way possible	Has the same goal like Media Primer but assigns a lower importance to the commercialization since they already operate a similar platform.

Exhibit 2: me²-platform

me²
Integrated smart city mobility and energy platform



me² is a two year R&D project funded under the Urban Europe Joint Programming Initiative that intends to develop a new market place for urban actors in which a local community of electric vehicle users and local smart meter owners are brought together through means of a local urban online community.

Situation

- Increasing **usage of charging spots**
- Increasingly **isolated neighborhoods**
- March of the **internet of things**

me² Solution

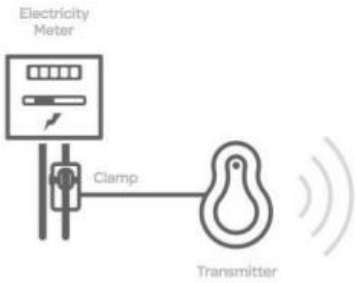
- **Smart city aggregator platform** linking mobility and electricity needs
- **Linking the grid with consumer** preferences via mechanisms for behavior change
- **Engaging user-centered**, gamified community platform

Expected Results

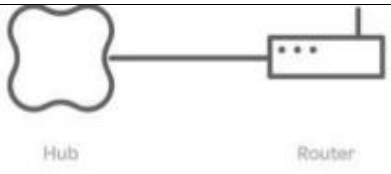
- **More efficient use of charging infrastructure**
- **Sense of belonging** & optimized electricity bill
- Viable **cross-cultural business model & policy** recommendation set

Further information can be found at
http://me2-project.eu

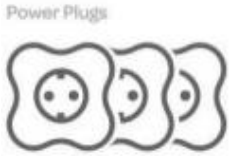
Exhibit 3: me² smart metering devices



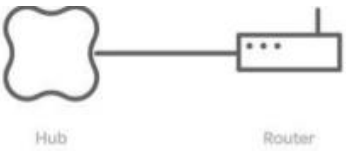
The transmitter is connected to the households electricity meter by using a clamp to track the overall energy consumption



The hub which receives all information from all parts is simply connected with the households router

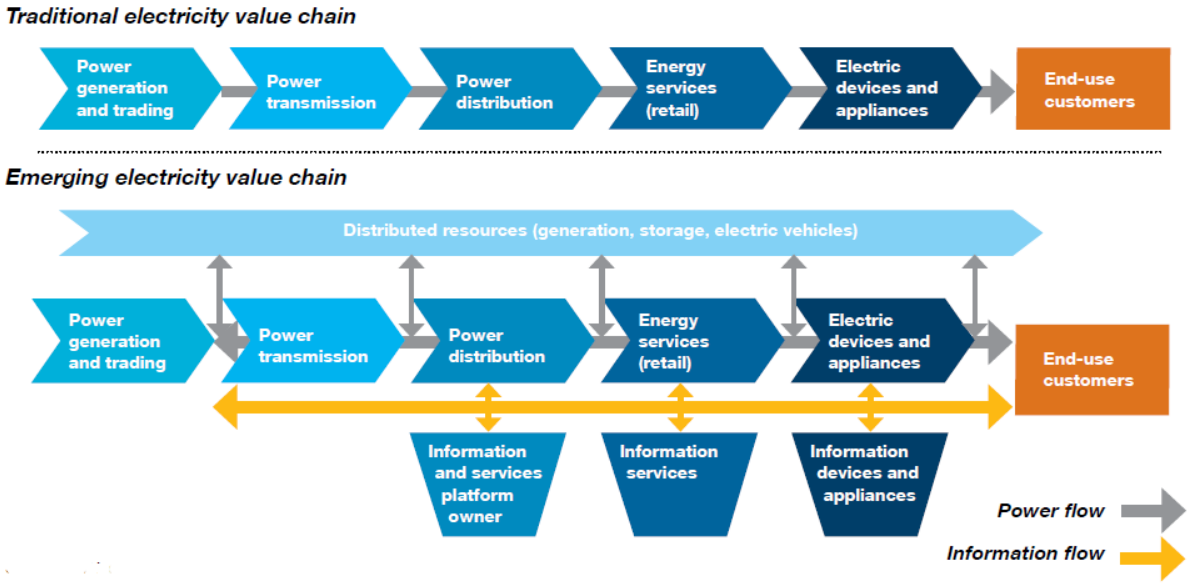


The power plugs belong between the device which is connected with the energy system of the household (e.g. fridge, washing machine,…). They control and measure the energy consumption of all connected devices and send information to the hub



The Hub collects all the information and sends them to the me² platform. As soon as the platform receives the data, the owner can look at them. Furthermore, the data is processed so that the whole community can benefit from it.

