The stakeholder analysis of Chinese Foreign Direct Investment SEA: the case of OBOR in Pakistan

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Stakeholder analysis for SEA of Chinese Foreign Direct Investment: the case of 'One Belt, One Road' initiative in Pakistan

This paper reports on a stakeholder analysis conducted for Strategic Environmental Assessment (SEA) on Chinese foreign direct investment (FDI), taking the ‘One Belt, One Road’ initiative (OBOR) in Pakistan as a case study. Based on a three-level framework of stakeholder analysis—identification, investigation, and communication, the study aims to develop an understanding of stakeholders’ characteristics, examine social network functions, and make recommendations for Chinese FDI in Pakistan for reducing environmental and social challenges and for seizing the opportunities noted by stakeholders in particular. Results suggest that whilst stakeholders overall have a positive attitude towards Chinese FDI in Pakistan, there are also challenges. In this context, air quality and water consumption were identified as the top two. Generally speaking, opportunities of investment were seen to be more important than challenges, such as increasing energy reserves, water quality improvement, and social-economic development. Ot is suggested that SEA can help to generate a win-win strategy for both countries.

Key words: Stakeholder analysis, SEA, Chinese FDI, OBOR, Pakistan

# Introduction

Over the past few decades, growth rates of foreign direct investment (FDI) in developing countries and transition economies have increased substantially (Alsadiq 2013). FDI indicates a substantial investment by establishing or buying business in a foreign country, instead of investing in financial assets there (Foreign Portfolio Investment). Different from Multilateral Development Bank loans, both sides of FDI share benefits and risks. Global FDI outflows are expected to continue rising, with significant contributions of investors from emerging markets, especially from China (Sauvant et al. 2010, Elliott et al. 2013). In 2015, Chinese FDI outflows rose to US$193.69 billion, up from US$ 173.33 billion in 2014. Global investments are mainly focusing on energy (US$55.03 billion) and transport (US$50.61 billion) (AEI 2016).

In the context of increased FDI flows all around the world, the impact of FDI on the environment has become a controversially debated issue (Zarsky 1999). FDI has environmental challenges and environmental opportunities for both, hosts and investors. For host countries and areas, investment boosts economic development. However, pollution often increases when raising outputs (the ‘scale effect’) (Ren et al. 2014, Wang et al. 2013). In addition, investment industries are mainly those that are resource intensive, such as mining, construction, timber and infrastructure construction, often putting a heavy burden on local ecological environments (WWF and CAEC 2015). Finally, gaps in national environmental standards may draw polluting industries to certain countries, creating ‘pollution havens’ and propelling a global ‘race to the bottom’ with regards to environmental standards (Zarsky 1999, Wagner and Timmins, 2009, Duanmu 2014).

FDI also brings environmental opportunities to host countries. These may include better skills and technology transfer, as well as potentially stricter environmental standards under international supervision, and more efficient energy use (the ‘technique effect’) (Cole and Elliott 2003, Zhang 2012).

Local environments come with environmental challenges and environmental opportunities to investors such as Chinese companies. Challenges include local environmental uncertainties and risks such as climate change problems and disasters. Also, a number of green barriers exist, restricting investment, such as strict environmental standards, green market access, and anti-eco-dumping (G2A2 2013). Taking tea export as an example, until 2001 China accounted for more than 70% of the world’s exports. After the appearance of green indicators analysis, tea exports dropped significantly. The Chinese appliance industry experienced a similar problem (Jing 2011). On the other hand, a host country also provides resources, energy, and environmental capacity for investment companies, presenting environment opportunities to investors.

Concerning FDI’s significant environmental consequences not only for host countries, but also for investors, there is a requirement to conduct Environmental Assessment (EA). The World Bank (WB), Asian Development Bank (ADB) and African Development Bank (AfDB) all require their investment projects to follow associated procedures (Fischer and Nadeem, 2014). The WB requires business activities with environmental and social impacts to implement the Environmental and Social Assessment and Management System (ESMS) (Moss et al. 2015). AfDB requires its clients to conduct environmental assessment in accordance with its Environmental and Social Assessment Procedures (ESAPs) (AfDB 2015). ADB classifies its projects into four categories based on their impacts and applies different levels of environmental assessment requirements. For projects involving investment of ADB funds through financial intermediaries, ADB requires them to implement an Environmental and Social Assessment and Management System (ESMS) (ADB 2003). All of these banks require all their investment projects to follow similar assessment procedures, and stakeholder analysis forms an essential part in this (Hu 2015). In February 2016, the Asian Infrastructure Investment Bank (AIIB) released a draft document of its environmental and social framework (AIIB 2016). This lays out a set of safeguards to avoid, minimize or mitigate adverse environmental and social risks and impacts of the operations, including environmental and social assessment, and stakeholder engagement and consultation.

