

A Model of a Product Launch at the Bottom of the Pyramid¹

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Abstract

Prahalad and Hart advise companies to launch a product innovation on the marketplace in low- and middle-income countries before launching it in high-income countries. The question arises which characteristics of low-, middle-, and high-income countries determine the success of a product innovation. The most important obstacles in high-income countries are strong competition, vested interests and high expectations from consumers. Competition in low- and middle-income countries is low and market size is too large to ignore. Poor living conditions and non-consumption make it easier for a new product to satisfy consumers. Lack of infrastructure can be a benefit.

Keywords: market introduction; radical product innovation; low-, middle-, and high-income countries

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1. Introduction

Until the 1980s low-income countries served as suppliers of labour and raw materials; eventually they themselves became markets, mainly for existing, often obsolete products. Recently, companies have paid more attention to low-income countries as markets for products which are adapted to the needs and preferences of the local population. For the introduction of a new product, however, companies still consider high-income countries as primary markets (Hart, 2005; Prahalad & Lieberthal, 1998; Arnold & Quelch, 1998).

Prahalad, Hart and co-authors propose that companies bring radical product innovation to the marketplace in low- and middle-income countries first, that is before launching the product in high-income countries² (Prahalad & Hart, 2002; Prahalad & Hammond, 2002; Hart & Christensen, 2002). Radical product innovation is part of a business model that Prahalad and Hart advise companies to adopt when entering the low- and middle-income countries. The authors draw attention to the four billion poorest people in the world (the majority of whom live in low- and middle-income countries) who are not targeted by multinationals. They believe that companies can increase their profits and at the same time contribute to sustainable development by selling their products and services to the people at the bottom of the pyramid. The authors emphasize that the potential market in the low- and middle-income countries is too large to ignore (Prahalad & Hart, 2002; Hart, 2005).

2 Actually Prahalad, Hart, and co-authors suggest companies to launch new products in low- or middle-income countries *before or at the same time* as launching them in high-income countries. We focus on the strategy where companies launch the product in low- or middle-income countries *prior* to high-income countries because we feel that this is the most important part of the hypothesis. Launching a product at the same time in high-, middle-, and low-income countries basically means pointing out to companies not to forget the low- and middle-income markets. It does not say anything about the ease or difficulty of selling new products in low- and middle-income countries compared to high-income countries.

Radical innovation is based on a new technology, contrary to *incremental innovation*, which is based on existing technology (Iyer, LaPlaca & Sharma, 2006). *Disruptive innovation* is a specific kind of radical innovation; it targets the non-traditional, less-demanding consumers instead of the mainstream-markets (Hart, 2005) and disturbs the balance of power in the market (Iyer, LaPlaca & Sharma, 2006).

The World Bank Group (2003) distinguishes high-, middle- and low-income countries based on their annual gross national product (GNP) per capita. *High-income countries* have a GNP per capita of \$9,206 or greater. *Middle-income countries* have an annual GNP per capita between \$745 and \$9,206. *Low-income countries* have an annual GNP per capita of \$745 or less. In 2003 there were almost thirty high-income countries with a combined population of almost one billion people, sixty five middle-countries with a combined population of 2.7 billion people, and sixty low-income countries with a combined population of 2.5 billion people³. Many people in low- and middle-income countries cannot meet their basic needs; people in middle-income countries have more access to goods and services than people in low-income countries.

Why do those authors find radical –even disruptive– innovation so important for business performance⁴? According to Hart (2005, p. 32) “technology is the business of business” and disruptive innovation (and not cost leadership or differentiation) is the key towards a competitive advantage in the 21st century (Hart, 2005). Hart and Christensen (2002) state that the market for disruptive innovation lies at *the bottom of the pyramid*, being the four billion poorest people in the world (Prahalad & Hart,

³ Only countries with a population of one billion or more were counted (The World Bank Group, 2003).

⁴ Business performance can be measured by profit, sales, revenue, growth, etc. Further in the paper we will focus on sales (market share), but for now we use the general term *business performance*.

2002). Hart and Christensen (2002) firstly argue that the business models used in low- and middle-income markets are adaptable so that companies can also apply them in high-income countries (by increasing costs and adding features (Hart, 2005)). Secondly they argue that competition in low- and middle-income countries mainly comes from non-consumption or low-quality products. *Non-consumption* means a consumer need is currently not being satisfied by any product (Hart & Christensen, 2002), either because no product exists that could satisfy the need, or because consumers cannot afford to buy the products available to satisfy the need. There is, therefore, a market for simple yet quality products. While it is difficult to launch new products prematurely in high-income markets, where competition comes from established products (Prahalad & Hart, 2002), people in low- and middle-income countries might accept new products faster because they have not yet become used to the old products (Prahalad & Lieberthal, 1998).

According to Prahalad and Hart (2002), launching a product first in low- or middle-income countries could also contribute to sustainable development⁵. They specifically talk about environmentally friendly products, which would allow demand in low- and middle-income countries to grow without creating the same waste as in high-income countries and which could replace unsustainable technologies in high-income countries (Prahalad & Hart, 2002; Hart, 2005; Hart & Christensen, 2002).

