

Megacities: turning ten million faces at Swedish environmental technology.

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Abstract: The world is facing a tremendous challenge with its current urbanization trend. In particular, two types of cities—i.e. emerging and transitional—are of interest given their rapid population growth and the subsequent pressure put on its infrastructure and logistics and on its surrounding environment. This can represent huge business opportunities for companies in Sweden, where population growth has stabilized and a lot of these problems have been already addressed. At the same time, the host city can benefit from the solution of some of their problems and a push towards a more sustainable development. In this article, the key dynamics for successful up-scaling and diffusion of environmental technologies in emerging markets are analyzed based on a case-study. The identification of key local stakeholders, such as governmental and non-governmental institutions (NGOs), intermediary institutions, industry representatives and academia was the raw material for a first round of interviews. The latter, provided an insight of what are the barriers to success, having in mind the specific social and economic context of the venue and its inhabitants/government's perceptions of their current environmental situation.

Keywords: Megacities, Environmental technology, Sustainable development, Emerging markets.

1. Introduction

The growing tendency of the global environmental technology market has become obvious as environmental awareness and regulations worldwide have equally increased. Both politicians and laymen have realized the importance of ecological considerations when talking about development.

Although domestic markets for this technology have showed to have grown, they pose bigger restrictions and are saturated more rapidly. For example, exports in this sector in Sweden (as defined by Statistics Sweden—SCB) had an annual average growth of around 12% in the 2003-2009 period, which when compared to the domestic figure (4%), can give signs of the saturation of the local market (SCB, 2011).

The environmental technology sector has been somehow difficult to define, although some agreements have taken place in order to measure its activities. As a concept, environmental

technology comprises the products/services created in order to solve an existing environmental problem or to prevent a new one from happening. In any case, it is normally related to the concept of sustainable development, as it is believed to allow a more environmentally friendly economic growth than one that has no ecological consideration whatsoever. The environmental technology sector understands and considers human activities and necessities and tries to provide less polluting and harmful solutions to them. This is why the Swedish government—and several other worldwide—has identified it as a stepping stone for the future development of its society.

Many governments and companies have started looking at the development of international markets as an important strategic alternative, especially in the small- and medium-size enterprises (SMEs) sector (Rundh, 2011). According to Greenaway and Kneller (2005), there is evidence suggesting that countries that have a trade-oriented strategy have “done better” than those who do not. Sweden is a good example of a country with an export-led growth. In 2009, exports represented roughly 48% of its GDP. However, even though with a growing tendency, the environmental sector does not show this behavior yet: in 2009, exports represented around 19% of the sector’s turnover, and roughly 2.6% of the total national exports¹.

Considering the possibility of domestic market saturation, it is therefore important to look for potential external markets for these technologies. A good example are cities, considering that most of the environmental impacts are caused by human–economic–activities, and that half of the world’s population is now living in urban areas (UN, 2008). The McKinsey Global Institute (MGI) estimates that cities in emerging markets are expected to contribute to 50% of the global economic growth in the upcoming 15 years. This figure is definitely attractive for managers and entrepreneurs thinking of expanding their boundaries into bigger markets. This unprecedented growth will not come without challenges, as many cities around the globe have already experienced. There is hardly another place where more environmental problems coincide than cities. This is particularly evident in megacities², where population is just but one of the pressures on their surrounding environment.

A particularly interesting group for this sector consists of emerging and transitional megacities—explained in section 2.1—given their needs and demands of environmental technologies that could help them confront their challenges and facilitate their path into sustainable development.

Following this line of thought, it is important to analyze ways of accessing information that provides strong grounds for the successful development and deployment of strategies and business models. Today’s global market and customers expect a proactive approach in order to react to their obvious needs, but also a deep understanding of their situation in order to address their future needs (Blocker et al., 2010). Much of this information lies within the target market itself and is especially guarded by local stakeholders. A deep field exploration is needed then in order to find out from firsthand about the conditions and requirements for the creation of an actual business arena.

