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Dear Fellow Geographers,

The latest statistics for our journal are very encouraging and pleasing to the editorial team and the presidium of the European Association of Geographers. On the other hand the road to a successful publication of the EJG might not be as smooth as these results made you believe or as easy as I might have liked. The unrelenting reality indicates that there are certain issues that characterize the publication of the EJG which need to be resolved in order to achieve a continuation of the successful results we are now witnessing. More specifically given that the EJG by definition incorporates three basic concepts, namely: the European aspect, the publication of an open access journal and the task of strengthening Geography. Thus a successful Europeanization, an acceptable open access journal and a desired enhancement of our science represent the challenges now and in the future for all of us. As a result, we seek your help which is paramount and more than welcome.

Kostis Koutsopoulos
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THE ROLE AND THE EFFECTS OF NATIONAL SYSTEMS OF INNOVATION IN EUROPEAN REGIONAL GROWTH

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Abstract:
Research and Development is directly related with industrial infrastructure, productivity effects and regional development, through “national system of innovation” indicating the national technological capabilities, as well as the underlying structure and planning on Research and Development. European technological policy has an important role for the economies of member states. Technological policy aims to reinforce national competitiveness along with convergence between member states. The purpose of this paper is to analyse and examine the evaluation and the development of European Union policy and how it can be implemented to member states. This paper also attempts to examine the effects of innovation activities and the impact of innovation policy on growth, productivity and integration process.

Keywords: Innovation, National System of Innovation, Integration, Convergence.

1. INTRODUCTION

The growing importance of technological change in world production and employment has been one of the characteristics of the last decades. Technological change has not been only a determinant of growth, but it has also affected the international competition and the modernization of European Union countries. The choice of technology depends upon a large
number of factors: the availability of technologies, the availability of information, the availability of resources, the availability of technology itself and its capacity for successful adoption to suit the particular needs and objectives. Technologically advanced countries, being among the leaders in technological change, tend to put a great deal of emphasis on policies which aim to enhance the development of research and technological activities.

Within the economic growth context, the adoption and diffusion of new technologies affect the structure and the competitiveness level of a national economy. The principal effects of technological policy can be distinguished in demand and supply driven. Economic performance in the majority of European Union manufacturing industries and services depends to a large extent on technology creation and diffusion, along with the collaboration of private and public research and technology efforts, as well as public policies on innovation-enhancing environment. This paper focuses on the importance of R&D innovation activities towards the productivity level enhancements (through increases in production value added).

2. TECHNOCUTLICAL FRAMEWORK AND THE NATIONAL SYSTEM OF INNOVATION

National system of innovation helps to understand and explain, why the development of technology is necessary in a certain direction and at a certain rate. The term "innovation" is used rather broadly, in order to encompass the processes by which firms master and get into practice innovative product designs and manufacturing processes. The term "system" indicates a set of institutions whose interactions determine the innovative performance, in other words a set of institutional actors that play the major role, influencing innovative performance (Nelson, 1993). We use the term "system of innovation", in order to indicate coordinating policies that are related with research and technological activities planning (both in a macro and micro economic view).

The first broad approach of "system of innovation" is that, it is a social system that is constructed by a number of elements, which interact in the production and diffusion of new technologies, including different parts of economic structure (such as the production system, and the marketing system). The second narrow approach of "system of innovation" is that, it includes organizations and institutions involved in new technologies creation and diffusion (such as technological institutes and research departments) (Lundvall 2010, Nelson 1993).

Even though the firm-specific factors are important determinants of innovation activity, technological opportunities and favorable entrepreneurial environment have a positive effect on innovation activity, as well. Technological change, innovation and technology creation and diffusion are an important factor to economic progress. While innovation may lead to divergence between firms or nations, imitation through diffusion and dissemination tends to erode differences in technological competencies, and hence lead to convergence (Fagerberg and Verspagen, 2002). On the other hand, combining the production functions in order to create and disseminate innovations leads to improvements in productivity and economic development (Malecki and Varaia 1986; Malecki 1991, Fagerberg and Verspagen, 2002).

The economic processes that create and diffuse the new knowledge are critical in the development process and there are powerful contacts between the investment in the human capital, the technological change and finally the economic growth (Acs, Anselin and Varga, 2002). As a motive force, it prompts the enterprises to long-term development objectives and the advancement of productive structures, so that they maintain the elements of growth, competitiveness and employment. Investments in new technologies aim to the modernisation of productive process and the qualitative upgrade of products, which is one from the basic factors of
increase of enterprises. The reason is that the new technologies lead to increase of productivity of factors of production, contributing in the long-term improvement of competitiveness (Griliches, 1980). The technology, also, contributes in the growth of economy, on the one hand because the new or improved products that result from innovations improve the level of existence, and on the other hand, because, with regard to the international trade, the record of open economy depends also from the propensity to innovativeness (Fagerberg, 1988). One additional reason is that via innovation the individual and collective needs are satisfied better which constitutes fundamental element of entrepreneurial spirit. The same holds also for countries and economies, which in order to maintain the elements of growth, competitiveness and employment, owe to change fast the new ideas in technical and commercial successes.

Innovative actions are considered to be rather important to economic growth, development and welfare. Firstly, they stimulate investments which introduce new commodities and processes, which improve the living standards of the society. Moreover, they lead to new developments, which increase the comparative advantage of an economy and affect positively the trade performance and competitiveness of a country worldwide. These effects result in a greater level of economic growth. On the other hand, innovation is rather important to an individual firm for two main elements, namely a double role in the incentives of the companies to pursue and invest on it.1 Firstly, a corporation, which undertakes R&D programmes, acquires new information and knowledge to embody in the new commodities, as well as new production and marketing processes, ready to be employed in product and process innovation. As a result, through innovation, a company is able to develop directly new products and processes and bring them to the market acquiring an advantage over its competitors. Furthermore, it can enhance the ability of the firm to develop and maintain capabilities to absorb and expand technology information available by external sources, and identify, assimilate and exploit new knowledge and technology produced elsewhere (Cohen and Levinthal, 1989).

The systematic analysis and the theoretical framework of the effects of innovation on the economic efficiency, productivity and growth is based on endogenous growth theory developed by Solow, 1957, Arrow, 1962, Romer 1986 and 1990, Lucas, 1990 and 1993. Endogenous growth theory claimed that not only the accumulation of capital, but mainly the development and accumulation of knowledge and technological change leads to increased and sustainable growth. The reason is that the long-run productivity decrease is avoided, due to capital accumulation through the qualitative-technological improvements of natural and human capital. According to Romer (1986, 1990), knowledge and technological progress are the main engines of economic dynamism and the economy grows endogenously through the accumulation and spillover of knowledge. Growth rate depends on the amount of technological activity within the economy and on the ability of the economy to exploit external technological achievements (Martin and Ottaviano, 1999, Grossman and Helpman, 1994, Coe and Helpman, 1995). Increasing returns and technical change are incorporated within the production function as determinants of the endogenous growth rate (Romer 1986, Lucas 1988, Grossman and Helpman 1991, Barro and Sala-i-Martin, 1997) and economic growth is sustained because of the continuous creation and diffusion of knowledge.

In the modern knowledge economy, growth depends extensively on the presence or the formation of a network and environment favorable to innovation, which is based on the

1 Cohen and Levinthal (1989) called this double role of innovation ‘dual role’.
endogenous development capabilities, creating systems of innovation, either in national, international and regional level.

Figure 1 illustrates the flows of National, International and Regional Innovation Systems:

![Figure 1. National, International and Regional Innovation System](image)

As it has been broadly described above, innovation is a key factor to determine productivity growth. Innovation helps in understanding the sources and patterns of innovative activity in the economy, as a fundamental prerequisite to develop better policies. As such, innovation assists Member States in identifying their own strengths and weaknesses and in designing corresponding policies and programmes.

3. INNOVATION ACTIVITIES WITHIN THE EUROPEAN UNION SYSTEM OF INNOVATION

Within this framework, an important contribution of the endogenous growth theory (Romer, 1987 and 1990) has been to identify the central role that knowledge and knowledge spillovers play in creating and sustaining growth. Pavitt and Soete (1982) examined growth as a result of the development of new knowledge in a country and the diffusion of knowledge between countries. According to Fagerberg (1987) there is a close relation between a country’s economic and technological level of development. The rate of economic growth of a country is positively influenced by technological level of the country and its ability to increase it through imitation and exploitation of the possibilities offered by technological achievements elsewhere. Krugman (1991) identified the major role that knowledge spillovers play in generating increasing returns and higher growth. Geroski and Machin (1993) asserted that innovations positively affect the development of enterprises and economies. Moreover, according to Silverberg and Verspagen (1995), technological change and diffusion constitute important factors in long-run macroeconomic growth and development. Moreover, Barro and Sala-i-Martin (1995 and 1997) asserted that growth rate may increase in correlation with technological growth. Furthermore, Freeman and Soete (1997) focused on the importance of technology and innovation claiming that lack of innovation leads to economic death. At the same point of view. Sternberg (2000) said that in industrialized economies the rate of long-term macroeconomic growth depends on the ability of constant development of innovative products and processes. Figure 2 illustrates the gross domestic expenditure on R&D, as well as the GDP growth rate in European Union during the period 1981-2007. It is apparent that there is a common trend, as far as the evolution of these two indicators is concerned:
Even though there is a certain level of gross expenditure on R&D, which moves along the GDP growth evolution, there is still a significant gap between European Union compared to USA and Japan. Figure 3 illustrates this innovation gap between EU, Japan and USA.

**Figure 2.** Gross domestic expenditure on R&D, 1981-2007

**Figure 3.** E.U. Innovation Gap
Figure shows that the innovation performance of the US and Japan is well above that of the EU27.

The 2009 European Innovation Scoreboard (EIS) provides a comparative assessment of the innovation performance of EU27 Member States, under the EU Lisbon Strategy, reporting overall innovation performance as calculated on the basis of 29 indicators covering five dimensions of innovation, (European Commission, 2009a and 2009b):

- **Innovation drivers** measure the structural conditions required for innovation potential;
- **Knowledge creation** measures the investments in R&D activities;
- **Innovation & entrepreneurship** measures the efforts towards innovation at the firm level;
- **Applications** measures the performance expressed in terms of labour and business activities and their value added in innovative sectors; and
- **Intellectual property** measures achieved results in terms of successful know-how.

The 2009 EIS report shows that most Member States until 2008 were steadily improving their innovation performance. The economic crisis may, however, be hampering this progress. Early indications show that the worst hit are Member States with lower levels of innovation performance, potentially reversing the convergence process witnessed over recent years. Meanwhile, the latest statistics show that the EU is having difficulty in catching up with the US in innovation performance, although it maintains a clear lead over the emerging economies of Brazil, Russia, India and China, despite rapid improvements in China. More specifically, the members states of the EU - 27 fall into the following four country groups ((European Commission, 2009a and 2009b):

- **Denmark, Finland, Germany, Sweden and the UK** are the **Innovation leaders**, with innovation performance well above that of the EU27 average and all other countries. Of these countries, Germany and Finland are improving their performance fastest while Denmark and the UK are stagnating.
- **Austria, Belgium, Cyprus, Estonia, France, Ireland, Luxembourg, the Netherlands and Slovenia** are the **Innovation followers**, with innovation performance below those of the Innovation leaders but close to or above that of the EU27 average. Cyprus, Estonia and Slovenia have shown a strong improvement compared to 2008, providing an explanation why these countries have moved from the Moderate innovators in the EIS 2008 to the Innovation followers,
- **Czech Republic, Greece, Hungary, Italy, Lithuania, Malta, Poland, Portugal, Slovakia and Spain** are the **Moderate innovators**, with innovation performance below the EU27 average. The EIS 2009 Moderate innovators are a mix of 5 Member States which were Moderate innovators in the EIS 2008 and 5 Member States which were Catching-up countries in the EIS 2008.
- **Bulgaria, Croatia, Latvia, Romania, Serbia and Turkey** are the **Catching-up countries**. Although their innovation performance is well below the EU27 average, this performance is increasing towards the EU27 average over time. All the countries are rapidly closing their gap to the average performance level of the EU27, and Bulgaria and Romania have been improving their performance the fastest of all Member States. This year’s assessment shows that there continues to be convergence amongst the groups, with Moderate innovators and the Catching-up countries growing at a faster rate than the Innovation leaders and Innovation followers.

As far as each country is concerned, Germany, Cyprus, Malta and Romania are the EU27 countries displaying the largest improvement within their peer groups. Within each of the country groups there is variation in growth performance, with Finland and Germany showing the
best growth performance of the Innovation leaders. Cyprus, Estonia and also Slovenia are the fastest growing Innovation followers. Czech Republic, Greece, Malta and Portugal are the fastest growing Moderate innovators and Bulgaria and Romania are not only the fastest growers among the Catching-up countries but also overall.

On the other hand, an impressive average annual growth rate over the last five years has led Estonia and Cyprus to catch up with the EU27 average innovation performance in 2009. Both Cyprus and Estonia have improved their performance from below the EU27 average in the EIS 2008 to an above average performance in the EIS 2009. For Cyprus strong growth in Finance and support, Linkages & entrepreneurship and Throughputs have been the main drivers of its improvement in innovation performance. For Estonia strong growth in Firm investments and Throughputs have been the main drivers of its improvement in innovation performance.

Although the EU27 has been, overall, improving its innovation performance, the economic crisis may threaten this good progress, particularly in moderate innovators and catching-up countries. The EU27 is making overall progress, with particularly strong increases in the numbers of graduates in science, engineering, social sciences and humanities, venture capital, private credit, broadband access, community trademarks, community designs, technology balance of payments flows and sales of new-to-market products.

4. INNOVATION ACTIVITIES AND SYSTEM OF INNOVATIONS IN EU

As the regional level is important for economic development and for the design and implementation of innovation policies, it is important to have indicators to compare and benchmark innovation performance at regional level. Such evidence is vital to inform policy priorities and to monitor trends. As a result, the 2009 RIS is able to replicate the methodology used at national level in the European Innovation Scoreboard (EIS), using 16 of the 29 indicators used in the EIS for 201 Regions across the EU27 and Norway. Changes over time are considered using principally data from 2004 and from 2006, (European Commission, 2009a and 2009b).

