

The Energy Kiosk Model for Electrification

Status Quo and Future Strategies

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Abstract

The energy kiosk model is an approach to provide electricity to low income households in underserved regions. Different kiosk models are being tested, ranging from charging stations for lamps and batteries to multi-service stations offering entertainment and education. Successful showcases have been implemented especially in Sub-Saharan Africa and India. However, only few projects have gone beyond the pilot stage. Although the model works in principle, it seems difficult to create, scale, and replicate projects with positive social impact and long-term economic viability. This study describes the status of energy kiosk initiatives, identifies key challenges and successful practices of operational projects, and outlines future strategies. As several initiatives carry their projects in directions diverging from the original energy kiosk approach, key success factors for these new strategies are identified in interviews with experts from different sectors.

Key words: *Electrification, off-grid, inclusive business models, energy kiosk, charging station*

I. Introduction

Energy kiosks are one solution for electrification of remote households in underserved regions, and contribute to close the energy access gap of 1.3 billion people worldwide [1, p. 88]. Energy kiosks are central stations for electricity production and provision to consumers, usually in rural areas far off the central grid. In most cases, electricity is produced from solar power, sometimes complemented by a diesel generator. The electricity reaches consumers through devices with a battery that are charged at the energy kiosk. These devices could be mobile phones, lanterns of different sizes, car batteries or specifically designed battery boxes to plug in razors or radios at home. Most energy kiosks reach less than 100 households with their charging services.

With the enhancement of private sector initiative in electrification, economic and social sustainability and replication of approaches get more important. This is a big challenge also for energy kiosks, where practitioners face challenges in establishing their projects and scaling up in numbers. Most research on electrification approaches focuses on the technology and institutional setup of projects. Little attention has been paid to their economic viability and revenue models. The energy kiosk model in specific has not been assessed at all – no overview on the status quo, concrete problems and existent solution strategies of energy kiosk projects is available. This paper intends to fill this gap. It

provides an overview of the existing energy kiosk companies, and assesses the viability of the concept as a business model. It does so by putting a focus on challenges and solutions in operation and resource provision of existing energy kiosk projects.

In qualitative interviews, the research question “What is keeping energy kiosk businesses from reaching their full potential?” was answered by energy kiosk practitioners. The focus was herein on the challenges and solution strategies of energy kiosk companies regarding their product mix, market demand, customer interface, local human resources and financial planning. After identifying three future strategies for energy kiosk projects, a second research question was framed: “What are key success factors for the future strategy scenarios of the energy kiosk model?” To get first insights into those strategies and their chances for success, practitioners following similar strategies in other sectors were interviewed.

After the introduction in chapter 1 follows an overview of the current status of energy kiosk projects worldwide in chapter 2. Chapter 3 sketches the challenges and solutions energy kiosk companies face currently. Chapter 4 outlines the future of the approach, and chapter 5 refers to the role and contribution of the ecosystem. A summary of findings and an outlook is provided in chapter 6.

2. Status Quo of Energy Kiosk Operation

In the benchmarking carried out in the scope of this research, 24 relevant cases of existing energy kiosk initiatives were identified. Start-ups, multinational companies, governmental institutions, and non-governmental organisations (NGOs) have initiated energy kiosk projects, differing in their operational setup and motives. Although not all of these initiatives have a corporate character, for reasons of simplicity they will be referred to as “energy kiosk companies” in the following. 45% of all company sites are located in Eastern Africa¹, followed by 17% in Western Africa and 14% in Southern Asia. Also Middle Africa represents a region of high activity with 10% of company sites. Looking at the number of operational kiosks per region, the picture is different. More than 90% of all active kiosks are situated in Southern Asia – in this case more than 2300 kiosks in India. In comparison, only 89 energy kiosks are placed in Eastern Africa, a similar amount to Western Africa with 78 kiosks.