¹ Elaborated with data from SCB.

² A commonly accepted definition is cities with more than ten million inhabitants (UN, 2008).

Therefore, the questions addressed in this article are:

- What are the major environmental problems in megacities?
- What are the key dynamics for the successful up-scaling of environmental technologies in cities in emerging markets?
- Which are the possible barriers to success?

In short, the aim is to analyze megacities as a potential market for Swedish environmental technologies. Structured environmental, cultural and contextual information—i.e. drivers, barriers and opportunities—might be helpful to facilitate the business's decision-making process.

2. Technology, human impact and sustainability.

Technology has given societies the power of creating solutions to practical problems by applying fundamental laws. However, humans are not optimizers, but developers of complex strategies in order to counteract the consequences of their actions (Dias de Avila-Pires et al., 2001). Access to technology and the increase of quality of life perceived from it—added to other social phenomena—is the main explanation of urban growth and rural migration.

Humans have always caused an impact on the environment. However, this impact materialized in a stronger way since the industrial revolution. From this point on, the difference between man-made and natural capital became more evident, with the ability to produce more, newer, faster and cheaper. In recent years, the concept of carrying capacity started permeating the political arena, and discussions started taking place in order to address the need of the preservation of natural ecological systems. Leaders started to understand that development—which could be defined as the planned change directed towards the improvement of the quality of life of humans—is embedded and dependent on a set of natural services, and therefore the necessity to include nature as an important component of such a concept.

Thus, the concept of sustainability and sustainable development became a central issue of environmental policies—especially after the Brundtland Report in 1987—and they deserve a deeper analysis, useful for the subsequent discussion of the role that environmental technology plays under many emerging and transitional cities' context.

2.1. Megacities' priorities and the sustainability dilemma.

A study made in 2004 by GlobeScan and MRC McLean Hazel and sponsored by Siemens, described three city archetypes based on their population growth rates, their infrastructure development and their ability of providing basic services to its inhabitants (Gareth Lofthouse and Economist Intelligence Unit, 2004). The first type is called emerging cities, and comprises those cities that have experienced high rates of population growth—to a big extent due to rural migration—and where infrastructure has not been able to cope up with the increasing needs of its inhabitants. They normally exist in countries with less than 50% urban population (e.g. Nigeria and India). The second type is called transitional cities, and is composed by cities experiencing a relatively stable—or even negative—growth over the past few years and although still have infrastructure challenges, are more capable of responding financially and organizationally to them. They are typically in countries with more than 50%

urban population (e.g. Mexico). Finally, the third type is called mature cities and is composed by those cities that have much slower growth rates than the previous two groups and for which the main challenge is to deal with the obsolescence of their infrastructure and the demand of services required by an ageing population. In these cities' countries, more than 75% of their population is urban (e.g. UK and U.S.A).

The study found—among other things—that emerging and transitional cities prioritize competitiveness and employment over environmental issues. Although the latter is recognized as an important subject, it is often sacrificed for economic targets.

The struggle of cities around the world for reaching material wealth can be explained from several perspectives, especially when talking about cities in developing countries (e.g. high poverty levels, low education levels, huge social gaps, lack of public services, etc.). Some environmental problems have been modeled using Simon Kuznets's hypothesis, which from an environmental perspective could be interpreted as: once income goes up, people start focusing on cleaning water and air, and start moving from dirty energy sources to cleaner and more efficient ones. This way of thinking has led policymakers to justify a *laissez-faire* position: “*growth will do the job*” (Bousquet and Favard, 2005). However, trying to reach the inflection point could mean in most of the cases irretrievable losses even for a million-times wealthier population—i.e. species extinction, habitats loss and non-renewable resources depletion.