The 2009 Regional Innovation Scoreboard (2009 RIS) adopts the European Innovation Scoreboard approach at regional level and provides richer analysis compared to previous reports due to the availability of more comprehensive regional Community Innovation Survey data. The analysis shows that all major EU27 countries have diverse levels of performance and relative strengths within their regions, and that Spain, Italy and the Czech Republic are the most heterogeneous. The 2009 RIS marks a significant step forward in measuring regional innovation performance although it also shows that more progress is needed on the availability and quality of innovation data at regional level. Despite this progress, the data available at regional level remains considerably less than at national level. Due to these limitations, the 2009 RIS does not provide an absolute ranking of individual regions, but ranks groups of regions at broadly similar levels of performance. The main findings of the 2009 Regional Innovation Scoreboard are (European Commission, 2009a and 2009b):

• **There is considerable diversity in regional innovation performances.** The results show that all countries have regions at different levels of performance. This emphasizes the need for policies to reflect regional contexts and for better data to assess regional innovation performances. The most heterogeneous countries are Spain, Italy and Czech Republic where innovation performance varies from low to medium-high.

• **The most innovative regions are typically in the most innovative countries.** Nearly all the "high innovators" regions are in the group of "Innovation leaders" identified in the European Innovation Scoreboard (EIS). Similarly all of the "low innovators" regions are located in
countries that have below average performance in the EIS. However, the results also show regions that outperform their country level: Noord-Brabant in the Netherlands is a high innovating region located in an Innovation follower country, the same holds for Pais Vasco, Comunidad Foral de Navarra, Comunidad de Madrid and Cataluña in Spain, Lombardia and Emilia-Romagna in Italy, Oslo og Akershus, Agder og Rogaland and Vestlandet in Norway are all medium-high innovating regions from Moderate innovators.

- The capital region in Romania, Bucuresti – Ilfov, is a medium low innovating region in a Catching-up country.

5. PROSPECTS

As it has been asserted in this paper, globalization and worldwide competition has shifted the comparative advantage of economies towards the factor of knowledge and innovation, where productivity based on the endogenous development capabilities plays a rather important role, as far as growth and competitiveness enhancement are concerned. In order to promote innovation activities and technological opportunities, productivity enhancement seems to have a significant to the long run performance of the economy as a whole.

European cohesion policy makes a major contribution to these objectives, especially in those regions where there is unused economic and employment potential which can be realized through targeted cohesion policy measures, so adding to the growth of the EU economy’s a whole. From a policy perspective, for regional development to be sustained requires favorable conditions being established at the national level, in particular a macroeconomic environment conducive to growth, employment and stability and a tax and regulatory system which encourages business and job creation. At the regional level, two complimentary sets of conditions need to be satisfied. The first is the existence of suitable endowment of both basic infrastructure (in the form of efficient transport, telecommunications and energy networks, good water supplies and environmental facilities and so on) and a labor force with appropriate levels of skills and training, strengthening of both physical and human capital, together with improvements in institutional support facilities and the administrative framework in place. The second set of conditions, which directly relates to the factors of regional competitiveness which are important in the knowledge-based economy, is that innovation should be accorded high priority, that information and communication technologies (ICT) should be widely accessible and used effectively and that development should be sustainable in environmental terms.; a business culture which encourages entrepreneurship; and the existence of cooperation networks and clusters of particular activities.

Small countries are likely to need a more comprehensive and oriented policy of co-operative innovative effort, in order to develop their future capabilities and to make the necessary choice for technological priorities. Looking first at scientific and technological output, the EU is still ahead of the US and Japan in its share of scientific publications, but lags behind in most of the other performance indicators, especially patents. There is, nonetheless, a substantial variation within the EU and certain EU Member States often score better than the US and Japan (most notably Sweden and Finland), yet the overall situation in the EU-27 is far from satisfactory. Although there are some noticeable encouraging tendencies in several acceding countries, one can expect that with the enlargement of the Union, the «European Paradox» will be, at least temporarily, further accentuated. In other words, in relation to its enlarged population, the EU-25’s strong performance in science will contrast increasingly with its weaker development and commercialization of technology. The slowing down of EU-27 investment in the knowledge-
based economy is likely to be reflected sooner or later in a significant decline in its performance. This trend underlines the urgency of implementing the Lisbon Strategy. In particular, the EU needs to increase its efforts, so as to give renewed impetus to the catching up of some countries with the rest of the EU-27 and to close the gap as soon as possible with the US, following actions towards (Korres 2011):

1. fostering a strong active learning process
2. building the right set of institutions and incentives in order to foster active learning.
3. building firm’s technological capabilities
4. fostering academic, basic research and R&D institutions
5. focusing mainly on some specific fields that are promising for the future development of an innovation process within the country.
6. motivating R&D for adaptation and improvement, manufacturing extension, technical assistance, demonstration and diffusion, networking of producers – suppliers and labs.
7. motivating issues like labour, education and training, a cooperative environment between management and workers, few hierarchical layers and total quality management become very important
8. elaborating macro – economic, industrial and educational policies for active learning

The countries that are technologically backward have a potentiality to generate more rapid growth even greater than that of the advanced countries, if they are able to exploit the new technologies which have already employed by the technological leaders. The pace of the catching up depends on the diffusion of knowledge, the rate of structural change, the accumulation of capital and the expansion of demand. The member states that are lagging behind in growth rates can succeed in catching up, if they are able to reduce the technological gap. An important aspect of this is that they cannot rely only on the combination of technology imports and investment, but they should increase their innovation activities and improve locally produced technologies (such as in the case of new industrialized countries Korea and Singapore).

Under this perspective, growth policies should focus on creating favorable environment for the co-operation between firms and institutions that support the development and exploitation of knowledge and innovation. Furthermore, policies should promote the entrepreneurial relations between firms and institutions, fostering the development and dissemination of the expertise, the mobility of human and physical capital and the enhancement of the relationships between business and research entities. Specifically, they should encourage actions such as, promoting innovation, technology transfer and interactions between firms and higher education and research institutes, networking and industrial co-operation and support for research and technology supply infrastructure.

As it has already been mentioned, innovation and technology is an important source of regional competitiveness through facilitating cooperation between the various parties involved in both the public and private sectors. In particular, they can improve collective processes of learning and the creation, transfer and diffusion of knowledge and transfer, which are critical for innovation. Such cooperation and the networks that are formed help to translate knowledge into economic opportunity, while at the same time building the relationships between people and organizations which can act as a catalyst for innovation. Such actions should extend to all the policy areas relevant for economic, scientific and social development and should ideally establish a long-term policy horizon.
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COMPARING TWO MODES OF PRESENTATION ON PERCEPTIONS OF FLU THREAT AND ATTRIBUTIONS FOR ITS GLOBAL OUTBREAK

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Abstract  
This study compared the effects of presenting the H1N1 flu threat using two different modes of presentation: via an interactive map (visual mode) versus using words and numbers (numerical mode) on people’s threat perceptions (susceptibility and severity) regarding the H1N1 flu, attributions for the rapid spread of the H1N1 virus, and intentions to seek additional information about the H1N1 flu in the next 6 months. Three hundred eighteen undergraduate students were recruited to take part in this experiment. Results found that compared to those exposed to a numerical representation of the H1N1 flu threat, or receiving a control message, those exposed to a visual representation of the threat reported greater feelings of H1N1 flu susceptibility and held stronger immigration-related attributions for the spread of the virus. Also, the visual representation of the H1N1 flu threat reinforced the negative attitudes among those who already held aversive attitudes toward Mexicans, as reflected in stronger immigrant-related attributions for the spread of the virus. Implications of the results for designing messages involving outbreaks of communicable diseases (such as the H1N1 virus) are discussed.

Keywords: H1N1 Virus, Perceptions of Mexicans, Visual Representations, Framing, Communication of Risk.

1. INTRODUCTION

The H1N1 flu virus has been rapidly spreading throughout the U.S. and worldwide since April 2009. Recently, the H1N1 flu has been spreading fast enough that scientists have begun to prep for a pandemic (Coughlan, 2009). As the spread has become more rapid in the last couple of months, many nations have taken actions to try and prevent their citizens from being exposed to
this threat, including imposing travel bans to destinations in Mexico (where it was reported to have originated), quarantining people at airports and border control facilities those individuals who exhibit symptoms of the H1N1 flu (McNeil, 2009).

Some of the earliest cases of the H1N1 flu were found to have originated in Mexico (Coughlan, 2009). This has led some Americans to be fearful of travel to Mexico and this fear was instigated further when Vice President Biden stated that Americans should stay off of planes and subways (Saltonstall, 2009), a statement that was later retracted due to the panic it caused. It was shortly after this statement that cruise ships quit docking at Mexican ports costing Mexico millions of dollars in tourism (McNeil, 2009), because Americans simply did not have a desire to travel to Mexico.

Since the H1N1 flu was believed to have originated in Mexico (Coughlan, 2009), the perception of H1N1 flu risk associated with both the country and its people has increased. Media coverage of the H1N1 flu has largely been negative and has led to an increase in fear among the general public. For example, the media began covering stories about the H1N1 virus outbreak by terming it the swine flu outbreak. This coverage led people to believe that if they consumed pork products, they would be at risk. Therefore, in order to correct these misconceptions about this virus and its method of transmission, the media renamed the swine flu the H1N1 flu.

In presenting the H1N1 flu threat to the public, the media has at its disposal different means of presenting the information, such as via the use of primarily a visual mode (e.g., using maps to depict the spread of the virus over time) or numerical mode (e.g., citing statistics to depict prevalence of the disease).

The way that the media presents information to the public has a profound effect on how people ultimately process the messages, affecting their perceptions and attributions for different events. Therefore, the purpose of this study was to investigate how the presentation of the H1N1 flu threat via either a visual or textual form can affect: (a) people’s perception of susceptibility for contracting the H1N1 flu, (b) people’s perceptions regarding the severity of the H1N1 flu, and (c) attributions people make about the rapid spread of the H1N1 flu both in the U.S. and globally. Additionally, the study also compared the effects of visual versus textual depiction of the H1N1 flu threat on people’s intentions to seek more information regarding the H1N1 flu.

2. NUMERICAL AND VISUAL COMMUNICATION OF RISK

The presentation of risk in communication can be discussed in terms of numerical and visual risk. Numerical communication of risk occurs when numbers are used to describe the likelihood of some event occurring (Lipkus, 2007). On the other hand, visual risk occurs when graphics or other visual displays are used to describe the likelihood of some event occurring (Lipkus, 2007). Both of these presentations of risk have advantages and disadvantages that lead to the effectiveness of each mode of communication.

When numeric communication of risk is presented, it tends to be advantageous because the numbers presented tend to be precise and therefore lead to more accurate perceptions of risk (Lipkus, 2007). Furthermore, numeric communication of risk conveys scientific credibility (Lipkus, 2007). Numbers can also be easily converted to other metrics and their accuracy can be verified (Lipkus, 2007). This accuracy can be attributed to the fact that the amount of risk can be computed using algorithms to obtain a summary score that can be easily understood by the public (Lipkus, 2007; Windschill & Wells, 1996).

However, in the end, people can appreciate numbers because they are familiar and consequently, people tend to prefer the numbers as their source of communication about risk.
(Lipkus, 2007). While numerical communication of risk is very advantageous, there are some disadvantages worth discussing. Numerical communication of risk houses an inability to address the problems that some have with understanding the numbers (Lipkus, 2007; Lipkus, Samsa, & Rimer, 2001; Woloshin, Schwartz, Moncur, Gabriel, & Toteson, 2001). Another possibility is that the algorithms used to produce the amount of risk may be incorrect (Johnson & Slovic, 1995; Lipkus, 2007), which could lead individuals feel a false sense of risk.

Overall, the advantages seem to outweigh the disadvantages. Numerical communication of risk receives the best results when natural frequencies are used (Gigerenzer & Edwards, 2003; Lipkus, 2007). Ultimately using these frequencies reduces misinterpretations because they reference the targeted group (Gigerenzer & Edwards, 2003; Lipkus, 2007). While numerical communication is effective when it is used by itself when communicating risk, it is often more effective when it is combined with graphics.

Graphs and pictures are often used as supplemental material to numerical communication of risk (Lipkus, 2007). Like numerical communication of risk, visual communication of risk also has advantages and disadvantages. One advantage of using graphs to communicate risk is that these graphs can summarize a large amount of data and show patterns (Cleveland & McGill, 1984). In addition, these visual forms of communication are often able to attract and hold people’s attention because the data is displayed in concrete visual terms (Lipkus, 2007; Lipkus & Hollands, 1999). Lastly, visual communication of risk enables people to easily visualize part-to-whole relationships (Lipkus, 2007; Reyna, Brainerd, & Numeracy, 2008).

However, the data patterns that do emerge may discourage people from looking at the details of the risk (Lipkus, 2007). And, if these graphs are poorly designed, they may not be understood (Lipkus, 2007). Additionally, with the varying educational backgrounds of everyone, people may not have the educational resources to interpret the graphs (Kreps, 2008; Lipkus, 2007). Graphs are often hard to create due to the technical programs they may require (Lipkus, 2007). Graphs often call attention to some things while ignoring others therefore leading to a potential to mislead about the magnitude of the risk (Lipkus, 2007). Oftentimes, the part of the graph that receives the most attention may influence interpretation and ultimately behavior (Jarvenpaa, 1990; Lipkus, 2007).

While we do have some understanding of what numerical communication of risk can do to affect behavior, there is still a need for research determining how graphical displays affect risk perception (Lipkus, 2007). But, graphs are good for promoting risk, specifically the risk of the H1N1 flu for two main reasons. First, certain graphs are more suited for certain tasks (Lipkus, 2007). For example, the expanding dots shown in the maps to express the spread of the H1N1 flu are very effective in showing both how the H1N1 flu is being spread as well as how many people are being affected. The larger the dots, the more people are affected. Second, a goal of visual communication is to promote accurate judgments of magnitude (Lipkus, 2007). For example, the global perspective of the expanding dots showed the magnitude of the spread of the H1N1 flu pandemic quite clearly.

3. Presentation of Risk and Perception of Risk

The amount of risk that an individual perceives is dependent on the type of communication used to spread the messages as well as the emotions and attitudes that an individual is feeling and thinking at the time of cognition. The way a message is communicated (numerically or visually) and the overall design of a message can enhance the effects of the message. Based on the
content, an individual feels a certain amount of salience. When the message is negative, they feel different levels of risk.

Differences between text and visual messages can affect attitudes. Visual displays have been shown to enhance the communication of risk on specific issues (Lipkus & Hollands, 1999). For instance, graphics that are used to illustrate a message allow data patterns to be noticed that may not be seen or recognized under a numerical message simply because numerical data is easier to see (Lipkus & Hollands, 1999) and when viewed in visual representations such as a map, messages are often conveyed more clearly than would be in text.