Innovation improves business performance but many new products fail to satisfy the company's expectations (Hult, Hurley & Knight, 2004; Kollat, Blackwell & Robeson, 1972). The strategy to launch a new product first in low- or middle-income

⁵ "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (World Commission on Environment and Development, 1987, p. 54) Sustainable development has an environmental, social, economic, and institutional dimension (United Nations, 1992).

countries can provide a new opportunity for product innovation that fails at the introduction stage in high-income countries (Hart, 2005).

The idea of choosing low- and middle-income countries as the primary market for radical innovation is interesting but lacks a clear theoretical framework and empirical support.

The work of Prahalad, Hart, and co-authors raises the question whether the performance (measured by short term profit, sales, revenue, growth, ...) of companies that bring radical innovation to the marketplace first in low- or middle-income countries and then in high-income countries is better than the performance of companies that immediately bring radical innovation to the marketplace in high-income countries. To answer this question we first need to know under which circumstances a product launch in low-or middle-income countries prior to its launch in high-income countries is preferable. The paper focuses on theoretically identifying these circumstances and therefore offers the groundwork for a model of a product launch at the bottom of the pyramid.

The paper proceeds as follows. Section 2 discusses the company's objective of choosing low- and middle-income countries as primary markets. Section 3 enlists the assumptions of the model. Section 4 presents a theoretical overview of the factors that influence the introduction of a radical innovation on the demand and supply side within the economic, political, legal, technological, and socio-cultural environment in low-, middle-, and high-income countries. Section 5 draws conclusions. Finally, section 6 briefly discusses the limitations of the model and future research.

2. The company's objective

The proposition to bring innovative products to the marketplace in low- or middle-income countries before bringing them to high-income countries raises the question: what would companies aim to achieve by following this strategy?

Companies follow a strategy to achieve an objective, such as profitability, market share, market development, or growth. Prahalad and Hart (2002; Hart, 2005) consider profitability to be a company's main, long-term objective (see Figure 1). They believe that companies can achieve it by launching a new product first in low- or middle-income countries, use the experience to improve the product, and sell the product in high-income countries as well. They do not suggest a choice between low-, middle-, and high-income countries for initial introduction to the market, but rather a sequence of market introductions. After having launched a new product in low- and middle-income countries, the company can adapt the product and sell it in high-income markets (up-market migration) (Hart, 2005).

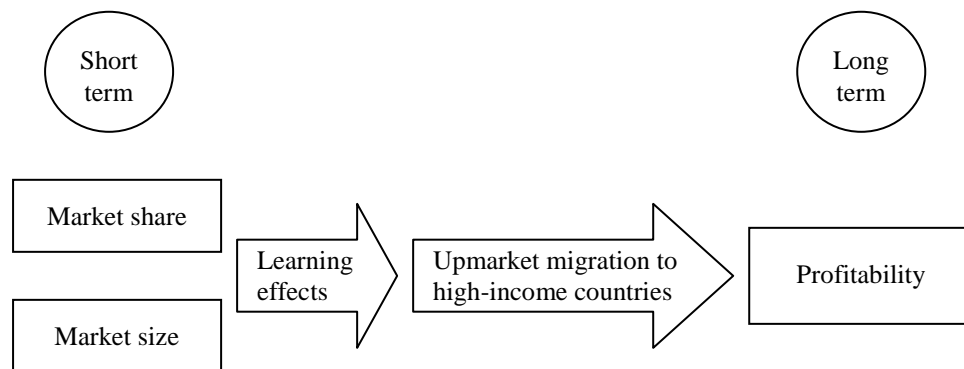


Figure 1. Company objectives in short and long term

By bringing the product to the marketplace instead of continuing to work on it in R&D-departments, production and consumption of the product begin. Production usually follows the classic learning curve by which average costs decrease as the company's cumulative output increases. Additionally, the product's performance

follows another learning curve: the product improves through time with increasing cumulative output making the product more attractive to consumers in high-income countries, where it has to compete against established products (Hart & Christensen, 2002; Prahalad & Hart, 2002). As time passes and consumer feedback is gathered, the company tries to improve the product. The more people use the product, the higher the probability that deficiencies are detected and reported.

In the short term, when the company brings the new product to the market solely in low- or middle-income countries, the company therefore has other objectives than profitability. To maximize the learning effects resulting from consumption and production, in the short term the company aims to sell the product to as many people as possible; a company tries to maximize its market share, or in case most competition comes from non-consumption, a company tries to develop the market and increase market size⁶.

To determine under which conditions companies would prefer to launch a new product in low- or middle-income countries first, companies need a clear idea of the factors that affect the diffusion of (new) products, and of which of these factors differ between high-, middle-, and low-income countries.

3. Assumptions of the model

The model examines the actions of **one company** that wants to launch a new product and has to decide in which country to launch it. To simplify the complex reality in which companies launch products, the model makes the following assumptions regarding (1) the product, (2) the company, (3) the markets, and (4) the production.

⁶ An alternative is beta-testing, as with new software.

Assumption 1a: The new product is a **radical innovation**. It is, therefore, also a real innovation, being an innovation that is new to the entire world (Mühlbacher, Leihs, & Darhringer, 2006).

