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Strategic Approaches and Barriers in Eco-Innovations: Case Studies in the Belgian and Swedish Beer Industries

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Abstract

This article contributes to the research on Eco-innovations in its exploration of the barriers to such innovations and of the different strategies managers use as they try to make their production and their products greener. The research consists of four case studies of manufacturers of ecological beer: two Swedish breweries and two Belgian breweries. The article examines how breweries, as first movers or fast followers, operate proactively or reactively when a new trend appears and takes hold in the alcohol industry. Based on the study's findings, a conceptual framework is presented that depicts the barriers and strategies relevant to Eco-innovations. The article concludes with managerial recommendations for how firms involved with Eco-innovations may develop strategies that overcome their barriers.

Keywords: eco-innovation, ecological beer, green management, first mover and fast follower, beer industry

1. Introduction

Many researchers in the twenty-first century propose Eco-innovations (EI) as sustainable solutions to environmental problems arising from, for example, climate change, waste disposal, and water/energy shortages (see, e.g., Bakhtina, 2011). We use Horbach et al.'s (2012, p. 113) definition of EI: *"The production, application or exploitation of a good, service, production process, organizational structure, or management or business method that is novel to the firm or user and which results, throughout its life cycle, in a reduction of environmental risk, pollution and the negative impacts of resource use (including energy use) compared to relevant alternatives".* Besides their many positive outcomes for the environment, EI can also prove advantageous to companies. According to Hartmann et al. (2005), such green innovations can favourably position and promote a company brand. According to Wong (2011), green innovations in product and process can give a company a competitive advantage over its rivals.

In this article, in which our settings are the Belgian and Swedish beer industries, we propose a conceptual framework for EI in which we depict firms' barriers to EI implementation and the strategies adopted to manage those barriers. We also offer managerial recommendations on how firms may develop strategies to overcome these barriers.

1.1 Literature Review

A number of researchers have studied EI since Fussler and James (1996) first introduced the term. In the last twenty years, many firms have implemented EI. However, according to Halila and Rundquist (2011), who compared differences and similarities in the success factors of "eco-innovations" and "other innovations", firms in the former group take longer to achieve market success. They also found that other innovators are more successful than eco-innovators in using their networks for financing and marketing. Angelo et al. (2012) found that EI implementers increasingly face multiple barriers at both the macro and micro levels. According to Thompson and Green (2005), insufficient support, time and resources create many of these barriers. In his study of the chemical industry in the United States, Theyl (2002) found industry context is a key factor in firms' successful use of EI. When an industry accepts the need for EI, firms in that industry find it much easier to implement EI. However, in industries less accepting of EI or in slow-growth markets, "first mover" advantages for firms that implement environmental technologies are not necessarily a reality (Cleff & Rennings, 2012).

1.1.1 Barriers to EI

The literature often distinguishes between internal and external barriers to EI (see, e.g., Dodge et al., 1994). This distinction generally helps us understand the internal (firm) barriers that managers and owners must solve as well as the external (market) barriers that policy makers must confront.

The literature also distinguishes between tangible and intangible barriers to EI (Barth, 2004). This distinction is a matter of manager or owner perception. Insufficient financing, inventory shortages, and inadequate equipment may create tangible barriers. Poor learning networks and unsatisfactory managerial skills as well as cultural differences may create intangible barriers.

For this article, we use Barth's (2004) four categories of barriers to EI:

-*Internal and tangible barriers* are associated with firm strategy and planning. Examples are absence of business/strategic/marketing plans, weak inventory and cash flow controls, and poor accounting records.

-*Internal and intangible barriers* are associated with firm management. Examples are personnel problems, unmotivated employees, time constraints, and unsatisfactory managerial skills.

-*External and tangible barriers* are associated with institutional norms and laws. Examples are employment legislation, taxation, public relations, and public policy implications.

-*External and intangible barriers* are associated with regional and national governance. Examples are cultural differences and network policies.

1.1.2 Strategic Approaches to EI

The success of a new technology is determined by how widely it is accepted and imitated (Cantono & Silverberg, 2009). Success depends on both the social and technical aspects of the technology. Increasingly, technologies identified as EI are becoming established as strategic tools firms use to achieve sustainable development. In certain cases, niche markets for technologies are created by environmental concerns and consumers' willingness to spend their high incomes.