Also, graphics tend to hold people’s attention because they display information in concrete terms and allow for a framework for cognitive processing (Lipkus & Hollands, 1999). By actually being able to see the spread of the H1N1 flu in the United States, audiences will see how much it has grown versus just reading about it. In fact, graphs effectively communicate risk when the issues are risk magnitude, relative risk, cumulative risk, uncertainty, and interactions (Lipkus & Hollands, 1999). Because the H1N1 flu is a huge risk to Americans’ health, a map would be the most effective way to communicate its risk. Ultimately, visual messages help describe numerical messages but in a more immediate, vivid, and memorable manner.

There are distinct differences when viewing a visual message versus reading a numerical message. Research has shown that judgments related to comprehension (e.g. clarity, salience, and complexity) were stronger with visual representations of the data versus numerical representations of the same data (Johnson & Slovic, 1995).

If audiences actually view the H1N1 flu spreading, that presents a more graphic depiction of the H1N1 flu invasion than a numerical representation would or could present. Similarly, visual representations of health information can substitute effectively for verbal information in order to promote comprehension and retention of message content (Buck, 1998; Doak, Doak, Friedell, & Meade, 1998; Stableford & Root, 1999). If individuals can comprehend the message, then they are more likely to perceive risk than those who cannot understand the message clearly. Source credibility has also been found to be more effective for visually communicated messages versus numerically communicated messages (Kopfman, Smith, Yun, & Hodges, 1998). For instance, seeing a news organization’s logo can instantly give credibility, especially if it is brought to our attention visually.

However, those in the numerical condition may or may not see the logo because their cognitive resources are devoted towards reading and comprehending the text. Those in the visual condition likely have more cognitive resources available to devote to other things. When all the components are taken together, research has shown that visual messages are superior in communicating risk to numerical messages (Parrott, Silk, Dorgan, Condit, & Harris, 2005).

How a message is communicated can ultimately affect the amount of risk one perceives. For instance, one study showcased that those that viewed messages regarding car crashes held a higher perceived risk of being involved in one than those who read messages (Buellens, Roe, & Van den Bulck, 2008). Therefore those that view messages regarding the H1N1 flu should hold a higher perceived risk (i.e., more susceptibility and severity) of contracting the virus than those that read a message, which in turn should elicit higher perceived risk than those that received a “control” message simply defining what the H1N1 flu is (i.e., how it was transmitted from pigs to human in a mutated form) and offering suggestions for preventing its spread.

H1: Individuals in the visual condition will have a higher perception of H1N1 flu susceptibility and severity than those in the numerical or control condition.
H2: Individuals in the numerical condition will have a higher perception of H1N1 flu susceptibility and severity than those in the control condition.

The amount of risk that one perceives is a potential motivator for health behavior change or even health behavior awareness (Becker, 1974; Weinstein, 1998; Witte, 1992). Since it is expected the visual messages of the H1N1 flu pandemic will elicit the highest risk perception compared to the numerical or control frames, it can be predicted that these individuals will also report the highest intent to seek information regarding the H1N1 flu. Previous research has found that risk perception is a positively related with information-seeking behaviors. For example, Friedman et al. (2006) found that among women with breast cancer symptoms, lower perceived risk for breast cancer was associated with greater delay in seeking medical consultation while higher perceived risk was related to shorter delay in information-seeking. Bernhardt, McClaine, and Parrott (2004) investigated people’s online health information seeking for genetic information and found perceived risk for genetic abnormality to be a positive predictor. Schwartz, Lerman, Miller, Daly, and Masny (1995) found that high perceived risk for ovarian cancer was associated with high scores on health monitoring, defined as the tendency to seek out and attend to threat-relevant information. Thus, the following hypothesis is posited:

H3: Individuals in the visual condition will report a higher intention to seek information about the H1N1 flu than those in the numerical or control condition.

3.1. Communication of Risk and the Impact on Attributions
Communication of risk has also been shown to affect the emotions and attitudes of those that process the numerical or visual message. In fact, positive and negative emotions trigger corresponding positive and negative risk assessments (Johnson & Tversky, 1983). Emotions can make people feel more pessimistic about the issue, which can lead to risk aversion (Hsee & Weber, 1997).

Specifically, fear leads to pessimistic judgments and risk aversion as they delve deeper into the message (Lerner & Keltner, 2000; Lerner & Keltner, 2001; Lerner, Small, & Lowenstein, 2004). If individuals have a negative disposition prior to seeing the message, they will process the message negatively (Marcus, Neuman, & MacKuen, 2000; Brader, 2006).

Therefore, depending on the emotions of participants prior to viewing the message, it may affect how the visual or numeric message is processed. Geographical location has also been shown to have an effect on perceived threat and perceived risk. Recent research (de Zwart, Veldhuijzen, Elam, Aro, Abraham, Bishop, Voeten, Richardus, & Brug, 2009) illustrated that geographical location did have an effect on perceived threat and risk of contracting SARS (Severe Acute Respiratory Syndrome). SARS originated in Asia.

During the SARS breakout, there was very little travel to Asia and they suffered similar tourism losses as Mexico did as news of the H1N1 flu pandemic broke. However, Asia is much further away than Mexico. Therefore the effects of a H1N1 flu outbreak in the United States are much more likely to occur due to its geographical location.

The H1N1 flu outbreak is said to have originated in Mexico, where the earliest cases were first identified (Cohen, 2009). Mexico is our neighbor and those in the United States recognize that the geographical distance between the U.S. and Mexico is not far. Because of this geographical closeness, Americans are likely to attribute the spread of the H1N1 flu to Mexicans migrating to the United States. Such attributions are further fueled by media reports of travel bans to Mexico (McNeill, 2009) and our Vice President suggesting people avoid traveling to...
Mexico (Saltonstall, 2009). These negative emotions may further reinforce negative attitudes some people hold towards Mexicans and immigrants as a whole.

Most individuals who are racist (i.e., those who have negative attitudes towards a specific race) usually are strong in their opinions. So, when these individuals view negative numerical or visual messages about that race, those messages should provide reinforcement of those views. Research has shown that these racist views are being transferred to negative views about immigration.

For instance, Shelton and Coleman (2009) examined racial attitudes and attitudes towards immigration after Hurricane Katrina. They found that both national and local factors influenced beliefs about Katrina evacuees. They concluded that the dynamics of race/ethnicity and negative feelings toward immigrants drove negative beliefs about those who relocated to their areas. This is similar to those immigrants coming to the United States after the H1N1 flu became extremely prevalent in Mexico. Similar research has shown that individuals that viewed media coverage regarding the aftermath of Hurricane Katrina had stronger negative racial attitudes than those that did not view the media coverage (Haider-Markel, Delehanty, & Beverlin, 2007).

Other research has assessed the association between Anglo aversion to Latinos, physical proximity to Latinos, and contact with ethnic minorities and preferences for immigration policies (Ayers, Hofstetter, Schnakenberg, & Kolody, 2009). Researchers found that attitudes about immigration may be motivated more by racial resentments than other considerations (Ayers et al, 2009).

This type of research has also been examined in Europe. Boomgaarden and Vliegenthart (2009) looked at whether news coverage of immigrants and immigration issues relates to macro-level dynamics of anti-immigration attitudes in Germany and found that both the frequency and the tone of coverage of immigrant actors in the news significantly influenced dynamics in anti-immigration attitudes.

Immigration is now becoming discussed in the literature as a racial issue. With the spread of the H1N1 flu and the influx of Mexican immigrants entering into the United States, it ultimately provides a justification for some people who already have an aversion to Mexican immigrants to maintain their negative attitudes towards Mexican immigrants.

Thus, the following hypotheses are posited regarding the relationship between numerical and visual communication of risk and attributions made regarding the spread of the H1N1 flu.

H4: Individuals in the visual condition will more likely attribute spread of the H1N1 flu to immigration-related factors (increase in Mexican immigrants, lack of border control) than those in the numerical or control condition.

H5: Individuals holding a high level social aversion toward Mexicans will more likely attribute the spread of the H1N1 flu to immigration-related factors than those holding a low level of social aversion toward Mexicans.

4. METHOD

4.1. Participants

Three hundred eighteen undergraduate students aged 18-25 (M = 19.64 years, SD = 2.40) were recruited from communication and geography classes at a large Midwestern university. They were invited to take part in the study for research credit via email and/or personal announcements in class. The current sample consisted of 113 males (35.5%) and 205 females (65.5%). The class standing composed of 184 freshmen (57.9%), 62 sophomores (19.5%), 30
juniors (9.4%), 19 seniors (6.0%) and 23 participants who skipped the question (7.2%). Approximately 75% of the sample was White, 5.7% African-American, 4.8% Hispanic, 4.8% Asian, 5.4% Alaska Native or American Indian, and 4.4% mixed. The majority of the sample was Catholic (57%) or Protestant (42%) and largely Republican (61.3%), with some Democrats (23.3%) and Independents (14.2%) comprising the group.

4.2. Experimental Design
This study utilized a 1 x 3 factorial design where 3 experimental conditions were created: A visual message condition (n = 108), a numerical message condition (n = 99) and a control message condition (n = 111). Both the visual message and numerical message conditions described the spread of the H1N1 flu using either a visual message (interactive map) or numerical message (news story) respectively. The interactive map and the news story were adopted from online news websites (e.g., New York Times, BBC) that provided coverage on the global spread of the H1N1 flu pandemic. The control message presented basic facts about the H1N1 flu (e.g., how it was transmitted from pigs to humans, what the virus is made of genetically) offered on the Centers for Disease Control and Prevention (CDC) website.

4.3. Procedures
Participants were first asked to read an informed consent screen, and after they agreed to participate in the study by clicking on the appropriate link, were directed to 1 of 3 online surveys hosted on the Survey Monkey server. Each online survey represented a different message condition. All participants were randomly assigned to 1 of the 3 experimental conditions, where they first were exposed to a specific message about the H1N1 flu, then asked to respond to a series of items assessing their general attitudes toward immigrants, aversion to Mexicans, perceived susceptibility and severity regarding the H1N1 flu, intent to seek information about the H1N1 flu, and demographic information. Finally, respondents were debriefed about the study.

4.4. Message Selection
Two different media frames depicting the spread of the H1N1 flu virus were selected for this study. For the visual message condition, participants were shown two different interactive maps that traced the spread of the H1N1 flu virus both in the U.S. and globally. Both interactive maps visually depicted H1N1 flu incidence data based on the World Health Organization’s special reports about the prevalence of the H1N1 flu (i.e., number of confirmed cases and deaths reported). One map was created by the New York Times while the other was created by the BBC. Both maps provided a visual timeline to show both the spread of the virus over time as well as its severity. Each confirmed H1N1 flu case and death were depicted on the map using different colored dots. Specifically, the map showed death tolls with black dots and expanding orange circles to indicate the severity of the spread of the H1N1 flu (i.e., to depict the magnitude of the spread of H1N1 flu). The larger the circle, the more severe the situation is for people living in a particular state and served as an effective means to manipulate susceptibility. Additionally the interactive maps also provided details tracking the H1N1 flu pandemic from the very first incident to the most recent incidents.

For the numerical message condition, two news documents describing the spread and severity of the H1N1 flu were selected for the study. Both stories were special articles published by the BBC, with the headlines: “U.S. passes million swine flu cases” (BBC News, 2009, July 27) and “Global swine flu deaths top 700” (BBC News, 2009, July 5). The former was framing the H1N1 flu pandemic numerically by including U.S. officials’ estimates regarding the number
of H1N1 flu cases expected in the next three months. In the latter report, the H1N1 flu pandemic was also communicated numerically but focused more on conveying the death toll count globally rather than just in the United States. A photo accompanied the story of Mexicans wearing masks.

For the control message condition, participants were directed to a page on the CDC website that provided a scientific definition of H1N1 (i.e., what the genetic make-up is of the H1N1 virus and how it differs from other flu strains such as the regular flu strain, the avian bird flu, and the pig flu), its contagiousness (i.e., how the virus mutated as it traveled from pigs to humans), symptoms of the H1N1 flu, and different ways to protect oneself from becoming infected (Centers for Disease Control and Prevention, 2009, August 5).

5. MEASURES

5.1. Covariates

**Political affiliation.** Participants’ political affiliation was measured with a single item, “Generally speaking, do you consider yourself a Republican, Democrat, or Independent?” It may be that because Republicans generally adopt more conservative stances on social issues such as immigration that they may be more affected by the communication used to talk about the H1N1 flu pandemic (i.e., directly related to Mexican immigrants) than Democrats or Independents.

**Attitude toward immigration.** A single item was used to assess participants’ general attitude toward immigration. The item was adopted from a study by Ward and Magoon (2008) and asked participants to describe their general views of immigrants on a scale from (0) very unfavorable to (100) very favorable.

**Aversion to Mexicans.** Using an adapted measure from Parrillo and Donoghue (2005), aversion to Mexicans was measured with a modified version of the Bogardus Social Distance Scale. Participants were asked the extent they would be comfortable having Mexican people admitted to: (a) citizenship to my country, (b) employment in my occupation, (c) my street as neighbors, (d) my club as personal chums, and (e) close kinship by marriage. They were asked to indicate their agreement by marking an X next to the appropriate items. An index was created by summing across the four items. A dummy variable was created to indicate level of Mexican aversion, with two to four items marked coded as (1) to indicate a high level of social aversion toward Mexicans and zero or one item marked coded as (0) to indicate a low level of social aversion toward Mexicans. Participants’ class standing, sex, religious affiliation, and ethnicity were also treated as covariates in the analyses.

5.2. Outcomes

**Perceived susceptibility for H1N1 flu.** Participants were asked to respond to three items measuring their level of perceived susceptibility regarding the H1N1 flu. They were asked the extent to which they were: (a) likely to get infected with the swine flu in the next 6 months if they do not get the swine flu vaccine, (b) concerned about getting infected with the swine flu in the next 6 months if they do not get the swine flu vaccine, (c) worried about getting infected with the swine flu in the next 6 months if they do not get the swine flu vaccine. The items were assessed on a 7-point Likert-type scale from (1) not at all to (7) very, and averaged across to create an index which yielded good reliability (α=.85).

**Perceived severity of the H1N1 flu.** Participants’ perceptions regarding the seriousness of H1N1 flu were assessed with three items. Specifically, the items asked: (a) how serious do you think the spread of swine flu is as a health problem, (b) how severe do you think the spread of swine flu is for people living in the U.S. and (c) how severe do you think swine flu is as a health
condition? Responses were measured using a 7-point Likert-type scale ranging from (1) not very to (7) very. Items were averaged into an index yielding good reliability ($\alpha=.89$).