In Pakistan, there are sound legal provisions for EA (Nadeem and Hameed 2008; Nadeem and Fischer, 2011). The Pakistan Environmental Protection Act (PEPA) 1997 has been the key legislation for EIA in the country. It requires public participation and EIA review (GoP 1997a). Apart from that, Pak-EPA developed EIA guidelines (Pak-EPA 1997), and EIA Regulations (Pak-EPA 2000), consisting of procedure requirements and public consultation (Saeed et al. 2012, Fischer and Nadeem 2014). However, in 2010, the Eighteenth Amendment of the Constitution was passed by the National Assembly of Pakistan. It gives provincial governments exclusive powers to legislate on the subject of ‘environmental pollution and ecology’, which is also an opportunity for the capacity building of Pakistan provincial environ-mental safeguards. There has been a definite shift in the use of SEA instruments in Pakistan after 2004. Several pilots were carried out in Pakistan, such as Pakistan Strategic Country Environmental Assessment in 2006, Pakistan Strategic Environ-mental, Poverty and Social Assessment of Freight Transport Sector Reforms (SEPSA) in 2011, Mainstreaming Environmental Sustainability into Pakistan’s Industrial Dev-elopment in 2012, SEA of AJK Hydropower Development in 2014, and SEA of the Master Plan for Gilgit city in 2014. Also, one of its provinces, namely Balochistan has also made SEA of plans and programmes as a mandatory requirement (GoB 2012). Other Provinces are following suit. All of these SEA practices developed in Pakistan after 2004 raised public awareness and promoted debate nationwide (Fischer 2014).

Stakeholder analysis (SA) should be a key element in SEA, to be conducted in the early stages of the process and including all those that have an interest, or are affected by the plans, programmes or strategies (Abaza et al. 2004). Several scholars studied frameworks of stakeholder management, proposing different methods for stakeholder analysis. The SA should identify key stakeholders and their interests, assessing the influence and importance of each stakeholder as well as the potential impact upon each stakeholder. It should also identify how best to engage stakeholders (WWF 2005, Gauthier et al. 2011, IAIA 2002, Ren and Shang 2005, van Doren et al. 2013). Chinyio and Akintoye (2008) and Reed et al. (2009) consolidated the range of approaches that can be used for stakeholder analysis and engagement. Yang et al. (2011) identified practical approaches and measured the effectiveness of these. The professional literature provides for some examples of environmental assessments that applied stakeholder analysis. In the field of waste management, social network analysis (SNA) and stakeholder analysis have been used in order to understand and examine the relationship among networks and stakeholders (Caniato et al. 2015, Caniato et al. 2014). In the natural resource area, some researchers (Reed 2009, Prell et al. 2009, Hjortsø 2004) conducted stakeholder analysis for participatory forest planning and natural resource management research. Ananda and Herath (2003) applied the AHP method to examine stakeholder preferences into regional forest planning. Stakeholder analysis also serves as a key element for water resource management. (De Marchi et al. 2000, Fath and Beck 2005, De Stefano 2010), analysing stakeholder imagination and perceptions of water issues by means of institutional analysis. Bernadine Maguire (2011) assessed stakeholder involvement in the management of the marine environment through the analysis of their interest and awareness. Furthermore, Liu (2013) developed an indicator framework of integrated coastal management by interviewing coastal stakeholders. Stakeholder analysis has also been conducted in terrestrial transport (Turcksin et al. 2011, Sun et al. 2015), aviation (Amaeshi and Crane 2006), flood management (van Buren et al, 2015) and the primary resource sector (Frost 1995). However, until now there have been no attempts of stakeholder analysis in the field of FDI management or investment programme related SEA.

Yanyang Wu (2014) and Tao Hu (2014a) identified stakeholders involved in FDI, and created a 4 × 4 conceptual matrix from the perspective of business, political, environmental and social stakeholders. Based on the matrix, Tao Hu (2014b, 2014c) qualitatively analysed the key players in Latin America and Southeast Asia. However, all of these studies have had limits with regards to clarifying the networks amongst stakeholders and making suggestions for future investment according to the social and environmental priority by communicating with stakeholders.

Since the environmental impact of investment projects can be substantive and complex, it is essential to identify the networks among stakeholders, and formulate effective approaches for stakeholder analysis and engagement. The purpose is to seek stakeholders’ characteristics, and to make recommendations for Chinese FDI in Pakistan by avoiding the environmental and social challenges and seizing the opportunities noted by stakeholders. Starting from the current environmental situation, this study focuses on critical issues that need to be assessed by stakeholders (Section 2). In Section 3, key stakeholders for investment programme related SEA in Pakistan are identified, setting out the methodology followed to investigate the practical approaches for stakeholder analysis. In Section 4, the identification, investigation, and communication levels of research are conducted through stakeholder analysis, social network analysis, and the drafting of a prioritization matrix. Sections 5 and 6 discuss results and draw conclusions.

# Key Environmental Issues in Pakistan

Pakistan is the sixth-most populous country globally, with a population exceeding 193 million people on a land area of 796,095 km2, most of which is arid or semi-arid. In 2013, the Chinese government proposed the ‘One Belt, One Road’ initiative (OBOR[[2]](#footnote-2)), which creates 6 economic corridors encompassing more than 60 countries in the continents of Asia, Europe, and Africa to encourage trade and investment among those countries. As an important neighbour of China, Pakistan witnessed the first investment of Silk Road Funds (a state owned investment fund of the Chinese government to foster increased investment in countries along the OBOR) for hydropower projects and became the first country to sign OBOR cooperation agreements and memoranda. China has announced that it will invest US$46 billion in Pakistan by 2030, which is hoped will end the chronic energy crisis of the country and ‘transform’ it into a regional economic hub (Fig. 1). The investments—equivalent to roughly 20% of Pakistan's annual GDP (Stevens 2015)—are related to the Gwadar Port as well as to the energy, transportation and infrastructure sectors, which will influence the use of land, potentially biodiversity and energy.