In recent years, the pressure for sustainable development has increased in response to social and political demands. More and more, politicians and environmentalists influence the business climate (Chen et al., 2012) with calls for greater sustainable development. Many industries and firms, including new industries and start-ups firms, have felt the pressure to take a more ecological orientation in their activities (Hockerts & Wüstenhagen, 2009). However, implementation of EI is not unproblematic (Van den Bergh, 2013). Research has shown that firms must take note of how well their industry accepts EI (Carrillo-Hermosilla et al., 2010). Firms engaged in EI also need to consider stakeholder attitudes towards resource sustainability, competitive pressures, and environmental regulations (Chen et al., 2012). Firms must also evaluate the risks and costs associated with EI (Angelo et al., 2012).

Organizations, whether established or new, always have to increase their efficiency (Marshall, 1965). Therefore, organizations must demonstrate continuous improvements, which often means developing innovations. When organizations develop technological innovations, they may change a current industry system, or even create an entirely new industry system (Carrillo-Hermosilla et al., 2010). EI are technological innovations that can change systems. The two principal aims of EI are the minimization of present environmental damage to society and the modification of environmentally harmful human behaviour. When these aims are combined as incremental/radical innovations, three different changes are possible:

- the *Component addition change:* the minimization or repair of the negative environmental effects of a system by a few changes;

- the *Sub-system change:* the creation of goods or services that reduce the negative environmental effects; and

- the *System change:* the alteration of the system and its components such that the negative environmental effects are reduced.

1.2 Markets and the Transformation of an Industry

Although there are inevitable costs associated with EI, their implementation can facilitate firms' expansion in existing markets and entry into foreign markets. Atkin et al. (2012) argue this is best accomplished by using a "pull" demand strategy in which consumers and societies are persuaded of the benefits of EI (see also Hockerts & Wüstenhagen, 2010). This persuasion requires an industry-wide approach in response to customer and investor pressure (Chen et al., 2012). A shared view of sustainable development by managers and owners can also influence the implementation of EI (Marshall et al., 2005), particularly if attention is given to market share and product quality (Atkin et al., 2012).

Hockerts and Wüstenhagen (2010) identify two types of actors in the EI arena: the incumbents and the new entrants. They label these actors, respectively, the "greening Goliaths" and the "emerging Davids". The implementation of EI by these actors can transform an industry in different ways. Here we describe some of those methods.

New entrants in the EI arena can gain market credibility if they present themselves as part of the problem's solution rather than finger-point at market incumbents as the problem's cause (Hockerts, as cited in Hockerts & Wüstenhagen, 2010). New entrants can also increase their credibility if their performance is environmentally friendly (Hockerts & Wüstenhagen, 2010). This strategy can be especially effective if they are content to remain as niche actors who are disinclined to promote mass consumption of their green objectives (Villigier et al., as cited in Hockerts & Wüstenhagen, 2010). However, as Hockerts and Wüstenhagen observe, small firms are usually not content to remain within their niches.

Incumbents often implement EI in response to actions by smaller firms, in particular new entrants (Hockerts & Wüstenhagen, 2010). Because of their size and history, incumbents have the capability of targeting the industry as a whole (Villigier et al., as cited in Hockerts & Wüstenhagen, 2010).

Early implementers of EI are often viewed as the first movers or (pioneers) in an industry. However, as noted above, a first mover does not always have important advantages (Cleff & Rennings, 2012). Any advantage is contingent on the first mover's market. In some instances, first-mover advantages are very difficult to achieve because of the risk in making rapid technological changes. Yet some early implementers of EI for new products and processes have achieved a competitive advantage over other firms (Wong, 2011).

In addition to first movers, the literature identifies a related group of EI implementers: fast-followers (Cleff & Rennings, 2012; Wunker, 2012). Fast-follower firms can often increase their market share (without taking the first movers' risks or incurring the first movers' development costs) by learning from their industry's first movers (Cleff & Rennings, 2012). This lag market strategy may even be more successful than the first-mover strategy. However, the advantages of the fast-follower strategy also depend on the market (Wunker, 2012). A fast-follower strategy can confer special advantages where the firm (e.g., a grocery or a newspaper) has a strong local presence. Yet, even for fast follower, there are decision-making time frames, product development cycles and sales stages that can delay entry into a fast-paced market

1.3 Research Questions

The primary research question of this article is: How can management's strategic choices help overcome the barriers present in EI? Our research sub-questions are the following:

1) Which external and internal barriers do firms invested in EI face?

