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ENVIRONMENTAL STRATEGY
AND
VALUE CREATION

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ENVIRONMENTAL STRATEGY AND VALUE CREATION

Abstract

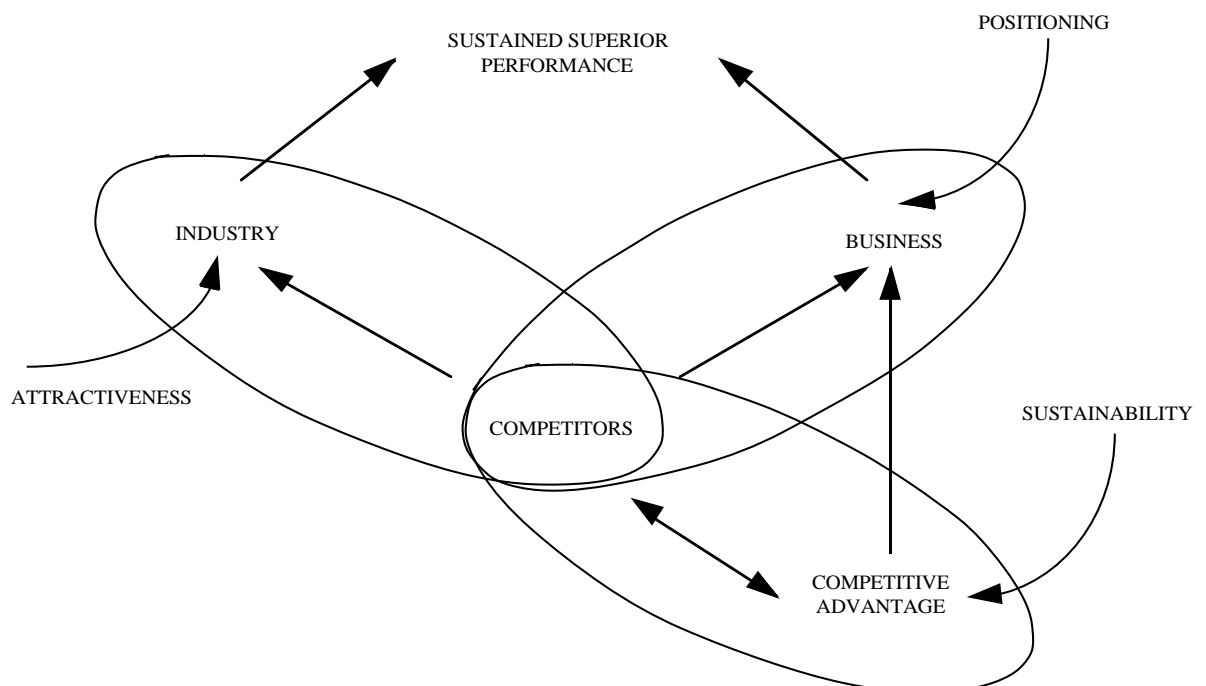
The purpose of this research paper is to show that the environmental variable influences companies' value creation processes. The goal of any strategy is to achieve sustained superior performance, and this depends on the industry's attractiveness and the choice of business positioning. In turn, the success of any given positioning depends on the sustainability of the competitive advantages on which it is based. This paper provides numerous examples to show the considerable influence that the environment has on industry attractiveness, business positioning, and the sustainability of competitive advantages. The conclusion is that although not all companies need to adopt an environmental strategy, they should all take the environmental variable into account when formulating their business strategy.

ENVIRONMENTAL STRATEGY AND VALUE CREATION

Introduction

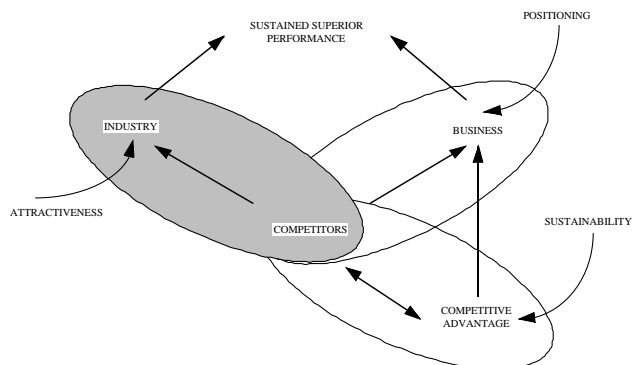
The purpose of any business strategy is to show in which direction the company should be going and how it should proceed in order to achieve *sustained superior performance*. In other words, the strategy should show the company how it can create more value in a sustainable manner over time. We believe that including environmental considerations in the strategy formulation process is not just desirable but necessary for companies' survival. If this is done, the commitment that any strategy implies will have a greater likelihood of success. The sustainability of the company's strategy will also be perceived by the company's stakeholders, and this will further boost, rather than decrease, the likelihood of success. However, concern for the environment and measures that tend to improve environmental impact do not by themselves guarantee anything. Companies must be capable of combining a good business strategy with a good environmental strategy. Or better still, of designing and implementing a strategy that takes both environmental and traditional business factors into account in a holistic manner.

Figure 1. Strategy and value creation



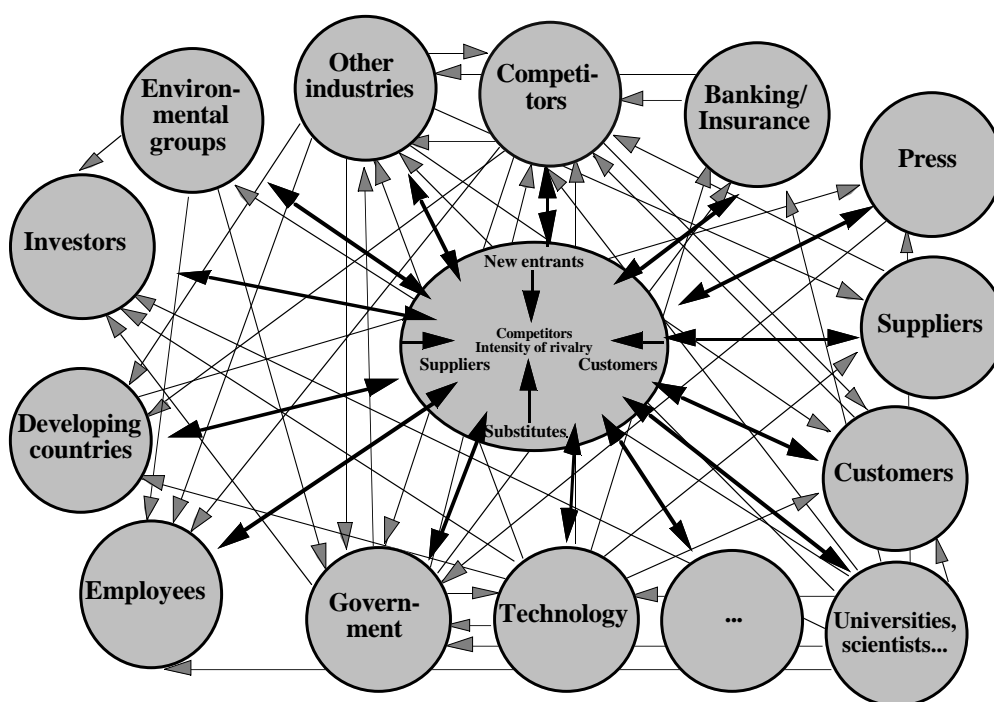
As can be seen in Figure 1, the possibilities of obtaining sustained superior performance and thus of creating value depend directly on the industry's attractiveness and our success in choosing the right business positioning. Both these factors, attractiveness and positioning, are influenced by what our competitors are doing. Finally, our positioning's success will depend on the sustainability of our competitive advantages, and this, in turn, will depend on the degree to which those advantages rest on capabilities and resources that are out of our competitors' reach. Following this outline and realising that drawing clear dividing lines between attractiveness, positioning and sustainability is, at the very least, arbitrary, if not impossible, our purpose in this paper is to explore how and to what extent the environment affects the three factors (attractiveness, positioning and sustainability) on which a strategy's ability to create value depends.