As most kiosk projects date back only some years, the number of operational kiosks per company is low in most cases. Six companies have between eleven and 25 energy kiosks in operation. The remaining 16 initiatives – two thirds of all benchmarked organisations – are running less than ten energy kiosks each. The 24 benchmarked kiosk companies are in different phases of development in 2014. Eight companies out of 24 are currently prototyping their technology and business model, setting up first trial series of their energy kiosk version. Two companies have to be located between the prototyping and replication phase. Both have tested their model several times, but are only building new energy kiosks if a third party requests a station and provides funds. Five companies are operating their existing stations, but are not growing in numbers any more. The reasons for this vary: Some are dependent on further public or private funding, some could not prove their business model to be

¹ All data represented in graphs and text in this chapter is based on interviews, emails, and online research. The respective sources are found in Appendix A4 in the thesis, in the Excel file *Chapter 4_Status Quo_resulting from Benchmarking*.

economically sustainable, but are operating the already set up stations with a positive social impact. Nine companies entered the phase of replication. They state to have their technical design and operation model validated and try to scale up their business. The current project phases of companies are visualised in Figure 3 in chapter 4, there linked to the future development of the kiosk projects.

Figure 1 shows that battery, phone and lantern charging are the predominant services offered at the energy kiosks. The frequency of recharging depends on the size of the battery, the usage pattern in households and the seasonally varying income of customers. Most companies state that customers frequent the kiosk between one and seven times per week. In some cases, customers only come once every 10 to 14 days. Seven out of 24 kiosk companies also provide entertainment services, in the form of TV screenings of movies and football matches. Seven companies have computers at their station to offer internet services, five of them state to also include printing, scanning, copying, and typing in their portfolio. Another option, realised by six companies, is the sale of solar or electric products such as torches, batteries, or devices that can be used in combination with charged batteries, e.g. fans, light bulbs and radios. Some companies also use parts of the generated electricity for cooling, other offers products not directly linked to energy, such as telecommunication products, clean water, consumer goods, or health and skills workshops.

Access to funding is crucial for the success of the kiosk projects. More than half of all benchmarked companies rely fully or partly on multilateral, international, or governmental donors. Other common sources of funding are foundations, private donors, and CSR budgets. Only few companies refer to their own funds, banks, or investors in order to finance their business.

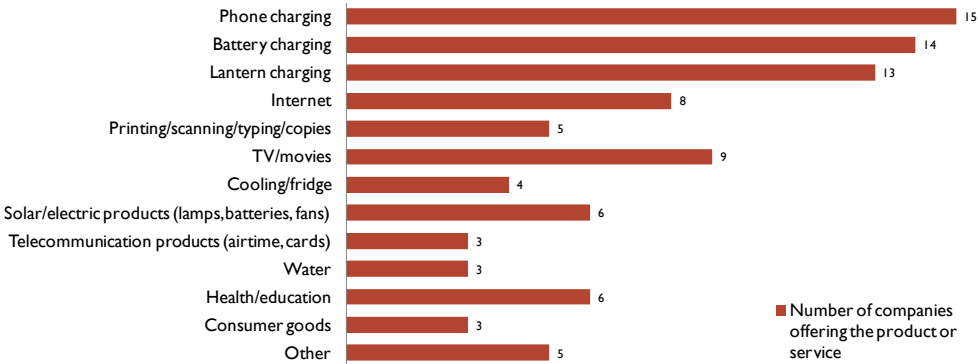


Figure 1: Variety of services and products offered in the energy kiosks (B1, B2)¹

Half of all benchmarked companies can be defined as non-profit initiatives where profit is – if at all – only considered as an indicator for sustainability. As Figure 2 shows, all companies clustered as non-profits are predominantly funded through public or private donors or through CSR budgets. The energy kiosk companies that do consider profit creation as a relevant indicator and aim at setting up sustainable business models vary in their main source of financing. They either cross-finance their kiosk businesses with other activities, or refer to investors, banks and own funds.

¹ This indicates which energy kiosk companies are considered for the graph; further details in Appendix A1 in the thesis.