Assumption 1b: The product follows a **learning curve** for average costs as well as for product performance.

Assumption 2a: Because the new product is a radical innovation, the company is a pioneer in the market. A pioneer is a company that is “the first to introduce a new solution to a customer problem in the market” (Mühlbacher, Leihs, & Darhringer, 2006, p. 378). There is therefore no **competition** from companies who produce the same product; competition comes from other kinds of products that meet the same needs or from non-consumption.

Assumption 2b: The company is a **monopolist** for the time horizon of the model.

Assumption 3a: The model considers **two markets** where to launch the new product: one market of rich consumers (a proxy for high-income countries), and one market of poor consumers (a proxy for low- and middle-income countries). The consumers in both countries are representative for each market.

Assumption 3b: There is a **worldwide demand** for the product.

Assumption 3c: The two markets are **segmented**, meaning that consumers cannot buy products in the other market.

Assumption 4a: There are **no location advantages** for production; we do not consider the difference between producing the product in the same market as it is sold, and producing it in the other market.

Assumption 4b: **Transportation costs** are zero.

Assumption 4c: There are **constant returns to scale**.

4. Factors influencing a product launch

Several factors can influence the launch of a new product. Following Mühlbacher, Leihs, and Darhringer (2006) we subdivide the company's macro-environment into the economic, political, legal, technological, social, and cultural environment, focusing on the factors that differ between low-, middle-, and high-income countries. The factors influence the attractiveness of the product to potential consumers and the ease with which the company can offer the product on the market with the aim to reach as many people as possible. Figure 2 enlists these factors, which are further discussed in the next paragraphs.

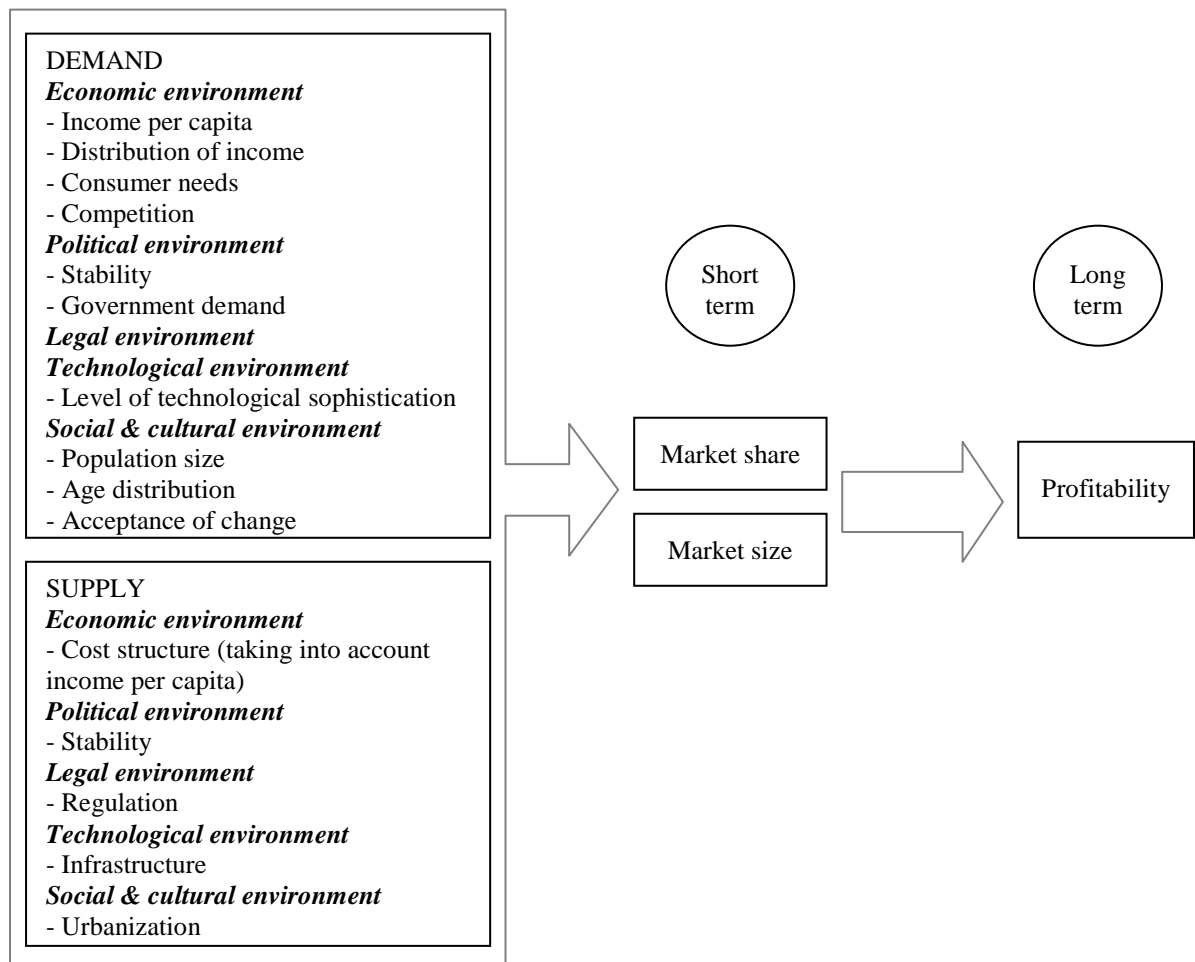


Figure 2. Factors influencing market share or market size, demand and supply side

4.1. Economic environment

Within the economic environment, we look at income per capita, distribution of income, consumer needs, and competition.

