Summer 6-1-2014

Research on Societal Constraints for Implementing an Innovative Electric Public Transportation System by BYD in Berlin

Nikola Zivlak
Center of International Programs, Donghua University, Shanghai, China, nikola@dhu.edu.cn

Paula Hergert
Center of International Programs, Donghua University, Shanghai, China, paulabopan@gmail.com

Research on Societal Constraints for Implementing an Innovative Electric Public Transportation System by BYD in Berlin

Dr. Nikola Zivlak[1], *Paula Hergert*[2]
[1]Center of International Programs, Donghua University, Shanghai, China, nikola@dhu.edu.cn
[2]Center of International Programs, Donghua University, Shanghai, China, paulabopan@gmail.com

Abstract: This research provides a unique view on the opportunities for Chinese companies to implement some of their advanced, innovative, technological solutions in the market of Germany. Research was conducted on the well-known and highly innovative Chinese company BYD (Build Your Dreams), their innovative technological solutions and the city of Berlin, which is one of the most supportive capitals for innovation and sustainable development. This research investigated societal constraints this company might face when entering the market of Berlin with the purpose of implementing their innovative public transportation system. This research has identified all three types of societal constraints, and numerous recommendations were developed on how to overcome the identified societal constraints to innovation.

Keywords: innovation, new technology, societal constraints, electric public transportation

1. INTRODUCTION

The rapid increase of urbanization and vast increase of passenger vehicles create plenty of challenges for current urban development. Not only traffic congestions and noise are urging issues, but more importantly the effects of pollution on the inhabitants and the environment. Cities are one of the main sources for air pollution and greenhouse gas (GHG) emissions, and these are two largest examples of environmental hazards [1].

As 70 percent of the total greenhouse-gas emissions are created within cities [2] and as car traffic within key cities is a major source for atmospheric pollution [3], a global debate on how to make transportation more sustainable arose. The Chinese company BYD introduced the “Zero Emissions Eco-System, Green City Solutions” innovative concept, of which electric public transportation is the main part. The exchange of common buses and also taxis with purely electric e6 taxis and k9 buses developed by the company BYD is the core idea. After this concept was already implemented in the Chinese city of Shenzhen, BYD lists zero emissions and no pollution, cost reduction (no gasoline/little electricity), no use of (dependency on) fossil fuels and limited to no noise pollution as key advantages achieved.

As Germany "seeks to lead European climate-protection efforts" it has introduced sustainable green-energy sources and quickly developed one of the most innovative renewable energy sectors in the world [4]. The country’s goal is to lower greenhouse-gas emissions and pollution levels as a total. Berlin, the capital city, is itself considered to be the most advanced city within the nation in the field of electric mobility [5]. Germany and its capital city are actively supporting sustainable transportation developments. So far, only German companies are involved in the development and potential future implementation of an electric public transportation network in Berlin. Foreign companies and their equipment are currently not integrated into the process.

Even though companies, such as BYD, have gained great experience in this field and have achieved great results in implementations of their innovations in Asia, South America and some parts of Europe, stated their interest in the development of electric transportation systems in German cities, results on the German market are still missing. BYD additionally has various innovative solutions for relevant issues, such as battery life spans and sizes.

The benefits of electric public transportation are numerous and Berlin is Germany's most advanced city in the field with support of the government. It has a great potential to become a model example for other large cities in Europe and rest of the world. However, it seems that there may be certain constraints for implementation of these innovative electric public transportation systems coming from abroad

1.1 Innovation

The economist and political scientist Joseph Schumpeter labeled the process of old technologies being replace by new ones as "creative destruction". With the creation of that term and his argument that innovation continuously drives economic development, he became a major influencer to other relevant theorists [6]. The Third Edition of the OSLO Manual furthermore defines four different categories of innovation, product, process, marketing and organizational innovation [7]. Relevant to BYD's situation is the combination of product and process innovation. Product innovation refers to new/radically improved products (services/goods) and process innovation refers to significantly improved production or delivery methods.

According to [8], it is generally possible to present innovation as invention that is successfully implemented on the market (Innovation = Invention + Commercialization). In this equation, the importance of the aspect of commercialization is extremely high. The real value for the company can only be realized once the invention is initiated on a market [8]. When focusing on the company BYD, results of their product innovation efforts are undoubtedly high, and they are able to provide some of the most innovative solutions in the field of electric transportation not only in China, but in the world. However, until now, commercialization of their innovative solutions in Europe seems not to be the most successful.

Since results of commercialization for BYD's innovative solutions in Europe are still missing, that can seriously impact on the whole company's future and it is of the highest importance to focus on it and develop some new knowledge. Therefore, this research will focus on innovative from a very different perspective. The aim of this research is to identify possible societal constraints Chinese innovative companies experience when entering the German market. Specifically, this research will provide detail analysis of the existing societal constraints that hinder the implementation of BYD's Shenzhen model of an electric public transportation system in the city of Berlin.