Pakistan is facing many serious environmental problems and issues (see Table 1), that could also be greatly affected by FDI. Air pollution is a rapidly growing environmental problem. There are currently no controls on vehicular emissions, which account for 90 percent of pollutants. The emissions of greenhouse gases (GHG) in Pakistan are small, but the emission intensity is considerable. Climate change is currently said to be the cause for increased flooding and rainstorms. The water crisis is currently the most serious environmental problem in Pakistan. According to the International Monetary Fund (IMF), Pakistan is one of 36 most water stressed nations in the world (Kochhar et al. 2015). It is also said to have the world’s fourth highest rate of water use. However, water productivity is relatively low. Also, water pollution and drinking water safety are a particular concern. 16 million people in Pakistan don't have access to safe water. Furthermore, over 68 million people don't have access to adequate sanitation (WaterAid 2016). As for biodiversity, with its location and widespread ecological regions, Pakistan has a great variety of landscapes and a rich diversity of life forms. This diversity has been substantially reduced over the long period of industrialization and urbanization. Among the countries of South Asia, Pakistan has the least variety of animals and plants per representative unit of area (ADB 2008).

# Methodology

A stakeholder survey was conducted focusing on the following issues: air (air quality, climate change); water (water consumption, water contamination, and drinking water safety); biodiversity (threatened species, forest area); land (green spaces, agricultural land area); energy (renewable energy use, energy consumption, energy efficiency, energy demand management, accessibility to electricity); and, human settlement (transportation convenience, employment, and urbanization).

In the field of management, Freeman (2010) proposed a framework equivalent to three levels of stakeholder analysis: eliciting stakeholder maps (rational level), relationship scanning (process level), and exchanges with stakeholders (transactional level). In this vein, stakeholder analysis followed three objectives: (1) to identify and categorize stakeholders in the process of Chinese FDI in Pakistan, and to recognize their knowledge and interests as well as power, and attitude (identification level); (2) to investigate the relationship of stakeholders and rank their importance (investigation level); and (3) to communicate with stakeholder about their understanding for the priority of environmental and social issues (communication level). The purpose was to seek stakeholders’ characteristics, and to make recommendations for Chinese FDI in Pakistan by avoiding environmental and social challenges and seizing the opportunities noted by stakeholders particularly.

## *Identification level*

An initial list of stakeholders was identified using three criteria: a) authors contributing to the book ‘Environmental Impact Assessment Handbook for Pakistan (Fischer, 2014a)’; b) attendees of the IUCN ‘Improvement of EIA Curricula of Tertiary Level Academic Institutions: EIA teaching in Pakistan workshops (Fischer, 2014b); and 3) affiliation to national professional SEA networks. Stakeholders thus identified were then asked to make suggestions for other actors who have a stake with Chinese FDI. In this way, applying the snowball method, the stakeholder list was continuously extended by new stakeholders (Alameddine et al. 2011).

A total of 244 questionnaires (see Appendix 1) were sent out and 39 were returned, of which 28 were valid. This figure representing a response rate of 16%, which is normal as a typical response rate for a self-administered mail survey (15 to 20%) (Bhattachejee 2012). Furthermore, in similar studies, where expert opinions were surveyed through questionnaires, a small number of responses were also used: Bragagnolo et al. (2012) surveyed a total of 12 experts; Polido et al. (2016) collected 16 filled questionnaires; and Peterson (2004) obtained 26 responses. The representative stakeholders in Pakistan included ten from government, seven from academia, six from environment or power companies, and five from Environmental Consultancies and NGOs. Stakeholders were grouped into 4 main categories: (1) Government; Planning and Development Department (P&D), Water and Power Ministry (W&P), Environment Department (ENV); (2) Academia; researchers in the fields of environmental management (EM), environmental engineering (EE), and biophysical science (BS); (3) Enterprise; companies in the field of environment, planning, energy, electric, and waste management; and (4) others; including NGOs, international organization, and environmental consultants.

Once the list of stakeholders was identified, further investigations were carried out to better understand their characteristics and perspectives. Stakeholder Analysis or Stakeholder Mapping has evolved in recent years as a technique for analyzing the likely interests and actions of stakeholders (Johnson et al. 2008). The method of stakeholder mapping was applied in this study as a visual analysis for investigating stakeholders’ perspectives and characteristics to Chinese FDI in Pakistan.

To investigate stakeholder characteristics, the respondents answered questions on knowledge (Question 2), interest (Question 3), attitude (Question 4), and their power (Question 5-7) on a 1-5 scale system (see Table 2). The power of the stakeholders was valued by synthesizing their involvement (Question 5), the information available (Question 6), and their influence (Question 7). According to their interest and power value, a power/interest matrix was formulated. The limited number of stakeholders in each group may bias the results. Therefore, in the matrix the power and interest value of each group were described in the form of an interval (Figure 2). By grouping stakeholders in these matrixes, Chinese FDI could be conducted with better communication and implementation.