2) How do these barriers differ, depending upon management's strategic choices?

3) Do firms invested in EI have both internal and external barriers? If so, does this explain why EI take longer time to implement than other innovations?

2. Method

We used primary and secondary data for the four case studies in the Belgian and Swedish beer industries. We took a phenomenological (qualitative) approach (Sanders, 1982) to the study of the four firms. The authors of this article worked simultaneously with the empirical data so as to ensure its internal reliability.

We collected secondary data from the websites of the companies we selected for our research settings. Our purpose was to learn about each company's history, vision, leadership style, markets, and products. We collected primary data in face-to-face interviews with managers in charge of EI at their companies. The managers had worked with EI at breweries for many years (between 4 and 7 years each). We followed the same structured interview guide for all respondents although we allowed them to express themselves freely. We transcribed the audio-taped interviews and printed them so the respondents could review them for accuracy.

We were concerned about the sensitivity and confidentiality of our data. This is a common concern in qualitative research (Saunders et al., 2009). We recognize that the companies and respondents in this research can be identified rather easily. Therefore, we clearly explained the purpose of our research to the companies' managements and described our intentions as far as the future use of our research. In our interviews, we focused on the companies' histories to minimize the possibility that the respondents would reveal future strategic choices.

2.1 The Four Case Studies

The brewing industry raises several environmental concerns (e.g., water/energy use and packaging/waste disposal). The industry also presents a food chain security concern to society. Because of these concerns, the industry tries reduce its negative impact on the environment in various ways including the use of recyclable containers and the conservation of energy and water.

Company A and Company B are Swedish breweries; Company C and Company D are Belgian breweries.

Company A (Swedish)

The quoted comments in the following description are from the interview with Company A's manager for EI.

A produces an ecological beer marked with the KRAV-label (a Swedish certification for organically produced products). To maintain this certification, the beer is tested annually. The grain (grist) and the malt are grown ecologically, without inorganic fertilizers or insecticides. Brewing production, which is carefully documented, is separated from the production of other beverages.

According to Company A's manager for EI, ecologically produced products began to gain favour in the Swedish alcohol market in 2008-2009. At that time, Company A created an ecological beer named "Go Green". However, it was difficult to find distributors for the new beer in Sweden's tightly controlled alcohol market. Company A contacted the largest Swedish supermarkets (ICA, AxFood and Coop) to see if they would sell the beer. ICA and Axfood declined, but in 2009 Coop agreed to sell both the 2.8% and 3.5% (alcohol content) beer. Today Coop sells one-third of Company A's ecological beer.

The ecological beer trend has not been sustained in Sweden. No bar or restaurant in Sweden sells Company A's Go Green. *"The ecological beer market in Sweden is very unsure. Ecological brands just come and go, and the market does not increase"*. Company A has tried unsuccessfully to increase its sales to the Swedish government alcohol monopoly (*Systembolaget).* "*There are some ecological beer brands at the moment at Systembolaget, but none of the brands has really succeeded"*. Nevertheless, the Coop continues to sell Company A's ecological beer in its many stores. *"This helps create a niche for our brand, which we think is our biggest advantage. The ecological beer sparks interest in our brewery. While it gives us no specific advantage compared to other breweries or brands, the beer helps us a complementary product"*.

The main barrier for Company A´s ecological beer is the lack of demand by customers, probably because of the price. Ecological beers, which are more expensive to produce, sell for more than other beers. Therefore, Company A is grateful that Coop sells Go Green. "*Coop's green thinking influences our company. Coop's ecological values reflect on us [...] if we could not sell our ecological beer at Coop, we could not continue producing it.*

Company B (Swedish)

The quoted comments in the following description are from the interview with Company B's manager for EI.

Company B's ecological beers carry the European Union certificate although not the Swedish KRAV-label. Company B has not pursued Swedish certification because of the cost. To maintain its EU certificate, Company B keeps careful records. *"The quality of our work has actually improved since we have been forced to keep journals. The quality is better, even for the ordinary products"*.