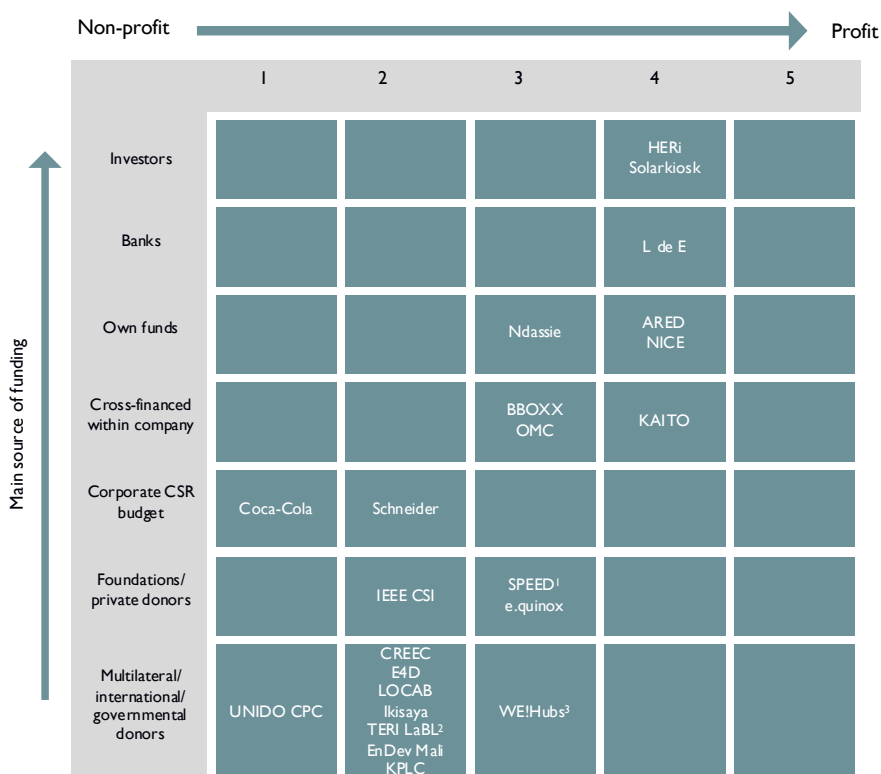


Figure 2: Companies clustered according to main source of funding and relevance of profit (B1, B2, except SELCO)¹²³

3. Practical Challenges and Solutions for Energy Kiosks

All energy kiosk companies are struggling to bring their projects to scale and replicate their model in order to create sustainable businesses. The reasons for this are manifold, as each company operates in a different environment and with diverse approaches. This chapter clusters all obstacles and difficulties named by the interview partners in order to identify the main challenges energy kiosk projects have in common⁴. At the same time, it lists possible solution strategies, sorted in four subchapters: Market demand, customer interface, local HR, and overall financial situation.

3.1 Market

Energy kiosk projects face very specific challenges when entering low-income markets. The energy kiosk companies named demand satisfaction, competitive pricing, and awareness raising as the most challenging aspects for market penetration.

Demand Satisfaction

Energy kiosk businesses refer their offer to households which cannot afford an own solar home system or grid connection. The needs of these households and the resulting demand profile varies according to local conditions, income level, and other factors. As a first step, the needs in each target area have to be identified. Then, energy kiosk companies must deal with the fact that the demand for electricity is low and fluctuating for low-income households, while higher income households request

¹ Private donations are used for project development and community engagement in the SPEED project; technology, infrastructure and manpower is covered by an investing energy supply company.

² Private donations and equity are also significant for the funding of the TERI LaBL initiative.

³ The WE!Hubs are also funded through foundations/private donors and CSR budget.

⁴ The information presented in this chapter bases on interviews with energy kiosk company representatives, see excel file *Chapter 5_Challenges and Best Practices_resulting from Interview Notes*.

electricity for fridges and TVs with high power capacity. Kiosk companies developed several strategies to manage these challenges. Before the setup of new kiosks, they conduct detailed surveys regarding income level and energy use. In many cases, the charging service is adapted and customised throughout the kiosk operation: Battery sizes, the frequency of recharging and the requested services depend very much on the local customers and context. Many kiosks offer additional services such as TV screenings or internet access on demand, or start selling electric products to complement the charging service and adapt it to the local requests.