**Attributions regarding spread of the H1N1 flu.** Participants were asked to respond to several items assessing their attributions regarding the spread of the H1N1 flu in the United States. Five items directly attributed the spread of the H1N1 flu in the U.S. to immigration-related factors (e.g., increase in the overall number of immigrants coming to the U.S., increase in the number of Hispanic immigrants coming to the U.S., increase in the number of Mexican immigrants coming to the U.S., ineffective control of U.S.-Mexico border, and illegal immigration). The five immigration-related attributions were averaged into an index and yielded excellent reliability ($\alpha=.96$). Individuals were asked the extent they attributed the spread the H1N1 flu to these factors ranging from (1) not at all to (7) very much.

**Intent to seek information about the H1N1 flu.** Participants were asked about their intention to seek additional information about the H1N1 flu in the next 6 months for various sources. Specifically, the items asked how likely participants intended to: (a) seek additional information about swine flu, (b) talk to a doctor about swine flu, and (c) search the Internet to learn more about swine flu in the next 6 months. The items were measured on a 7-point Likert-scale ranging from (1) not at all to (7) very likely. The three items were averaged into an index and yielded good reliability ($\alpha=.83$).

6. **RESULTS**

6.1. **Descriptive Statistics**

Prior to testing the main hypotheses, descriptive statistics were calculated for some of the key variables measured in the study, including: (a) participants’ perceived susceptibility for contracting the H1N1 flu, (b) participants’ perceived severity regarding the spread of the H1N1 flu virus, (c) extent to which individuals attributed the spread of H1N1 flu to immigration-related factors, (d) intentions to seek more information about the H1N1 flu, and (e) overall attitudes toward immigrants. A summary of the statistics is presented in

<table>
<thead>
<tr>
<th>Table 1. Means and Standard Deviations for Key Study Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Perceived susceptibility for contracting the H1N1 flu</td>
</tr>
<tr>
<td>Perceived severity regarding spread of the H1N1 flu</td>
</tr>
<tr>
<td>Attribution to immigration-factors for spread of H1N1 flu</td>
</tr>
<tr>
<td>Intent to seek additional information about H1N1 flu</td>
</tr>
<tr>
<td>Overall attitude toward immigrants</td>
</tr>
</tbody>
</table>

6.2. **Test of Hypotheses**

To test the first four hypotheses posited, four analyses of covariances (ANCOVAs) were done with perceived H1N1 flu susceptibility, perceived severity of the spread of the H1N1 flu virus, immigration-related attributions for the spread of the H1N1 flu virus, and intention to seek information about the H1N1 flu as the respective dependent variables. For all four ANCOVAs, the independent factor was the framing condition (visual, text, control) that participants were randomly assigned into. The aforementioned covariates were controlled for in the analyses. To test the last hypothesis, an ANCOVA was performed on the data set with immigration-related...
attributions for the spread of the H1N1 flu virus as the dependent variable and social aversion to Mexicans (low, moderate, high) as the independent factor.

6.2.1. Hypothesis one
The first hypothesis predicted that individuals in the visual condition will report a higher perception of H1N1 flu susceptibility and severity than those in the numerical or control condition. For H1N1 flu susceptibility, the model for the experimental conditions was significant, $F(2, 308) = 21.57, p < .001$, partial $\eta^2 = .12$, accounting for approximately 12 percent of the overall variance after controlling for covariates. Specifically, participants exposed to the visual depiction of the spread of the H1N1 flu reported significantly higher perceptions of susceptibility to the H1N1 virus than those exposed to a numerical depiction of the H1N1 flu spread or those exposed to the control message (see Table 2).

Similarly, for perceived severity regarding the spread of the H1N1 flu virus, the model for the conditions was also significant, $F(2, 308) = 18.63, p < .001$, partial $\eta^2 = .11$, accounting for 11 percent of the overall variance after controlling for covariates. Participants that saw the spread of the H1N1 virus visually reported significantly higher ratings regarding the severity of the H1N1 flu pandemic than those who only read about the spread of the H1N1 virus or those who received the control message (see Table 2). Overall, H1 was supported.

6.2.2. Hypothesis two
The second hypothesis predicted that individuals in the numerical condition will report higher perceptions of H1N1 flu susceptibility and severity than those in the control condition. Looking at the means, participants who read about the spread of the H1N1 flu virus reported significantly higher perceptions of H1N1 flu susceptibility than those exposed to the control message, but did not differ significantly from this condition with regards to perceptions of severity related to the H1N1 flu pandemic (see Table 2). Thus, H2 was partially supported.

6.2.3. Hypothesis three
The third hypothesis posited that individuals in the visual condition will report a higher intention to seek information about the H1N1 flu than those in the numerical or control condition. The model for the experimental conditions was significant, $F(2, 308) = 12.46, p < .001$, partial $\eta^2 = .08$, accounting for approximately 8 percent of the overall variance after controlling for covariates. Participants who received a message visually depicting the spread of the H1N1 flu virus across the U.S. and globally reported significantly greater intentions to seek additional information about the H1N1 flu in the next 6 months than those receiving the control message, but did not differ significantly from those exposed to a numerical message describing the spread of the H1N1 flu (see Table 2). Thus, H3 was partially supported.

6.2.4. Hypothesis four
The fourth hypothesis dealt with how different communication types (numerical or visual) of the H1N1 flu pandemic would affect people’s attributions for the rapid spread of the H1N1 virus both within the U.S. and abroad. Specifically, it was predicted that individuals in the visual condition will more likely attribute the spread of the H1N1 flu to immigration-related factors (e.g., increase in the number of Mexican immigrants moving to the U.S., lack of strong border control) than those in the numerical or control condition. The overall model for the experimental conditions was significant, $F(2, 308) = 16.07, p < .001$, partial $\eta^2 = .09$, accounting for approximately 9 percent of the overall variance after controlling for covariates. Participants who
viewed the spread of the H1N1 flu pandemic unfold via interactive maps reported significantly stronger immigration-related attributions for the rapid spread of the H1N1 virus than either individuals exposed to a numerical description of the spread of the H1N1 flu or those who received the control message (see Table 2). Interestingly, those who received a numerical description of the H1N1 flu pandemic did not report much stronger immigration-related attributions for the rapid spread of the virus compared to participants in the control condition. Based on the data, H4 was supported.

**Table 2. Adjusted Means and Standard Errors for Outcome Variables by Condition***

<table>
<thead>
<tr>
<th>Susceptibility for Contracting H1N1 Flu</th>
<th>M</th>
<th>S. E.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Visual depiction of spread for H1N1 flu</td>
<td>4.09a</td>
<td>.13</td>
<td>108</td>
</tr>
<tr>
<td>B: Numerical description of spread for H1N1 flu</td>
<td>3.37b</td>
<td>.14</td>
<td>99</td>
</tr>
<tr>
<td>C: Control (scientific description of H1N1 flu)</td>
<td>2.89c</td>
<td>.13</td>
<td>111</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Severity of H1N1 Flu Pandemic</th>
<th>M</th>
<th>S. E.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Visual depiction of spread for H1N1 flu</td>
<td>4.87a</td>
<td>.13</td>
<td>108</td>
</tr>
<tr>
<td>B: Numerical description of spread for H1N1 flu</td>
<td>4.21b</td>
<td>.13</td>
<td>99</td>
</tr>
<tr>
<td>C: Control (scientific description of H1N1 flu)</td>
<td>3.80b</td>
<td>.12</td>
<td>111</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Immigration-Related Attributions for H1N1 Flu Pandemic</th>
<th>M</th>
<th>S. E.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Visual depiction of spread for H1N1 flu</td>
<td>4.54a</td>
<td>.15</td>
<td>108</td>
</tr>
<tr>
<td>B: Numerical description of spread for H1N1 flu</td>
<td>3.73b</td>
<td>.15</td>
<td>99</td>
</tr>
<tr>
<td>C: Control (scientific description of H1N1 flu)</td>
<td>3.41b</td>
<td>.14</td>
<td>111</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intentions to Seek More Information About H1N1 Flu</th>
<th>M</th>
<th>S. E.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Visual depiction of spread for H1N1 flu</td>
<td>3.68a</td>
<td>.14</td>
<td>108</td>
</tr>
<tr>
<td>B: Numerical description of spread for H1N1 flu</td>
<td>3.22a</td>
<td>.14</td>
<td>99</td>
</tr>
<tr>
<td>C: Control (scientific description of H1N1 flu)</td>
<td>2.74a</td>
<td>.13</td>
<td>111</td>
</tr>
</tbody>
</table>

*Note: All the means were adjusted for the different covariates tested in the ANCOVA models. Within each set of means, those that are significantly different at p<.05 will not share a superscript.*

6.2.5. **Hypothesis five**

The final hypothesis predicted that individuals holding a high level of social aversion toward Mexicans will more likely attribute the spread of the H1N1 flu to immigration-related factors than those holding a low level of social aversion toward Mexicans. Controlling for the other covariates in the study, the overall model was significant, \( F(1, 310) = 32.42, p < .001, \) partial \( \eta^2 = .10 \), accounting for approximately 10 percent of the overall variance after controlling for covariates.

Specifically, individuals who hold a high level of social aversion toward Mexicans reported significantly higher attributions for the spread of the H1N1 virus to immigration-related factors (adjusted \( M = 4.46, SE = .13 \)) than those who hold a low level of social aversion toward Mexicans (adjusted \( M = 3.40, SE = .12 \)). H5 was therefore supported.
7. DISCUSSION

The purpose of this study was to examine the effects of visual versus numerical communication of the H1N1 flu pandemic on people’s perceptions regarding vulnerability in contracting the disease, severity of the pandemic in terms of its spread worldwide, attributions for the rapid transmission of this virus both within the U.S. and across the globe, and intentions to seek additional information about the H1N1 flu. Overall, the results clearly show that a visual representation of the H1N1 flu outbreak can have powerful effects on people’s perceptions, especially related to risk judgments. The findings are consistent with previous research that compared the effects of visual vs. numerical communication of similar information on assessments of personal risk (e.g., Parrott et al., 2005) finding that risk perceptions increased when a visual message was used rather than a numerical message in describing the H1N1 flu outbreak. An important implication of this finding is that campaign designers need to consider the type of “packaging” their messages are delivered in and not just think about issues. It may be that there is an interaction between the specific type of message frame used (gain/loss) and the form in which the message is delivered (visual/text) that impacts a person’s desire to engage in risk aversive versus risk seeking behaviors. This is an empirical question that future research can examine.

Moreover, it was interesting to find that a visual image (i.e., interactive maps) tracing the transmission of the H1N1 flu outbreak from its origin in Mexico to the U.S. and places abroad could also alter people’s attributions for why the H1N1 virus spread as quickly as it did over a span of a few months. Primarily, those who were exposed to the visual message of the H1N1 flu outbreak attributed the rapid spread of the virus to immigrants, in particular, the increase in the number of Mexican and Hispanic immigrants moving to the U.S., as well as to the lack of effective control of the U.S.-Mexico border, and to the increase of illegal immigration in this country. Such an attribution effect was not found among participants who were exposed to the textual frame describing the H1N1 flu outbreak.

This finding has important implications for how the media should consider coverage of not only the H1N1 flu pandemic in the near future, but other disease outbreaks as well. While the use of interactive maps as a message frame may help to more vividly and dramatically depict the severity of disease outbreaks such as the H1N1 virus, and increase the public’s perceptions of vulnerability to communicable diseases, thus motivating people to take greater precautions (e.g., washing hands frequently, using hand sanitizers), there may be a downside to using such communication.

The danger is that depending on the geographic origin of the outbreak, people from that region may be discriminated against. In our study, it was found that people who were presented with the visual message for the H1N1 flu outbreak were more likely to attribute the rapid spread of the H1N1 virus to increase in U.S. immigrants (i.e., blaming them for the H1N1 flu outbreak). Such attributions may lead some people to develop racist attitudes toward Mexicans and Hispanics.

Additionally, our study found that among those who already hold aversive attitudes toward Mexicans, framing the H1N1 flu outbreak using visual maps only reinforced their negative attitudes as these individuals reported significantly higher immigrant-related attributions for the rapid spread of the H1N1 virus compared to those received either the numerical message or a control message. So for those who already hold aversive attitudes toward a specific racial/ethnic group, framing a disease outbreak visually by tracing the geographic path of the outbreak may
further reinforce feelings of resentment and hatred toward that group if members of that racial/ethnic group are found to immigrate to regions that are part of the outbreak path.

In closing, it is important to consider the consequences of how messages are packaged for public consumption. With regards to outbreaks involving communicable diseases, while there are some good benefits to packaging the information in a visual form rather than in numerical form (e.g., just presenting statistics and facts), it must be acknowledged there are some potential drawbacks as well, in particular, how it may affect people’s attitudes toward different racial, ethnic, or cultural groups. While it is important that health campaign designers identify the most effective way to capture the attention of the audience in communicating risk information, scholars need to be wary of unintended negative consequences stemming from something as seemingly innocuous as type of communication.

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GREEN SPACES AND URBAN TOURISM DEVELOPMENT IN CRAIOVA MUNICIPALITY IN ROMANIA

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Abstract
As component of any urban system many green spaces such as parks, botanical or zoological gardens, and urban forests have a role of protection and improvement of the environmental quality standards in the cities, and are attraction poles for the inhabitants as well as for all the types of tourism (leisure, cultural, business tourism, congress and meetings tourism or mix tourism forms). However in Romania, the tourist function of green spaces is not yet considered as building the city image. After setting the framework of urban tourism and destination marketing, and the insertion of the green spaces within the urban tissue, we discuss the principles that make a place attractive for tourists. Taking the example of the town of Craiova we try to identify the green spaces that may appeal to tourists, the required characteristics for a green space to become a touristic place and how to further develop the tourist function without hindering the other functions. The case of two parks we consider remarkable and attractive from the touristic point of view is analysed from this point of view.