## *Investigation level*

In this study, we employed social network analysis (SNA) to explore stakeholders’ relationships and importance (Question 8). The respondents were asked to list other related organizations or actors they interacted with, and to rate the level of interaction with the actors they had listed (Question 9 and 10). The score from 1-5 of the ties indicate their relationships between individuals, groups, and institutions. A higher value would indicate that a node has a closer relationship with other nodes.

It is not practical and usually not necessary to engage with all stakeholder groups with the same level of intensity all the time. Therefore, calculating stakeholders’ weights according to their relevance could promote stakeholder engagement.

In social network analysis (SNA), the concept of centrality indicates the central position of the individual who has higher power, status, and popularity. The centrality of a point can be determined by reference to three different structural attributes: degree, betweenness, and closeness. Degree centrality measures only the number of nodes that are directly connected to others without considering the indirect connection between nodes. Likewise, betweenness centrality only measures the degree of ‘intermediary’ effect. The closeness centrality, which refers to the distance between nodes, primarily represents the capacity of stakeholders to analyze resources, information and methods within the network (Freeman 1978). Beauchamp (1965) used closeness to design organization with ‘optimum…efficiency’ in communication. Sabidussi (1966) defined the most central point in a network as the one with the minimum cost or time for communicating with all other points. Therefore, this paper uses the concept of closeness centrality to rank stakeholder importance and the weight of them. The absolute value is the sum of the shortest distance between one node and the other nodes in the diagram over the network size minus one (Sun et al. 2015). The equation (1) shows the extent of connection and closeness centrality of point pk (Beauchamp 1965, Daly and Haahr 2009), where n is the number of reachable nodes in the network and d (pi, pk) representing the length of the geodesic line between nodes pi and pk. Thus, closeness centrality represents a value for the stakeholder’s capacity to obtain resources and influence in the network, and is chosen to measure the weights of stakeholders when calculating the environmental and social issues’ prioritization.

(1)

## *Communication level*

In order to evaluate the challenge and opportunity of FDI for the host country, a sheet of environmental and social issues was listed by the author based on the analysis in Section 2 to establish a Prioritization Matrix of key problems in the process of Chinese FDI in Pakistan. At the beginning of the survey, a description of OBOR, as well as a brief explanation of Chinese main investment industries was given. Then, a questionnaire sheet to evaluate the 18 environmental and social issues was designed (see Appendix 1). These assessment categories were selected according to the local environmental status and Chinese investment industries in Pakistan (Section 2). Respondents were asked to value the impact of investment based on their understanding (strongly negative impact, negative impact, no impact, positive impact, strongly positive impact) and their concern for different issues (not at all concerned, slightly concerned, moderately concerned, very concerned, extremely concerned) (Question 11 and 12). Also, stakeholders could supplement their comments. Finally, the results of key issues were calculated by the categories according to the stakeholder’s weights obtained through SNA.

Those areas that high-importance actors most commonly rated as both ‘negative impact’ and ‘concerned’ were then identified as ‘high priority research areas’, which is the challenge of the investment for Pakistan. Whereas the opportunity of the investment refers to the area rated ‘positive impact’ and ‘concerned’.

# Results

## *Stakeholder analysis*

Among the 28 stakeholders, 26 had heard about the ‘One Belt, One Road’ initiative (OBOR) or China-Pakistan Economic Corridor (CPEC). Figure 2 shows the stakeholders’ powers, interests, knowledge, and attitudes towards Chinese FDI in Pakistan. The dots indicate the average power and interest in each group. The extension lines indicate the range of power and interest in each group. The range of enterprise and W&P group are shown in the graph on the top left.

It is clear from Fig. 2 that stakeholders that have more knowledge of the Chinese FDI in Pakistan are usually more interested in it. The government has a much higher degree of power than the other three groups. All respondents had a positive opinion on Chinese FDI in Pakistan, which indicates the general support of OBOR. Stakeholders such as government officials have a high level of power, interest, knowledge, and attitude, and should probably be seen as key stakeholders in Chinese FDI in Pakistan.

The dominant group is government authorities, having both, interest and significant power towards the investment. P&D (e.g. Planning Commission of Pakistan, Ministry of Planning, Development & Reform, Planning and Development Department of Punjab) has the greatest power, as it is a key player for all planning and decision-making activities, and has a higher influence, a higher degree of involvement and mastery of resources of FDI in Pakistan than any other group. However, its interest and knowledge are less than W&P and ENV. The interest and knowledge of W&P (e.g. Private Power and Infrastructure Board, Water & Power Development Authority) and ENV (e.g. Pakistan Environmental Protection Agency, Ministry of Climate Change) are the highest. Most of the Chinese investment is directed towards transportation and the energy sector. With a high demand for water and power, W&P and ENV have high relevance for FDI.

Academic stakeholders (universities, education and training institutions and research centres) reflect various degrees of interest and knowledge. The EM has the highest level of knowledge and interest towards the Chinese investment, as they have a direct relationship with the SEA of OBOR. In contrast, BS and EE have less interest and knowledge in the investment. BS has general knowledge, but limited interest considering the investment impact on biodiversity compared with air and water. EE finally, has less knowledge, but more interest in the investment. This is because most of the EE experts are from the field of new energy. Considering most of the investment industries are clean energy, representing a positive ‘composition effect’ (Copeland and Taylor 1994) to the energy sector in Pakistan, academics hold a strongly positive attitude towards Chinese FDI in Pakistan as well as a strongly positive attitude towards ENV.