Competitive Pricing

Further challenges for energy kiosk companies are linked to competition and pricing strategies. Although there is a need for the provision of modern energy services in underdeveloped rural areas, the willingness and ability to pay for most customers is very low. The battery or lantern charging service has to compete with kerosene and candles as existing alternatives at most sites. Next to that, more and more solar home system distributors reach rural areas, providing another competitive solution. Some energy kiosks are even located in areas that the central grid covers. The kiosk companies all follow similar strategies to compete with these approaches. They set the price for electricity at the energy kiosk equal or lower to what households would pay for fuel-based lighting for the same amount of hours. In order to enable customers to use electricity regularly on the one hand and to stabilise kiosk revenues on the other hand, the energy kiosk companies offer payment per month, week, or day. According to several companies, the main competitive edge of charging services in comparison to fuel-based lighting is the higher quality of light and the reduction of health hazards through avoided emissions from kerosene lamps and candles. Overall, kiosk companies tend to choose sites far off the grid, where no alternatives such as solar home systems are available. Also in this context, initial surveys investigating the local competition are of high importance.

Marketing and Awareness Raising

Marketing and awareness raising towards potential customers is necessary in order to draw the attention of the target group to the benefits of new products and services and attract households to the energy kiosk offer. Conventional marketing tools often fail due to a lack of radios, TVs, or computers, and due to a high illiteracy rate in the targeted areas. At the same time, energy kiosk companies often need to overcome initial scepticism towards new products, and struggle with the low awareness of customers of their own needs. Many of the energy kiosk companies carry out marketing on site and in person. Product demonstrations at the kiosk and door-to-door campaigns help to build trust, and awareness and training campaigns increase the knowledge of the population on light quality and health effects. In this, it is important to convince key actors in the villages first. Overall, many of the kiosk companies agree that building trust takes time and resources.

3.2 Customer Interface

Alongside the challenge of market penetration, the maintenance of continuous relations with individual customers constitutes another difficult task for the energy kiosk companies and their local operators. The challenges in the customer interface include delivery of services and payment, sustainable aftersales activities, and all other efforts to ensure customer satisfaction.

Delivery and Payment

One of the characteristics of the energy kiosk model is the central provision of services. As an effect of this centrality, transportation of charged devices – mostly batteries and lanterns – from the kiosk to the households is required, and central payment has to be carried out. In many rural settings, houses are scattered over a large area; customers often live several kilometres away from the charging station. An issue linked to that is the unreliable return of empty batteries and lanterns. Several companies struggle with customers keeping discharged devices for several weeks without returning them. Similarly, requesting fees and transferring them to the company headquarters is a complex procedure that can result in delays and is prone to fraud. To overcome these difficulties, kiosk companies developed several smart strategies. They specifically design robust and waterproof devices that can be transported easily, or even offer a home delivery service of charged devices. To prevent fraud and mistreatment, many companies register the batteries, document the rental and set up clear guidelines in a customer contract. A solution for timely payment is the use of mobile payment schemes.

Aftersales Service

The charging service offered by energy kiosks works on batteries or devices that include batteries. These batteries are sensitive and require proper treatment and maintenance. At the same time, most customers renting a battery lack adequate knowledge on how the device functions and how it should be handled. In case of technical failure of the charging devices, fast and reliable action is required. The lack of skilled technicians in targeted regions often leads to long waiting times until a device is repaired. To alleviate these problems, many kiosk companies are offering intense technical training to both operators and customers. Awareness of customers might prevent failures, and skilled operators might be able to repair and maintain the technical equipment. Either operators provide aftersales service locally, or company technicians visit the kiosk site in regular intervals for customer service and repair of technical equipment.