Keywords: urban tourism, green spaces, remarkable gardens, tourist function, destination image

1. INTRODUCTION

The renewed interest in urban tourism since the beginning of the 1980s has changed tourism trends and practices to a high degree. Therefore, the cities with a historic past and cultural heritage have become tourist attractions, visitors rushing into museums, cathedrals and castles. Heritage, whether cultural or natural, is a very popular issue nowadays. A number of sites have worked hard to get international recognition and be labelled World Heritage. The majority of sites (745 out of 962) are cultural sites. Searching the World Heritage List database for the word ‘garden’, we had a result of 102 properties (mostly gardens located in the historic centre of a city, or gardens that belong to a castle or to an already labelled site), among which none is labelled only for its garden. Such a result is not surprising in so far as gardens are either public gardens located in the city’s historic centre, as an important element of the urban morphology, or are private, belonging to an extended property that consists of a building and its surroundings usually planned as green spaces.
As statistics show, tourism is the privilege of urban areas. Many cities play the tourism card, investing a lot of money in new equipments and urban regeneration projects, in order to change the unappealing image of certain neighbourhoods and turn them into touristic targets. For many, tourism is a cornerstone of a policy of urban development that combines a competitive supply able to meet visitors’ expectations with a positive contribution to the development of towns and cities and the well-being of their residents. (EDGTU, 2000:9) Such an approach has its advantages, both for the residents and the tourists, in terms of safety and security, sanitation and salubrity, hospitality and social interaction. Tourist attraction strategies lie on promotion campaigns which present the “urban offer” (tourism resources, leisure equipments, urban environment and urban quality of life, etc.). (Vlès, Berdoulay, Clarimont, 2005:7) In this respect, promoting the image of a “green, sustainable city” has to be ensured by the existence of natural amenities (i.e. gardens and parks) and non-polluting equipments. This type of marketing builds a “narrative city”, where each place has a story to tell, a message to send. Of course, such a marketing strategy will be most effective in terms of tourist attraction, but the risk is “narrative reduction” (the construction of an impoverished image, that is based on a depleted historic background). (Vlès, Berdoulay, Sylvie Clarimont, 2005:64)

In this context, tourists have become more fastidious and look for unique experiences. New types of tourists have appeared: globe trotters, city breakers, tourists coming for niche tourism practices. Consequently, the destination marketing that has traditionally been aligned with growth oriented strategies is now changing course for a responsible marketing approach preserving the resources of a tourist destination as well as providing a high quality visitor experience. (Meredity Wray et al., 2010:24)

Accordingly, the present research analyses the potential of tourism development in Romania’s 6th important city - Craiova municipality – (fig.1), aiming at highlighting the specificities of cultural tourism, especially the potential that green spaces hold and the tourists they may attract.

Figure 1. Craiova municipality localization

We shall focus on green spaces specificity, adopting an in-depth approach to the parks and gardens with touristic potential in the Craiova municipality.

2. ANALYSIS TEMPLATE – THE INSERTION OF GREEN SPACES IN THE URBAN TISSUE

Tourism as a phenomenon raises interesting questions regarding the relationship between tourism and the city, more specifically, the urban dimension of tourism. Consequently, the quality of a
place, its status (public or private) and the touristic value it has already acquired are becoming important issues that affect the number of its visitors.

Considering destinations as dynamic places, we tried to build a spatial organizational model of the touristic space circumscribed by the urban space. Hence, the following questions arose:

- How does a place become tourist attractive? What elements make it attractive to tourists?
- How does a touristic place function? What are the relations between touristic sites and other locations?

The touristic space (fig.2) is individualized by its organization (a touristic organization in this case), achieved through distinguishable and successive planning techniques that result in a new organization, in accordance with social and touristic needs, as well as the environment carrying capacity.

![Figure 2. The chorem of the touristic space integrated to the city’s functional zoning](source: A.C. Popescu, 2011)

However, the touristic space must be considered through visitor flows, which transform the existing space, thus rearranging it according to their needs. *Through time, certain touristic polarities appear, others are reinforced, but the touristic space is clearly delimited within the city.* (MIT Research Team, 2002, cited by T. Saint-Julien, R. Le Goix, 2007:49)

Usually, the old town attracts most of the visitors flows, which are then distributed towards peripheral places, depending on the importance that peripheral sites have from a touristic viewpoint, i.e. the distance from the historic centre or the means of transport that connect the sites. Therefore, for the city’s touristic space to use its full potential, it is necessary that the touristic attraction should be conceived as an integrated visiting system of interconnected networks, with efficient public transportation. As a consequence, the sites need good logistics in terms of tourist access and reception, without which the attraction function is bound to remain theoretical.

To put it in a nutshell, the touristic phenomenon has the capacity to structure the territory, imposing a spatial organization suited to the tourist function. Consequently, the touristic space is specialized, having its own functional organization, its own shaping forces and phenomena.

### 3. VISITING GARDENS AS A LEISURE AND TOURISM ACTIVITY

The first pleasure gardens appeared in England as early as 1661. They were leisure places where people spent their time listening to music, taking part in theatrical performances or simply strolling along tree-bordered walks. (Racine, David, 1994:19)

A strong movement of garden recognition and visiting developed in Western Europe during the 20th century, when gardens became known for their cultural, as well as for their tourism resources. Great Britain, the Netherlands, France, Belgium and Italy developed trusts and associations in
charge of protection and management of historical gardens. Moreover, the associations and the authorities conducted promotion action plans with the purpose to arouse public interest in gardens (i.e. Visit an English Garden in England, Visit a Garden in France and The Garden Month in France). Gardens soon became heritage, and the Florence Charter (1981) adopted a year later by ICOMOS, strengthened this status by defining historic gardens and setting the parameters for their maintenance, conservation, restoration, reconstruction and use.

Article 1 of the Florence Charter, defines a historic garden as an architectural composition of interest to the public from the historical or artistic point of view. As such, it is to be considered as a monument. As may be seen from the definition above, the historic garden is assimilated to a monument, a natural monument more precisely, just like a landform, a geological feature or some outstanding scenery. However, being man-made, a historic garden is closer to an architectural monument. This idea is further developed in the fourth article of the Florence Charter where the characteristics of a historic garden are detailed: The architectural composition of the historic garden refers to its plan and its topography; its vegetation, including its species, proportions, color, schemes, spacing and respective heights; its structural and decorative features; its water, running or still, reflecting the sky. The mediating position of artistic gardens is also found in the fifth article “...as an expression of the direct affinity between civilization and nature [...] a testimony to a culture, a style, an age, and often to the originality of a creative artist”. Thus, the Florence Charter clearly states the heritage value of gardens and acknowledges the importance of the landscape artist who tamed the elements so that his work should be perfect and everlasting.

However, from a lexicological point of view, the word “garden” is a particularly large, ambiguous, a dreamlike term which encloses a large number of green spaces. (Racine, David, 1994:9) As the reader has observed, the literature uses the expressions: pleasure garden, historic garden, artistic garden, remarkable garden as interchangeable phrases, even if, out of context, they are not exact synonyms. For example, a pleasure garden can be considered as a historic garden only if it is a certain age and if its amusement facilities are original and cannot be found replicated elsewhere. It is the case of the Tivoli Gardens in Copenhagen, which to some extent may be considered the predecessor of the amusement parks. If historic gardens are clearly remarkable gardens, because these characteristics brought them the label of “historic garden”, gardens may be remarkable without being historic.

Moreover, the Florence Charter specifies in the sixth article that the term "historic garden" is equally applicable to small gardens and to large parks, whether formal or "landscape". Therefore we propose a typological distinction of green spaces in general and of gardens with tourism potential, before taking the Craiova municipality in Romania as our case study (see §4.1.).

3.1. Green Spaces’ Functions

Green spaces fulfill different functions within the urban system:

- An environment improvement and conservation function as they purify the atmosphere, reduce pollution and have a moderating effect over the urban microclimate;
- A social function as they create natural surroundings with relaxing effects;
- A leisure function developed as a consequence of the limited spare time of the working people who prefer to spend it in the open, but within the city or very close to it;
- An aesthetic function as their purpose is to embellish buildings and to highlight their architecture (Ana F Iliescu, 2003:91-104);
- A touristic function reflected by the number of visitors that come to such sites because they are attracted by the historic heritage of gardens and parks, design style, flora, entertainment facilities, etc.
Particularly significant to our study are the leisure, aesthetic and touristic functions of the green spaces. The touristic function, however, includes the other two, because leisure facilities and the aesthetics of a place are the main motivations that drive tourists to visit a place.

For instance, from the tourism point of view, parks and gardens can develop a touristic function because, on the one hand, they have the attributes (aesthetics, historical background, design style, landscape) that may make them tourist-attractive and, on the other hand, their surface area is large enough to allow the planning of different attraction points.

Visiting parks and gardens is a form of cultural tourism. The cultural value of parks and gardens is the result of their aesthetics, history, social and scientific importance. The development of green spaces from the touristic point of view was first supported by castle gardens and royal domains. Hence, through time, the visiting circuits of such cultural sites were conceived so as to integrate the visit of the gardens as well as the buildings.

According to the interest they generate, gardens can be classified as follows:
- Historical gardens;
- Botanical gardens;
- Landscape gardens. (Rialland, 2003:32)

As to parks, they emerged in 15th century Italy during the Renaissance. They were large green space units, usually orchards that developed into decorative parks - trees were aesthetically clipped, lawns mowed, flowers artistically arranged. Unlike a garden, a park surface area should exceed 20 ha so that the recreation infrastructures should be more diversified than in a garden. Park planning has to comply with specific planning rules. Accordingly, in recreation parks, the visitor will always find the following sections: a passive recreation section, an adults’ entertainment section, a children playground, sports grounds, historic and naturalistic sections, etc. This functional zoning is necessary to prevent different activities from overlapping and causing disturbance and overcrowding. (Filofteia Negruțiu, 1980:105-108)

The design components of parks and gardens comprise natural and artificial elements whose associations result in the visual and functional aspects of the planned area. The natural elements are landscape components (micro-landscapes, streams, swamps, meadows, rocks, soil, and vegetation), to which we add the circulation (walks and alleys), the decorative and functional constructions (terraces, pergolas, colonnades, bridges, kiosks, wharfs, restaurants, and open air theatres), outdoor furniture and sport equipments, that make use of the natural elements, highlighting some particular features: height, depth, width, etc.

Park and garden touristic exploitation can be developed via a specific offer for this form of tourism and promotion in specialized guides so that these sites become visible. The development of parks and gardens, which increases tourist awareness, is based on animations (festivals, exhibitions, fairs, etc.), organized all year round. Animations related to vegetation (flower fairs, gardening workshops and ikebana courses) are perhaps the ones that have the strongest impact on the public and are in keeping with the specificity of the green spaces. (Watkins, Wright, 2007:59) Other activities that can take place in such sites are music concerts, painting exhibitions and theatre or opera shows.

The offer for green spaces has to:
- Ensure the public’s access to the site;
- Provide reception infrastructure and touristic organization of the gardens;
- Conceive thematic circuits that offer a quality tour to the tourist;
- Introduce an integrated tourist infrastructure in parks and gardens (informative panels, maps, direction pointers, etc.);
- Present diversified tourist animations;
- Introduce light vehicles for a greater freedom of movement (bicycles, carts, segways);
- Monitor park entrances and exits;
Create a green space touristic network.

3.2. Tourists’ Attraction Towards Green Spaces

There are gardens for tourists just like there are, in every town, restaurants for tourists, places considered prestigious and ‘a must’ for those who really want to experience a city. (Sansot, 1995:82)

It is true that we tend to visit the most popular and well-known place in a destination. But, when it comes to green spaces, they are like a welcomed description passage in the urban narration. Either small squares or large gardens, they all have the same effect of relaxation upon the visitor. We can even consider them necessary from the tourists’ point of view because they offer the perfect setting for relaxing after having visited a museum.

Among green spaces, historic or remarkable gardens are by far the most visited. They are visited for pleasure, for the impact they have on one’s senses, because they satisfy people’s need for beauty. Tourists visit gardens because they are interested in plants and landscape planning or they may be looking for interesting ideas for their own garden, be interested in garden history, or want to discover the destination’s heritage in a different way (looking for the unique experience).

Even though there may be tourists with an interest for heritage gardens circuits, garden visits are also adapted to proximity tourism. Garden visit is a phenomenon generated by the urban way of life and by the fact that mineral spaces dominate within a city. Therefore, garden visit may be considered a form of ‘green’ tourism practised within the city.

In connection with the way of life, we can observe that the garden trend returns at the same time as the wish to reset one’s living space and daily practices develops. Garden visit is especially the consequence of private ownership that has been developing in the past 30 years, to which we can add ecological awareness. (Racine, David, 1994:10)

4. REMARKABLE GARDENS IN CRAIOVA IN THE LIMELIGHT OF URBAN POLICIES *

It is obvious that not all the green spaces of a city are remarkable and thus visited as such by tourists with the same motivation. The green spaces of the city centre, usually squares, fulfill the function of an “oxygen pump” within a mineral environment of concrete buildings. Such green spaces, even if not remarkable are much frequented because they are located in the neighborhood of touristic sights and offer a suitable place of relaxation. In the case of Craiova municipality, there are green spaces situated in the city centre which fulfil such a function (fig.3).

Figure 3. The territorial disposal of green spaces in the Craiova municipality
There are also parks and gardens which are historic and have the status of a monument. They are being visited by tourists because of their historic and aesthetic importance.

Lastly, there are the parks situated at the outskirts of the city that occupy a large surface and are frequented mostly during the week-end.

Other distinctions between green spaces come from their different size, degree of complexity, biological diversity, and function. In the field of territorial planning, green spaces represent a functional category in the city and its outskirts, a space occupied primarily by vegetation and secondly by facilities designed for relaxation and outdoor sports.

Planning parks and gardens is equally important for tourists and for residents. Therefore the planning vision has to combine the entertainment function and the cultural heritage. The actions of intervention in the landscape for the development of the tourist function have to take into consideration the style and the natural characteristics of the site. In order to optimally develop the entertainment and tourist functions of green spaces, we have to consider the fact that people visit parks and gardens to unwind in a natural environment, to walk or jog, to spend quality time with their friends and families, to socialize, to enjoy the view and breathe fresh air.

At the city level, the policy of developing green spaces targets not only the ecological, entertainment, social, aesthetic and tourist functions, but also the improvement of the city’s image (a city with many green spaces is considered cleaner and more pleasant to live in).

4.1. Green Spaces’ Characteristics

The surface area occupied by planned green spaces on the territory of Craiova municipality totals 680 ha. Related to the city’s population (322,000 inhabitants), each inhabitant has 21.25 m²; related to the city’s total surface area (6250ha), the surface occupied by planned green spaces is 10.88%, which is very little if we take into consideration the European Commission recommendation of three quarters of green spaces for the total intra-urban territory.