Income per capita

The most obvious distinction between low-, middle-, and high-income countries is income: high-income countries have a higher income per capita than middle- and low-income countries (The World Bank Group, 2003). As income is one of the factors that determine demand for a product, Prahalad and Hammond (2002) call poverty one of the reasons for multinationals not to target low-income countries.

According to Prahalad and Hammond (2002) companies believe that prices in low- and middle-income countries are lower than in high-income countries and therefore find it more difficult to sell products with a profit. Some companies, though, try to lower production costs so that they can sell more cars at lower prices and still make a profit. Vodafone, for example, is bringing mobile phones of \$25 on the market in Africa (The Wall Street Journal, 2007b). Nissan and Renault are working on a \$3000 car for the Indian market (The Wall Street Journal, 2007c). Car companies understand that only a small part of the population in low- and middle-income countries can afford a car of \$15,000 or more (as many cars in high-income countries cost). Many companies, however, do not realize that people in low-income countries are confronted with the Poor Pay More Syndrome: due to monopoly power of distributors, poor people in low- and middle-income countries often pay more for a product or service than people in high-income countries (Consumers International, 2004; Prahalad & Hammond, 2002).

Distribution of income

Many low- and middle-income countries have an unequal distribution of income: a small part of the population earns a large part of the country's income (United Nations Development Programme, 2006; Mühlbacher, Leih, & Darhringer, 2006; Weil, 2005). Considering the size of the population, this national elite or middle class can consist of many people able to buy more expensive products and provide an interesting test market for certain product innovations.

The automobile industry, for example, is developing low-cost cars for people who used to be able to afford nothing more than motorcycles, but are now, as their income increases, on the market for a car (The Wall Street Journal, 2007c). Car companies do not have to develop new cars; the elite in some low- and middle-income countries can afford to buy some cars that car companies bring on the market in high-income countries as well.

Consumer needs

Many people in low- and middle-income countries are mainly concerned with meeting their basic needs –such as food, clothing, housing, and fuel– and can only afford to spend a limited amount of their income on luxury products (Gangopadhyay & Wadhwa, 2004). However, DeSoto (2000) and Prahalad & Hammond (2002) emphasize that poor people also spend money on luxury and high-tech products, such as televisions. Additionally, people in low- and middle-income countries are becoming more acquainted with products sold in high-income countries; as incomes rise, demand for these products increases (Arnold & Quelch, 1998; Prahalad & Hart, 2002).

Considering that many people in low- and middle-income countries are still trying to meet basic needs, these countries are interesting for companies in industries that serve these needs. Because some people (often women and children) in poor countries still have to walk long distances to get water or wood, companies active in the utilities industry can have a large influence on those people's living conditions by selling them their products.

Due to fast growth in some low- and middle-income countries, income is increasing as such that people can now afford to meet other consumer needs; more people are, e.g., able to buy a car instead of having to walk everywhere or take public transportation. In high-income countries, on the contrary, many households already have a car and the car market is becoming saturated. Because of this slowdown of demand in high-income countries, companies such as Nissan and Renault start to pay more attention to low- and middle-income countries where demand rises (The Wall Street Journal, 2007c). Also Vodafone is focusing on what people in low-income countries can afford, namely cheap mobile phones for basic calling and text-messaging (The Wall Street Journal, 2007b).

Competition

While there are many competing, established products available in high-income countries, competition in low- and middle-income countries mainly comes from non-consumption or low-quality products (Hart & Christensen, 2002; Prahalad & Hart, 2002; Prahalad & Lieberthal, 1998). Non-consumption can facilitate the introduction of new products (Arnold & Quelch, 1998). Iyer, LaPlaca and Sharma (2006) also believe that markets with less-demanding consumers, non-consumers, and few competitors may provide more opportunity for radical innovation.

Prahalad and Hart (2002) expect that vested interests of powerful incumbents and institutions in high-income countries restrain market introduction of product innovation. Vested interests committed to an old product or technology will try to hinder the adoption of a new product (Easterly, 2002). In the U.S., oil companies are hindering gas stations to offer ethanol at the pumps, for example, by contractually forbidding them to sell ethanol or by forcing them to install ethanol pumps on a separate island on own costs (The Wall Street Journal, 2007a). On the one hand the small supply of ethanol is a consequence of the limited demand for it (The Wall Street Journal, 2007a); on the other hand, people will not buy cars that run on ethanol when there are not enough gas stations where they can fill their tanks. Not only competition from powerful incumbents, but also vested interests from institutions (e.g. the Catholic Church's opposition against the use of contraceptives) can prevent companies from profitably offering new products (Prahalad & Hart, 2002). As a result, companies might find it easier to sell product innovation in low- and middle-income countries before selling it in high-income countries.

