Maximizing the Potentials of Megacities

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Abstract: - The article aims at efficient measures to maximize thepotentials of megacities across the globe and based on research questions 'What solutions are suggested to deal with the major challenges associated with a mega-city?'. The paper introduces the term "Megacity" coined and defined by the United Nations; and the urbanization trend observed in recent times to understand the problems. The diversity of challenges faced by these cities such as low maturity levels, natural disasters, infrastructural, safety and social problems are highlighted by referring to a survey conducted by Siemens in 2016. Possible solutions with regards to governance, financing and strategies to overcome these challenges are recommended based on desktop research and also literature review of reports by reputed companies such as Allianz and Ericsson. A long term approach of dealing with the challenges are not just addressing the five pillars of sustainability: ecology, economy, legal, urban layout/ architecture and social aspects; but, a holistic approach integrating information communication technology in order to minimize the weaknesses and threats.

Keywords: **Megacities, Three Ages of Megacities, Information Communication Technology**

I. INTRODUCTION

A. Research Aim

The report aims for strategies to increase the opportunities of megacities while overcoming its challenges by considering survey and reports of reputed companies. Recommendations are made not just in terms of governance, economy and social aspects; but also highlighting how the use of technology could possibly make a positive difference.

B. Definition

The term "megacity" was coined by the United Nations (UN) in the year 1970 to designate urban areas with more than 8 million inhabitants and in 1990's this threshold was raised to 10 million inhabitants and over. A few other definitions say mega-cities are cities with a minimum population densitiy level of 2,000 persons/sqkm. A mega city can either be a single metropolitan area or a combination of two or more metropolitan areas which have grown to an extent to be called urban areas. Synonyms of mega-city include Megapolis or Megalopolis and cities which have population of more than 20 million people are called Hypercities [4].

Figure 1. Examples of Megacities: New York and Shanghai (Roger, 2019), (Shine, 2019) [5], [7]

C. Urbanization Trend

10 out of the 15 most populous cities in the year 1950 were from the industrial countries or countries with high per capita income such as the United States, United Kingdom, and Japan etc. and there was only one megacity which existed i.e. the city of New York whose population was 12.3 million [9].
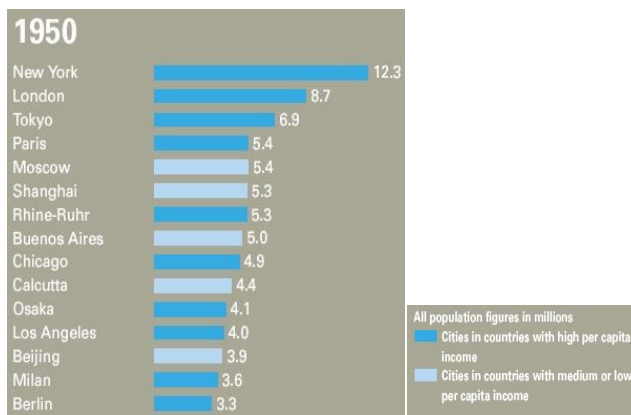

Figure 2. Megacities in 1950 [9]

However, when compared to the year 2015, when only 3 amongst the 15 most populated cities are from industrialized or countries with high per capita income and they are Tokyo, New York and Los Angeles. Statistics show that in the last year i.e. 2018, there were 31 megacities in the world and by 2030, there will be 41 megacities. Out of these 31 megacities, 24 are located in the less developed regions; 6 in China and 5 in India (the two most populous countries in the world) [4].
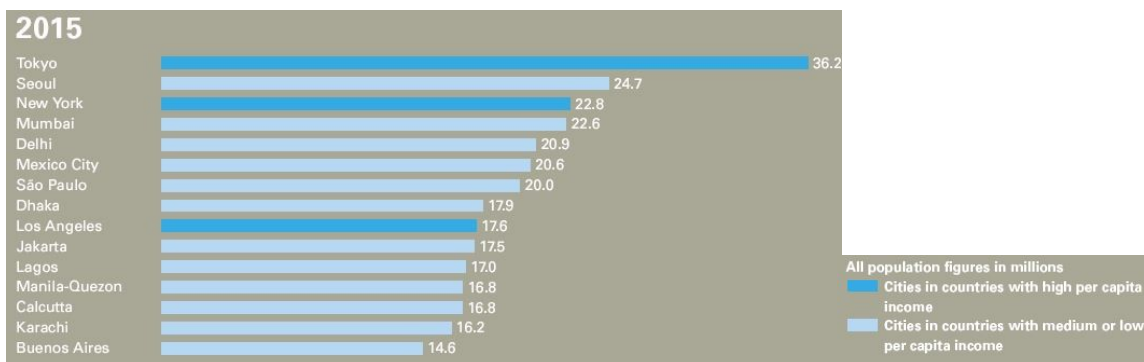