The territorial record of green spaces in Craiova (fig.4) highlights the existence of green spaces in residential areas - approximately 41% out of the total surface of planned green spaces, followed by parks 36% (243ha), and only 6% (38ha) represented by public gardens, the remaining 17% being other types of green spaces. (Development Strategy for Craiova municipality, 2006: 111-113)

![Figure 4. The territorial record of the planned green spaces of the Craiova municipality](source: A.C. Popescu, 2011, after Development Strategy for Craiova municipality, 2006)

The disposition of green spaces within a city may be intra-urban, represented by parks, gardens, squares, or extra-urban, such as recreation areas represented by forests and amusement parks. (Ciangă, Deszí, 2007). In Craiova, all the green spaces are located in the city, and on its outskirts,
but their distribution is patchy and unevenly spread on the city’s territory. On the map below (fig.3) it may be observed that the majority of green spaces are located in the city centre. In spite of the concentration of the green spaces in the centre of the city, the green space ratio is small, because of the reduced surface they occupy in comparison to the built space. These green spaces located at the centre of the city are usually squares or small parks that accompany public institutions (the City Hall and the English Park, the Prefecture and the Central Square, “Marin Sorescu” National Theatre and the National Theatre Park) and were designed to highlight the abovementioned buildings.

The parks that are located at the periphery are larger and more complex, as lakes and rich vegetation are the major components.

4.2. Parks With Tourism Potential In Craiova

In this part we chose to present in detail two parks in Craiova that hold touristic potential. We chose these two parks because their surface exceeds 20 ha and hence they have the capacity to retain the visitor’s interest for at least half an hour. Secondly, they were planned by the same landscape planner – Eduard Redont around the same time, but their evolution was very different. They were both part of the urban development politics of the beginning of the 20th century and meant to respond to the functionalist concept of Volkspark (Folk Park). (Cortesi, 2000:33) They are both situated outside the historic centre, in the south western part of the city (The Youth Park), and in the south eastern part of the city (Romanescu Park), more easily accessible. The differences between them come from a clearly more elaborated landscape planning, as well as from a development of the city in the south-eastern part rather than in the south-western part. Their roles are complementary.

The Youth Park (57ha) replaced the old, derelict and obsolete leisure area of Lunca Jiului (Jiu’s Meadow). Planned by Eduard Redont, but located in the south-western periphery of Craiova, this park was initially conceived as an urban forest. Starting from 1990, however, the area was settled by gypsies and socially stigmatized and even avoided ethnic groups. As a stage of urban reshaping and revival of the district in which it is located, it was rebuilt and opened in 2009. Now it provides children playgrounds equipped with modern urban furniture, sports grounds. But the transformation of this park is indeed remarkable, due to its landscape planning, fountains and many topiary figures (fig.5). It thus fulfils the two functions of relaxation and touristic attractiveness.

In the conscience of the inhabitants of Craiova, Nicolae Romanescu Park is one of Craiova’s oldest parks, a complex landscape plan spreading over 96 ha in 1903. It is remarkable and a heritage monument because it has kept its original landscape planning - plans and sketches (fig.6) designed by Eduard Redont and awarded the golden medal at the Exposition Universelle of 1900 in

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**Figure 5. View of the Youth Park, Craiova**

*source: A.C. Popescu, 2011*
Paris. It is one of the largest and most beautiful parks of Romania, and one of the few parks in Europe that preserves the romantic composition style it was designed in.

Figure 6. 1900 Bibescu Park (Romanescu Park former denomination) Landscape Planning

*Figure 6. 1900 Bibescu Park (Romanescu Park former denomination) Landscape Planning
Source: Romanescu Park Administration Archive*

Nowadays, out of the 96 ha total surface area of the park, 90 ha are occupied by vegetation, 4 ha by a system of lakes, the rest being occupied by a hippodrome, a velodrome, a wharf and a small zoological garden. The romantic buildings that are integrated to the park and that spotlight its romantic style are: a medieval castle, rocky groupings, rustic bridges and a suspension bridge (fig.7). A series of waterfalls connects the lakes, creating a complex hydrographical system which combines vegetation elements on the islands, hydrographical diversity and a varied fauna. It may be considered a heritage garden according to the Florence Charter and labelled as such, but for the inhabitants as for the tourists it is a “remarkable park”.

Figure 7. The suspended bridge and the castle of N. Romanescu Park

*Figure 7. The suspended bridge and the castle of N. Romanescu Park
Source: http://www.judetulolj.ro/dolj*

These two parks answer to the two criteria of being the green lung of the city as well as an attraction for both the inhabitants and the visitors.

The threats that endanger green space distribution are uncontrolled urban sprawl, pollution, land returned to its owners, which may be plots belonging to parks (it is what happened in the cases of
Conțioiu Park and Hanul Doctorului), and the change of category of the land (from a park to a supermarket). (fig.3)

5. CONCLUSIONS

The patrimonial value that a place holds is the one that determines its attractiveness. However, for a place to become touristic, it needs to be accessible, visible (with efficient road signs) and to offer enough activities so the tourist may be induced to visit it. Moreover, the marketing strategy should focus on offering a diversified touristic product, so that the tourists may have the possibility to choose and combine in different ways the touristic amenities and services offered by a given destination. That is what makes a destination competitive and market efficient, when the image created has the power to attract and transform the potential tourist into an effective tourist.

The potential of green spaces for tourism has not been exploited in Romania yet. Personally, we consider that green spaces tourism should be an important part of a destination promotion, especially in those places where gardens and parks with historic value can be found. Nicolae Romanescu Park is the example that best illustrates this statement. Its importance for Craiova is related to its social and leisure function, appreciated by the citizens who acknowledge its cultural value. Yet, its image as a cultural tourism attraction is only vaguely mentioned in some guidebooks.

Integrated to the urban green space system, together with other historic gardens and parks, N. Romanescu Park may become a decisive touristic site within cultural and thematic tourism circuits that should be promoted in Craiova. In the future, the tourism offer for Craiova will have to take into consideration the tourism function of green spaces if it intends to promote Craiova as a sustainable tourism destination.

In conclusion, the present research is a starting point for the fully-fledged analysis of the tourist function that certain green spaces may have, aiming to determine the attractive elements, the green spaces which can develop such a function and the way in which the tourist function is to be promoted. Our analysis is qualitative, based on thorough observation and documentary research and we do consider that visiting remarkable gardens is a tourism niche market that can be successfully tested by the Craiova municipality.

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ANALYSIS OF TOURISM ATTRACTIVENESS USING PROBABILISTIC TRAVEL MODEL: A STUDY ON GANGTOK AND ITS SURROUNDINGS

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Abstract:
Tourism is now one of the largest industries in the world that has developed alongside the fascinating concept of eco-tourism. The concept of tourism could be traced back to ancient times when people travelled with a view to acquiring knowledge of unknown lands and people, for the development of trade and commerce, for religious preaching and also for the sheer adventure of discovery. In fact the system of tourism involves a combination of travel, destination and marketing, which lead to a process of its cultural dimension. Gangtok as a core centre of Sikkim has potential command area over different tourist spots in East Sikkim, which are directly linked by a network of roads centering Gangtok and are perfectly accessible for one-day trips. The tourist attractions of East Sikkim are clustered mostly in and around Gangtok, the state capital. This study shows the tourism infrastructure as well as seasonal arrival of tourists in the Gangtok city and to develop the probabilistic travel model on the basis of tourist perception which will help the tourism department for the further economic development of the area.

KeyWords: Eco-tourism, command area, tourist attractions, probabilistic travel model

1. INTRODUCTION
Tourism is now one of the largest industries in the world that has developed alongside the fascinating concept of eco-tourism. The World tourism Organisation (WTO) has defined that tourism involves travelling to relatively undisturbed natural areas with the specific object of studying, appreciating and enjoying nature and its virgin flora and fauna as well as the existing cultures of the original inhabitants of the tourist centres. The concept of tourism could be traced back to ancient times when people travelled with a view to acquiring knowledge of unknown lands and people, for the development of trade and commerce, for religious preaching and also for the sheer adventure of discovery. In fact the system of tourism involves a combination of travel, destination and marketing, which lead to a process of its cultural dimension.

Sikkim state in India has been considered a potential tourist zone in the Himalayan region. It is characterised by beautiful terrains varying in altitude from lofty mountains to valley floors dissected by torrential rivers. Tista, Rangit, Lachung, Lachen, Zemu, Lhonak, Sebozung rivers divide the region into several units. The wildlife sanctuaries of the state viz. Fambong Lho,
Alpine Sanctuary, Shingba Rhododendron Sanctuary, Maenam Wild Life Sanctuary and Kanchendzonga National Park are irresistible to nature lovers. Lakes at high altitudes especially, Gurudongmar Lake, Tsomgo Lake, Khechipalri Lake, Green Lake, Memancho Lake enhance the beauty of the natural landscape [Govt. Sikkim]. Yumthang Valley, Chopta Valley, Lachen Valley comprises with variety of natural fauna which includes almost 3000 species of flowering plants, 11 species of oak, 250 species of ferns, 40 species of primulas and 350 species of medicinal plants and herbs. Moreover, Sikkim is known as the home of orchids having about 450 species both in its subtropical and temperate regions.

There is plenty of academic literature relating to tourism demand forecasting. The study of tourism demand began in the 1960s. Though 420 essays studying this object have been published from 1960 to 2002, the real development occurs until the 1980s, because more than 90% of those 420 essays are published in the 1980s and after over 80 more essays have been published in the recent five years, from 2002 to 2007. The scholars, such as Corneliu Iatu, Mihai Bulai (2011), Formica, S. and Uysul (2006) who clear up and observe the literatures just list the related literatures or study the recent ones. Among many tourism forecasting models, the generally used are the traditional quantitative and/or qualitative research methods, such as the Delphi method, the life cycle method, the econometric method, the space gravity model, and the time sequence method, etc.

Since the 1980s, the comparative study of accuracy of different tourism demand forecasting models began to appear. The scholars, such as Lovingwood, P. E., Mitchell, L. E. (1989), Popescu I., Corbos R (2010) and Shoval, N. and Raveh, A. (2004) compared the accuracies of these methods by analyzing the data of different countries. But none of the existing models is intended for Hong Kong. In addition, the international tourism forecasting model currently used is the time sequence method. Though the time sequence is believed to be the most practical forecasting method of tourism, it can only predict the future growth or decrease of the tourist number and cannot interpret the causing factors. So the enterprises or the official tourism department cannot take the targeted measures to promote the growth of tourists.

It has been studied that, tourist are prefer Gangtok city to start their travel origin for the basic transport, lodging, tour information etc. facilities. Most of the time tourist spent their time to acclimatise with the alpine climate and necessary tourist information. Within this short time of two to three days, tourists travel the surrounding places of Gangtok. In this study, an attempt has been made to perceive their travel preferences in and around Gangtok city.

1.1. Study Area
Gangtok, the state capital of Sikkim is ideally located from the tourist point of view. During the past few years there had been a regular growth in the number of tourists, visiting the state which increased to 41,000 in 1985 and gradually culminated in 2, 25,500 in the year 2005 [C. Iatu and M. Bulai, 2011; ]). It may be due to the disturbances in Kashmir, Darjeeling and the hill town Shillong, which are the other important tourist centres of India. Since 1995 there has been an avalanche of tourists not only in Gangtok but also in many of the other potential tourist centres of Sikkim mainly centering on Gangtok as the nodal point which provides the maximum amount of information about (i) transport networks radiating to different tourist spots, (ii) administrative facilities required for permission to visit the remote, isolated and border areas, (iii) statistical information pertaining to the development of tourism, (iv) historical or evolutionary records of different tourist places and (v) foreign exchange facilities [2]. As a result it is expected that in the next 20 years the number of tourists visiting Gangtok would increase by at least 10,000 per year (Master plan for Gangtok, 2020-UD & HD, Government of Sikkim).
Gangtok as a core centre of Sikkim has potential command area over different tourist spots in East Sikkim, which are directly linked by a network of roads centering Gangtok and are perfectly accessible for one-day trips. The tourist attractions of East Sikkim are clustered mostly in and around Gangtok, the state capital. The town spreading from Talangchang to Bhurtuk along the western slopes of the hills is located at the altitude of 1200 meter to 1700 meter.

In the north of Gangtok town there are hills, which gradually gain their altitude leading up to the ranges of the Kanchendzonga, which are towards the north west of Gangtok and the third highest mountain of the world. Trade and commerce are the most important functional linkages between Gangtok and its neighbouring regions. As a result, the entire state of Sikkim depends on Gangtok to meet its economic requirements. Gangtok, as base town offers the best infrastructural facilities to visiting tourists.

The tourist attraction in Gangtok can be classified under (i) natural sightseeing, (ii) monasteries, (iii) sanctuaries of different kinds viz., alpine and wildlife sanctuaries, (iv) manmade sightseeing and (v) cultural and historical places. The tourist attraction places of Gangtok and its surroundings are shown in Table 1.
Table 1. Classification of tourists’ attraction to Gangtok and its surroundings.

<table>
<thead>
<tr>
<th>Natural Sight Seeing</th>
<th>Monasteries</th>
<th>Sanctuaries</th>
<th>Man Made Sight Seeing</th>
<th>Cultural and Historical Attraction</th>
</tr>
</thead>
</table>

1.2. Objectives
The following objectives have been set for the study:
1. To assess the tourism infrastructure in the Gangtok city,
2. To find out the nature of seasonal arrival of tourists in Gangtok city and
3. To develop the probabilistic travel model on the basis of tourist perception.

2. MATERIALS AND METHODS

The study is based on the primary data collected through the intensive field survey among the Indian as well as Foreigner tourist of Gangtok city. The primary information is supplemented with secondary data whenever is needed. Distance of different tourist’s attraction places from Gangtok has been collected from SNT Taxi Stand of Gangtok.

2.1. Sample Design and Data Collection
In order to make a proper questionnaire, primarily a pilot survey has been done to find out the most attractive places of the tourists came to Gangtok. With the help of pilot survey 15 places have been identified as most visited by the tourist. A Likert scale has been developed and sample has been collected through a detailed questionnaire. The tourists have been asked to give points which ranges 1 (denote lowest attractiveness) to 7 (denote highest attractiveness). The entire field survey was conducted during March-May, 2012 and collected data have been analysed.

2.2. Adoption of Statistical Techniques
For the purpose of the present study both qualitative and quantitative methods have been adopted. However, in quantitative analysis both simple and standard statistical techniques have been used to infer the facts.

- Primarily utility of tourism product has been measured with the help of following formula:
  \[ U_j = \frac{S_j}{D_{ij}} \]  
  where, \( U_j \) is Utility of Tourism Product Measure, \( S_j \) is Some Measures of Attractiveness of Destination J and \( D_{ij} \) is Distance between Starting Point and Tourist Destination.
After having the tourism product measure, Probabilistic Travel Attitude [1] of Tourists has been analysed with the help of following formula:

\[ P_{ij} = \frac{U_j}{\sum U_j} \]  

\[ P_{ij} \] is measures of Probabilistic Travel Attitude of Tourists.