Enterprises have very little knowledge and power with regards to Chinese FDI in Pakistan. Their attitude towards it is positive, which is not surprising considering the investment and economic development opportunities to enterprises. Finally, other stakeholders (e.g. NGOs, international organization, and Environmental Consultants) currently do not play an important role, as they have minimum knowledge, and have both the least interest and least power towards FDI in Pakistan.

## *Social network analysis*

Respondents were asked to list other actors (e.g. authorities, companies, groups, organizations) they had contact with, and their level of interaction with them. Respondents introduced a wide range of actors (Fig. 3). The Board of Investment (BOI) and Ministry of Commerce (MOC) only had a limited amount of interaction and information exchange with P&D in this system. However, most of the stakeholders have extensive relationships with others. The interactions were concentrated with P&D and ENV. P&D is central in the network of information and contact exchange, with close ties to all other stakeholder groups of government, academia, enterprise, and NGOs. ENV is also central given its strong ties to the companies and P&D. It acts as an environmental monitor in the process of FDI in Pakistan. Compared with other groups, companies have the highest degree of closeness with other stakeholders, especially with W&P which have a lot of cooperation with energy companies.

Regarding the depiction of social networks among stakeholders in Fig. 3, it is important to consider the level of closeness amongst stakeholders. An actor with a frequent interaction with others should be able to collect information faster and of better quality, thus their opinion having some dominance in this system. The study used SNA closeness centrality (Freeman 1978) to determine the degree of importance of each stakeholder group. The weights are counted in accordance with their ‘proportion of importance degree’ among stakeholders. According to the calculation method illustrated above, P&W has the highest importance (22.75%), followed by ENV (18.61%). Academia has the least importance (13.65%), owing to its limited access to information.

## *Prioritization matrix*

In order to evaluate the expected social and environmental impact of Chinese FDI in Pakistan on the variety of objectives of different stakeholders, environmental and social issues were chosen according to the top concerns of government, academia, enterprise, and others (e.g. environmental consultants, international organizations, NGOs). Fig. 4 shows the Chinese FDI impact level of the priorities among 18 social and environmental issues for each group. Scores on a -3 to +3 scale show the impact level, with minus indicating a negative impact.

The results indicate that energy use and accessibility to electricity are perceived to be the most important environmental and social impacts for Chinese FDI in Pakistan as three groups rank them as top concerns. All stakeholders are convinced that the Chinese FDI in Pakistan will bring strongly positive impacts on all energy issues (e.g. energy use, accessibility to electricity, renewable energy use, energy efficiency, and energy demand management), as most of the Chinese investment is in the area of clean energy. Similarly, employment rates and transportation convenience are also high and are expected to have a strong positive impact as well. Air quality received the most negative results. All stakeholders believe Chinese investment in Pakistan will have negative impact on local air quality (Fig. 5). This is therefore a major challenge for Chinese investment, requiring special attention.

There are also some issues with divergence of impact by different stakeholder groups. Water resource consumption is an important environmental issue which receives attention from government, enterprises and others. Government believes that the impact on water consumption should be positive (0.71), as they appear to believe that government will bring forward positive action. For example, more restrictive environmental legislation and implementation will happen under international observation. According to ENV, FDI in Pakistan will have benefits in resulting in better environmental planning, management, and monitoring (from the comments of the questionnaire). Thus, the impact on water consumption might be positive with an improved industrial structure (composition effect) and more advanced production technology (technical effect) (Copeland and Taylor 1994). However, enterprises and others consider the investment impact on water consumption to be negative, -1.5 and -1.0 respectively, which are reasonable given that the construction of associated infrastructure and operation of power plants consuming water.

By calculating the responses of all stakeholder groups by their weights, the prioritization matrix of the total impact and total concern of 18 social and environmental issues are shown in Fig. 5. The issue of greatest concern is underground water. However, overall stakeholders believe the impact of FDI on it will be neutral. Enterprises and others thought there would be a slightly negative impact on underground water in coal mining and power plant areas. However, government thinks that negative impacts could be minimized by conducting SEA or implementing mitigation measures. Furthermore, one of the stakeholders mentioned the international relation with neighbouring countries, such as India. The Indian government has particular concerns on the China-Pakistan Economic Corridor that is part of OBOR which includes projects in territory claimed by India. The OBOR may be a potential economic opportunity but it also threatens India’s current dominance in its backyard – the Indian Ocean region (Madan 2016, Mishra 2016).

Overall, the opportunity of the investment with regards to energy and human settlement is obvious, especially energy use and employment rate, which rated with ‘high concerns’ and ‘positive impacts’ by respondents. Water quality issues, such as groundwater water quality and drinking water safety are also under positive impact of FDI. The challenge of investment is concentrated on e.g. air quality. This has the most serious influence. Water consumption should also be paid more attention, considering the large amount of water needed for construction of infrastructure and operation of power plants. These issues are identified as high assessment priority areas and represent a real challenge for Chinese FDI. Biodiversity and land use in Pakistan will be influenced by Chinese FDI. However, the issue is not urgent at this moment, as it can be mitigated through forward looking environmental planning.

# Discussion

Stakeholder analysis is a technique which has been used widely in e.g. waste management, natural resource management, and marine management. However, up until now few have attempted to apply stakeholder analysis in the field of FDI management. The research underlying this paper explored the stakeholder analysis model of investment programme related SEA, and clarified the investment network among stakeholders and environmental priorities of OBOR in Pakistan.