Attractiveness



As has been universally acknowledged since Porter’s work (1980), an industry’s attractiveness, that is, its potential for creating value above and beyond the capital cost required to take part in it, depends on the relationships between five forces: the threat of new companies entering the industry, the threat of substitute products or services appearing that improve on those offered by the industry, the bargaining power of the industry’s suppliers, the bargaining power of the industry’s customers, and the degree of rivalry between the companies competing in the industry. As Figure 2 shows, the environment introduces numerous factors whose influences and interrelations may bring about substantial changes in the correlations between these five forces. In the following pages, we shall see how and to what extent these factors influence industry attractiveness, and what some companies are doing to turn this influence to their advantage.

Figure 2. Influence of environmental factors on an industry’s structure



Entry threat

The entry threat depends, first of all, on the industry's intrinsic attractiveness. In principle, it is obvious that industries with a higher existing or potential level of growth and value creation may become targets for companies in other industries or may attract new business ventures. Thus, in the environmental field, industries related to recycling, soil decontamination, waste management, etc. are being occupied by engineering firms or companies whose core businesses are in industries such as construction, water and electricity.

In any case, entry barriers –defined by factors such as economies of scale, product or service differentiation, capital requirements, access to distribution channels, other cost disadvantages independent of scale, or government policy– are decisive in facilitating or blocking the entry of new companies in an industry. However, a given industry's entry barriers may undergo dramatic changes for environmental reasons. To illustrate this, let us take the most obvious case: government action. It is common for new environmental regulations to be applied with different degrees of strictness to companies that are already established in an industry and companies that wish to enter the industry. This is the so-called “grandfather clause” by which the government, while imposing a new environmental standard that must be met by any company wishing to start operations in the industry concerned, usually gives a prudential grace period to enable companies already operating in the industry to bring themselves into line with the new requirements. To give a concrete example, let us take the well-known case of the Danish brewery industry, which, although it has since become obsolete, is still illustrative of the point we want to make. The environmental requirement enforced by the Danish government that beer and soft drinks be distributed in returnable containers raised an almost insurmountable entry barrier to non-Danish breweries (their market share is 0.08%), as they could not afford to create a container collection and reuse infrastructure without, at the same time, having an industrial commitment in Denmark.

Substitutes threat

Environmental problems are an important reason for the introduction of new products and services to replace those currently being marketed in numerous industries, and their importance is likely to grow in the future. The Danish multinational company Novo Nordisk, for example, is a pioneer in so-called “green chemistry”, that is, in finding biological products to replace synthetic chemicals (Flynn, Schiller, Carey, and Coxeter, 1994). Its commitment to sustainable technology, even before synthetic chemicals were widely perceived as environmentally harmful, has made it a world leader, with a market share of over 50% in rapid growth markets such as industrial enzymes and biological insecticides. Seizing the opportunity offered by the environmental challenge, Novo Nordisk has developed enzymes for industrial applications that have successfully replaced the chemicals used previously in such diverse industries as detergents, starch, textiles, beer, sugar, fur, fats, and paper. It has also positioned itself favorably for entering the developing countries with biological products for agriculture and industry. Foreseeing similar developments, companies such as DuPont Agricultural Products are developing substitute products from within the industry itself. DuPont regularly reviews its product portfolio to determine whether it meets stakeholders' present and future requirements and needs. Its new herbicides have reduced production waste by about 3 billion kilograms and the rate of use by farmers by between 90% and 99%, with the resulting benefits in storage costs, transportation, packaging material management, etc. both for the company itself and for its distributors. Thanks to products such as these, between 1985 and 1995 DuPont Agricultural Products quadrupled its sales, multiplied its profits forty-fold, and climbed from eighth to second place in its industry

(Blumberg et al., 1998). Another example is the shift from PVC to PET in mineral water bottles and in the food industry in general.

Suppliers' bargaining power

The suppliers' bargaining power depends, among other things, on how many of them there are, how important the industry in question is for them, whether there are substitute products, how differentiated their products are, switching costs, the possibilities of forward integration by suppliers or backward integration by companies competing in the industry, etc. Here, too, environmental factors can cause changes in any of these variables. Let us stay with the case of Novo Nordisk. Obviously, the industries that Novo Nordisk supplies (see above) have to comply with increasingly stringent environmental requirements. The natural origin of the products that Novo Nordisk supplies is invaluable to them. However, the supply of such products is obviously more limited, so Novo Nordisk will be a more critical supplier than one that provides, for example, a non-differentiated chemical.

Buyers' bargaining power

The buyers' bargaining power is the obverse of the suppliers' bargaining power. Therefore, it is determined by similar variables, which are subject to similar environmental influences. Let us look at an example related to distribution, as distribution is a customer of many industries. One of Germany's largest distributors, Otto Versand, inspects the environmental quality of potential suppliers' products when making buying decisions. Until 1994, one of its suppliers was the Spanish subsidiary of the Japanese multinational Sharp. In 1994 Sharp lost the Otto Versand account for several reasons, but one of the most decisive was the poor environmental rating of its television sets. After making substantial environmental improvements to its sets (minimum current drain on standby, design for disassembly, reduction of packaging material weight, etc.), in 1997 Sharp won sales of television sets to Otto worth 80 million marks (almost 7 billion pesetas), more than 20% of its total billing of 30 billion pesetas. Obviously, the behavior of distributors such as Otto or Karstadt in Germany, Thorn in the United Kingdom or Migros in Switzerland is driven by the high environmental standards set by consumers, governments and society in general in their respective countries.

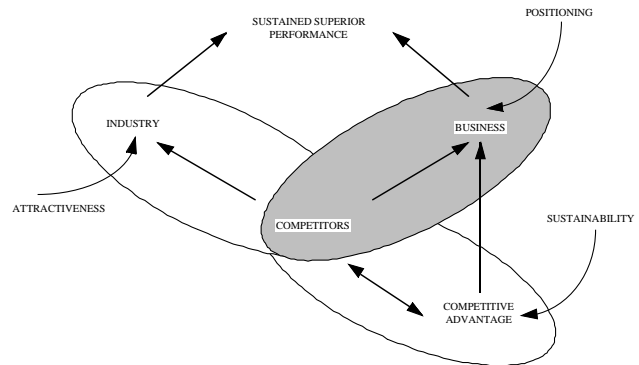
Rivalry between competitors

The intensity of the rivalry in an industry is determined, among other things, by the number of competitors, their size and power, the degree of differentiation of their products and services, their cost structure, the industry's growth rate, and the exit barriers. A clear example of the environment's influence on rivalry between competitors is to be seen in the CFC industry (Reinhardt 1989, 1998). In the early '70s, the two most popular CFCs were CFC11 and CFC12, which between them accounted for about 90% of the total market. In addition to being the most popular, they were also technically the least complicated to manufacture, although they required high investment in specialized assets. Consequently, all the major chemical companies manufactured and marketed them with very tight margins. In contrast, CFC113 was much more difficult to manufacture and was only produced by a couple of companies in the United States and one or two more in the rest of the world. In 1978, the US government, along with the governments of other countries such as Canada and Norway, prohibited the use of CFCs as aerosol propellants. Studies performed by Rowland

and Molina supported the hypothesis that CFCs were responsible for the destruction of the ozone layer. The considerable exposure given to these studies in the press and to other studies performed in other universities and scientific organizations, the resulting accusations by environmental groups, the ready availability of substitutes for this application, the interest shown by consumers and, therefore, manufacturers in using CFC-free aerosols, and, in general, the intense public protest led to a prohibition. The fall in demand had major consequences. The producers suddenly saw a sharp drop in sales. Because they had to make maximum use of capacity to cover their costs, and because the assets used in manufacture were highly specialized, they also faced major exit barriers. They reacted by embarking on a price war that further reduced what little attractiveness the industry still had.