Figure 3. Megacities in 2015 [9]

When it comes to the Urbanization trend, the relative population of cities generally falls or decreases as they grow in size. An example to illustrate the same is the city of Tokyo whose population has been relatively decreasing over the last few years and will continue to decrease in the years to come. This trend is true for cities which are highly developed, where the number of inhabitants will not increase anymore, or will do so only marginally. A future growth of 3% or more is expected only in a few megacities such as Dhaka, Delhi, Jakarta and Karachi [4]. The graph below illustrates the trend in the increase of urban population over the years in developing countries, which is much more in comparison to the urban population in industrialized or developed countries.
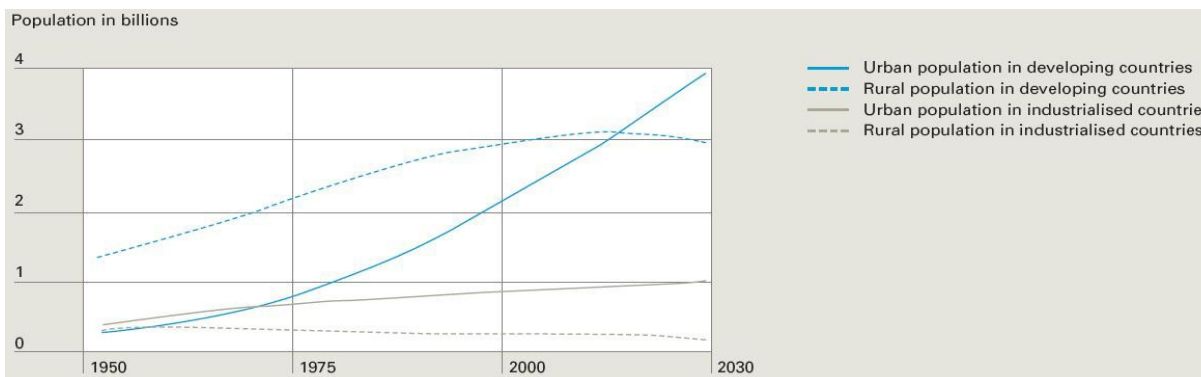

Figure 4. Urbanization trend [9]

Despite the declining population in Tokyo, it still is expected to remain the world's largest city in the year 2030 with a population of nearly 37 million inhabitants. Delhi is expected to be at the 2nd place with nearly 36 million as it is projected to add around 10 million people between 2016 and 2030. The most astonishing fact is that the top 10 populated cities in the year 2030 are all going to be Hypercities as shown in the table below developed by the UN.

City, Country	Population in 2030 (thousands)
Tokyo, Japan	37 190
Delhi, India	36 060
Shanghai, China	30 751
Mumbai (Bombay), India	27 797
Beijing, China	27 706
Dhaka, Bangladesh	27 374
Karachi, Pakistan	24 838
Al-Qahirah (Cairo), Egypt	24 502
Lagos, Nigeria	24 239
Ciudad de México (Mexico City), Mexico	23 865

Figure 5. Population of top 10 megacities in 2030 [9]