4.2. Political environment

Within the political environment, we look at stability and the government.

Stability

The political system is generally more stable in high-income countries than in low- and middle-income countries. An unstable political system reduces the predictability of the business environment (Mühlbacher, Leihs, & Darhringer, 2006). In countries in war, for example, the high costs for security makes it difficult to do business.

Countries with a high income inequality (which is the case for many low- and middle-income countries) tend to have a high degree of socio-political instability (Weil, 2005, p. 393). For low- and middle-income countries, Rouvinen (2006) surprisingly found that democratic regimes have a lower rate of diffusion of mobile telephony than authoritarian regimes. Rouvinen (2006) speculates that authoritarian low-income countries are politically more stable and adopt more communication technologies for military purposes than democratic countries.

Government

Governments in low- and middle-income countries desire advanced technology (Mühlbacher, Leihs, & Darhringer, 2006). The demand from those governments can provide the support required for the introduction of a product innovation. Government support can help diffusing expensive products, such as personal computers, among the entire population (and not just the rich elite). MIT's \$100-laptop, for example, is cheap compared to computers in high-income countries, but can still be too expensive for some people living in low- or middle-income countries. Thanks to government support, MIT can reach more people (One Laptop per Child, 2007).

The government can also hinder doing business in low- and middle-income countries, because of corruption or weak institutions (Prahalad & Hammond, 2002; Arnold & Quelch, 1998; Hart, 2005). According to Iyer, LaPlaca and Sharma (2006) unsatisfactory institutional development negatively influences the success of radical innovation.

4.3. Legal environment

Within the legal environment, we look at regulation.

Regulation

Different countries have different rules concerning competition, marketing, protection of intellectual property, packaging, product liability⁷, advertising, etc. (Mühlbacher, Leihs, & Darhringer, 2006). Also the enforcement of these rules differs between countries. High-income countries have more complex regulation than low- and middle-income countries (Weil, 2005, p. 342). Because rich people tend to be more risk-averse, rules and enforcement in high-income countries may be stricter than in low- and middle-income countries. Arnold and Quelch (1998) and Hart (2005) name the lack of regulation in low- and middle-income countries as one of the obstacles for doing business there.

Some companies move their production sites to low- or middle-income countries because laws on labour and environmental pollution are less strict than in high-income countries. In the same way can companies choose to bring new products to the market first in low-income countries because laws on, e.g., product liability, are less strict. On the contrary, the stricter regulation regarding environment in high-income countries can also stimulate the development of environmentally friendly products. For example, since 2006, New York no longer allows oil companies to demand from gas stations that they only buy fuel from the oil company itself, opening opportunity for gas stations to sell ethanol (The Wall Street Journal, 2007a).

4.4. Technological environment

Within the technological environment, we look at infrastructure and level of technological sophistication.

⁷ Product liability refers to the responsibility of the supplier of a good to guarantee that the consumer will not incur any personal damage by using it (Mühlbacher, Leihs, & Darhringer, 2006).

Infrastructure

A country's infrastructure can be subdivided into transportation, communication, energy, and commercial infrastructure. The general idea is that a certain level of infrastructure is required to sell and distribute products (Mühlbacher, Leih, & Darhringer, 2006). Prahalad and Hammond (2002) name an inadequate infrastructure as one of the barriers to do business profitably in low- and middle-income countries. According to Iyer, LaPlaca and Sharma (2006), unsatisfactory infrastructure negatively influences the success of radical innovation.

However, the lack of infrastructure can also help the adoption of new technologies (Arnold & Quelch, 1998; Easterly, 2002). The presence of an old technology creates a deadweight that hinders the adoption of a new technology (Easterly, 2002). The heavy investments for letting factories work on steam engines made in the past, discouraged factory owners to replace the steam engine with the electric engine, despite its benefits (Easterly, 2002). The lack of infrastructure for the old technology can therefore speed up the diffusion of the new technology because it facilitates leapfrogging. Technology leapfrogging means that companies or countries skip one or more generations of a technology. They go from not using the technology or using an old generation of the technology to using the new technology (Arnold & Quelch, 1998). For example, many telecommunication companies try to sell mobile phones in low- and middle-income countries where fixed-line telephony is not extensive. So companies active in an infrastructure industry can bring new products to the market easier in low- and middle-income countries than in high-income countries where a solid infrastructure is already widely present. Developing an adequate infrastructure in low- and middle-income countries could not only be profitable, but

would also improve connectivity with potential customers and lower the entry barriers for companies active in other sectors (Prahalad & Hammond, 2002).

Level of technological sophistication

The level of technological sophistication in a country gives an idea about what people there are used to working with. Being able to understand and work with a certain technology may facilitate the use of another technology. For example, using a mobile phone is easier when the consumer has experience with fixed-line telephones. Rouvinen (2006) found that the diffusion of mobile telephone is higher in low- and middle-income countries with a higher diffusion of non-telecommunications technology (such as PC penetration). High-income countries have more internet users and also more mobile phone subscribers than middle-income countries and even more than low-income countries (United Nations Development Programme, 2006). Because the level of technological sophistication is higher in high-income countries, bringing a new product to the marketplace there may be easier than in middle- and low-income countries.