3. FINDINGS AND ANALYSIS

In order to fulfill the objectives hotel owners, travel agent, tourists (domestic and foreign), taxi driver and local people have been selected for purposive sampling. The information regarding infrastructural facilities, probabilistic travel plan were ensured through field investigation. The entire field survey was conducted during March-May, 2012 and collected data (Table 2) have been analysed.

Table 2. Sample size (in field investigation) of the study

<table>
<thead>
<tr>
<th>Place</th>
<th>Hotel</th>
<th>Lodge</th>
<th>Travel Agent</th>
<th>Tourist</th>
<th>Taxi Driver</th>
<th>Local People</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Gangtok</td>
<td>38</td>
<td>21</td>
<td>59</td>
<td>107</td>
<td>56</td>
<td>163</td>
<td>26</td>
</tr>
</tbody>
</table>


3.1. Tourism Infrastructure in the Gangtok City

Tourism infrastructure comprises mainly a number of good hotels, well connected to different tourist spots, a transport network, health units, marketing etc. to promote the growth and development of tourism.

Table 3. Types of hotels in Gangtok City.

<table>
<thead>
<tr>
<th>Room Type</th>
<th>Grade A</th>
<th>Grade B</th>
<th>Lodges</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Room / Dormitory (Gr. B)</td>
<td>17</td>
<td>137</td>
<td>57</td>
<td>211</td>
</tr>
</tbody>
</table>

Source: Sikkim Tourism, Govt. of Sikkim.

Total length of roads inside the town is estimated to be 28 km covering 19.3 percent of the total developed area. Incidentally, the road density is higher in Gangtok in comparison to other state capitals of India. The composition of traffic in this area mostly constitutes of private cars and taxis. Thirty percent of this composition is private cars, 40 percent comprises taxi movements, which act as para transits and public modes in Gangtok. Bus constitutes only 3 percent of the traffic movement.

Table 4. Types of hotels in Gangtok City.

<table>
<thead>
<tr>
<th>Room Type</th>
<th>Maximum Tariff (in Rs.)</th>
<th>Minimum Tariff (in Rs.)</th>
<th>Average Tariff (in Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Room / Dormitory (Gr. B)</td>
<td>400</td>
<td>75</td>
<td>194</td>
</tr>
<tr>
<td>Single/ Standard (Gr. B)</td>
<td>475</td>
<td>100</td>
<td>272</td>
</tr>
<tr>
<td>Double/ Deluxe (Gr. A)</td>
<td>850</td>
<td>200</td>
<td>491</td>
</tr>
<tr>
<td>Suites (Gr. A)</td>
<td>2900</td>
<td>600</td>
<td>1410</td>
</tr>
</tbody>
</table>

Source: Sikkim Tourism, Govt. of Sikkim.
It has been observed during past few years that motor vehicles, especially two wheelers and goods carriers registered a high growth rate over other vehicles [17]. The private/ government vehicles have increased from only 47 in 1979-80 to 4189 in 1995-96 (Motor Vehicles Dept., Govt. of Sikkim) registering a growth rate of 32.3 percent.

There are many travel agents/ tour operators in Gangtok. They organize tours in different places of interest under a number of package tours in the following circuits:

(i) Gangtok-Tsomgo (Chhangu Lake) Circuit,
(ii) Gangtok – Rumtek Circuit and some other local trips offering under three points, five points and seven points one day trip for sightseeing.

Incidentally, Gangtok is the headquarters of TAAS (Travel Agent Association of Sukkim), which promotes tourism in the state.

From the local field survey it has been observed that Gangtok has a tremendous potentiality for carrying the burden of 70 percent of hotel industry in the state with facilities of well connected roads, transports, banking, booking centers of air ways, railways and distant bus journeys, medical facilities and some administrative facilities that are extended to the tourists. Both domestic and foreign tourists are required obtain a Restricted Area permit (RAP), an entry pass and a Protected Area Permit (PAP). RAP is required to visit Tsomgo Lake in East, Shighik, Yumthang, Thangu in North. PAP is required to visit Dzongri area and Yuksum in the West. Gangtok as a state capital town provides marketing opportunities for the local cottage industries viz. carpets, mask, various kind of ladies’ bags, brassware, woolen garments, Thanka paintings (traditional art) etc.

3.2. Seasonal Arrival of Tourists in Gangtok City

Both domestic and foreign tourists usually visit Gangtok from March to May during the summer season. The second peak season of the year is October for domestic tourists with a flow of 13.2 per cent, whereas for foreign tourists the month of October and November are the peak season for their tour to Gangtok representing a flow of 16.4 per cent and 12.2 per cent respectively.

3.3. Probabilistic Travel Model

Probabilistic travel model is an approach to study the nature and preferences to different tourist spots of the domestic and foreign tourists. Basically from domestic and foreign tourist perspective it has been found from the survey that, the preferences to different tourist spots are different. Therefore, the structural forecasting method is needed to interpret the factors affecting the increase or decrease of tourists.

This study hope by analyzing the factors to tourists of Gangtok and its surroundings will open new vision to the research in this field. Both domestic and foreign tourists preferred Tsomgo Lake and Nathula Pass for its natural picturesque beauty.

Every tourist enjoys the travel route to Tsomgo Lake. During April-May of every year this route is full of Rhododendron (State Flower) of different colours. Though the value of Pij becomes very low for Tsomgo Lake (2.53) and Nathula Pass (1.64), it is basically also depend on distance. According to Likert scale highest value according to preferences goes to Tsomgo Lake (6.85) and Nathula Pass (6.23).
Table 5. Probabilistic travel model of domestic and foreign tourists.

<table>
<thead>
<tr>
<th>Tourist’s Attraction Place</th>
<th>$D_{ij}$ (km.)</th>
<th>$S_j$</th>
<th>$U_j$</th>
<th>$P_{ij}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tsomgo Lake</td>
<td>40</td>
<td>6.85</td>
<td>0.17</td>
<td>2.53</td>
</tr>
<tr>
<td>2. Nathula Pass</td>
<td>56</td>
<td>6.23</td>
<td>0.11</td>
<td>1.64</td>
</tr>
<tr>
<td>3. Tashi View Point</td>
<td>8</td>
<td>5.89</td>
<td>0.74</td>
<td>10.88</td>
</tr>
<tr>
<td>4. B2 Water Falls</td>
<td>21</td>
<td>4.45</td>
<td>0.21</td>
<td>3.13</td>
</tr>
<tr>
<td>5. Rumtek Monastery</td>
<td>24</td>
<td>5.83</td>
<td>0.24</td>
<td>3.59</td>
</tr>
<tr>
<td>6. Enchey Monastery</td>
<td>3</td>
<td>2.32</td>
<td>0.77</td>
<td>11.43</td>
</tr>
<tr>
<td>7. Fambong-Lho WLS</td>
<td>25</td>
<td>3.72</td>
<td>0.15</td>
<td>2.20</td>
</tr>
<tr>
<td>8. Ganesh Tok</td>
<td>7</td>
<td>3.52</td>
<td>0.50</td>
<td>7.43</td>
</tr>
<tr>
<td>9. Hanuman Tok</td>
<td>12</td>
<td>3.76</td>
<td>0.31</td>
<td>4.63</td>
</tr>
<tr>
<td>10. Zoological Garden</td>
<td>8</td>
<td>4.72</td>
<td>0.59</td>
<td>8.72</td>
</tr>
<tr>
<td>11. Deer Park</td>
<td>5</td>
<td>2.11</td>
<td>0.42</td>
<td>6.24</td>
</tr>
<tr>
<td>12. Sramsa Garden</td>
<td>14</td>
<td>3.02</td>
<td>0.22</td>
<td>3.19</td>
</tr>
<tr>
<td>13. Do-Drul Chorten</td>
<td>5</td>
<td>1.92</td>
<td>0.38</td>
<td>5.68</td>
</tr>
<tr>
<td>14. Tibetology</td>
<td>6</td>
<td>1.32</td>
<td>0.22</td>
<td>3.25</td>
</tr>
<tr>
<td>15. Handicraft House</td>
<td>3</td>
<td>2.01</td>
<td>0.67</td>
<td>9.90</td>
</tr>
<tr>
<td>16. Flower Show</td>
<td>4</td>
<td>4.21</td>
<td>1.05</td>
<td>15.56</td>
</tr>
</tbody>
</table>

$\sum U_j = 6.77$ --------

Source: Computed by Author based on Field Survey.

According to tourists perception characteristics of some of the tourist points are given below:

Table 6. Attractiveness of some of the tourist points perceived by domestic and foreign tourists.

<table>
<thead>
<tr>
<th>Tourist Points</th>
<th>Attractiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tsomgo Lake</td>
<td>The lake remains frozen during the winter months. The lake located at a high altitude and attracts its air of blissful tranquility.</td>
</tr>
<tr>
<td>2. Nathula Pass</td>
<td>Located on the border between India and China in the Tibetan Plateau. It remains open only on Wednesday, Thursday, Saturday and Sunday. Due to this the tourist has lesser chance to visit this place.</td>
</tr>
<tr>
<td>3. Tashi View Point</td>
<td>Situated along the North Sikkim Highway, only 8 kms. away from Gangtok. From this point both Mt. Kanchendzonga and Mt. Sinialchu are clearly visible.</td>
</tr>
<tr>
<td>4. Rumtek Monastery</td>
<td>The Rumtek Monastery is the seat of Gyalwa Karmapa, head of the Kargyupa sect of Tibetan Buddhism, which has 300 centres worldwide. The original Rumtek Monastery was built by the fourth Chogyal in 1730 A.D. The monastery is located on the hill top above about 24 kms. away from Gangtok. The Rumtek Monastery is the replica of the Chhofuk Monastery in Tibet.</td>
</tr>
<tr>
<td>5. Fambong-Lho WLS</td>
<td>It is located at a distance of about 25 kms. from Gangtok with an area of 51.75 sq.kms. covered by thick vegetations of Oak, Katus, Kimbu, Champa, thick bamboo forests and ferns. The sanctuary is the home to a large number of wild orchids, rhododendrons etc. The best seasons for tourists are April to May and October to December. Wild animals and Himalayan birds are found in this sanctuary.</td>
</tr>
<tr>
<td>6. Zoological Garden</td>
<td>It is known as Bulbulay and is situated about 8 kms. from Gangtok covering an area of about 205 hectares.</td>
</tr>
</tbody>
</table>

Source: Field Survey.
A circuit completes the local sightseeing of 5 points or 7 points and the domestic tourist are very much enjoying this tourist spots. Rumtek Monastery, Enchey Monastery, Zoological Garden, Tibetology, Tashi View Point, Hanuman Tok, Ganesh Tok etc. are the important spots have been point out by the domestic tourist. Flower show, Directorate of Handicraft and Handloom House, Lal Market are the local sights within the Gangtok city and tourists can easily access those points by walking.

4. CONCLUSION

Gangtok as the state capital of Sikkim has a historical background and is influenced by the traditional ethnic culture of the Sikkimese. After 1975, when Sikkim was merged with India as 22nd state, the state opened out to the domestic tourists. During the survey it has been observed 90 percent of the domestic tourists were from west Bengal and the remaining 10 percent were from other states of the country. As a result, Gangtok has now become a cosmopolitan city, which has inculcated a mixed Indian culture in terms of language, food habits, dress etc. The regular influx of population of different cultures has helped to form a cosmopolitan nature in Gangtok and its influence has also been marked on the different tourist centres of the state. Though the tourist centres are under the command of Gangtok, the nodal point of tourism in the state, if the development of infrastructure for each district is individually considered, each of these tourists’ centres could become nodal point of tourism for their respective districts, bringing the other tourist spots of the district under command of district headquarters [Govt. of Sikkim]. In such a way the state capital, Gangtok would able to maintain a sustainable growth in tourism through the process of eco-tourism without disturbing the bio-diversity in and around Gangtok. During the survey domestic and foreign tourists have offered their following suggestion:

- Bagdogra airport should be declared as an International Airport.
- Upgradation of the existing reservation counter to a full-fledged reservation centre and not just an out station agency is necessary.
- Improvement and proper maintenance of the NH 31A should be undertaken.
- Sikkim should be declared as a transit area between India and China for tourists for which Nathula in the east and Katao in the north districts of Sikkim can be turned into transit points. This will also revive the age-old trade routes between two countries and also improve bilateral relations.
- Sikkim should be publicized as an international tourists’ heaven.
- During the peak seasons of tourism, local products, especially handicrafts could be intensively marketed to attract both domestic and foreign tourists.
- According to tourists, Gangtok should not be allowed to get as overcrowded as Darjeeling.
- Construction of multistoried buildings on the hill slopes should be stopped immediately since it has been declared as a seismic zone.

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GEOGRAPHY IN THE ORGANIZATIONAL STRUCTURE OF ACADEMIC INSTITUTIONS – SELECTED ISSUES

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Abstract
The goal of this article is to indicate the position that geography occupies within the organization structure of universities in given countries and to provide an overview of the research of research that predominated in the institutions and departments connected to geography in these universities. Separately, I draw attention to the structure of geographical institutions in Poland and identify the most serious institutional and organizational issues that hamper their effectiveness and development. The results seem to point to a process of gradual disintegration of the field. Research teams in the area of physical geography are clearly drifting towards the “hard sciences”, and within them, particularly the natural sciences, while research agendas that deal with socio-economic geography are strongly leaning towards the humanities. The link between physical geography and its related fields of study (geology, ecology, geophysics), however, seems to be the prevalent one, which explains the increasingly interdisciplinary nature of research teams handling modern-day environmental problems. Finally, an overview of institutes of geography has established that these typically fall under departments of natural sciences rather than social sciences or the humanities.

Keywords: Geography, institutes of geography, physical geography, human geography, research agendas

1. INTRODUCTION

A cursory look at the world of contemporary science reveals a dual tendency that permeates it. On the one hand, research is becoming increasingly specialized; on the other, complex interdisciplinary studies realized by a diverse team of researchers have seen increased prominence and importance. The specificity of research is a growing tendency, but the conclusions are to respond to broad, sweeping questions. New scientific fields are being created, constituting a hybrid of already existing fields (Dogan 1996). It is becoming increasingly difficult to classify the sciences (classic typologies are, today, primarily of historical interest) as well as to define the extent of research areas. All this brings about organizational problems pertaining to the activities of academic structures, the organization of research, the realization of research projects, awarding academic titles etc. One can have the impression that the organizational structures of science can no longer keep up with the dynamic development of science itself.