Our prioritization matrix results reveal the opportunities and challenges of Chinese investment. All challenges affect Chinese FDI in Pakistan, but according to the prioritization matrix, air quality is the key limiting factor and could be a serious problem if not treated adequately (Fig. 5). Vehicular emissions currently account for 90% of Pakistani pollutants. The investment in the transport sector (the second largest Chinese FDI sector for OBOR) will bring more air pollution (negative impact of scale effect). However, quick and efficient transport would be helpful in reducing mineral fuel consumption (positive impact of scale effect). Thus, SEA and EIA of transport policies, plans, programmes and projects should be introduced to support minimization of impacts on air. Special attention should also be paid to the transport GHG emissions which could aggravate the problem of climate change. Water consumption is the second largest challenge of investment and the most serious environmental problem in Pakistan. Thus, investment industries should use advanced technology and high water productivity.

Chinese FDI creates an opportunity for Pakistan. As most of Chinese investments is in the field of energy and infrastructure, OBOR will reduce the proportion of manufacturing in the long term, which may cause some de-industrialization in Pakistan. Environmental problems accompanied with manufacturing production may be reduced. In addition, according to the respondents, there are great benefits and opportunities in the energy field, especially energy use. With the largest amount of investment for OBOR focusing on energy, the available reserves of energy resources would increase. As for an optimistic energy prospect in Pakistan, energy consuming industries, such as manufacturing, may benefit in the future. Finally, the problem of water contamination and drinking water safety would be eased with more advanced technology and better environmental management under the pressure of international opinion (Zarsky 1999).

Similar surveys should be conducted later, once the impacts of investment become clearer. Future research needs to refine the list of social and environmental issues, and explore the reasons for diverging attitudes of different stakeholder groups towards specific impacts, as well as to consider the mitigation measures in the communication level of stakeholder analysis. Also, considering the stakeholder concerns about the international relationship with neighbouring countries, more attention should be paid to the trans-country impacts in SEA.

Given that stakeholders involved in FDI in Pakistan have different scopes of influence and different areas of expertise, giving stakeholders an equal weight is problematic. Therefore, this paper determined the weights of stakeholder opinions based on their importance and closeness in social networks. Authors improved the stakeholder analysis model through the prioritization matrix at the communication level. Stakeholders were asked to value the impact of investment and their concerns on social and environmental issues. The identification of priority can be applied in order to recognize the opportunity and challenge of investment.

Stakeholder analysis, ideally applied at the start of an SEA, can be developed further to accompany the whole process of investment programme related SEA. Moreover, such analysis could be further improved by conducting surveys with various stakeholders, e.g. experts and government from specific fields and departments, and – importantly – considering the opinions of local people. Also, further research could involve stakeholders from the investor country in the three level model of stakeholder analysis and value the priority of the issue sheet according to their interests and concerns. Finally, the social and environmental issues listed need to make progress along with the social and economic development.

# Conclusions

Using stakeholder mapping at the identification level, social network analysis at investigation level, and prioritization matrix at the communication level, this paper examined stakeholder characteristics, their interactions, and the priority issues involved in Chinese FDI in Pakistan. The purpose is to support Chinese FDI in Pakistan by avoiding / reducing environmental and social challenges and seizing the opportunities noted by stakeholders. In general, almost all Pakistani stakeholders included in the analysis support Chinese FDI. Among the stakeholders, the government is the core one with the highest level of characteristics, and the highest importance of opinions. SEA should be conducted involving stakeholders according to their knowledge, interest, power, and importance. This way, stakeholders can be better grouped and weighted. Those who could directly affect the system should be involved, while others should be at least adequately informed with communication according to their importance and weights (Bryson et al. 2011). According to the high importance of government, reasoned decision-making and active guidance are crucial for investment programme related SEA. Stakeholders such as academics could make valuable contributions. Enterprises will probably be supportive in financial and technical terms.

The prioritization matrix graded by stakeholder reveals the opportunities and challenges of Chinese investment. Air quality and water consumption were found to be the top two challenges upon Chinese FDI, particular given existing environmental problems in Pakistan and the features of planned Chinese investment. Nevertheless, several actors thought that negative impacts can potentially be mitigated, based on improved environmental planning, management and monitoring. We suggest that negative impacts should be minimized and suggest that investment programme related SEA should be conducted. Furthermore proposed mitigation measures coming out of SEA will need to be adequately enforced. Potential opportunities of investment include energy reserves increase with a large number of energy investments, and water quality improvement with advanced technology and strict environmental management. Particularly, not only the environmental benefits to be accrued from Chinese investment, but also the wide social-economic and human settlement benefits such as higher employment rate and more convenient transport need to be acknowledged.

In general, our findings suggest that the opportunities of investment were perceived to be greater than the challenges. Chinese FDI in Pakistan can therefore be a win-win strategy for both countries, if caution is used and negative impacts are avoided / reduced. For China, OBOR could absorb excess production capacity. On the other hand, the FDI could also promote sustainable development of the economy and society through infrastructure construction and energy reserves increase in Pakistan. SEA and EIA of transport policies, plans, programmes and projects should be introduced to minimize the impact on the local environment. Moreover, safeguard should be devolved to Pakistan provinces for capacity building. Finally, it is important to considering the trans-country impacts in SEA. Therefore, SEA of Chinese FDI in Pakistan should consider interests of all stakeholders (potentially including those from other countries), the potential social and environmental challenge and opportunity, and the international situation.