4.5. Social and cultural environment

Within the social and cultural environment, we look at population size, age distribution, degree of urbanization, and acceptance of change (Mühlbacher, Leihs, & Darhringer, 2006).

Population size

The larger the population, the larger the possible size of the product market. Authors such as Prahalad and Hart (2002; Hart, 2005) use this argument to convince

multinational corporations to sell their products in low- and middle-income countries where most people in the world live (about 5.2 billion people (The World Bank Group, 2003)). Most multinationals, however, focus their business on the 1 billion people living in high-income countries (Prahalad & Hammond, 2002). Large, fast-growing countries (such as China and India) also gain special attention from companies (Mühlbacher, Leihs, & Darhringer, 2006).

Age distribution

In general, low- and middle-income countries have a younger population than high-income countries (UNDP, 2006). Contrary to past findings that young people adopt innovations quicker than old people, studies on the age difference between early and late adopters of innovation do not provide conclusive results (Rogers, 2003, p. 288).

Urbanization

Urbanization represents the degree of concentration of potential customers, more precisely the part of the population that lives in cities (Mühlbacher, Leihs, & Darhringer, 2006). It reflects the ease of access to customers when entering a new market. A dispersed population –such as in rural areas– is more costly to reach than a concentrated population –such as in urban areas (Hart, 2005; Prahalad & Hammond, 2002). Another important factor linked to the degree of urbanization is infrastructure⁸. A dispersed population is more difficult to reach because it is more difficult and costly to develop the infrastructure (such as roads and communication channels). An adequate infrastructure makes it easier to reach rural areas.

⁸ See Technological environment: Infrastructure

The percentage of the population living in urban areas is highest in high-income countries, second highest in middle-income countries and lowest in low-income countries (UNDP, 2006). In high- and middle-income countries, more people live in cities than in rural areas; less than one third of the population in low-income countries lives in cities (UNDP, 2006). In absolute terms this comes down to almost half of the world population living in urban areas.

Obviously, not everyone living in a city is rich or easily reached. Too rapid urbanization may lead to concentrations of poor people, who often work in the city's informal economy (Mühlbacher, Leihs, & Darhringer, 2006). The urban poor do not only consume different products than the urban rich but also than the rural poor; companies can therefore not approach the poor in urban and rural areas in the same way (Mühlbacher, Leihs, & Darhringer, 2006).

Acceptance of change

The acceptance of change (for instance of new products) differs from country to country. People who are informed about other cultures tend to be more tolerant towards changes (Mühlbacher, Leihs, & Darhringer, 2006).

Religion, living conditions, and the material culture of a society shape people's tendency to accept changes (Mühlbacher, Leihs, & Darhringer, 2006). In general, people in high-income countries accept change faster than do people in low- and middle-income countries (Mühlbacher, Leihs, & Darhringer, 2006). However, thanks to a global, increasing access to information, people in low- and middle-income countries know which goods and services companies sell in high-income countries (Prahalad & Hart, 2002). Even though they do not consume the products themselves, knowledge about the products may increase their acceptance to change.

Rogers (2003) identifies five product characteristics that affect product diffusion: relative advantage, trialability, observability, compatibility, and complexity.

Relative advantage

When a new product is perceived to be superior to past generations of products (relative advantage), people are more likely to adopt it (Rogers, 2003, p. 229, 233). Relative advantage depends on which other products potential customers compare the product to. If there are many satisfying products available, such as in high-income countries, the competition might be too heavy. Consumers in high-income countries have higher expectations regarding quality and features of new products than consumers in low- and middle-income countries, who compare the product to few products of lower quality or (in case of non-consumption) to no competing products at all (Prahalad & Hammond, 2002; Hart, 2005; Hart & Christensen, 2002). The market introduction of more modest products may therefore go more smoothly in low- and middle-income countries (Hart, 2005; Hart & Christensen, 2002).

Trialability

When potential customers can experiment with a product on a limited basis (trialability), they will be more likely to buy the product (Rogers, 2003, p. 258). Mühlbacher, Leihs, and Darhringer (2006) agree that people tend to adopt a new product when the risk of testing the product is low. They sum up seven types of perceived risk: physical, functional, psychological, social, financial, environmental risk and the risk to waste time on the product search.

The personal risk of testing a product consists of the physical, psychological, and social risk. The possibility of harming the customer's health (physical risk), the risk of

damaging the customer's self-image (psychological risk), and the risk that the purchase or use of the product embarrasses the consumer in front of others (social risk) lowers a consumer's willingness to buy the product (Mühlbacher, Leihs, & Darhringer, 2006). The personal risk of buying a new product is unlikely to be different in low-, middle-, or high-income countries. The social risk, however, might be bigger for people who live in smaller communities where living in anonymity is less possible. For example, boiling contaminated water in Los Molinos, a town of 200 families in rural Peru, is linked to illness. As a result, the habit to boil water is only adopted by sick people and people who were raised in other towns and fear diseases non-boiled water might lead to (Rogers, 2003, p. 1-5).