The latter makes the sustainable development concept ambiguous, even if it has been the buzzword for governments and industry since the mid-1980s. As Hansson (2010) states, it is therefore hardly applicable under concrete socio-technological contexts. As a word, “sustainable” could imply something that has the ability to operate for long periods of time. A popularly accepted model describes three equally sized spheres—namely economy, society and environment—where sustainability is represented as their triple intersection.

Economists and environmentalists seem to lead the debate over the best approach to sustainability in order to solve the environmental crisis that humanity is facing (see Ayres et al., 2001; Beckerman, 1995 and Hansson, 2010). From an economic perspective, the dominant interpretation of sustainability includes a development that can go on from generation to generation at a non-diminishing level (Hansson, 2010). This is labeled as weak sustainability by environmentalists, as passing on less environmental resources onto subsequent generations is justified if more human-made capital is passed instead. The idea of allowing natural resources to deplete if they are compensated for by increases in other resources renders the sustainable development idea meaningless, as Hansson states. On the other hand, strong sustainability refers to the preservation of both, treated separately. Thus, it is considered by many as impracticable. In short—from an ecological perspective—the sustainability dilemma could be analyzed as a problem of a dominant system—i.e. macro-economic—and its ecological illiteracy (Jackson, 2009).

This debate is difficult to solve over the short-term, due to the social dependence on the current, rigid and fragile system. However, more recently, humans have started realizing that this discourse is not black and white, but has a lot of different colors. This means that two sciences cannot—and *will* not—provide the ultimate solution to the current environmental crisis, and a multi-disciplinary approach is needed for the more efficient and immediate solutions required. The understanding of the interconnected nature of this planet is definitely not a one-field job. Therefore, the role of other social and natural sciences is seen now as an important component of today's environmental discourse.

A big debate has circled around the concept of green growth as a means of achieving a friendlier economic growth, which includes—among other things—the promotion, development and dissemination of environmental technologies. The returns on these types of investment has shown to be very attractive, both from an economical and from a sustainability perspective, and are probably going to become even more attractive in the upcoming years, when resource depletion and increasing energy prices will be a reality (Jackson, 2009). In particular, technology is considered by some as responsible for the impact caused on the environment (Chertow, 2001), summarized in the *IPAT* equation (Daily and Ehrlich, 1992). However, a responsible and holistic understanding of the role that green investment and green jobs could play on today’s society represents a good solution to the environmental crisis and at the same time become an opportunity for a different type of growth. As Schneider et al. (2010) comment, technological development is not necessarily hindered by sustainability practices, but redirected from more to better.

2.2. The Swedish environmental sector

Since 2000, SCB has been working on the generation of information related to the field of environmental technology, in order to provide data to different stakeholders for forecasting or decision-making processes. Although a clear definition of the environmental sector is difficult to achieve, SCB adopted the one established by the OECD in 1999: “*The environmental goods and services industry consists of activities which produce goods and services to measure, prevent, limit, minimise or correct environmental damage to water, air and soil, as well as problems related to waste, noise and ecosystems. This includes cleaner technologies, products and services that reduce environmental risk and minimise pollution and resource use*” (SCB, 2009). Thus, thirteen environmental areas were defined in order to classify activities within the environmental sector. Table 2.1 shows each area and its participation in the overall sector.

Table 2.1: Swedish environmental areas and their domestic market share in 2009. (1) Area’s share of the total sector’s turnover; (2) Area’s share of the total sector’s exports; (3) Exports’ share within each area (Elaborated with data from SCB).