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# Appendix 1. Questionnaire

A) Introduction

We are from University of Liverpool (UK) and Nankai University (China) and we are conducting a study to explore the opinions of several important actors who are interested in social and environment impact and Strategic Environmental Assessment (SEA) of the Chinese Foreign Direct Investment (FDI). As an important actor about such topic, it is crucial for us to obtain your opinion and that of your organization.

The information obtained through these interviews will be for the direct use of the researchers, and will be presented in a paper without identifying individual opinions.

B) Background of Chinese Investment in Pakistan

In 2013, the Chinese government proposed “One Belt One Road” strategy (OBOR), which creates multiple economic corridors encompassing more than 60 countries to encourage the investment among those countries. As one of six international economic corridors, the China-Pakistan Economic Corridor (CPEC) plans to connect China to the Persian Gulf through the quickest route.

In April 2015, during a visit by China’s president to Pakistan, China has announced to invest $46 billion by 2030, which it is hoped will end Pakistan’s chronic energy crisis and “transform” it into a regional economic hub. The investments—equivalent to roughly 20% of Pakistan's annual GDP—are related to the Gwadar Port as well as energy, transportation and infrastructure sectors.

C) Basic Information

Date: …………………………………………..............................................................

Name (only for internal use): …………………………………………………………

Your Position and Organisation: ……………………………………………………...

Email: …………………………………………………………………………………

D) Your Opinion on Chinese FDI in Pakistan

1. Have you ever heard about “One Belt One Road” (OBOR) strategy or China-Pakistan Economic Corridor?

* 1. Yes
  2. No

2. How well do you think you understand Chinese FDI in Pakistan? (5=complete, accurate and total knowledge; 4=plenty of knowledge; 3=good idea; 2=some knowledge; 1=no knowledge)

3. Are you interested in Chinese FDI in Pakistan? (5=considerable interest; 4=some interest; 3=moderate interest; 2=litter interest; 1=no interest)

4. Which of these categories best describes your attitude towards Chinese FDI in Pakistan as the background described?

* 1. Strongly positive
  2. Positive
  3. Neutral
  4. Negative
  5. Strongly negative

5. To what extent do you/your institution involve over Chinese FDI in Pakistan? (5=to a large extent; 4=to some extent; 3=to a moderate extent; 2=a little extent; 1=not at all)

6. Do you/your institution have many, some, or no resources and information about Chinese FDI in Pakistan? (5=extensive; 4=a lot; 3=moderate; 2=a bit; 1=none)

7. Do you feel you/your institution could affect other actors’ behavior or FDI process in any way? (5=considerable influence; 4=some influence; 3=moderate influence; 2=little influence; 1=no influence)

8. Are you/your institution in contact with other stakeholders that are interested in Chinese FDI in Pakistan (authorities, companies, groups, organizations, etc.)? Please list them.

9. Regarding the previous list, please rate the level of interaction with them. (5=always; 4=often; 3=sometimes; 2=rarely; 1=never)

10. Regarding the previous list, please quantify the exchange of information with them. (5=a large amount; 4=some; 3=moderate; 2=a small amount; 1=rarely exchange information)

E) Your Opinion on Taking Environmental and Social Issues into Account

11. Please score the potential social and environmental impact of Chinese FDI in Pakistan. (2=strongly positive impact; 1=positive impact; 0=no impact; -1=negative impact; -2=strongly negative impact)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| No. |  | -2 | -1 | 0 | 1 | 2 | No idea |
| 1 | Air quality |  |  |  |  |  |  |
| 2 | Climate change (change in mean rainfall, risk of flooding) |  |  |  |  |  |  |
| 3 | Water quality |  |  |  |  |  |  |
| 4 | Availability of clean drinking water |  |  |  |  |  |  |
| 5 | Water resources consumption |  |  |  |  |  |  |
| 6 | Underground water depletion |  |  |  |  |  |  |
| 7 | Deforestation |  |  |  |  |  |  |
| 8 | Total number of threatened species |  |  |  |  |  |  |
| 9 | Energy use |  |  |  |  |  |  |
| 10 | Renewable energy use |  |  |  |  |  |  |
| 11 | Energy demand management |  |  |  |  |  |  |
| 12 | Energy efficiency |  |  |  |  |  |  |
| 13 | Accessible to electricity |  |  |  |  |  |  |
| 14 | Area of agriculture land |  |  |  |  |  |  |
| 15 | Area of green spaces for public use |  |  |  |  |  |  |
| 16 | Urbanization |  |  |  |  |  |  |
| 17 | Employment rate |  |  |  |  |  |  |
| 18 | Transportation convenience |  |  |  |  |  |  |

Comments: apart from the list above, what are the potential benefits and potential threats on environment and society brought by Chinese FDI in Pakistan?