Customer Loyalty

Most energy kiosks operate in rural areas with a limited number of potential customers within reach. In such a setting, customer satisfaction and loyalty is of high importance, especially when considering the effort it takes to overcome scepticism and to build trust. Many customers only return irregularly to the service, and show little care for the charging devices, which are not in their ownership. To overcome this, most energy kiosk companies request the payment of a deposit for the battery or lantern that is rented out. This increases the attachment of the customer to the device and to the service, same as monthly subscription and payment schemes do. In order to ensure customer satisfaction, regular surveys and the establishment of a complaints mechanism is recommended.

3.3 Local Human Resources

In order to manage the charging service and other potential energy kiosk activities, the kiosk companies cooperate with local actors as operators. Companies need to find ways to prevent fraud and ensure a high quality service by selecting and supervising their local staff.

Selection and Support

The success of a charging station depends in big parts on the entrepreneur. At the same time, access to talent is considered a challenge for many companies. The lack of skills of applicants in remote rural

areas is one major aspect in this. Furthermore, local operators need to be accepted within the community. Once a fitting candidate is found, day-to-day support through the energy kiosk company is necessary. Missing rural infrastructure and differences in the management culture between local operators and often Western-based companies affect the quality of service operators provide. In order to make sure that the prospective operators are able to run the station independently, most of the energy kiosk companies set minimum criteria for applicants, such as the ability to read and write, and basic computer and accounting skills. Kiosk companies prefer candidates with business experience, and often involve local key persons in the selection of operators. After selection, operators receive intense business and technical training and ongoing support through visits and calls by representatives of the energy kiosk companies.

Performance of Operators

Next to selection, training, and supervision, there are tested several more strategies to enhance the performance of operators and reduce problems and conflicts in the cooperation. Seven out of 18 interviewed companies detected fraud or criminal activity of individual operators in the past. This could be small incidents, but also severe fraud as repeated theft of money. Other reported incidents linked to local partners relate to lack of motivation. In some cases, operators did not show up at the kiosk during core business times, or show little cooperation in general. Many energy kiosk companies also mention the lack of entrepreneurial initiative of local operators. To minimize the risk of fraud, regular control visits through company representatives are carried out. As a second point, the choice of operation model regulates the opportunities to cheat. In employment, it is easy and tempting to cheat. Two companies suggest that a franchising system gives less opportunity for fraud as operators pay a fixed fee to the company and are otherwise responsible for their business themselves. In order to enhance the motivation and entrepreneurial thinking, some kiosk companies make operators invest in the kiosk infrastructure and involve them in the setup of the station. Good experiences were also made with a code of conduct to raise awareness for rules and obligations as operator.

3.4 Finances

The financial situation is the most critical aspect for the performance of many companies. However, the goal of reaching financial sustainability is interpreted differently by the energy kiosk companies. Profit-oriented companies refer to a situation where all fixed and variable costs are covered or surpassed by kiosk revenues. Sustainability for non-profit initiatives rather refers to a situation where operation can be ensured long-term, regardless of the coverage of initial costs.

Especially profit-oriented companies face three major internal challenges regarding finances. First, they struggle to cover the management salaries through kiosk revenues. The second challenge are the high upfront and recurring investment costs for energy kiosk infrastructure. Thirdly, the kiosk revenues through charging are by far too low to cover the occurring costs and generate profits.

The strategies to overcome these challenges are pointing in different directions. While non-profit initiatives are covering their costs through public or private donations, many profit-oriented companies try to increase their revenues. This is realised through a bigger number of kiosks with a constant management overhead, and the offer of other income-generating products and services at the kiosks. Others rather focus on lowering expenses by cutting down manufacturing costs or reducing the kiosk

size and capacity in order to decrease investment costs. Different from other challenges, proven and concrete best practices to ensure financial sustainability do not exist; all companies are still testing different approaches to create economically sustainable business models.