Environmental area	Turnover ¹	Overall export ²	% (export/turnover) ³
Renewable energy	51%	41%	15%
Recycled materials	11%	18%	29%
Heat/energy saving	6%	13%	43%
Other resource man. (incl eco-tourism)	2%	9%	71%
Waste management	13%	6%	9%
Wastewater management	4%	5%	21%
Air pollution control	2%	4%	50%
Environmental consultants	3%	2%	10%
Soil and groundwater	1%	1%	22%
Education, research and monitoring	1%	1%	28%
Sust. agricult./fishery	2%	1%	6%
Sustainable forestry	3%	0%	1%
Noise and vibration	0%	0%	21%

Areas that contribute the most to the overall exports (e.g. renewable energy and recycled materials) have a relatively low rate of exports/turnover. This means that these areas’ offerings have a greater unitary weight—i.e. each unit sold abroad contributes more than the rest in relative terms. However, other areas like waste management, wastewater management

and environmental consultants have a potential to grow within their own areas, as their export/turnover rates are still low. This does not mean that those areas that have a higher rate do not have the potential of increasing such figure—e.g. air pollution control, considering for instance the contextual conditions of their domestic market vs. the one under study; i.e. lower vs. higher emissions and a service vs. a manufacturing oriented economy.

3. Methodology and the research field.

The study is taking place using a case-study methodology, considering the fact that the objective is to address “how” and “why” a social phenomenon works (Yin, 2009; Berg, 2009). In this case, we are researching the contextual conditions hindering/promoting the implementation of environmental technologies in megacities in emerging markets and the subsequent creation of a business arena for this sector.

For this purpose, it was very important to rely on trustful information and especially on local contacts that could provide easy access to the still-to-identify stakeholders. Thus, previously acquired contacts—through professional, academic or situational networks—were identified as useful by the research group in order to decide which venue to choose. Under that premise, Mexico City was chosen considering the good relations acquired through previous work with research projects and external programs like UNIDO (United Nations industrial development organization). On the other hand, Mexico City fulfilled the conditions defined by the team and the funding institution for the development of the research project, i.e. a transitional megacity and all that implies: a growing population and technical systems trying to catch up.

After having decided the venue to study, the team focused on identifying the main environmental challenges that the city has faced and is facing, which are the priority and how the different stakeholders have dealt with them. Through governmental reports, supra-national institutions studies, web pages and newspaper articles, the main issues were identified and categorized according to frequency of appearance and level of affectation given the social/economic/geographical situation.

The next step was to identify the stakeholders; those affected by the detected problems and those directly or indirectly involved in their generation or solution. Also, as the focus is on business relations, those affected/affecting them. Having this in mind, four groups were identified:

- governmental institutions;
- intermediary institutions and non-governmental organizations (NGOs);
- universities and research centers and
- industrial conglomerates.

The idea of using several sources of information is to get a better approximation to the problem we aim at addressing, by using data triangulation (Berg, 2009). It is important to state that citizens were defined as an important stakeholder, but were not considered in the first round of interviews due to time and access restrictions.

Once the aforementioned groups were clearly identified and demarcated, a field trip to Mexico City took place in December 2010. A first round of interviews was held with those

representatives that were available/reachable through the team's local contacts or personal inquiries. Such interviews were held under a semi-structured frame. A set of important topics considering the literature review and the nature of the interviewees were scrutinized before the visit. Such topics were brought up during the interviews, although did not have a constraining nature, as a dynamical development of the conversation was preferred in order to access as much information as possible. The first round of interviews was very useful both for reassuring the research team's concerns and for unveiling unknown preoccupations. Table 3.1 shows the interviewees and their background.

Table 3.1: information about the respondents.