II. MEGACITIES CHALLENGES

A. Diversity of Challenges

Megacities have made an enormous contribution to the development of modern society. However, a large population means a lot of challenges to deal with and some of the many challenges that megacities need to address on a timely basis are transportation, water, unemployment, urban divides etc. One of the major challenges as seen from the resident's perspective is the quality of life [2]. All these challenges cannot be treated individually, and a holistic approach is required as each sector can affect the others .
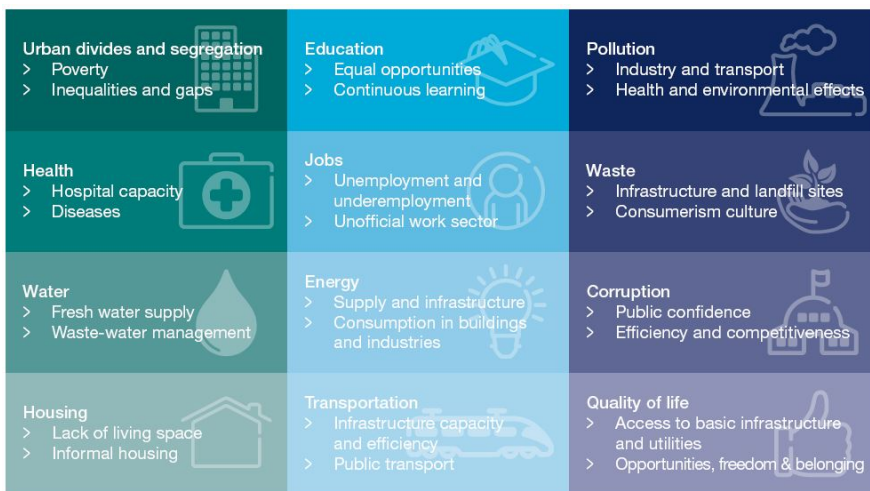

Figure 6. Diversity of challenges linked to megacities [2]

B. The three ages of Megacities

Every megacity is categorised depending on its stage of development, location and culture to identify its maturity level. The three categories or ages are low, medium and high; and each one of the ages has its own characteristics, challenges, risks and opportunities as mentioned in the figure below. For instance, the top priority in Dhaka would be fighting extreme poverty and social segregation; whereas in New York the priority is to address health challenges such as obesity, diabetes and cardiovascular problems[2].

Figure 7. The three ages of megacities [2]

C. Natural Catastrophes

Megacities are generally pre-destined or prone to major natural catastrophes. The losses are enormously high due to the large number concentration of people and also due to the high quantity of material assets in the risk zone. Some of the major catastrophes of the early 20th century are the earthquakes in San Francisco (1906) and Tokyo (1923) which caused widespread devastation leading to pro-longed declination or paralyzed economic activity. The image below referring to the risk of exposure of cities to natural disasters shows that 3 megacities Tokyo, Osaka and Manila face a high risk of exposure to three or more types of natural disasters and the megacities of Delhi, Jakarta and Dhaka face a high risk of exposure to two or more types of natural disasters [4].
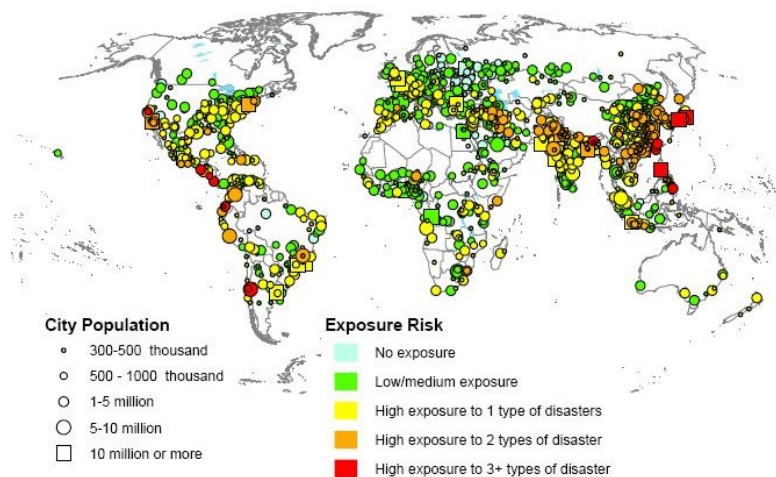
Figure 8. Cities risk of exposure to natural disasters [9]