Company B uses organic raw materials in the production of its ecological beers. In the production, which is a separate process from the production of other beers, an effort is made to minimize the use of water and other ingredients. *"We always try to use as little water as possible"*. Instead of printed labels, Company B uses screen-printed labels that require less ink and glue. Thinner glass is used in bottling the ecological beers. All these actions are ongoing. *"You always learn something new when you start making organic beer. You learn things that you did not think about before. When you make a new beer, people and journalists talk about it. This is a good thing"*.

Company B's main distribution outlet is the national government alcohol monopoly, *Systembolaget*. Company B can only ask *Systembolaget* for data about the amount of its beer sold; it cannot request any information about the customers who buy its beers. *"Although the communication is quite hard, there are still a lot of advantages with our cooperation with Systembolaget"*.

Company B also sells its ecological beers to restaurants. "*Specific restaurants actually request ecological beer to satisfy the customer demand, although it's a small amount."* For a while their ecological beers were also sold on tap at pubs in one Swedish city. *"The pubs were surprised when they heard we had an ecological beer. But now*

we have to change back to using only bottles to satisfy Systembolaget. It will be interesting to see what the pubs think".

Because the customer must pay a premium for ecological beer, which depresses sales, Company B continues to produces both ecological beers and other beers. *"The customer can always choose*". The cost of production for ecological beer is therefore a barrier to EI. To overcome this barrier, Company B promotes its ecological beers in various ways. One ecological beer has a flower design that was commonly used in bottle design in the 1800s. Social media are used to advertise the beers. Employees are encouraged to see the ecological beer production as good for the environment *"It's good to have the employees engaged in ecological thinking"*. It is Company B's EI manager who is behind the promotion of the ecological beers *"I was the main one interested in making an ecological beer [...] it's good for the environment. I mostly buy ecological products myself [..] the owner lets me work with EI. He is not very interested in this".*

Company C (Belgian)

The quoted comments in the following description are from the interview with Company C's manager for EI.

Company C produces ten different beers of three different types: export beers, regional beers and organic beers. Because the company has only five employees, it is easy to spread the manager's philosophy of environmental sustainability amongst them. Because his aim is to create an ecological culture at Company C, there is a continuous "war" on waste. For example, when there are compression air leaks, the manager is as concerned with the waste of energy as with the loss of money.

Company C was a first mover in its market when it adapted its bottling machinery for recyclable kegs instead of stainless steel kegs. Today, 50% of Belgian breweries use recyclable kegs. Company C also uses waste stabilization ponds that reduce the amount of waste, especially yeast, from the production of beer. "*We are proactive towards innovation in general. Eco-innovation is my personal preference*". However, because of the cost, the brewery was unable to install solar panels for heating water. Environmental willingness is limited by economic viability: cost is the barrier.

No part of Company C's revenue stream is dedicated to the ecological beer. "*We are a too small company for that*". Yet with sales of the ecological beer in 2013 at 30% of total company sales, the manager is glad he had the foresight to invest in three new fermentation vats. These vats doubled Company C's production capacity. However, the manager admits customers are not interested in EI: "*The distributors do not care about EI. They just want the product to be delivered as cheaply as possible*".

An example of another barrier Company C faces is related to its proposed biomethanation waste project in which organic materials are converted to biogas. However, implementation of such a system would mean greater cost because more employees would have to be hired.

Company D (Belgian)

The quoted comments in the following description are from the interview with Company D's manager for EI.

Company D, which was founded in 2012, has always had a comprehensive ecological vision. Because the manager thinks production and products should be sustainable, raw materials are organic. The brewery also prefers to purchase these materials locally in order to reduce transportation distances and thereby harmful emissions. By 2016, Company D aims to be carbon neutral. The brewery, which now measures CO_2 emitted on a per-bottle basis, will use this data to evaluate the situation in 2016. *"Being sustainable is a global vision".* The brewery won a European award for its sustainable energy activities.

Company D was created "*ex nihilo".* This meant, lacking any history of non-ecological beer production, the brewery could adopt a sustainability vision from the beginning. Company D could produce its ecological beer without risk to other beers.

Amongst the other environmentally friendly programmes at Company D are the following: bottle and package recycling, optimized isolation of the brewery, optimized water and waste management, glueless bottle labels, and green electricity for optimized energy use. The brewery does not use cadmium bottle serigraphy on its bottles.