Organization/Institution	Type	Responsibilities
Metropolitan Environmental Commission (CAM)	Governmental.	Definition, coordination and monitoring of legislation, projects and actions regarding environmental protection, preservation and restoration of the ecological balance within the urban area.
World Business Council for Sustainable Development (WBCSD) – Mexican chapter.	Industrial coalition.	Participation in research, analysis and solution of problems related to sustainable development; promotion and training regarding sustainable development and eco-efficiency. All, in cooperation with the different sectors involved.
Center for studies about the city, Universidad Autónoma de la Ciudad de México (UACM).	Academia.	To generate research within the urban phenomenon, particularly in Mexico City. To communicate its results through seminars, colloquiums and publications in cooperation with other universities and governmental bodies.
National Council of Ecologist Industrialists (CONIECO).	Industrial coalition - Academia.	Promoting an ecologic culture in industrial processes and the efficient and responsible use of energy and water; participating in the creation, revision and analysis of the ecologic regulations for industry; spreading technical, economic and cultural information for pollution control.
Institute for Transportation & Development Policy (ITDP).	Non-governmental organization.	Influencing policies and raising awareness of the role that transportation plays in sustainable development; advising local governments for the implementation of transport solutions for the reduction of pollution, poverty and the improvement of quality of urban life.
Global Environmental Management Initiative (GEMI).	Non-profit organization – Industrial coalition.	Guaranteeing legal stability for companies involved regarding environmental legislation; promoting green supply chains; making environmental assessments; providing advisory to industry, society and government; benchmarking best practices worldwide.
Mexican Center for Cleaner Production (CMPL).	Supra-national initiative (United Nations) - Academia.	Delivering services to business, government and other stakeholders for the implementation of cleaner production methods, practices, policies and technologies.

Table 3.1. (Ctd).

Waste Commission of the Federal District.	Governmental.	Proposing and defining mechanisms and criteria for the coordination of issues regarding generation, handling, treatment, minimization, use and final disposal of residues within the Federal District.
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Once collected, the information was classified in different groups, according to what was discussed with each particular interviewee. This provided a good raw material for an analysis over what were the different conceptions and opinions on shared/transversal issues.

The last step consisted of an initial identification of which were the most promising areas for Swedish environmental technologies in Mexico City, considering both the literature review and the information obtained during the field trip. Then, a tentative model was proposed having in mind the dynamics and barriers identified and possible strategies to overcome them.

4. Preliminary results of the Mexico City case-study.

4.1. Mexico City's environmental challenges.

As many megacities around the world, Mexico City faces several environmental challenges. Although one of the main concerns is transport infrastructure (the city has an average speed of 3 km/h in some places during peak hours (The Clean Air Institute, 2007) and an average commute time of 2.5 hours (Burdett and Sudjic, 2007)), other concerns circle around problems like air pollution—highly tied to the transport problem, water supply—both quantity and quality, solid waste—more than 12,000 tons generated every day only in the Federal District (Federal District's Government webpage), energy supply—80% of its electricity comes from oil, coal and natural gas (Sumner et al., 2010), and population/housing—60% of the constructions are illegal or informal (Burdett and Sudjic, 2007).

Again, the city's objectives of generating employment and boosting economic growth, directs a big share of the resources towards the improvement of transport and technological/information infrastructure, although the evident need for the solution of other problems and the international visibility that the city has acquired has turned the government's face towards other needed investments. However, the environmental legislation is not adequate all the time and does not produce the required incentives for a proactive behavior coming from the industrial sector.

4.2. Mexico City's dynamics: initiatives from the government, the industrial sector and from independent institutions.

Mexico City has had a long story of environmental impacts caused by its population. Even before the Spanish conquest, the valley was a busy area for agriculture and commerce for the Aztec empire. However, this impact became more evident after the Second World War, when the population started growing exponentially and the industrialization of the city was promoted in order to fulfill the government's plans to support and defend local production and imports substitution (Pradilla Cobos, 2005).

Transport, mobility and productivity are a big concern for Mexico City's government. However, there are also non-profit non-governmental institutions working for the improvement of these areas. Improving mobility, as ITDP sees it, requires the promotion of public transport, non-motorized transport and restrictions to private car use. On the other hand, giving access to transport and to the city's services to those most vulnerable is another advantage of these policies.

The development of non-motorized transport (e.g. bicycles) is seen as a positive initiative by ITDP, although criticized for its focus on lanes construction, not on speed reduction and safety. Another success story is the implementation of the city's bus rapid transit (BRT) system—*Metrobús*. ITDP's role is to advise the city's administration during the design, construction and operation phases, while defending the system's rights over private cars owners.