1.2 The sixth constraints theory

The 6 Constraints Theory is a recently developed framework that has the purpose of firstly identifying and then overcoming the existing constraints against innovation that is successfully implemented. The framework is divided into six different categories, Individual, Group, Organizational, Technological, Societal and Industry Constraints.

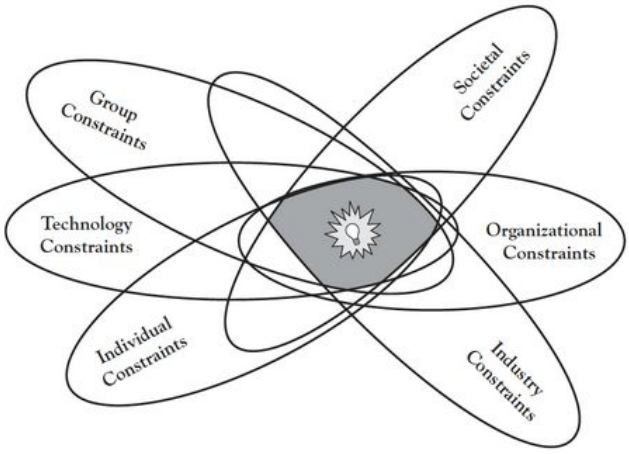

Figure 1. Venn diagram of the 6 Constraints Theory by David A. Owens

The author proposed that an innovation, in order to be successful, needs to satisfy each of the constraints in the context of the innovation itself. Societal Constraints are often wrongly disregarded. This can lead to the creation of serious issues and increase the chance of failure of an innovation and that is the reason why this research focuses on this particular constraint. According to [9] all new ideas need to change society in a certain way on a certain level. However, he clearly points out that the more changes an innovation requires the more challenges it will face. This can consequently lead to a higher chance of the idea failing.

2. RESEARCH METHODOLOGY

Findings of this research were based on both primary and secondary data. Research was conducted both in China and Germany during the period from October to December 2013.

Primary data was collected through an ad hoc survey of a sample of thirty Berlin citizens, who are potential users of an electric public transportation system. It was focused on the fact that the respondents were of different age groups with diverse professions and educational backgrounds. Both genders were equally distributed between male and female. The survey design was based on the original "Societal Constraints Diagnostic Survey", which was introduced and explained by [9]. In order to achieve the aim of this research more adequately, questions where adjusted accordingly.

Additional interviews with four experts in various fields were conducted. Those experts include an employee of the German railway company, an internationally known Professor, an employee of the German electric mobility company eMO, and finally the chairman of the Shanghai Chapter of the European Chamber of Commerce in China (EUCCC) and former employee of McKinsey & Company, who are all the main sources of reference for this research.

3. FINDINGS AND ANALYSIS

In [9], it was clearly explained that if equal to, or more than six societal constraints exist for a company, it is highly recommended to strategize on overcoming those as any innovation can ultimately fail if existing societal constraints are disregarded.

In this research a total of eight societal constraints have been identified for the case of implementing a sustainable, innovative, public transportation system in Berlin based on the model of Shenzhen by BYD. Those can be grouped into three different constraint types (which all have subcategories): values, social control and history. By combining the findings of the research, survey and interviews, identified societal constraints are explained and analyzed in the following part.

The first identified societal constraint belongs to the constraint type *values*, specifically to the subcategory of societal values. It was identified as a deeply rooted constraint as innovations challenging the current societal structure (in this case cut against the grain of traditional society) aren't likely to succeed. It was furthermore recognized that German society remains to be a traditional one especially within the car industry as they value their own products with a high level of pride (local preferred over foreign products).

Social control is the second constraint type, which has two more subcategories; laws and regulations, and morals and ethics. Two societal constraints were identified in the first one as [9] also argues that the constraining effects are apparent. Experts' opinions however lead to the conclusion that actual constraining laws exist much fewer than expected. However, a form of resistance against Chinese innovative solutions and products (services/goods) in general was identified. The second subcategory of morals and ethics is directly related to German society along with its traditions and beliefs. Two different reasons for stopping an innovation exist. One is that an innovation doesn't support a society's values. The other is that an innovation conflicts the existing values and is stopped by society without actual laws against it. This societal constraint has been identified to

directly conflict with the existing values (meaning morals) of German society, because the ethical impact of Chinese solutions is being questioned by the general public.

Four societal constraints were identified in the final constraint type: *history*. According to [9], the past continuous to influence and shape the present. Consequently, past experiences and decisions constrain the present and also future. This happens in different areas: current infrastructure, existing understandings and historical standards. The current infrastructure of Berlin is according to the interviewed experts already highly developed, creating difficulties for any adaptations like the implementation of needed charging stations. Existing understanding refers to the existing skills and practices of Berlin citizens, which are deeply implanted into society. This can lead to the rejection of alternatives, even if those are improvements. Berliner's are according to the interviewee's quite particular about the city's public transportation. It is valued highly and contributes to the "feeling" of the city. The acceptance and willingness to adapt is therefore another concern for BYD. Historical standards are often societal constraints. Because people assess innovations according to a historical set of standards and are dismissing new ideas. The persistence of those standards is strongly embedded into society. This is not only regarding the functionality but also the role of it within society.