12. Please rate your concern over the following social and environmental issues in Pakistan. (5=extremely concerned; 4=very concerned; 3=moderately concerned; 2=slightly concerned; 1=not at all concerned)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No. |  | 1 | 2 | 3 | 4 | 5 |
| 1 | Air pollution |  |  |  |  |  |
| 2 | Climate change (change in mean rainfall, risk of flooding) |  |  |  |  |  |
| 3 | Water contamination |  |  |  |  |  |
| 4 | Drinking water safety |  |  |  |  |  |
| 5 | Water resources shortage |  |  |  |  |  |
| 6 | Underground water depletion |  |  |  |  |  |
| 7 | Deforestation |  |  |  |  |  |
| 8 | Total number of threatened species |  |  |  |  |  |
| 9 | Energy shortage |  |  |  |  |  |
| 10 | Renewable energy use |  |  |  |  |  |
| 11 | Energy demand management |  |  |  |  |  |
| 12 | Energy inefficiency |  |  |  |  |  |
| 13 | Accessible to electricity |  |  |  |  |  |
| 14 | Loss of agriculture land |  |  |  |  |  |
| 15 | Reduction of green spaces for public use |  |  |  |  |  |
| 16 | Urbanization |  |  |  |  |  |
| 17 | Employment rate |  |  |  |  |  |
| 18 | Transportation convenience |  |  |  |  |  |

Comments: are there any other environmental and social issues you think are important but that are not included in the list?

12. Any suggestions for other contacts for completing the questionnaire?

# Appendix 2. Time Scale

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Oct  15 | Nov  15 | Dec  15 | Jan  16 | Feb  16 | Mar  16 | Apr  16 | May  16 | Jun  16 | Jul  16 | Aug  16 | Sep  16 |
| Reading and research into chosen topic |  |  |  |  |  |  |  |  |  |  |  |  |
| Draft introduction/methodology chapters |  |  |  |  |  |  |  |  |  |  |  |  |
| Questionnaire design and test |  |  |  |  |  |  |  |  |  |  |  |  |
| Issuing questionnaires |  |  |  |  |  |  |  |  |  |  |  |  |
| Collecting questionnaires |  |  |  |  |  |  |  |  |  |  |  |  |
| Sending remain email |  |  |  |  |  |  |  |  |  |  |  |  |
| Data analysis |  |  |  |  |  |  |  |  |  |  |  |  |
| Draft results/discussion/conclusion chapters |  |  |  |  |  |  |  |  |  |  |  |  |
| Check, final proof-read, and submit |  |  |  |  |  |  |  |  |  |  |  |  |
| Revision |  |  |  |  |  |  |  |  |  |  |  |  |

Table 1. The key environmental issues in Pakistan.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Key Environmental Issues |  | Criticality |
| Air | PM2.5 air pollution, population exposed to levels exceeding WHO guideline value (% of total) | 99.99%  (2013) | 0.8 |
| CO2 emissions (kg per 2005 US$ of GDP) | 1.23  (2011) | 0.83 |
| Water | Water productivity, total (constant 2005 US$ GDP per cubic meter of total freshwater withdrawal) | 0.78  (2013) | 0.96 |
| Renewable internal freshwater resources per capita (cubic meters) | 303.54  (2013) | 0.85 |
| Improved water source (% of population with access) | 91.4%  (2015) | 0.64 |
| Improved sanitation facilities (% of population with access) | 63.5%  (2015) | 0.69 |
| Biodiversity | GEF benefits index for biodiversity (0 = no biodiversity potential to 100 = maximum) | 4.88  (2008) | 0.26 |
| Forest area (% of land area) | 2.02%  (2013) | 0.89 |

Note: the criticality is calculated by dividing the rank of Pakistan by the total number of the ranked countries. The bigger value (closer to 1) indicate the lower ranker (maximum=1, minimun=0).

Source: The World Bank, World Development Indicators. 2008-2015

Table 2. Scoring table used to investigate stakeholders’ characteristics.

|  |  |
| --- | --- |
| Parameter | Scores |
| Knowledge about Chinese FDI in Pakistan | 1. No knowledge  2. Some knowledge  3. Good idea  4. Plenty of knowledge  5. Complete, accurate and total knowledge |
| Interest about Chinese FDI in Pakistan | 1. No interest  2. Little interest  3. Moderate interest  4. Considerable interest  5. Great interest |
| Attitude towards Chinese FDI in Pakistan | -Strongly negative  -Negative  -Neutral  -Positive  -Strongly positive |
| Involvement during the process of Chinese FDI in Pakistan | 1. Not at all  2. To a little extent  3. To a moderate extent  4. To a considerable extent  5. To a large extent |
| Information available about Chinese FDI in Pakistan | 1. None  2. A bit  3. Moderate  4. A lot  5. Extensive |
| Influence towards other stakeholders during the process of Chinese FDI in Pakistan | 1. No influence  2. Little influence  3. Moderate influence  4. Considerable influence  5. Great influence |

1. \* Corresponding author. Email: hyy0405@hotmail.com [↑](#footnote-ref-1)
2. China is backing the OBOR initiative with considerable resources, setting up a New Silk Road Fund of US$40 billion to promote private investment along OBOR. The New Silk Road Fund is sponsored by China’s foreign exchange reserves, as well as government investment and lending arms. In addition, some IMF expected to support the initiative such as AIIB (US$100 billion) and the China Development (US$900 billion). The Economist magazine reported that $1 trillion in “government money” would be spent on the initiative. [↑](#footnote-ref-2)