Moreover, since the 1980s there has been a tremendous focus on the pollution of the city's air. Especially, since vehicles are responsible for half of the city's emissions (Federal District's webpage), successful regulations have taken place and showed interesting results. Actions like improving the quality of liquid fuels, improving the performance of private and public vehicles with periodical technical checks and a circulation restriction program based on the age of the engine and the result of these checks are mentioned by the *CAM*. Fixed sources are also considered within the general pollution control plan. In order to avoid socio-economical problems due to environmental contingencies—when industry has to reduce its activities drastically—and to promote emissions reduction, the administration started “clean-industry certification” and self-regulation programs.

There are currently 36 monitoring stations controlling the air's quality; 24 within the Federal District and 12 in its suburbs. A metropolitan index for the quality of the air (*IMECA*) was developed in order to keep track of pollutants and to have an instrument for the communication of environmental risks/contingencies to the citizens. The latter has become a successful way to increase the number of days “within the norm” and keeping people aware and informed. Ozone levels, for example, are tracked and published every minute on the internet. An important program (*PROAIRE*) has been set incorporating urban development and climate change with the preoccupation for the air's quality and involves 80 measures for its improvement. The program has a holistic approach, thus several commissions meet periodically in order to discuss it, showing the transversal nature of this issue.

Regarding the solid waste problem, the waste commission stated that 30,000 tons are received every day at the *Bordo Poniente* landfill, east of the Federal District. Only 10% is properly sorted and recycled or composted, the rest goes to the landfill. The closure of the landfill has been planned since 2009 but has not taken place, due to the lack of alternatives. The latest closing date established is December, 2011. There are some possible sites in surrounding states for landfills. However, the administration is aware of the great costs that the transportation activities will imply, added to the logistics and mobility problems.

Greenhouse gases emissions and energy efficiency measures have caught a lot of attention from the industrial sector. The national inventory of greenhouse gases emissions (*INEGEI*) presented by the national ecology institute (*INE*) and the secretary's office for the environment and natural resources (*SEMARNAT*) gives the government and the industrial sectors good information for their decision-making processes and emissions reductions plans. As stated by the interviewee from the WBCSD, several companies responsible for roughly 1,500 million tons, are analyzing together production schemes and energy behaviors. The group is very diverse, from big companies as *PEMEX*—Mexico's state-owned oil company,

with around 50 million tons/year—to small companies responsible for 10,000 tons/year. After five years, companies are actually moving towards the establishment of goals and sustainable practices, to the point that last year, a 7% reduction was reached in comparison to 2009. It is important to mention that this is a voluntary program, not required by law. Climate change awareness in Mexico City represents big business opportunities, especially considering its ambitious climate action program.

Some examples of initiatives mentioned by the WBCSD include the creation of the commission for the studies of sustainable development in the private sector (*CESPEDES*), the general law of ecological equilibrium and environmental protection (*LGEEPA*), plans for the reduction of 50 million tons CO₂ for 2012 (equivalent to *PEMEX*'s emissions) and a total reduction of 50% in emissions for 2050. In addition, an identification of opportunities for the industrial sector brought by climate change was made in 2009, highlighting Mexico's need to develop and grow, but recognizing the relevance of climate change and the importance that the entrepreneurial sector has in participating in the definition of the climate change policy.

4.3. Detected barriers for the implementation and dissemination of environmental technologies in Mexico City.

Environmental regulations are seen by many as barriers for the implementation of clean technologies or long-term commitments. Although the ideology has changed amongst industrialists, the incentives are contradictory for them, according to GEMI. They do not see clear instruments that could promote the adoption of better soft/hard technologies. The trend is to comply with the existing regulations in order to avoid fines, but proactive thinking is not always encouraged by governmental policies. Moreover, when incentives do exist, there is no good dissemination and they are not properly communicated to those for whom they are directed in the first place. Institutions like GEMI have the task of participating in the generation of public policies. Not to make things easier for companies, but to provide them with legal security. They also promote joint programs with governmental institutions like *SEMARNAT* regarding environmental leadership and proactive behaviors.