Exhibit 4: Emerging Electricity Value Chain



Source: IBM Institute for Business Value (2010)

Exhibit 5: Cross-Cultural Analysis (6-D Model) – Portugal vs. Netherlands

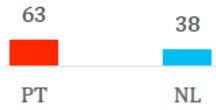
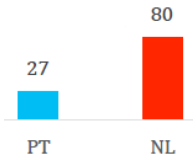
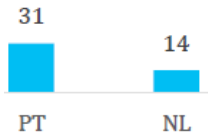
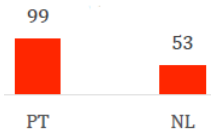
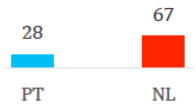
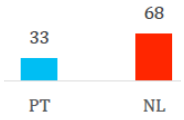
Dimension	Description	Degree	
		High	Low
Power distance 	Power Distance has been defined as the extent to which the less powerful members of organizations accept and expect that power is distributed unequally.	Acceptance of hierarchical distance Centralized distribution of power	Hierarchy is formal necessity Decentralized, more equally distributed power
Individualism vs. collectivism 	It is the degree to which people in a society are integrated into groups	<u>Individualism:</u> Person and only close relatives, friends are important	<u>Collectivism:</u> Long-term commitment to members of larger related group (family, friends)
Masculinity vs. feminity 	Masculinity refers to cultures that value competitive, convincing and persisting behavioral attributes in order to reach a goal. Feminine societies are valuing stronger caring, supporting or helping behavioral attributes	<u>Masculinity:</u> Competitiveness Success Achievements	<u>Feminity:</u> Caring Solidarity Consensus oriented
Uncertainty avoidance 	It indicates to what extent a culture programs its members to feel either uncomfortable or comfortable in unstructured situations. Unstructured situations are novel, unknown, surprising, different from usual.	Prefers clear patterns, rules, and structures. Planning in advance. Less open to unorthodox behaviors or ideas	Flexible and open to new unknown situations Planning less in advance
Long-term orientation vs.short-term normative 	Long-term values perseverance, thrift, ordering relationships by status, and having a sense of shame, Short-term pole were reciprocating social obligations, respect for tradition	<u>Long term:</u> Preparing the future Pragmatism Present and Future	<u>Short term:</u> Living more in the past Inflexible in social situations
Indulgence vs. Restraints 	Indulgence stands for a society that allows relatively free gratification of basic and natural human desires related to enjoying life and having fun.	<u>Indulgence:</u> Immediate gratification, impulsive, happiness	<u>Restraints:</u> Stronger self-control Tendency to pessimism

Exhibit 6: Business Model Archetypes

Product Business Model

A good or service is worthless until the consumer does something with it

The value creation for the consumer takes place away from the producer

The consumer has to be creative or adds other resources to create value

Examples: frozen food (needs to be prepared), car (needs to be driven)

Solution Business Model

Customer directly engage together with the company in the value creation process

Therefore, the company is more aware of the needs of its customers

Examples: Co-creation of consulting solutions, meal that is consumed in a full-service restaurant

Matchmaking Business Model

Involves 3 or more actors (platform owner, seller, buyer)

The matchmaker creates value by bringing buyer and seller together (saving effort and time)

Buyer does often not know about the existence or source of a good or service

Examples: AirBnB, Uber

Multisided Business Model

Involves 3 or more actors (platform owner, 2 disconnected customer groups)

Beneficiary customer who receives service below costs and paying customer that benefits from the using of the product by the beneficiary customer