Company D has been unable to implement all its desired EI. One reason is the long time it takes to acquire the necessary brewing equipment. Another reason is the requirement to meet food safety chain and water reject rules.

Company D's sustainability vision has financial implications that can create a barrier to EI. It can be quite challenging to ask banks for a loan for a new microbrewery. Some €300,000 are required as the initial capital. According to Company D's manager, in general banks are not especially interested in the sustainability vision; their interest is the security of their loans. However, Company D found a bank that was flexible enough to

appreciate this vision. Thus, an evolutionary relationship developed between the brewery and its bank partner. *"The financial barriers can be overcome in long-term investments".*

3. Findings

The breweries' managements, cultures, and capabilities influenced their environmentally responsible actions. These actions were, in some cases, thwarted, by environmental rules, customer demand, and costs (see Angelo et al., 2012; Chen et al., 2012; Jabbour, 2010). Our four case studies reveal a clear connection amongst the breweries' green management philosophies, their external/internal influences, and their strategic approaches in dealing with the barriers.

Although external barriers somewhat affected the implementation of EI at Company A, Company B and Company D, only Company A had a very critical external barrier. Company C was the one brewery affected only by internal barriers. The breweries where management had a strong interest in environmental issues were more likely to develop a green management structure and to make the necessary changes to implement that structure. Company C and Company D supported an environmentally friendly vision and culture from their founding. Company D also recognized the issues involved with the increasing demand for ecological beers. Company B, a very small brewery, found it challenging to implement EI on a firm-wide basis. Company A, in recognition of the customer demand and rival competition, was the only brewery that saw the external environment as a business opportunity, Environment values guided Company B, Company C, and Company D in their proactive positions toward resource sustainability.

Despite its large share of the ecological beer market and the stimuli from its environment, Company A lacked a deep commitment to environmental issues. Therefore, the brewery's strategy for overcoming barriers to EI was largely reactive. Their cooperation with Coop, with its stronger commitment to environmental issues, influenced Company A to some extent. However, this was not the reactive strategy that Angelo et al. (2012), Chen et al. (2012) and Jabbour (2010) have described. On the whole, taking culture, management, and culture into consideration, Company A is best described as a passive reactor to EI, without an internal environmental vision.

Company B, with its greater commitment to environmental issues, followed a proactive strategy for overcoming barriers to EI. Unlike Company A, Company B focused on various internal factors in its implementation of EI. This is the hallmark of a proactive firm, even though Company B, because of its small size, was not as proactive as Company C and Company D.

The first-mover theory and the fast-follower theory (Atkin et al., 2012; Cleff & Rennings, 2012: Wunker, 2012) link to the breweries' strategic solutions. Company C and Company D are first movers. Company C's solution to barriers to EI is to position itself as a firm that stays ahead of the competition and of mandated regulations. Company D's solution is to maintain and spread a sustainability attitude throughout the firm. Company A and Company B are fast followers. Company A's solution to barriers to EI is to adopt a passive strategy by following industry and market trends. Company B's solution is similar, although chosen for different reasons than Company A. Owing to its small size, Company B has little chance to become a trend setter.

Because Company A faces more external barriers than the other three companies, its strategy is market-oriented. The strategies of Company B, Company C and Company D are firm-oriented. In Section 5, we list our managerial recommendations for overcoming barriers to EI. We present these recommendations separately for companies with a market-orientation and companies with a firm-orientation.

4. Conclusions and Discussion

Breweries that implement, or plan to implement, EI face numerous and various barriers. They are forced (to a greater or lesser extent) to choose a strategy aimed at overcoming these barriers. Some strategies are more reactive, others more proactive. The main reason for the choice of strategy is related to the sincerity and depth of the green perspective amongst brewery owners and managers as well as amongst their customers and distributors. In short, because the cost of EI equipment is significant and because the cost of manufacturing ecological beers is greater than the cost for other beers, for breweries that produce ecological beer the issue is the following: Which is greater – their concern for the environment or their concern for financial/business success?

One example makes this point. Initially Company C developed recyclable kegs because of its concern for the environment. When it became known that these kegs resulted in cost savings, other breweries began using them. It was the cost savings, not the environmental issue, that was important to the follower breweries. A second example is the European award to Company D for its work towards CO_2 neutrality. This award caught the attention of other breweries when Company D was honoured and acclaimed in the press.