Most of the interviewees mention also lack of money as an important barrier to solve environmental problems. This has pushed them to try to solve the problems by their own, with low-tech or inappropriate solutions, as the interviewee from *CONIECO* commented. There are no formal structures for the selection of the proper technology amongst companies or industrial groups. It can be described as a random process, where of course, costs have an important weight in the final decision. In particular, spare parts and maintenance are “feared” by industrialists, especially regarding foreign technologies. Mexico, as many other ex-colonies, has experienced long periods of foreign voracity, which has affected its social, cultural and industrial milieus. Institutions like the WBCSD or *CONIECO* have the task of trying to find and disseminate information about the best technologies by attending or arranging international expositions or workshops with representatives from abroad.

An important issue mentioned by the WBCSD was that the concept of Clean Development Mechanisms (CDM) was very attractive at the beginning for Mexican companies. However, very few programs showed good results and made them abandon this kind of instruments as a tool for improving their operations.

Although the World Bank ranks this year Mexico as “easy” regarding the possibilities of doing business (The World Bank webpage), industrialists often complain about the huge amount of procedures and requirements involved in legal obligations—*tramitología* in

Spanish—and influenced by the system’s inefficiency—let alone the well-known “*mordidas*”; i.e. bribes.

In addition, the concept of long-term is very different in most Latin American cities, and Mexico City is not the exception. Due to, e.g. inconsistent legal frameworks, low legal security, low incentives and economic instability, companies do not feel encouraged to commit to long-term contracts or agreements, as the *CMPL* implies. There is a common condition in Mexican companies regarding future planning or commitment: they struggle to survive every day, they confront their everyday problems, which constrains the planning time-frame. In addition, as the *CMPL* states, there is a poor reinvestment of profits into the productive system and a lack of planning or future development thinking. Profits are normally used only to increase private wealth, reflected on the interviewee’s quote “*poor industry, rich owners*”.

Another big barrier identified by most of the interviewees in the city is the lack of coordination amongst its different administrations. The Federal District is divided into 16 *delegaciones* (boroughs), and the whole metropolitan area comprises several other municipalities. There are three political parties involved in the administration. *CAM* mentioned independent funds that have been created financed by, e.g. gasoline surcharges, but are not lasting and create political controversies. Transversal issues like waste management, sewage, roads, etc. can become a difficult subject to agree upon and to maintain, considering that a democratic consensus can be difficult to reach.

Regarding transportation, there is an extensive network for public transport in the city comprising a metro system, heavy and light rails, electric trolleybuses and an extensive bus system. Although around 4.4 million passengers use this network every day—representing 80% of the daily trips, the city has one of the largest stocks of cars and motorcycles in Latin America (Sumner et al., 2010). In addition, the city lacks of an integrated pricing system for its public transport system and congestion charges or carpooling lanes for its already congested roads. Although some citizen initiatives have taken place to improve the access to information³, there is also a lack of an official central information system for transportation. In such a big city, good information can help solving part of the traffic problem, although the current infrastructure makes time scheduling difficult for some sub-systems (e.g. buses).

5. Conclusions and discussion.

Emerging and transitional megacities appear as an option for expanding businesses. They are becoming more and more evident considering the international visibility they are gaining regarding their environmental needs. Such needs are evident not only within the industrial sector, but in everyday’s life. From the field study, this claim became more evident. Both the literature study and the interviews, show a match between these venues’ needs and those areas analyzed in table 2.1. Good examples are renewable energy; recycled materials; waste and wastewater management; air pollution; and soil and groundwater.