Platform owner often offers complementary products

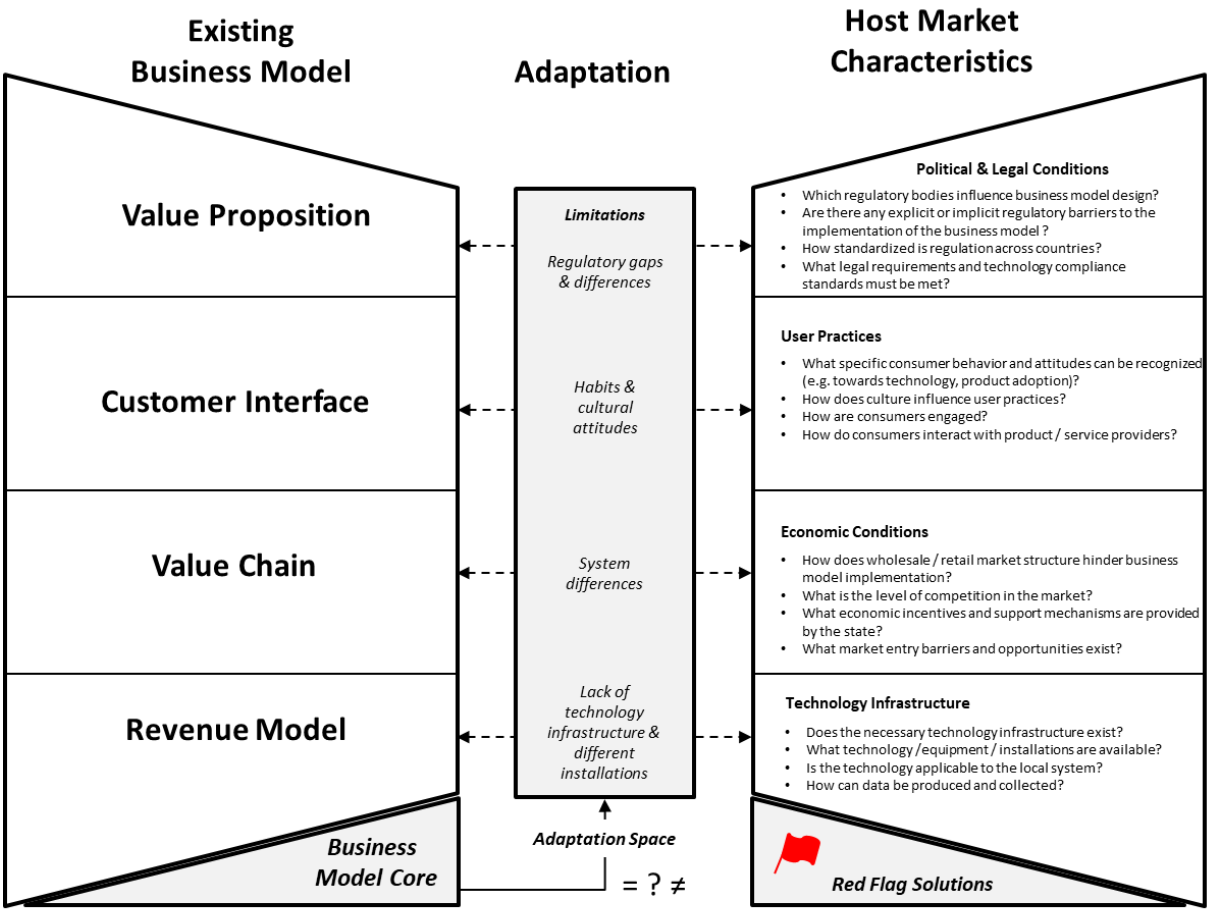
Examples: Advertisement financed newspapers, search engines

Source: Baden-Fuller, Guidici, Haefliger & Morgan, 2017

Exhibit 7: Competitors

Company	Logo	Product
EDP – Energias de Portugal		
Iberdrola		
Endesa		
Tesla		
Edimax		
Smappee		

Exhibit 8: Market Design Canvas



1. Evaluate international market design by analyzing market characteristics following the four market dimensions of the canvas, answering all specified questions.

2. Have a thorough understanding of your current business model or the business model which you wish to implement.

3. Compare your current business model with the identified market design characteristics to recognize business model fit and/or possible constraints or conflicts with certain business model elements.

4. Highlight barriers by setting red flags.

5. Develop red flag solutions which do not conflict with the business model core and can be applied through business model adaptation.

6. Adapt each business model element to fit the foreign market design in line with business strategy.

But be careful: if you need to adapt more than five components, you should potentially reconsider your market choice, as there seem to be too many contradicting forces.

Exhibit 9: Important Market Design Issues

	Portugal	The Netherlands
Regulations for feeding in electricity (EUR/kWh)	Wind: 4.6 ct/kWh Solar: 3.5-5.0 ct/kWh (BMU, 2011a)	Wind: 11.3 – 12 ct/kWh Solar: 9-15 ct/kWh (BMU, 2011b)
Cryptocurrency regulation? Blockchain usage?	No regulations (Cryptocoinnews, 2017)	No regulations Dutch central bank develops own blockchain prototype – DNBCoin (Perkinscoie, 2017)
Subsidies	Reduced value-added tax on solar energy-producing facilities (BMU 2011a)	No tax on energy consumption for the produced amount of electricity (BMU, 2011b)

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