D. Weather and Climate

Megacities have their own individual city climate which influences the weather and therefore it is a causative factor. The weather and climate of megacities have various impacts in comparison to other cities or rural areas. Megacities are pronounced heat islands; the mean temperature in these city centres in comparison to the surroundings can be up to 10 degrees Celsius higher. The satellite and thermal images from the city of Shanghai highlights this phenomenon. In addition to the climate change, megacities as previously mentioned impact the weather; for instance, cold snaps, increased frost days in the winter seasons and significantly intensified heat waves, thunderstorms or hail in the summer seasons [4].
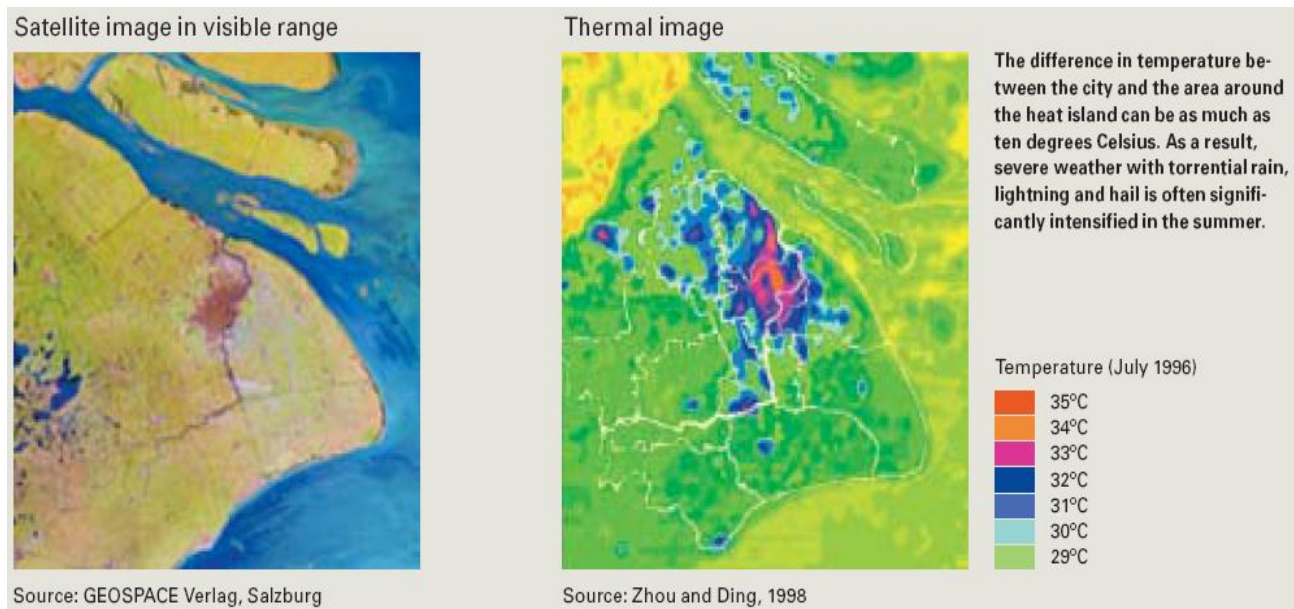
E. Survey by Siemens

For analyzing the other major challenges such as infrastructural, social, city governance/finance, safety and security; a survey conducted by Siemens in association with Globe scan was referred to. It was conducted in September 2016 across 25 cities out of which 8 of them are megacities.

The megacities surveyed were: Istanbul (Turkey), Lagos (Nigeria), London (England), Moscow (Russia), Mumbai (India), New York (USA), Shanghai (China), and São Paulo (Brazil); for every city, 20 interviewswereconductedeither by face to face or over the telephone. A total of 522 stakeholders from 4 differentcategories: private, public employees, elected and influencers wereinterviewed. The below image shows the percentage of stakeholders questioned; the influencers include NGO's, media and academics [8].
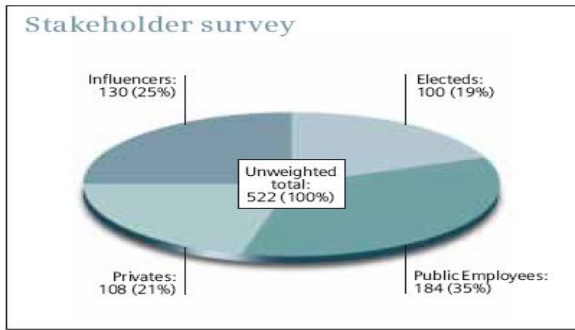
Figure 9. Percentage of different stakeholders contacted for survey [8]

Infrastructural Risks: From the results of the survey, it is clear that transportation is perceived to be the biggest infrastructure challenge. In underdeveloped / low maturity or transitional countries, 43 % of the respondents voted for transportation and surprisingly only 4% agree that lack of funding is a major challenge [8].
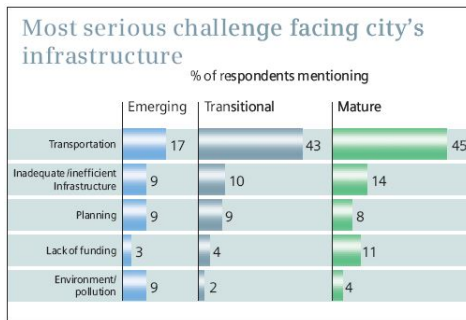