It is important however to consider the city’s context. This is not something new to business men, but the environmental technology field is filled with more engineers than salesmen. Trustful local contacts can provide cultural, legal and situational information and save both time and money. Industry conglomerates, non-governmental organizations and independent institutions have a huge effect on the actual stakeholders and possible customers

³ E.g. www.viadf.com.mx

of foreign technologies. They are definitely important allies on a difficult business arena, as they provide local knowledge acquired by the mere fact of acting locally.

Although environmental technologies are solving real human/ecological problems, one cannot deny the main objective of private companies and governments: to increase sales and boost economic growth, respectively. However, one cannot either deny that developing countries have to deal with other kinds of problems not necessarily solvable through the implementation of technologies. It is at this point where these organizations play an important role and can therefore be included in the picture if a company wants to increase its probability of success. By making the implicit benefits more evident—i.e. soil remediation, water sanitation, renewable energy, etc.—the explicit interest—i.e. making money—is smoothed down and more easily accepted as a part of the whole package when benefits are clearly shown and understood, as fig. 5.1 intends to depict:

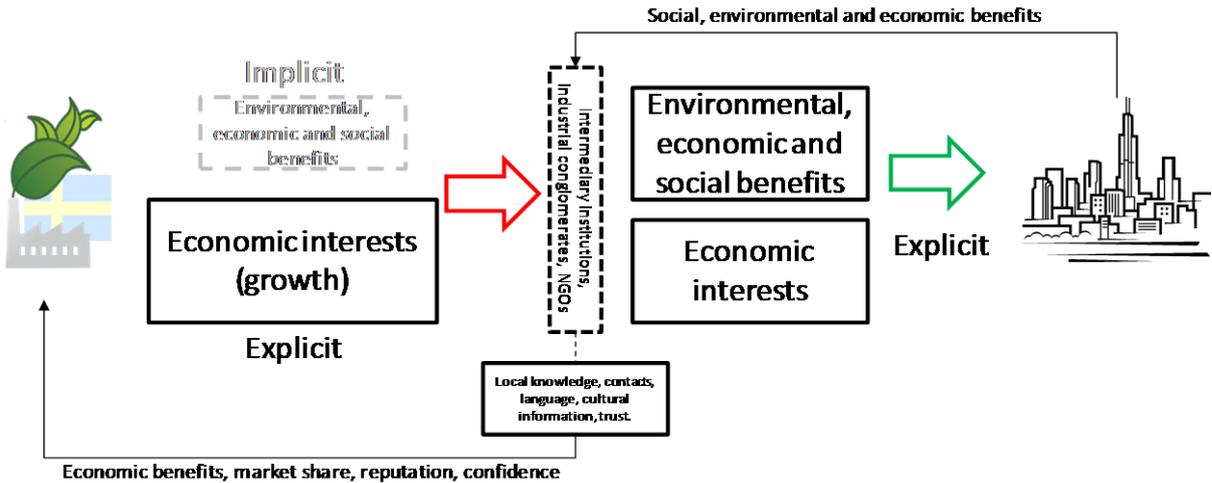


Fig. 5.1: The role of local intermediaries.

A business arena in emerging markets is normally built easier under a close cooperation with local stakeholders (see e.g. Chesbrough et al., 2006 and Dahan et al., 2010). Intermediate organizations and local conglomerates seem to be facilitators of such a condition. They act as a catalyst for the adoption and acceptance of foreign technologies and for smoothing down the business relation. They act locally and are a meeting point for those stakeholders that are spread all over the city, sometimes even unreachable individually.

As human agglomerations have grown to be complex, its dynamics are hardly understood by one single individual, especially if it is an alien one. Cooperation is the key concept to deal with here, and the actors vary depending on the context. An initial insight on how a successful strategy could be developed is depicted by an analysis of one of the biggest cities in the world, from which much can be learned in order to avoid costly and time-consuming mistakes and learning curves.

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