4. Future Strategies for the Energy Kiosk Business Model

The solutions to reach financial sustainability lead many companies in the direction of changing the initial business model of a classic charging kiosk fundamentally. Three new strategies could be identified in the interviews with kiosk companies: The business-to-business or business-to-public (B2B/B2P) strategy, the retail hub strategy and the business-in-a-box strategy¹.

In Figure 3, all benchmarked energy kiosk companies are clustered according to their future strategy derived from statements during the interviews. The lines of the matrix indicate the current project phase of the respective initiatives in 2014. The grey arrows show the direction in which the respective company would like to head implementing their future strategy. As the matrix shows, many companies are currently testing one of these three strategies, running first prototypes. The grey arrows indicate that most of them aim at replicating their kiosks with their new strategy, or want to set up additional sites on demand. Several companies already entered the replication phase with the retail hub and B2B strategy; the majority of these companies is just beginning to scale up. Next to the companies following the three strategies mentioned, there are some kiosk initiatives that do not see the need to change strategy for financial sustainability. Those projects plan to continue the standard kiosk model and are represented in the first column; most of them are non-profit initiatives.

Business-to-Business (B2B) or Business-to-Public (B2P)

B2B/B2P kiosk companies are technology providers, developing and selling the hardware for charging stations to public institutions or private businesses as customers. Different from the classic energy kiosk model, the B2B/B2P kiosk company is not involved in the management of operations; this is the responsibility of the buyer of the kiosk. Key factors for the success of this strategy are the identification of solvent customers who are looking for social impact instead of profit, the establishment of hardware distribution channels and the setup of aftersales services in the countries of operation.

Retail Hub

The availability of electricity and the central character of the kiosk make it an interesting multiplier for other products and services. This is why some companies decide to transform their charging kiosks to retail hubs by extending their portfolio. This could either happen by adding services, or by renting out sales floor for products and offering advertising space to partner companies. The refitted kiosks become multi-purpose stations that create revenues not only from charging services, but also through other products and services. For successful operation, energy kiosk companies following this strategy need to establish a diverse last mile infrastructure for product delivery and a clear reporting and tracking system to monitor the more complex processes. For financial stability it is furthermore essential to keep logistic costs on a low level.

¹ All information regarding these strategies is collected as interview quotes in the Excel file *Chapter 6_Future strategies_resulting from Interview Notes*, to find in Appendix A4.

Business-in-a-Box

With the business-in-a-box approach, kiosk companies are selling charging stations to local micro-entrepreneurs. In order to be affordable for local actors, the size of the charging kiosks is significantly smaller than in the classic energy kiosk model. One system is usually designed to charge 10 to 20 phones or lanterns at a time. The charging systems are installed in private households or small shops to serve the immediate neighbourhood of the local entrepreneur. For this model to work, local needs for electricity must be very low in order to be satisfied by this micro solution. Furthermore, the payback time for the system must be long enough to be affordable for the entrepreneur, but should not exceed three years. The companies selling businesses-in-a-box need to provide technical and marketing support to the entrepreneurs, but expensive control efforts should be minimised at the same time.