This research resulted in a total of eight different societal constraints that were clearly identified. This leads to the conclusion, that it is highly recommendable for BYD to create strategies on overcoming those. Two different reasons for stopping an innovation do exist. One is that an innovation doesn't support a society's values. The other is that an innovation conflicts the existing values and is stopped by society without actual laws against it.

4. CONCLUSIONS AND RECOMMENDATIONS

In the following part suggestions on how to overcome the identified societal constraints are given. Those were created to successfully introduce some of the innovative solutions for a sustainable public transportation system in Berlin, provided by the Chinese company BYD.

It was identified in this research that BYD's innovative solutions cut against the grain of Germany's traditional society and that innovations challenging a nations current societal structure aren't as likely to succeed. Thus, a direct involvement of customers during the transitioning process is highly recommended. Trial periods and a slowly increasing amount of operating busses are possible methods. Maintaining the same set of standards (layout, tickets) is additionally recommended, as innovations are known to be accepted quicker if based on the previous deign.

In this report, few actual laws and regulations were identified that make the success of BYD's sustainable public transportation system more difficult. However, German standards were identified to be much higher in several areas. Quality and safety norms are examples of areas of higher standards that need to be aware of and more importantly adapted to. Attempts of modify the current set of standards and values of German society isn't recommendable.

This study found that tacit laws are another serious concern for BYD, but can be overcome if handled correctly. The image of Chinese products, services and also innovative solutions is comparative low. Open discussions of the company's ethical and environmental concerns, public guarantee of fulfilled standard norms (TÜV certificates etc.), and potential community services are all methods of changing the negative image of BYD as a Chinese company within Berlin, Germany.

A large number of individuals, who agreed to participate in this study's survey, weren't able to conclude it due to their lack of knowledge on the company BYD and their innovative solutions. Creating awareness within targeted social groups is an important and necessary step for the company and can be done by cooperating with local universities and other institutions. Different social groups (mainly students and seniors) make use of public

transportation within Berlin and consequently need to be addressed specifically with designed marketing strategies or within their social network.

The final and most radical recommendation of this research is for BYD to follow the example of the SANY Group. SANY Heavy Industry Co., Ltd. is a Chinese heavy machinery manufacturing company that conducted a green field investment in Germany [10]. It started manufacturing operations in Germany and is nowadays well integrated into the German market. SANY was able to eliminate several societal constraints by staring operations in Germany, some of which are relevant for the company BYD: the elimination of constraining laws, regulations and required civic approvals, the effects of tacit laws such as the negative perceived image of Chinese solutions and products, and also the damaging drawn connection to negative environmental and labor treatment.

REFERENCES

[1] McKinsey Global Institute. (2013, September). *How to make a city great.* Retrieved 09 21, 2013, from McKinsey&Company: http://www.mckinsey.com/Insights/Urbanization/How_to_make_a_city_great

[2] UN-HABITAT. (2011, March 29). *Global Report on Human Settlement 2011.* Retrieved October 22, 2013, from UN-HABITAT: http://www.unhabitat.org/downloads/docs/GRHS2011/P1HotCities.pdf

[3] Nudes, Bennett. (2011, March). *Green Innovation in the Automotive Industry*. Retrieved September 22, 2013, from Iande: http://www.iande.info/wp-content/uploads/2011/03/Green-Innovation-Management.pdf

[4] Nicola, S. (2013, July 29). *Merkel's Green Shift Backfres as German Pollution Jumps*. Retrieved October 24, 2013, from Bloomberg: http://www.bloomberg.com/news/2013-07-28/merkel-s-green-shift-backfires-as-german-pollution-jumps.html

[5] eMO. (2013). *Projekte*. Retrieved 10 24, 2013, from eMO Berliner Agentur für Elektromobilität: http://www.emo-berlin.de/de/projekte/

[6] Schumpeter, J. A. (1934). *The Theory of Economic Development.* Cambridge, Massachusetts: Harvard University Press.

[7] OECD, Eurostrat. (2010). Guidelines for collecting and interpreting innovation data. *OSLO Manual* , 16-17.

[8] Mills-Scofield, D. (2011, October 01). *Innovation - Commercialization Gap*. Retrieved December 07, 2013, from Innovation Excellence: http://www.innovationexcellence.com/blog/2011/10/01/innovation-commercialization-gap/

[9] Owens, D. A. (2012). *Creative People Must Be Stopped.* San Francisco: Jossey-Bass.

[10] SANY Group. (2011, June 23). *Hunan Government Official Website: Sany Industrial Park in Germany Goes Operational*. Retrieved December 09, 2013, from SANY Group: http://www.sanygroup.com/group/en-us/media/27185_for_news_text.htm