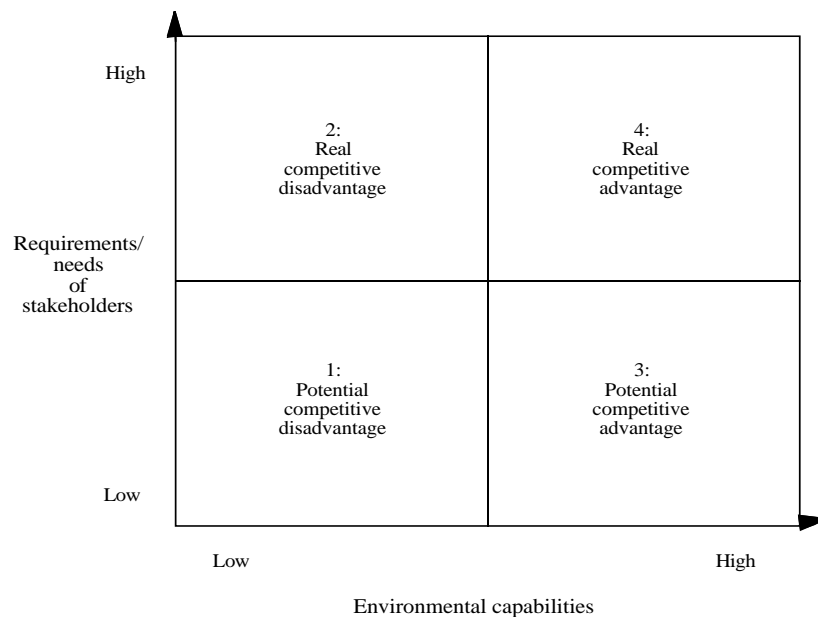
Events in the CFC industry a few years later show us how the same environmental factors can have totally opposite effects. The Montreal Protocol imposed significant reductions in CFC production. Because of the lack of substitute products, according to US Environmental Protection Agency (EPA) estimates this reduction in supply generated additional profits for the industry amounting to 9 billion dollars.

Positioning



As we have already indicated, a company's ability to generate sustained superior performance depends not only on the attractiveness of the industries in which it competes but also on its businesses' competitive positioning. By integrating environmental aspects in the variables traditionally used to define a company's business positioning, we obtain the positioning model shown in Figure 3. This positioning model has been developed theoretically and validated empirically (Rodríguez and Ricart, 1998).

Figure 3. Environmental strategic positioning model



In the section on industry attractiveness, we already saw that industry analysis needed to be expanded to take account of the influence of environmental factors (“stakeholders”). In this section on sustainability, we will see how environmental considerations enrich our analysis of the strategic capabilities and resources which can provide competitive advantage. Whether or not the environment will give us a position of real competitive advantage will depend both on the requirements and needs of various environmental factors and on our environment-related capabilities.

When identifying the sources of competitive advantage we could distinguish between “first mover” advantage, “preemption”, “commitment”, or “vision of the future”. But basically, the sources are of two types: costs and differentiation. Therefore, given that a company’s income statement can be represented by the formula $(P-C) S$, in the following pages we shall see how companies can increase their prices (differentiation), reduce their costs, or increase their sales turnover (costs and/or differentiation) by integrating environmental variables in their strategies. Although costs and price are obviously related to sales turnover, for the purpose of our discussion we will address the three possibilities separately.

Cost reduction

The literature offers numerous examples of companies that managed to reduce their costs substantially thanks to environmental improvement activities. Some of the pioneer programs –such as 3M’s Pollution Prevention Pays (3P), started in 1975, or Dow Chemical’s Waste Reduction Always Pays (WRAP), implemented in 1986– showed that savings could be achieved by preventing pollution during production processes instead of installing costly equipment at the end of the processes. In the first year alone, 3M’s innumerable improvement projects brought savings in excess of 810 million dollars. And Dow’s investments in its projects have obtained an average rate of return of 55% (1st Business and Environment Meeting, IESE, 1998). Obviously, the possibility of saving environmental costs has arisen largely as a result of government action to force companies to internalize their negative environmental externalities, which previously had cost them nothing. However, this is not always a *sine qua non*: If I reduce my energy consumption or waste creation, I will be improving my efficiency and reducing my costs, without there being any need for government intervention, as both energy and raw materials are goods that, being subject to a financial transaction, have a price, and therefore also a cost that can be reduced. Another necessary condition for companies to appreciate the advantages of reducing their environmental costs is that these costs be posted directly to the activities and products that generate them instead of being considered indirect costs, as is still the custom today.

As we will see below, a growing number of companies have found out for themselves that a proactive environmental attitude enables them to discover a multitude of ways to reduce their costs and thus increase their capacity for value creation. Sometimes, given the obvious synergies between environmental and economic improvements, it may be felt that the environment should not be the factor prompting cost reduction. However, as the abundant literature on the subject makes clear, it is environmental factors that uncover the opportunity for improvement. Obviously, reducing environmental costs may give companies a significant competitive advantage (provided all the other companies in the industry do not do the same) and/or an increase in profits (provided conditions in the industry do not force them to pass on the full amount of the savings to their customers). Table 1 lists the options that companies have for reducing their environmental costs, together with the examples we shall be using to illustrate each option.

Table 1. Reduction of environmental costs

Possibilities	Examples
• Reduced energy consumption	– Ciba – “Green Lights” Program
• Reduced water consumption	– Galvasa
• Reduced raw material purchases	– Anheuser Busch
• Reduced service provider costs	– Storebrand
• Waste reduction	– Dow Chemical – Mejcana de Cobre
• Product reuse	– Xerox – DuPont Méjico
• Reduced toxic material consumption	– SC Johnson Wax
• Reduced production costs	– Philips – Hewlett Packard
• Reduced capital costs	– Domini 400 Social Index – Citizens 300 Index – The Performance Group
• Reduced insurance premiums	– Forum of 123 banks and 78 insurance companies
• Cost avoidance	– BSH Electrodomésticos de España – Nestlé España – Toyota (court case)

Reduced energy consumption

As we have already indicated, reducing the energy consumed per unit of production has a direct impact on a company’s bottom line. This impact may be even greater in the future if taxes on capital and labor gradually give way to environmental taxes, as seems increasingly plausible in view of environmental problems in general, the need to reduce CO₂ emissions in particular (Kyoto), and the structural unemployment problems in Europe. Examples abound, some as outstanding as that of Ciba, which between 1991 and 1995 reduced its energy consumption per ton of product by 93% (Blumberg et al., 1998). The fact that the US Environment Department’s voluntary “Green Lights” program requires that

the investments of participating companies have a rate of return of *at least* 20% gives an idea of the tremendous potential for savings. What rate of return do companies usually consider acceptable when deciding their investments?

Reduced water consumption

Reducing water consumption has the following impacts on costs: water bill, investments and costs for water treatment at the start or end of the process, and local authority discharge and decontamination charges. To get an idea of the impact on costs, let us look at the example of Galvasa. This small Spanish company specializing in metal galvanization (its annual turnover runs at about 700 million pesetas) had in 1984 an annual water consumption of 240,000 m³. From that year until 1991, increasingly stringent legal requirements led the company to reduce its consumption to 27,000 m³ by adopting good practices and making a very modest financial investment. In 1992, due to the introduction of a municipal tax on pollutant discharge levied on Galvasa because of its high coefficients for polluting processes, the company's management carried out an in-depth study of the galvanization process and made substantial changes, thereby preempting a foreseeable increase in costs and the inevitable stiffening of environmental requirements in the future that would make it necessary to install an end-of-line purifying plant. The project's final result exceeded expectations, achieving zero discharge in process and a reduction of water consumption to 1,196 m³ in 1998 (the absolute minimum required for staff facilities and replacing the water that evaporated during the process), along with spectacular reductions in air pollution, energy savings, and improvements in the company's productivity and work atmosphere. The changes implemented in the galvanization process have given a total saving (1) of 22,370,000 pesetas per year. The payback period of the investment is 2.4 years. Considering the company's billing, it is easy to see that the changes implemented in Galvasa have had a considerable impact.

Reduced raw material purchases

Changes in production processes can lead to reduced waste production and, through this, to reduced raw material consumption. As can be seen in the next example, changes in product and packaging design can also lead to significant reductions in material requirements. Since 1974, Anheuser Busch has reduced the weight of its aluminium beer cans by 33%, giving an annual saving of 120 million kilograms of metal. Also, since 1988, it has reduced the weight of its glass bottles, achieving an annual saving of 150 million kilograms of glass. It has also become the world's largest aluminium can recycler, attaining a figure equivalent to 125% of the cans it sells. All this gives it an average annual saving of 200 million dollars.