Figure 1 presents our conceptual framework that we developed based on the findings from the four case studies and on relevant theories.

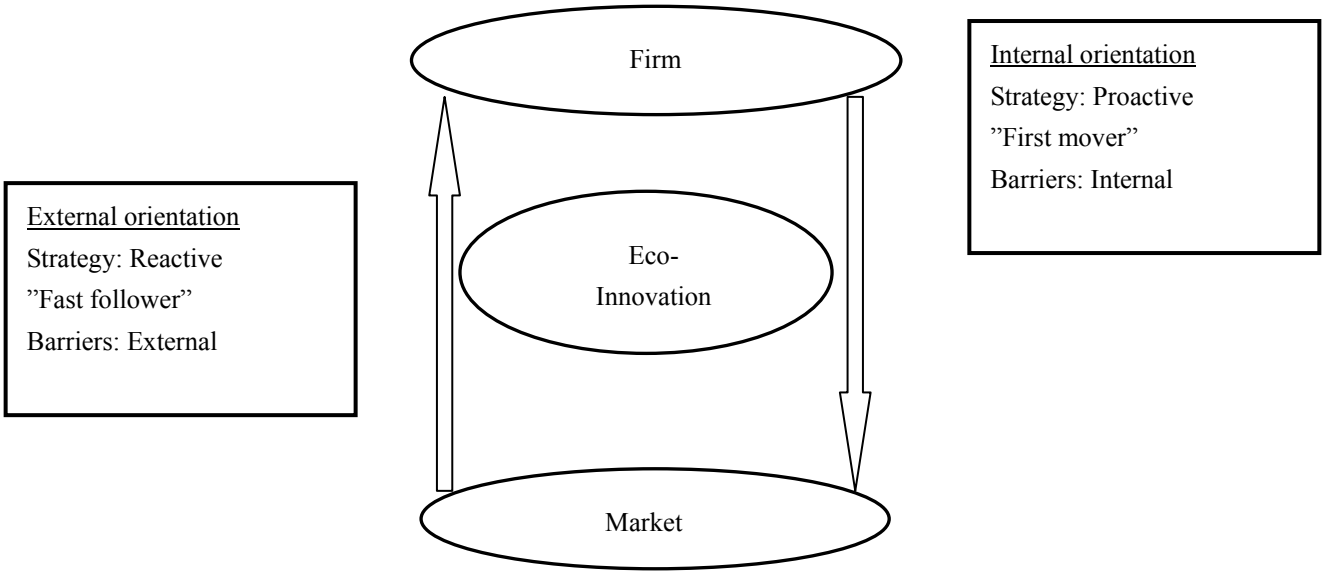

Figure 1. A conceptual framework: Depiction of the barriers and the strategies in Eco-innovations

This conceptual framework depicts how a firm can manage its strategy, depending on the internal or external orientation of the firm. First-mover firms have an internal orientation and take a proactive strategy. The principal (internal) barriers to EI they face are the following:

- Low motivation amongst the personnel who resist a change in strategy
- The initial cost to the firm of implementation of EI
- Technical problems from the first mover position

Fast-follower firms have an external orientation and take a reactive strategy. The principal (external) barriers to EI they face are the following:

- Difficulty of obtaining certified products from suppliers
- Low demand from product purchasers
- Few, or no, economic benefits

However, some firms are likely to encounter both internal and external barriers. For such firms, the challenge is to deal with the double externality problem (Rennings, 2000). These firms question the incentives to invest in EI. This situation explains why EI are more difficult to introduce and take a longer time to implement than other innovations (see Halila & Rundquist, 2011).

5. Managerial Recommendation

We offer the following strategic recommendations for overcoming barriers to EI. The recommendations are classified by market orientation and by firm orientation.

Market orientation

- Create customer interest in EI products
- Educate customers about the benefits of EI
- Use dependable suppliers
- Be aware of industry trends
- Use marketing tools familiar to customers
- Consider production of niche products

Firm orientation

- Appreciate that EI are long-term investments
- Stay ahead of environmental trends and rules
- Maintain a firm-wide sustainability culture

We offer these recommendations to two groups: firms that are dealing with EI barriers and firms that are planning investments in EI.

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