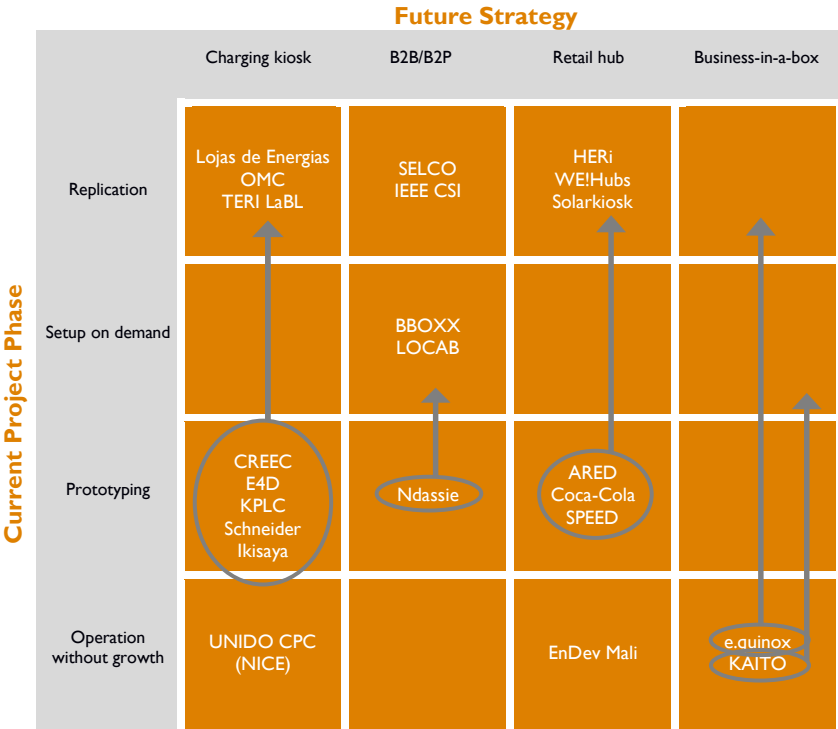


Figure 3: Companies clustered according to current project phase and future strategy (B1, B2)

5. The Role of the Ecosystem

Energy kiosk companies heavily depend on the environment in which they engage. The ecosystem of inclusive businesses consists of four pillars – information, incentives, investment, and implementation support [2, pp. 9, 22]. The fact that kiosk companies develop internal solutions in order to meet the challenges they encounter shows that they learned to deal with the difficult business environment at the bottom of the pyramid. However, high effort, costs, and time losses come with these compensatory activities. Some issues are also too big to be tackled by one company individually. A functional ecosystem that actively supports business activities would significantly increase the chances for success of energy kiosk companies.

Public sector partners such as governments, development agencies, and international organisations play a key role in supporting the implementation of businesses in developing countries. One example is the provision of infrastructure such as roads, public transport, telecommunication, and internet

access. This is especially relevant for kiosks in remote regions where the contact with local operators is maintained via mobile phone, email and site visits. Furthermore, energy kiosk companies struggle with the lack of basic skills of operators and lack of awareness of customers. Improvement of education standards is only achievable with governmental initiatives and the support of development agencies or international organisations. Governments should also provide incentives for off-grid and renewable energy investments such as stable subsidy and tax schemes, and provide statistical data for better market insight. Moreover, governmental institutions could significantly improve the energy kiosk companies' access to finance by providing investment guarantees and patient capital.

Next to public institutions, also the private sector can do its part to foster businesses such as energy kiosk companies. Both multi-national and national companies could – and already do – engage in the setup of infrastructure, and the collection of market information. If the respective institutions fail, private actors could even cover public services such as recycling or education. However, individual companies do not have the power to change the ecosystem alone. The existent gaps often are of systemic nature, and collective action of whole industries or sectors is required.

Several other partners also play a key role for the success of energy kiosk companies. Banks and investors need to offer fair credit conditions and patient capital, and NGOs and local actors have an essential role in capacity building and awareness raising of the village population.

6. Concluding Remarks

Throughout this research project, the energy kiosk model was examined from a variety of perspectives. A picture of the status quo of existing energy kiosk projects was drawn, including quantitative data on kiosk setup and management as well as qualitative evaluations of energy kiosk actors regarding challenges and opportunities in their business. Beyond that, possible future developments of the model were outlined and several future strategies were identified.

Overall, energy kiosk companies developed smart solutions to overcome operational challenges regarding market penetration, customer interface and local human resources. The fourth factor analysed specifically is the financial stability of companies. Most companies aiming at economic sustainability without donor support follow strategies that differ from the classic charging kiosk approach. The main three strategic paths identified – retail hub, B2B/B2P, and business-in-a-box – either require significantly lower investment costs or enable companies to increase and stabilise their revenues. These strategies are currently tested. The development of these strategies of energy kiosk companies should be further evaluated, and the role of ecosystem actors should be investigated more in detail. Further research is also needed regarding the social and economic impact of energy kiosk projects on the local population.

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