Reduced service provider costs

Just as it helps us discover ways of cutting costs in material purchases, the environment can also show us ways to reduce service costs. Storebrand is one of Norway's largest insurance companies, with a 40% market share in car insurance, and the largest customer of car repair shops. By providing environmental training and incentives, Storebrand

(1) In addition to savings directly related to the reduction in water consumption, this figure also includes other savings such as those obtained by recycling raw materials and shortening the production cycle.

managed to reduce the volume of waste in the repair shops and save itself several million dollars in the process.

Waste reduction

After the improvements achieved in this field through the implementation of quality methodologies, the environment is currently pushing companies to search for and find new ways of reducing the waste generated in their production processes. Companies are also finding ways of recycling their waste internally or externally. All this reduces raw material and waste management costs, and enables companies to discover markets for their byproducts. One indication of what can be achieved in this field is the fact that one of Dow Chemical's environmental goals in 1996 was to reduce its waste management costs by 1.3 billion dollars over a period of ten years. Remember that this company started its Waste Reduction Always Pays program back in 1986, so it had already spent ten years reducing its waste when it set this goal. The case of Mexicana de Cobre shows us how, besides reducing waste costs, it is also possible to create a byproduct market and obtain other advantages (Cardenas and Pratt, 1988). Mexicana de Cobre has built a sulfuric acid production plant, with which it has managed to generate new revenues and, at the same time, reduce SO₂ emissions from its regular operations by 98%. Its strategy of being stricter than current legislation has reduced administration costs and avoided operation shutdowns, which are costing other competitors tens of millions of dollars a year.

Product reuse

Some pioneering companies are discovering the tremendous cost reduction potential of reuse, in any of its forms (remanufacturing, cannibalization, recycling, etc.), of their products, components, parts, materials, etc. once they have completed their *first* service life. Xerox is saving between 300 and 400 million dollars a year thanks to the "leasing" of its photocopiers and its policy of using the machines upon expiry of the contracts with its customers as a source of high-quality, low-cost components, parts and materials for new products (Murray, 1993). DuPont Mexico designed a new returnable, recyclable container for sodium cyanide, thereby eliminating its customers' waste management costs. The result was a 75% reduction in DuPont's packaging material costs and a reduction of its customers' inventory cycle from 28 to 7 days, plus 3 million dollars per year in savings for Du Pont and an increase in its market share from 58% to 90% (The Aspen Institute, 1998).

Reduced toxic material consumption

Eliminating or, at least, reducing the use of toxic materials decreases a company's costs or investments in areas such as storage, insurance policies, worker health and pollutant emissions. SC Johnson Wax has developed a new insecticide which contains half the quantity of volatile organic compounds (VOC) of similar products. With this, the company calculates that it has reduced VOC emissions by 7 million kilograms a year in the United States alone and achieved annual savings amounting to 2 million dollars (DeSimone and Poppoff, 1997).

Reduced production costs

As happened a few years ago with quality in product assembly, the environment is leading some companies to take speed and ease of disassembly into account at the design phase, which almost always has a favorable impact on assembly activities. Furthermore, the concern with disassembly has led them to analyze how they can reduce the number and variety of components in their products. In addition to increasing product recycling, this can also lead to substantial reductions in manufacturing defects and costs. Let us briefly look at two examples taken from Philips and Hewlett Packard. Philips Sound and Vision has developed a 14-inch television set, called Green TV, in which, besides eliminating all types of toxic or hazardous products, the company has managed to reduce the number of components by 30%, electricity consumption during use by 40%, weight by 11%, and disposal costs at the end of its life by more than 30% (DeSimone and Poppoff, 1997). In order to set and monitor its products' environmental improvement goals, Hewlett Packard uses a range of measures such as the number and variety of parts, disassembly time, recycled material content, weight, etc. In the last five years, this has enabled it to reduce the number of parts in its Vectra computer from 1,650 to 350, and the computer's weight by 46% (Ditz and Ranganathan, 1997).

Reduced capital costs

Both banks and investors are increasingly taking companies' environmental performance into account in their decision making. The banks do so because of the increased risk of default on the loan if the company has to pay the consequences of environmental damage, or if it is stuck with environmental liabilities. The investors, or mutual funds, because of their risk analysis, or because of their growing tendency to include ethical reasons when deciding which companies to place their savings in. One example of this are the so-called "Environmental Value Funds". In their investment analyses these funds not only consider the traditional variables but also carry out concurrently other analyses aimed at identifying the companies that could be considered to be leaders from an environmental viewpoint in each industry. This policy proves that they recognize the existence of a positive link between what is good for the environment and what is good for shareholders. The issues they consider include: climate change, ozone layer, toxic emissions, use of water and energy, efficiency in the use of materials, environmental responsibilities, comprehensiveness and depth of environmental management systems, commitment to a recognized code of environmental conduct and, in general, the quality of environmental management. For example, the average yield of Storebrand and Scudder Kemper Investments' Environmental Value Fund, established in 1996, has been 3% better than the Morgan Stanley Capital International World Index. Among the various institutions that are applying the same criteria are the United Bank of Switzerland, Credit Suisse, National Provident Investment and The Sustainable Asset Management Group (The Aspen Institute, 1998). The socially responsible mutual funds market is most developed in the United States, where in the space of two years, from 1995 to 1997, the quantity invested in socially responsible funds grew 326%, from approximately 25 to more than 80 trillion pesetas. In 1998, ten of the fourteen socially responsible funds operating in the United States with a capitalization greater than 15 billion pesetas obtained top ratings from either the Morningstar agency, the Lipper agency, or both. In addition, 25% of these funds were among the top 10% in their category during the three-year period ending 12-31-98 (2). First-class managers such as Merrill Lynch or Salomon Smith Barney are offering products –asset management or socially responsible funds– that have already

(2) Source: Social Funds, 1999.

attracted hundreds of billions of pesetas in investments. In the United States, there are already two respected indexes which include only socially responsible companies (3): the Domini 400 Social Index, composed of 400 companies, of which 250 are included in the S&P 500, and the Citizens 300, which contains 200 of the S&P 500 companies and is made up of a total of 300 companies. During the period 1990-1998 (4), the Domini 400 Social Index obtained a return of 442.0%, clearly outperforming the S&P 500, with 365.6%. The Citizens 300 Index also showed the financial sense of investing with social responsibility, obtaining a yield of 260.3% during the period 1994-1998, compared with the S&P 500's 189.3% (5). All of this is already having an impact on companies' capital costs, and the impact is expected to increase in the future. Two years ago, Electrolux, Deutsche Bank, Gerling, ICI, Monsanto, Unilever and Volvo formed a consortium called The Performance Group to study to what extent good environmental management can affect the value created for shareholders. After consulting other companies such as 3M, BP Amoco, Daimler-Chrysler and The Body Shop, the consortium concluded that mutual fund managers and individual shareholders will soon expect companies to develop environmental strategies that enable them to maximize shareholder value by exploiting the opportunities to reduce costs and command higher prices. As the president of one of the companies in the consortium says, "We have seen that, in all the industries studied, there are common paths for converting sustainability into higher margins. The companies who are unable to rise to the challenge are going to find themselves out on a limb" (Burt, 1999).

Reduced insurance premiums

For similar reasons to those given in the previous section, insurance companies are including environmental risk in the valuation of their insurance premiums. For example, as part of the United Nations Environment Program, 123 banks and 78 insurance companies in 35 countries have created an international forum to examine how environmental issues influence the risk analysis of their credits, investments and insurance policies, in addition to committing themselves publicly to incorporate such issues into their operations and their management in general (The Aspen Institute, 1998).

Cost avoidance

In addition to all the above-mentioned ways of reducing environmental costs, companies must take into account the costs –which may be more difficult to quantify even approximately– they can avoid by fully integrating the environment in their strategy and day-to-day management. We are referring to issues such as the costs of future environmental liabilities, legal proceedings, fines, etc., costs associated with a deterioration of their image, investments in non-productive environmental equipment, etc. Let us look at a couple of examples we have learned about at first hand through companies that have taken part in our seminars, programs and courses.