The risk to lose money (financial risk, (Mühlbacher, Leihs, & Darhringer, 2006)) depends on the price of the product relative to the personal income of the customer. Considering the lower per capita income in low- and middle- income countries (except for the rich elite), the financial ease of testing is a bigger obstacle there than it is in high-income countries. The risk of non-performance of the product (functional risk, (Mühlbacher, Leihs, & Darhringer, 2006)) is closely related to the financial risk because it increases the risk of spending money on a defective product. It is not just about whether someone can afford to buy the product or about the opportunity cost of buying it, it is about possibly spending money without getting anything in return. The risk of wasting time on the product search reflects the opportunity cost of spending time on, e.g., leisure or work (which in the case of work increases the financial costs of searching for a product). The opportunity cost of time is lower in low-income countries than in high-income countries. However, seeing that in low-income countries more people live in rural areas and have to cross a larger distance for certain

purchases, the time spent on searching for a product can be long and, as a result, the financial cost high compared to personal income.

In accordance with the environmental Kuznets curve⁹, people in high-income countries (and the elite in low- and middle-income countries) are more likely to consider the negative effects on the environment of consuming a product (environmental risk, (Mühlbacher, Leihs, & Darhringer, 2006)) than people in low- and middle-income countries. It can therefore be easier to launch environmentally friendly products in high-income countries.

Observability

When the results of an innovation are visible, people who have not yet adopted the innovation will be more likely to do so (Rogers, 2003, p. 258). As Mühlbacher, Leihs, and Darhringer (2006) put it, consumers are more likely to buy a new product when they understand its relative advantage (ease of communication). Barriers to communication are language and intellectual capability.

Prahalad and Hammond (2002) name illiteracy as one of the obstacles for doing business in low- and middle-income countries.

The intellectual capability of the population is influenced by the educational system and the national level of technological sophistication. Depending on what consumers learned in school and depending on their experience with innovation, a good product can fail because of a lack of proper communication. In the Peruvian town Los Molinos, for example, some inhabitants did not want to adopt the habit of boiling water because they did not understand the relevance of it. They could not

⁹ According to the Environmental Kuznets Curve, environmental degradation first increases with income per capita and then decreases. The turning point appears to be between \$5,000 and \$8,000 per capita (Dasgupta, et al., 2002).

understand that non-boiled water can be contaminated with germs and make whoever drinks it, sick (Rogers, 2003, p. 1-5).

Compatibility

When a new product fits with a consumer's experiences, values, or needs (compatibility), consumers will tend to buy the product (Rogers, 2003, p. 240, 249). Living conditions influence the choice of products that people adopt (Mühlbacher, Leihs, & Darhringer, 2006). People will be more willing to adapt their lives when the use of the new product tremendously improves their living conditions. It may be easier for new products to improve the living conditions of people in low- and middle-income countries than in high-income countries.

Complexity

When consumers find the product itself (not its relative advantage) difficult to understand (complexity), they are less willing to buy it (Rogers, 2003, p. 257). It can be very difficult to explain how a new product works to people who do not have any experience with similar appliances¹⁰.

Intellectual capability influences complexity as well. According to Prahalad and Hammond (2002), the conventional idea of multinationals that poor people cannot use advanced technologies is wrong. They point out that, for example, people in low- and middle-income countries are able to use mobile phones even though most of them have never used a phone of any other kind before.

¹⁰ Also see Technological environment: 'Level of technological sophistication'

5. Conclusions

Which factors stimulate or hinder the diffusion of a radical product innovation in low-, middle- and high-income countries? Obstacles in high-income countries are usually benefits in low- and middle-income countries and vice versa.

Table 1 shows the factors that positively or negatively influence the product launch of an innovation in high-income countries, on the demand or supply side.

	POSITIVE INFLUENCE	NEGATIVE INFLUENCE
D E M A N D	<i>Economic environment</i> High income per capita	<i>Economic environment</i> Saturated markets
	<i>Political environment</i>	High competition
	<i>Legal environment</i> Strict environmental enforcement	Vested interest of incumbents
	<i>Technological environment</i> High level of technological sophistication	<i>Political environment</i>
		<i>Legal environment</i>
	<i>Social & cultural environment</i> Higher acceptance of change Financial ease of testing Care about environmental risk	<i>Technological environment</i> Vested interest in old technology
S U P P L Y	<i>Social & cultural environment</i>	<i>Social & cultural environment</i> Small population High consumer expectations High opportunity cost in search of product
	<i>Economic environment</i>	
	<i>Political environment</i> Stability	<i>Economic environment</i>
	<i>Legal environment</i>	<i>Political environment</i>
	<i>Technological environment</i> Solid, widely present infrastructure	<i>Legal environment</i> Complex regulation Strict enforcement
	<i>Social & cultural environment</i> Urban (ease of access)	<i>Technological environment</i>
		<i>Social & cultural environment</i>

Table 1. Factors influencing product introduction in high-income countries

The high budgets in high-income countries allow companies to offer all sorts of products and services (compared to low- and middle-income countries). The high level of technological sophistication increases acceptance of new technology and makes it easier for consumers to work with new products. Since more people in high-income countries live in urban areas than in rural areas, potential customers are easy to reach. Because of the high income per capita, consumers can afford to care about

the environment and demand environmentally friendly products. The strict rules concerning pollution stimulate the development of environmentally friendly products.