Figure 10. Survey results for most serious infrastructure challenges [8]

Safety and Security: For the safety and security aspects, the most serious concerns are organized crimes and terrorism. 13% and 8% voted for natural disasters and ethnic conflicts/mass events respectively as the concerns to be addressed. Combination of crimes received 7% of the total votes whereas other crimes and violence received the least voting of 6%. The survey conducted by the team on the predicted approach for safety and security suggests prevention of the problem is a better solution in comparison to protection from the problems [8].
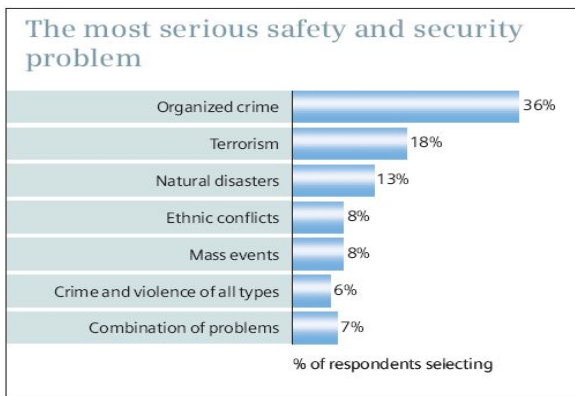

Figure 11. Survey results for most serious safety and security challenges [8]

Social Challenges: According to the respondents, poor living conditions is considered to be the most serious social challenge; whereas an equal weightage of 7% each was given to education, population growth, public safety and unemployment. The other key issue is the gap between rich and poor [8].
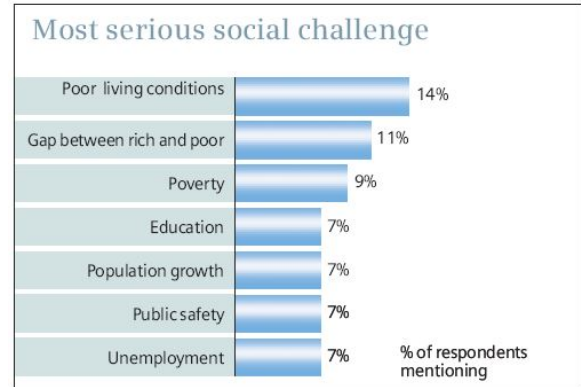

Figure 12. Survey results for most serious social challenges [8]

III. SOLUTIONS AND POTENTIALS

A. City Governance and Finance

When it comes to the best solution to city management, more than 50% of the respondents agree that there is a need for improved management and planning. Surprisingly, better education is not considered to be the better solution [8].

Figure 13. Survey results for best solution to city management [8]

B. Strategies

Due to the number of challenges associated with megacities, it is crucial for city and urban planners to find a balance between environmental, social and economic growth. Apart from these aspects, it is also important to strike a balance between competitiveness, quality of life and good governance. The key strategies for the same are community/ business participation, sustainable city models and dynamic city operations centres. Community or business participation is enabling the dialog between public, businesses and organizations through social networking and stakeholder management meetings. It also includes providing data and knowledge of the functional aspects of the government to them. Dynamic city operations are dealing with efficient use of available resources and optimization of the system[8]. Whereas, sustainable city models combine using ICT

(information communication technology) solutions and other functions for sustainable development as represented in the image below.
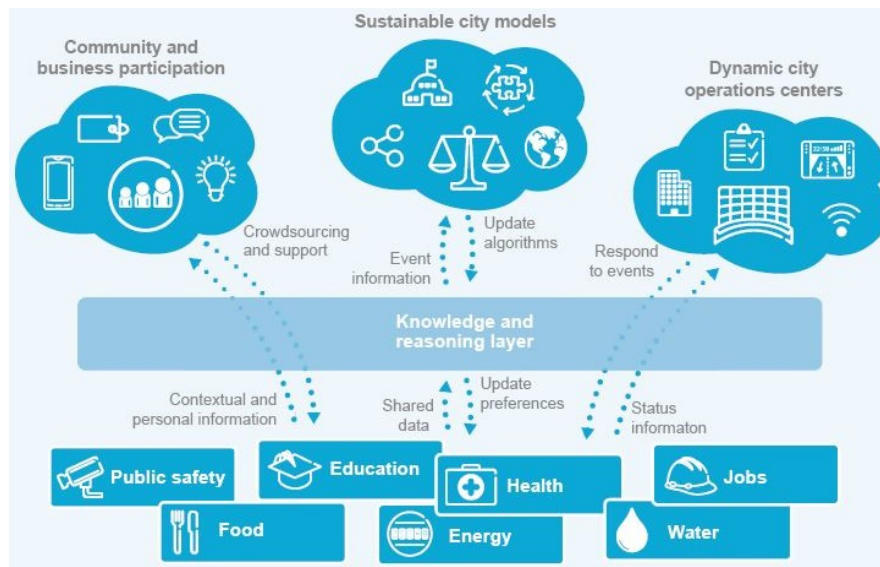