(3) Dow Jones & Company, the creator of the famous Dow Jones index, has also discovered socially responsible investment. It is planning to launch the Dow Jones Islamic Market Index. This index will start to operate with 600 companies in 30 countries whose products and services observe Shari'ah law.

(4) The Domini index was launched in May 1990, the Citizens index on December 31, 1994.

(5) In 1998, these indexes' returns were as follows: Domini 400 S. I., 34.6%; Citizens 300 S. I., 45.0%; S&P 500, 28.8%.

The BSH Group, a leader in the Spanish white goods market, has virtually all of its plants certified to ISO 14000 standards and EMAS regulations. The company's Santander plant was the last to obtain environmental certification. In the initial environmental impact analysis, they found that, due to the consumption of 212 liters of water per unit produced and the characteristics of their production process, in order to comply with legislation they would have to install a wastewater treatment plant with a capacity of 20 m³ of water per hour. This would mean an investment in non-productive plant amounting to 120 million pesetas. The prospect of this outlay induced them to carry out a complete analysis of their production process. As a result, they were able to implement, among others, the following improvements: recovery of alkaline water, microfiltration of baths, filtration and recycling of enamel sludge, scheduling of pickling baths, ultrafiltration for the water lancing equipment, installation of flowmeters, etc. These improvements, which required a total investment of 37.5 million pesetas, enabled them to reduce their water consumption per unit produced from 212 liters to 76. There were other improvements, too, such as prolonging the service life of the baths, eliminating oils and suspended solids in the wastewater, and, in general, reducing the wastewater's pollutant load. The final outcome was the installation of a water treatment plant with a capacity for treating 4 m³ of water per hour (although, in actual fact, it operates at slightly more than 2 m³/hour) instead of the 20 m³ per hour initially planned, and an investment of 16 million pesetas instead of 120 million. How many projects give a rate of return on investment of more than 200%?

Nestlé España provides another useful example. This company found that, as a result of a change in legislation, its coffee roasting operations were infringing environmental regulations. The multinational company that manufactured Nestlé España's roasters proposed installing a catalyzer or an afterburner, but both these solutions were not only expensive but ineffective, as they would still not bring the company into line with Spanish legislation. The alternative of replacing the eight roasters the company had in its Spanish plants with new ones was unacceptable, as this could represent an average outlay of 175 million pesetas per roaster. In this situation, with the help of another Spanish company, Nestlé España looked for a way to change the roasting process so as to eliminate the undesirable environmental impact. The modifications to the process resulting from this analysis cost the company about 20 million pesetas per roaster. This solution not only enabled the company to avoid buying new roasters, but also turned out to be about 10 million pesetas cheaper per roaster than the initial alternative of installing a catalyzer or an afterburner. The reader can easily calculate the costs avoided, and weigh this against the fact that other Nestlé subsidiaries had decided to change their roasters. Finding examples of other ways of avoiding costs is slightly more difficult, for obvious reasons. Perhaps the case of Toyota is the most spectacular – the US Government is suing this company for 9.5 trillion pesetas because its vehicles have been exceeding the pollutant emission limits. In any case, to give a general idea, we propose the following reflection: What would be the cost in time, lawyers, public relations, image, etc. of a lack of environmental proactiveness for those companies whose chief executives are being prosecuted for environmental reasons?

Price increases

Differentiation or a general image for quality is, or can be, a source of competitive advantage, allowing the company to increase prices and/or market share. Similarly, including environmental attributes in products or building a general image –for the company or for a brand– of environmentally friendly action may create a competitive advantage that makes it possible to raise prices and/or win new customers.

In a recent article, Forest Reinhardt (1998), professor of the Environmental Management course at Harvard BS, says that, as with any differentiation strategy, for a product's environmental differentiation to be successful, three conditions must be met: the company must be able to create a desire among its customers to pay for a higher environmental quality; the company must be able to communicate credible information on its products' environmental attributes; and it must be able to protect its products against competitors' attempts to copy them.

One example of this is the launch of the "green-fresh" brand of refrigerators by the Bosch-Siemens Group (BSH) in Germany and its subsidiary in Spain (Rodríguez and Ricart, 1998). In 1996, BSH decided to manufacture and market refrigerators using "green freeze" technology, a technology that had been developed by a small German company in collaboration with the environmental organization Greenpeace. A sizeable investment was required to adapt the company's production process. The change also brought an increase in variable costs, basically because the new compressor was manufactured by only a few suppliers and was more expensive. With "green freeze" technology, BSH replaced HFCs as insulating and cooling gases with the hydrocarbons cyclopentane and isobutane, thereby reducing its refrigerators' impact on the greenhouse effect. It was able to recover the higher cost of its refrigerators by increasing their price, as it was able to successfully communicate the environmental benefits and German consumers proved receptive to the products' environmental attributes and were prepared to pay a little more in return for improving the environment. Also, although several of its competitors had the technology, they were all able to maintain the higher price, probably because of German society's high purchasing power and the fact that the German market is highly concentrated and stabilized in terms of the market share held by the few companies and brands that compete in it. "Green freeze" technology now no longer implies any extra cost, as most suppliers have started to manufacture the new compressors, which means that their price has fallen, and the initial investment has already been amortized. Thus, an environmental good has been achieved without this implying, today, any need to internalize a cost.

For BSH's Spanish subsidiary, manufacturing the new line of "green fresh" refrigerators increased its costs by 6%. In spite of the sales and marketing departments' reservations about whether it was the right time to launch the new line –considering the higher price, the fierce price competition in the market, and the low environmental awareness among Spanish consumers– the launch was a success. One of the reasons for this success was, without a doubt, the major communication effort made by the company, and consumers' receptiveness to the environmental message. Although it had to gradually reduce the price differential, BSH España was the only company that actually gained market share (by 2.5%) in terms of units sold in a year in which the market contracted 3.8%. In this case, we see that even though the consumer may not be prepared to pay more for a product's environmental attributes, the increase in market share may more than make up for the costs. Furthermore, BSH España's competitive advantage is sustainable in the sense that the new technology requires a considerable investment and a change in the production system, so its local competitors are unlikely to be able to imitate it in the short term. And in any case, they will suffer from the disadvantage that BSH will be further along the new technology's learning curve.

Green Mountain Energy Resources is another example (The Aspen Institute, 1998). This North American electricity distributor, which operates in the states that have liberalized this service, is able to charge a premium for electricity generated from renewable sources. Although the market was liberalized only recently, Green Mountain has already become the largest distributor in the retail electricity market.

Reinhardt also distinguishes between the behavior of industrial customers and end customers. The price that industrial customers are prepared to pay depends on the ratio between the value of the product or service they purchase and the total costs of the activity for which it is purchased. The brand or image of the supplying company are much less important than for end customers. In a sense, as we shall see in the following example, this distinctive behaviour may favor the sale of environmental value to industrial customers. Ciba Specialty Chemicals (Reinhardt, 1998) has developed a new bi-reactive dye that gives value to its customers in the following aspects: they need to use less dye because of its higher fixing rate; they need to use only one-fourth of the quantity of salt previously required to trigger the color fixing reaction; reprocessing costs are lower as the color's reproducibility is greater. Because of all these properties, customers' environmental costs are lower. Ciba can command a higher price for its product because its advantages are communicable and credible; its customers are prepared to pay the extra price because of the economic advantages they gain from using the product; and Ciba's competitors cannot imitate the product because it is protected by patents.

Increased turnover

Environmental issues may have a positive or a negative effect on companies' turnover. A poor environmental image, or environment-unfriendly production processes or products, may induce companies and consumers to decide not to use a particular company's products or services. They may even induce companies to consider backward integration as a means of meeting their environmental goals. For example, the dramatic increase in the number of environmental certifications is no doubt largely attributable to the requirements of industrial customers and governments. Today, environmental certification still has a competitive value. Judging by the trend, however, it will not be too long before uncertified companies start to find it difficult to stay in the market. When this happens, certification by itself will not be enough and, as is already starting to happen in some places, industrial customers will rate the quality and performance of the environmental management systems that their suppliers have implemented. The same applies to the end customers. Growing concern for the environment together with wider availability of information on companies' environmental performance is leading customers to boycott companies that do not take steps to mitigate the environmental impact of their activities.