When companies try to bring radical innovation to the already saturated high-income market, however, they face strong competition from industry incumbents and vested interests. The supply of many products of high quality increases competition and the consumers' expectations towards new products. These high expectations make it more difficult to launch a new product in high-income countries. Extensive regulation and strict enforcement of laws (e.g., concerning pollution) make it difficult for companies to do whatever they want.

Low- and middle-income countries also have characteristics that facilitate or hinder the launch of a new product, as shown in table 2.

The political instability, weak institutions, and corruption can make low- and middle-income countries an unattractive environment to do business in. Reaching consumers is difficult because a large part of the population lives in distant, rural areas and because of the lack of infrastructure. The credit constraints of the poor lower the trialability of a new product and pushes companies to lower cost so they can lower prices. The high illiteracy rate makes it difficult to communicate about new products. The low technological sophistication of the poor is a disadvantage that can be overcome.

Considering the population size in low- and middle-income countries, there is a large, potential market for many products, especially products that serve basic needs. Poor people, however, also spend part of their income on other products. Companies that sell luxury products may not forget that there is a fairly large elite and middle class in low- and middle-income countries as well who are able to buy some products that companies offer in high-income countries.

	POSITIVE INFLUENCE	NEGATIVE INFLUENCE
D E M A N D	<i>Economic environment</i> Presence of elite/middle class Basic needs and luxury needs Low competition	<i>Economic environment</i> Low income per capita Inequality Basic needs
	<i>Political environment</i> Government demand	<i>Political environment</i> Corruption Weak institutions
	<i>Legal environment</i>	<i>Legal environment</i>
	<i>Technological environment</i>	<i>Technological environment</i> Low level of technological sophistication
	<i>Social & cultural environment</i> Large population Lower consumer expectations (relative advantage) Poor living conditions (relative advantage)	<i>Social & cultural environment</i> Lower acceptance of change Higher social risk High financial risk Less care for environmental risk Long time in product search Illiteracy Lower intellectual capability Lack of experience with similar products
S U P P L Y	<i>Economic environment</i>	<i>Economic environment</i> Need for lower cost structure
	<i>Political environment</i>	<i>Political environment</i> Instability
	<i>Legal environment</i> Lack of regulation and enforcement	<i>Legal environment</i> Lack of regulation Less enforcement
	<i>Technological environment</i> Technology leapfrogging	<i>Technological environment</i> Inadequate infrastructure
	<i>Social & cultural environment</i>	<i>Social & cultural environment</i> Rural

Table 2. Factors influencing product introduction in low- and middle-income countries

Familiarity with and demand for products sold in high-income countries increases because of easier access to information. In many sectors, most competition in low- and middle-income countries comes from non-consumption. In general, regulation in low- and middle-income countries is less extensive and less enforced, which attracts companies. Sometimes support comes directly from governments who demand products and subsidize the distribution among their people. The poor living conditions of many people in low- and middle-income countries makes it easier for a

new product to be perceived as superior to other products that aim to meet the same needs, or in the case of non-consumption, the advantage is even clearer. The lack of infrastructure can be a benefit due to the possibility of technology leapfrogging. Emerging countries gain special attention from companies because of their large size together with rapid growth. Companies probably pay so much attention to emerging countries because they combine the benefits of low-, middle- and high-income countries.

6. Limitations and future research

The research of the paper has several limitations. A first set of limitations concerns the categorization of countries. The model compares two groups of countries: low- and middle-income countries on the one hand, and high-income countries on the other hand. The model can be improved by separating low- and middle-income countries into two separate groups. The model also makes a generalization of all low-, middle-, and high-income countries; it ignores differences among, e.g., high-income countries.

A second set of limitations concerns the assumptions made in the model. Firstly, the company that wants to launch a new product is a monopolist. As a result of the lack of direct competition at the moment of the product launch we did not consider imitation, counterfeiting, and regulation of competition and of intellectual property. Arnold & Quelch (1998) and Hart (2005), however, refer to the lack of effective protection of intellectual property as one of the obstacles that discourage companies to do business in low- and middle-income countries. When expanding the model to include direct competition at the moment of the product launch or to take into account

the entry of competitors in the future, the influence of factors such as imitation and intellectual property protection will be examined as well.

Secondly, the assumption of two segmented markets excludes international trade. As a result, we did not consider the effects of export/import policy, trade sanctions, exchange rates, and trade unions.

Finally, the assumption of the absence of location advantages excludes the consideration of comparing regulation in the home and the host country, foreign investment, market entry mode, labour force, and acceptance of companies and goods of a certain country.

As indicated in the introduction, the paper offers the groundwork for a model of a product launch at the bottom of the pyramid. Future research can gather empirical data to support or reject the theoretical findings of this paper, based on the experience of multinationals that have approached the markets in low-, middle- as well as high-income countries. The empirical research can find out which factors influence a product launch the most, and for which sectors approaching low-income countries first would be interesting.

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