Figure 14. Strategies for dealing with megacities challenges [8]

The image below illustrates how some of the many strategies could be implemented in order to deal with the complex challenges linked to the development of a sustainable megacity.

Some examples of methods taken by megacities are: Tokyo for combating climate has made mandatory CO2 emissions reporting system for all small and medium sized facilities. For dealing with natural catastrophes, Tokyo government in 2011planned a new city 250 miles away from the existing one– dubbed Integrated Resort, Tourism, Business and Backup City which would include office towers, parks, housing for 50,000 and working space for 2, 00,000 in case of natural catastrophes. This is however not a realistic approach as the city's population is 13 million and the new city can house a maximum 50,000 residents. Further, Delhi in order to improve transportation has set up measures to set up better public transportation and passing a law which states no more diesel taxis will be issued licenses starting 2016.

Figure 15. Some of the strategies for dealing with megacities challenges [1]

C. Social Strategies

Some of the many solutions that are suggested by Sundeep Wasleka (the President of Strategic Foresight Group) is that there is a need for politicians to live like the voters. He explains this using the example of Turkish President Recep Tayyip Erdoğan who moved into a two-story house in downtown Ankara and urged all ministers and members of Parliament ought to live in their own homes like commoners. Other suggestions made by Sundeep are to eliminate inequality. For instance, the Nigerian government has taken measures to treat all the different ethnic groups in the country equally. Other step is to deploy technology to democratize education. For example; the go digital initiative in India aims at providing WiFi in rural areas in addition to the plan to develop 100 smart cities.

D. Potentials

Despite the numerous challenges and risks faced by megacities; there are a number of potentials linked to it. The cities of Mexico City in Mexico and São Paulo in Brazil contribute to 50% of the income of their countries. The city of Bangkok contributes to more than 40% of the country's GDP, despite it being home to just 10% of the country's population (Schule, 2019)

IV. CONCLUSION

As per the survey results, what is required for megacities is better transportation, solutions to improve poor living conditions, improved city management and planning; and measures to combat terrorism and organized crimes.In addition, it is important and crucial to consider the 5 pillars of sustainability: ecology, economy, legal, urban layout/architecture and social aspects. A long-term holistic approach in addition to the use of ICT (information communication technology) is what is required as each of the aspects is directly or indirectly linked to the others. This could maximize the potentials of a megacity while minimizing its threats and weaknesses. Furthermore, research limitations are the requirement of further study and in-depth analysis to understand the pros and cons linked with the recommended strategies based on the context.

ABBREVIATIONS

ICT – Information Communication Technology

UN – United Nations

CONFLICT OF INTEREST

The author hereby declares that there are no personal circumstances or interest that may be perceived as inappropriately influencing the representation or interpretation of reported research results.

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REFERENCES

[1]. Allianz. (2015). *The megacity state: The world's biggest cities shaping our future.* Munich: Allianz SE.
[2]. Ericsson. (2012). *The three ages of Megacities.* Stockholm: Ericsson AB.
[3]. Ericsson. (2013). *The next age of megacities.* Stockholm: Ericsson AB.
[4]. MunichReGroup. (2005). *Megacities - Megarisks Trends and challenges for insurance and risk management.* Munich: Munich Re Group.
[5]. Roger, J. (2019, 6 7). Retrieved from Unsplash: https://unsplash.com/photos/LY1eyQMFeyo
[6]. Schule. (2019, 6 7). Retrieved from Schule: http://webs.schule.at/
[7]. Shine. (2019, 6 7). Retrieved from Shine: https://www.shine.cn/
[8]. Siemens. (2016). *Megacity Challenges - A Stakeholder perspective.* Siemens.
[9]. UN. (2016) *The world cities in 2016.* United Nations.