Sound management of environmental issues can also have a decisive influence on a company's turnover. The ability to innovate is fundamental for competitive success in most industries. And the environment is becoming one of the major forces driving innovation in a growing number of industries and companies. Hence the rapid growth in popularity of the term eco-innovation. In the following pages, we will take a closer look at some of the possibilities outlined in Table 2 below.

Table 2. Increase in turnover

Possibilities	Examples
• Customer loyalty	– 3M – Kodak
• Increased market share	– ITT Nokia – Volvo
• Sell services instead of products	– Interface – DuPont
• Access to markets	– BSH – Motorola
• Marketing of environmental know-how or clean technologies	– Portico – DuPont
• Development of new markets	– See the “sustainability” section

Customer loyalty

Gaining customer loyalty not only ensures repeat purchases but, depending on our customers' switching costs, can also enable us to charge higher prices and progressively add other products and services to their accounts. As we shall see below, the environment opens up new possibilities for locking in customers. 3M, for example, provides information on legislative trends and requirements to help its customers in the furniture industry manage their environmental responsibilities. (Remember that the companies operating in this industry are usually small, so they cannot afford to divert resources for such purposes). Thus, 3M saves them time and money and wins their loyalty. In a similar vein, Kodak helps the –usually small– companies that process photographic material to manage their technical and legal affairs in the environment area. For example, it helps them recycle and control the toxic products they use. Again, this increases its customers' loyalty.

Increased market share

Throughout this paper we have seen examples of companies such as Novo Nordisk, DuPont Agricultural Products, BSH or Ciba, that have increased their share of the markets they compete in. To further illustrate this, we could mention the cases of ITT Nokia and Volvo. ITT Nokia's share of the 24-inch TV market shot up by 57%, and its gross profits by 73%, one month after a consumer magazine rated the product as “best buy”, partly on the grounds of its electricity consumption, recyclability, and use of non-toxic and non-hazardous materials (The Aspen Institute, 1998). Likewise, Volvo's share in the European truck market (16 tons and above) increased by 35% following the introduction of the FH series, which meant that this division's contribution to the company's operating profit rose from 30% to 56%. Two of the themes on which Volvo centered its message were the trucks' fuel economy and low fume emissions (Blumberg et al., 1998).

Sell services instead of products

Solving some environmental problems seems to depend on companies' maintaining control of their products throughout their life cycle. To achieve this goal, some companies are reconsidering their corporate mission: instead of considering themselves as manufacturers and sellers of products, they are coming to view themselves as suppliers of the services associated with their products. As we saw, Xerox is increasing its customers' loyalty and lowering costs by reusing assets. In a very different industry, carpet manufacture, Interface is doing something similar (Day, 1998). One of its products is Evergreen Lease: instead of buying the carpet, customers hire Interface's services. Periodically, the company takes away the old carpet and replaces it with a new one. Thanks to its good management in areas such as reverse logistics and remanufacturing, Interface is able to achieve significant cost savings. Another example is the relationship between Ford and DuPont in the United Kingdom (Arnold and Day, 1998). Instead of simply buying paint from DuPont, Ford has subcontracted the management of its bodywork painting operations to DuPont, which uses its better knowledge of the properties of coatings and painting in general to use less product. Instead of paying per gallon of paint, Ford pays DuPont per car painted. The latter's goal is no longer to sell paint but to offer the best service using the least quantity of product. By this means, it locks in its important customer and obtains first-hand information on its competitors' products and the negotiating strategies they use in their sales.

Access to markets

The attitude of many multinational companies in Third World countries has changed radically. Aware of the importance of establishing good, solidly-based relations with these countries' governments in order to benefit from the enormous opportunities offered by the planet's highest growth markets, instead of moving their most environmentally damaging operations to such countries, they are building plants equipped with state-of-the-art technologies. This is the case, for example, of Volvo (Burt, 1999), BSH (Rodríguez and Ricart, 1998), and Motorola (Arnold and Day, 1998). BSH's refrigerator plant in China does not use CFCs as insulating and cooling gases, even though they are still permitted there, but, like the company's European plants, cyclopentane and isobutane. Motorola has built a plant in Tianjin, China, with the most advanced technologies it has, which it shares with the Chinese government. This enables Motorola, like BSH or Volvo, to generate several billion dollars of sales in China, in addition to establishing a solid position for the future.

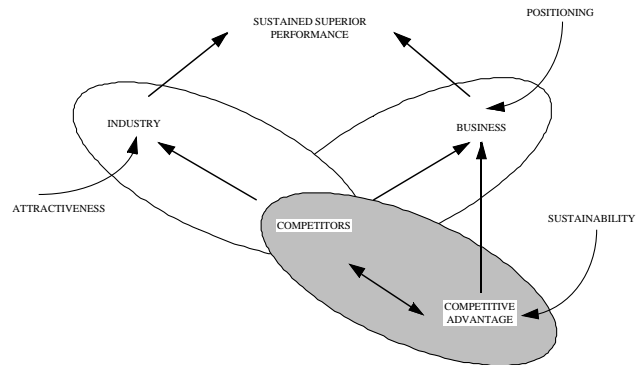
Selling environmental know-how and clean technologies

More and more companies are discovering that the knowledge acquired or the technologies developed thanks to their environmental proactiveness enables them to open up new business lines. This is the case of Portico and DuPont (Arnold and Day, 1998). Thanks to a considerable extent to good environmental management of its timber operations, Portico controls more than 50% of the Southeast US market. It has now created a new consultancy business based on its experience and know-how. DuPont has used its experience in sulfur derivatives to offer its customers a new service in which it takes care of everything to do with the management of these products, increasing its customers' loyalty in the process.

Development of new markets

As we shall see in greater detail in the next section, the satisfaction of major needs related to sustainable development leads to the appearance of completely new markets.

Sustainability



In the previous pages, we have seen the clear influence that the environment has on an industry's attractiveness and the positioning of a company's businesses. However, when we talk about the sustainability of competitive advantages, it is not simply that the environment has an influence; rather, the very concept of sustainability takes on a whole new dimension.

The theory of the resource-based view of the firm is the one that offers us the most solid model of what has traditionally been understood by sustainability. According to the authors who have contributed most to the development of this theory (Wernerfelt, 1984; Rumelt, 1984; Barney, 1991), companies obtain sustainable competitive advantages by developing capabilities that are grounded in the possession of certain resources. For these authors, in order to provide sustainable competitive advantages these resources must be:

- *Valuable and non-replaceable.* For the resources to have a lasting value, they must support the development of capabilities that are important from the competitive viewpoint and cannot be developed by alternative means.
- *Scarce and/or company-specific.* That is, the resources cannot be widely distributed among the companies operating in an industry and/or they must be closely identified with a particular company, so that it is difficult to transfer or buy them.
- *Difficult to imitate.* Perhaps this is the most important characteristic. The competition must not be able to imitate the resources, either because they are intangible assets based on practical learning accumulated through experience and refined by practice, or because they depend on a large number of people or teams, so that few people have a complete knowledge of the phenomenon.

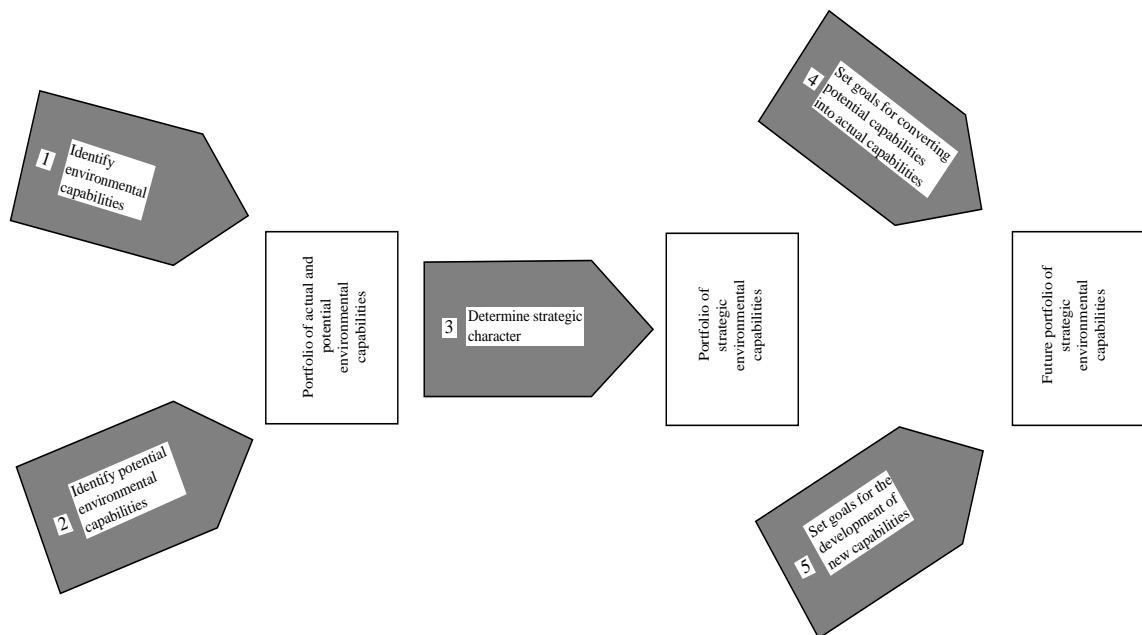
Just as the resource-based view of the firm substantially changed the general approach to corporate strategy, Hart's (1995) natural-resource-based view of the firm will no doubt bring about an equally dramatic change in the way we conceive of strategy. Hart argues that, given the growing scale of the world's environmental problems, the challenges and limitations imposed by the environment will be among the main forces driving the development of new business resources and capabilities. In other words, strategies and competitive advantages are likely to be based on capabilities that facilitate a type of business activity that is sustainable from an environmental viewpoint. Therefore, besides the three characteristics mentioned above, the resources that provide sustainable competitive advantage must favor a more sustainable development from an environmental viewpoint.

In the examples included in this article, we have seen how many companies have managed to create value by developing environmental resources and capabilities. Because these resources and capabilities cannot be imitated by competitors, and because stakeholders –and particularly customers– directly or indirectly appreciate the value these resources and capabilities create, they have become a source of competitive advantage. Thanks to these competitive advantages, the companies have been able to benefit from changes in the industry’s attractiveness brought about by environmental variables, and have succeeded in improving their businesses’ competitive positioning by reducing their costs or differentiating their products and services with environmental attributes. To summarize, in terms of the environmental positioning model (see Figure 3), these companies have generated competitive advantages because their environmental capabilities have met the following conditions:

- They meet their stakeholders’ requirements and needs.
- The stakeholders have assigned the capabilities a value for which the companies’ customers have been willing to pay.
- The capabilities have not been uniformly or widely distributed throughout the industry.
- Competitors have not been able to imitate them.

As Figure 4 shows, in a company’s portfolio of environmental capabilities we must distinguish between actual and potential, and strategic and non-strategic, capabilities.

Figure 4. Planning the development of a portfolio of strategic environmental capabilities



By potential environmental capabilities, we mean all those capabilities in which the environmental issue could be integrated relatively easily, though this has not yet been done. Let us give an example. Think of a company that has succeeded right from the start in creating an intense and well-managed interrelation in its product design process between the various departments involved (marketing, R&D, production and purchasing, for example), and between the company and certain key customers and suppliers. To date, however, this company has not considered it appropriate or necessary to include environmental considerations in this process. It seems plausible that it would be fairly simple for this company to integrate the environmental issue in its product design process, as it already has a good basis for such integration in its present configuration. Whether an environmental capability is strategic or not depends on whether it can generate competitive advantages.

Obviously, in order to develop environmental capabilities the company may have to invest resources. We say “may have to” and not “will have to” because it is possible for companies to develop environmental capabilities without investing resources specifically for that purpose. That is because there may be synergies between good environmental management and good management in general; in other words, developing a particular business capacity may go hand in hand with developing an environmental capability, or may necessarily include environmental improvement. It is also because some multinational companies encourage their subsidiaries to share their best environmental practices, thus fostering the development of this type of capability. All the same, developing capabilities of any type usually requires resources. Sometimes, the investment may be absolutely necessary if the company is to continue to compete. Consider the increase in environmental certifications in Spain: if in the invitations to tender for public works some government departments give 20 bonus points out of 100 to companies holding EMAS certification, construction companies must obviously view obtaining such certification as a top priority. When the situation is not one of absolute necessity, a company must decide which activities it will invest its scarce resources in so that they will generate value, either directly or indirectly. And the decision may be right... or it may not. Investing in capabilities, environmental or otherwise, usually entails a risk when our goal is to steal a march on our rivals. If in retrospect it turns out that our new capabilities cannot provide competitive advantages in the prevailing conditions, we may well find that our competitive position has weakened. Returning to the environmental strategic positioning model (see Figure 3), if we stay for too long in a position of “potential competitive advantage”, when we have had to specifically invest resources to get there while our competitors have not done so, our competitiveness will undoubtedly deteriorate. In any case, the risk that the environment may not value our capabilities can also make the investment in developing such capabilities more attractive. Risk usually causes paralysis, so most of our competitors will adopt a wait-and-see attitude. In this situation, wise management of the risk, together with a good capability development strategy and appropriate communication with the environment, may lead to the discovery and exploitation of enormous opportunities for generating value.

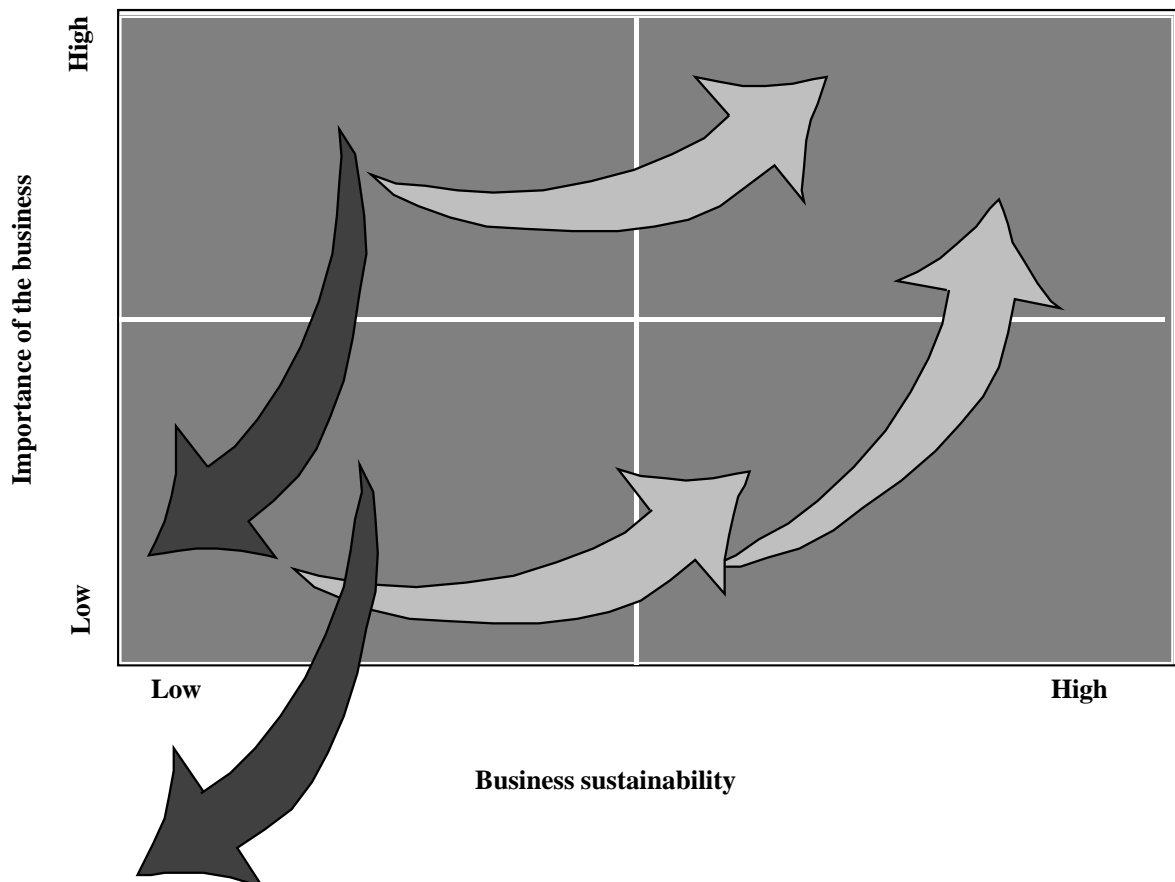
Another more drastic way in which companies can analyze the issue of sustainability consists of considering to what extent their way of creating economic value is compatible with environmental sustainability. There is no doubt that society, through the influence of what we have called environmental factors (see Figure 2), will strip these companies, and any industry that does not contribute to sustainable development, of the right to operate. From this viewpoint, the sustainability of a company’s competitive advantages will either be based on economic and environmental factors, or it will not have any sustainable advantages at all.

To understand sustainability in this light, we must realise the blatant unsustainability of the current situation of the environment and of most of the world’s population, and

the obvious inequalities on which it is based or that are the byproduct of our model of economic growth. And, with that, the major needs we will have to satisfy in a future that is already just around the corner. We are referring to the quality and availability of water supplies, unpolluted air, soil quality, sustainable use of natural resources, food supply, climate change, and the health of ecosystems and the preservation of biodiversity. Obviously, satisfying these needs represents a tremendous opportunity for value creation by companies, but we have to acknowledge that it also entails significant risks.

Any creation brings with it some destruction. In this sense, this new vision of sustainability is not without its problems. Corporations, particularly those that compete in industries that are very clearly unsustainable, will have to reconsider their business portfolio, as suggested in Figure 5.

Figure 5. Sustainability of the business portfolio



As shown in Figure 5, in time, corporations will have to construct a business portfolio that is sustainable from both the economic and the environmental viewpoint. To do this, we believe, the two basic variables to be considered are “sustainability of the business” and “importance of the business” for the company. When analyzing a business’s sustainability, we must take into account its intrinsic sustainability and the different stakeholders’ perception of its sustainability. It is these perceptions that will generate the stakeholders’ future

requirements, so they are something that companies must consider very carefully. Likewise, companies must be aware that, often, sustainability is not something fixed and unchanging. Sometimes, major technological changes or radical rewriting of the rules of the game enables companies to increase the sustainability of certain businesses they compete in. But when a business is absolutely unsustainable, it seems strategically appropriate to withdraw from it. The speed of withdrawal will probably depend on how important the business is for the company. Companies will adopt different procedures and attitudes, depending on whether the unsustainable activity is a core business for them or a marginal one. In principle, it is better to have a proactive attitude than to try to block the course of history. Nevertheless, it is always possible to adopt a reactive attitude and try to deny or minimize the importance of environmental requirements and needs. And, of course, there are innumerable other possibilities between the two extremes. Choosing the right attitude to take is a very important decision that has significant risks but also offers enormous opportunities.

There are already several examples of sustainable solutions at various stages of development. One is to be found in the search for new sources of food, such as fish-farming. Although fish-farming is currently associated with certain environmental problems, there is no doubt that the seas offer immense possibilities as “virgin territory” that could become a virtually unending source of cheap, abundant protein. Developing this source would also help to protect many marine species from extinction as a consequence of current fishing practices. Another activity is silviculture and the cultivation of quality tree species such as teak, rosewood, chestnut or oak. Besides helping to conserve the few virgin forests that remain on our planet and thus protect biodiversity, silviculture has become a flourishing business and an attractive investment opportunity. Another business area that is not only attractive now, as the example of Green Mountain Energy Resources shows, but has an even more brilliant future is the production and sale of renewable energies. The growing evidence of global warming and the increasing awareness in society of the need to address the problem are creating the necessary conditions for this industry to at last take off. A final example is provided by one of the most controversial industries: plastics. Two of the most serious environmental problems associated with the plastics industry are the use of non-renewable resources and the difficulty of recycling the products. Recently, some companies seem to be developing a capability to chemically recycle plastics, breaking them down time and time again into their monomers and then using these monomers to produce the desired polymers. If this proves feasible, an industry often considered unsustainable would be transformed into a new, flourishing, and sustainable industry – for the companies that had the necessary capabilities to compete in it. The advantages obtained by the companies that secured a leading position on these new activities’ learning curve would surely be sustainable. Imagine how much value would be created!

To summarize, this new vision of sustainability, in which economics and ecology are closely intertwined, offers companies fantastic opportunities for value creation and, at the same time, imposes ineluctable demands. And, without doubt, significant risks too. Those companies that do not wish to address the demands, or are unable to take the opportunities, will find that the competitive advantages that have supported them until now will turn to clay. Those that grasp the challenge and are able to adequately manage the risks will enjoy sustained superior performance.

Epilog

The reactions you get when you talk about the importance for companies of adequately managing the environmental variable can be classified according to the type of individual:

- The “redneck”: “It’s all in the ecologists’ imagination! There’s a lot of talk about environmental problems, but things don’t seem to be so bad to me!”
- The “pragmatist 1”: “Well, perhaps you’re right ... but ethics is one thing and business is another.”
- The “pragmatist 2”: “Yes, yes, all this stuff about ethics and the environment is all very splendid. We’ve got to take it into account. Of course. But you’re not going to tell me it’s more important than marketing?” (Here, instead of “marketing” we could put finance, operations, etc. The “pragmatist 2” comes in many different varieties... almost as many as there are areas of interest.)
- The “dilettante”: “Yes, yes, it seems... um... there’s no doubt... of course... in the future... it’s an issue that will become increasingly important. Of course.”
- The “techno-optimist”: “Don’t worry. It’s not as bad as it seems. In any case, when it’s really necessary, we’ll develop the technologies to fix it.”

These reactions are not only found in the business world. In the academic world in general, and in business schools in particular, we can find plenty of examples of all the types.

In this article, we believe that we have given more than enough reasons for the rednecks, pragmatists, dilettantes and techno-optimists to change their attitude. And by that, we are not saying that all companies must adopt an environmental strategy. Not at all. What we are saying, however, is that the environment must be taken into account when formulating any business strategy. In the logical run of things, the result obtained by adopting this attitude should depend on the possibilities for creating environmental value that are brought to light by strategic reflection.

We have seen that the environment can have a decisive influence on the attractiveness of the industry in which we compete, and it can have dramatic effects on the five forces that structure the industry. We have also discussed how the environment can influence our business positioning. Costs, prices and market share can vary substantially. Finally, we have seen how the very concept of the sustainability of our competitive advantages takes on a new and richer meaning when environmental needs are considered. Through numerous examples we have shown the tremendous potential for value creation that the environment generates by influencing industry attractiveness, business positioning and the sustainability of competitive advantages.

In this situation, one basically has to choose between two attitudes. We can try to block the environment’s influence in many ways. But, if that is our decision, we must not forget that unfortunately we are not alone. Our competitors’ actions can change the rules of the game, sometimes very suddenly. A situation we were able to control may suddenly become one in which we no longer have time to react, or only at the cost of considerably weakening our position. The alternative is to be proactive and develop the capabilities that

will enable us to build valuable new competitive advantages, now and in the future. However, this alternative also entails risks. That is inevitable. We may devote our resources and strength to developing capabilities that time shows to be unnecessary.

What should we do? Obviously, there are no magic formulas. It has never been easy to compete successfully. And the environment does not exactly simplify matters. It is a new variable to be taken into account. A variable that may be important, tremendously important... or not. But isn't that why we pay our chief executives? In this article, we have argued that they must consider the environment when meditating on the strategy to be followed by their companies. Whether it is best to take a reactive or a proactive stance, or at what pace the new environmental capabilities should be developed, is something that only time will tell. But they cannot afford to wait. They must decide. Their skill as strategists will be crucial in deciding whether the advantages on which their companies' competitiveness is based crumble into dust, or on the contrary their companies continue to enjoy sustained superior performance. □

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