This general current of specialization, diversification and hybridization also swept geography along. Today, it is a challenge to delineate the discipline’s thematic boundaries, which have
been clearly widened, while at the same time part of its traditional repertoire of topics has been claimed by other disciplines, both classical (geology, economics, sociology, ecology) and contemporary (tourism, land management). Parallel to this, a discussion is underway regarding the state of the field as well as its future. Lisowski (2011) points out that geography is losing its essence, as “space”, “environment” and “region” become keywords in other areas. He also quotes two prominent British geographers, whose contrasting opinions either liken the state of contemporary geography to the Great Fire of Rome (Hamnett 2003) or see the future in brighter colors (Thrift 2002).

An interesting topic for discussion that is intimately connected with the trends described above is the institutional and organizational status of geography. One of the strands in this active discussion is the question of the organizational and research structure of research centers dedicated to geography. Admittedly, however, this topic is rarely touched upon in the literature on the subject, and when it is, it typically accompanies broader considerations on the education system and geography’s place in it (Dawson, Hebden 1984; Haigh 1982; Johnston, Sidaway 2007; Hardwik 2001; Murphy 2007) or the role of contemporary geography as a science (Clifford 2002; Pitman 2005; Johnson 2003, 2006; Thrift, Walling 2000; Thrift 2002; Turner 2002). Pitman (2005), for instance, argues that the present education system produces physical geographers who lack fundamental knowledge in economics as well as social geographers with little background or experience in the physical sciences. Clifford (2002), in turn, claims that in British and American universities, geography has been removed from the “mainstream” of academic fields, and we can expect this tendency to be exacerbated in the future. As far back as the 1980s, Haigh (1982) and Smith (1987) were already alerting the academic community about the crisis of geography at American universities. Nevertheless, Murphy (2007) counters that recent years have strengthened the institutional position of geography at the same institutions. Hardwick’s (2001) previous research was along the same lines, indicating the increase in the number of students of geography at universities in the United States. In Poland, similar studies are focused around three main issues: the development of a combined research- and teaching-focused faculty (Czyż 2002; 2008); the institutional and organizational conditions surrounding the evolution of geography (Kamiński 1996; Liszewski, Łoboda 2008; Matczak 2008); and the assessment of the revel and usefulness of research being conducted in academic institutions (Bajerski 2008; Bański 2011).

The examples above illustrate the point that the place of geography in the institutional structure of universities and the diversification of the system of organizing geographical research agendas are interesting topics for investigation, and can help us draw conclusions that will lead to broader reflections. It is therefore pertinent to ask the following questions: how diverse is the organization of geography in universities in different countries and what is the thematic range of the institutions of advanced geographical research that are active there? Answering these question is the fundamental goal of this analysis.

Polish institutions in particular are singled out and discussed separately in this paper. Based on this overview, I have outlined several problems, both institutional and organizational, that geography struggles with in Poland.

### 2. SELECTION OF GEOGRAPHICAL INSTITUTIONS

According to the Geography Departments Worldwide database (http://univ.cc/geolinks), in 2012 there were 940 active academic institutes operating on different levels (from faculties to institutes and departments) worldwide1. The majority is located in the United States (233),

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1 In total, the database comprises 9052 institutions of higher education (academies, universities, universities of technology etc.).
followed by Germany (82), Great Britain (78), Canada (58) and Brazil (28). An analysis of research areas in each geographical unit brings up three main subfields that most of these areas fall into (human geography: 745 institutions, physical geography: 671 institutions, GIS and cartography: 703 institutions).

However, these data should be examined with a caveat in mind. For certain countries, the database treats geographical units (institutes, departments, teacher training schools) operating within the same institution separately. Additionally, for the United States, the database includes all types of schools – that is, both universities and colleges, of which the latter typically limit themselves to imparting education and can award Bachelor’s degrees at most.

![Figure 1. Countries with the largest number of schools that include subunits dedicated to the study of geography, according to Geography Departments Worldwide, 2012](http://univ.cc/geolinks), accessed 8 March 2013

The selection of geographical institutions to around which to structure this study was carried out on two levels: first I isolated six countries, and subsequently I examined five universities in each. I was interested in countries that are commonly considered to belong in the “top tier of geographical studies”. The specific selection was made using the h-index (Hersch index)\(^2\) derived from the SCImago\(^3\) database (www.scimagojr.com) for works in the areas of Geography, Planning and Development that were published between 1996 and 2010. Consequently, I chose the United States, Great Britain, Canada, the Netherlands, Australia and Germany.

These countries are in the vanguard in terms of both number of works cited and number of citations (Table 1). Two small sovereign Asian territories – Hong Kong and Singapore – enjoy a relatively high ranking, undoubtedly a consequence of their strong association with British geography.

In selecting universities for the study, I was guide by the Academic Ranking of World Universities (www.shanghairanking.com), whose criteria include quality of teaching, quality of teaching Staff and research results. I made the assumption that geographical units attached

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\(^2\) The h-index is used to measure the academic productivity and impact of scholars by based on the number of published papers and number of citations they have received in other works.

\(^3\) The SCImago database comprises 448 titles in the areas of geography, planning and development.
to high-ranking universities are also among the top schools in their field in the country in question. We can also surmise that these research centers also play an important role on a global scale. In other words, such centers reflect the contemporary themes and “hot topics” of world geography, pioneer new research agendas and pave new pathways, and their faculty are among the most active in research and the dissemination of its results.

That said, not all of the most prestigious institutions have a school or institute of geography within their organizational structure (Table 2). Also, in some cases, geography may be a subject of research or study in academic units with a wider focus, but not form the cornerstone of a separate institute. My analysis is limited to those universities that include precisely defined geographical units that focus primarily on geography4.

Table 1. Ranking of countries by h-index based on the SCImago database in the Geography, Planning and Development category for 1996-2010

<table>
<thead>
<tr>
<th>Rank (h index)</th>
<th>Country</th>
<th>h index</th>
<th>Number of works cited</th>
<th>Number of citations</th>
<th>Citations per publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Great Britain</td>
<td>87</td>
<td>18 605</td>
<td>122 607</td>
<td>7.25</td>
</tr>
<tr>
<td>2</td>
<td>United States</td>
<td>87</td>
<td>26 779</td>
<td>132 994</td>
<td>5.75</td>
</tr>
<tr>
<td>3</td>
<td>Canada</td>
<td>54</td>
<td>5 678</td>
<td>31 396</td>
<td>6.39</td>
</tr>
<tr>
<td>4</td>
<td>The Netherlands</td>
<td>41</td>
<td>2 919</td>
<td>15 613</td>
<td>6.22</td>
</tr>
<tr>
<td>5</td>
<td>Australia</td>
<td>40</td>
<td>5 546</td>
<td>23 176</td>
<td>5.24</td>
</tr>
<tr>
<td>6</td>
<td>Germany</td>
<td>39</td>
<td>5 715</td>
<td>17 245</td>
<td>3.32</td>
</tr>
<tr>
<td>7</td>
<td>China</td>
<td>35</td>
<td>4 110</td>
<td>12 336</td>
<td>3.79</td>
</tr>
<tr>
<td>8</td>
<td>Sweden</td>
<td>35</td>
<td>1 478</td>
<td>8 784</td>
<td>7.16</td>
</tr>
<tr>
<td>9</td>
<td>France</td>
<td>34</td>
<td>5 091</td>
<td>11 057</td>
<td>2.39</td>
</tr>
<tr>
<td>10</td>
<td>Hong Kong</td>
<td>34</td>
<td>1 173</td>
<td>7 557</td>
<td>7.45</td>
</tr>
<tr>
<td>11</td>
<td>Belgium</td>
<td>32</td>
<td>1 243</td>
<td>6 158</td>
<td>7.88</td>
</tr>
<tr>
<td>12</td>
<td>Switzerland</td>
<td>32</td>
<td>1 294</td>
<td>5 954</td>
<td>5.54</td>
</tr>
<tr>
<td>13</td>
<td>Spain</td>
<td>32</td>
<td>2 383</td>
<td>6 339</td>
<td>3.74</td>
</tr>
<tr>
<td>14</td>
<td>New Zealand</td>
<td>32</td>
<td>1 078</td>
<td>6 134</td>
<td>6.92</td>
</tr>
<tr>
<td>15</td>
<td>Singapore</td>
<td>29</td>
<td>904</td>
<td>5 113</td>
<td>6.61</td>
</tr>
<tr>
<td>16</td>
<td>Italy</td>
<td>28</td>
<td>1 982</td>
<td>6 441</td>
<td>4.38</td>
</tr>
<tr>
<td>17</td>
<td>Denmark</td>
<td>26</td>
<td>1 069</td>
<td>5 416</td>
<td>6.52</td>
</tr>
<tr>
<td>18</td>
<td>Japan</td>
<td>26</td>
<td>2 551</td>
<td>5 240</td>
<td>2.43</td>
</tr>
<tr>
<td>19</td>
<td>Norway</td>
<td>26</td>
<td>1 248</td>
<td>4 903</td>
<td>4.52</td>
</tr>
<tr>
<td>20</td>
<td>South Africa</td>
<td>25</td>
<td>2 128</td>
<td>6 764</td>
<td>3.66</td>
</tr>
</tbody>
</table>

Source: own elaboration based on the SCImago database (http://www.scimagojr.com/)

The base sources of information were the websites of the respective academic institutions. In some cases, relevant literature and other online sources were used to supplement the information. In obtaining data for Germany and Dutch universities, the English language versions of each university’s website was the source of choice in most cases.

The grand majority of world universities has an English language version, but it typically contains much more scarce information than the original.

4 I disregarded this rule in the case of two Australian universities (the University of Sydney and the University of Western Australia), where geography is represented by research teams that number approximately between a dozen and 19 researchers working within the scope of interdisciplinary institutes. They carry out independent geographical research, but the organizational structure of their host institution does not reflect this, as there is no independently operating geographical research center.
Table 2. Institutions of higher education according to the Academic Ranking of World Universities 2011 (institutions with working geographical subunits are underlined)

<table>
<thead>
<tr>
<th>National rank</th>
<th>United States</th>
<th>Great Britain</th>
<th>Canada</th>
<th>The Netherlands</th>
<th>Australia</th>
<th>Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>University</td>
<td>University</td>
<td>University</td>
<td>University</td>
<td>University</td>
<td>University</td>
</tr>
<tr>
<td>1 Harvard University</td>
<td>University of Cambridge</td>
<td>University of Toronto</td>
<td>Utrecht University</td>
<td>University of Melbourne</td>
<td>Technical University Munich</td>
<td>47</td>
</tr>
<tr>
<td>2 Stanford University</td>
<td>University of Oxford</td>
<td>University College London</td>
<td>McGill University</td>
<td>Radboud University Nijmegen</td>
<td>University of Queensland</td>
<td>54</td>
</tr>
<tr>
<td>3 Massachusetts Institute of Technology</td>
<td>Imperial College of Science, Technology and Medicine</td>
<td>University of Alberta</td>
<td>University of Sydney</td>
<td>University of Sydney</td>
<td>University of Gottingen</td>
<td>62</td>
</tr>
<tr>
<td>4 University of California, Berkeley</td>
<td>McMaster University</td>
<td>University of British Columbia</td>
<td>University of Amsterdam</td>
<td>University of Amsterdam</td>
<td>University of Gothenburg</td>
<td>86</td>
</tr>
<tr>
<td>5 Princeton University</td>
<td>University of Manchester</td>
<td>University of Melbourne</td>
<td>McGill University</td>
<td>University of Melbourne</td>
<td>102-150</td>
<td>86</td>
</tr>
<tr>
<td>6 Columbia University</td>
<td>University of Edinburgh</td>
<td>University of Melbourne</td>
<td>VU University Amsterdam</td>
<td>Monash University</td>
<td>University of Frankfurt</td>
<td>100</td>
</tr>
<tr>
<td>7 University of Chicago</td>
<td>King’s College London</td>
<td>The University of Calcutta</td>
<td>Delft University of Technology</td>
<td>University of New South Wales</td>
<td>University of Pittsburg</td>
<td>102-150</td>
</tr>
<tr>
<td>8 Yale University</td>
<td>University of Bristol</td>
<td>University of Waterloo</td>
<td>Erasmus University</td>
<td>Macquarie University</td>
<td>University of Münster</td>
<td>102-150</td>
</tr>
<tr>
<td>9 University of California, Los Angeles</td>
<td>University of Nottingham</td>
<td>University of Wuerzburg</td>
<td>University of Adelaide</td>
<td>University of Edinburgh</td>
<td>University of Edinburgh</td>
<td>102-150</td>
</tr>
<tr>
<td>10 Cornell University</td>
<td>University of Sheffield</td>
<td>Laus University</td>
<td>University of Maastricht</td>
<td>Flinders University</td>
<td>University of Würzburg</td>
<td>102-150</td>
</tr>
</tbody>
</table>


To enrich the study, expand the material for analysis and facilitate comparison, similar breakdowns of chosen universities in Spain (University of Barcelona, University of Alcala, University of Sevilla, University of Salamanca), Russia (Lomonosov Moscow State University, Irkuck University, Saint-Petersburg State University, Far Eastern Federal University) and Japan (Tokyo Metropolitan University, University of Tsukuba, University of Hiroshima, Nagoya University) were made.

In line with the aforementioned criteria for selection, the research centers associated with these countries are not among the “cream of the crop” on a global level. However, Spanish, Russian and Japanese geographers are highly active in international structures and circles and represent a very diverse set of cultures, which may make the results of my research “more attractive”.

Typically universities simultaneously teach, train and conduct research. The majority also makes it possible to enroll in a doctoral program. In very broad terms it can be assumed that
the available degrees and courses are illustrative of the particular research specialization each institution has. However, my focus is the place of geographical institutions within the organizational structure of selected universities and their primary research agendas. I do not consider specific majors or forms of instruction and imparting education.

3. GEOGRAPHY IN THE ORGANIZATIONAL STRUCTURE OF UNIVERSITIES

3.1. United States
Most top American universities do not have independent units dedicated exclusively to the study of geography, but geography accompanies other fields of study in interdisciplinary teams (e.g., at Princeton University, Stanford University and Columbia University). Harvard University no longer conducts any geographical research whatsoever; the research center closed its doors in 1948, raising controversy and sparking an intense debate (Smith 1987). The research at Stanford University primarily revolves around environmental topics (climate dynamics, changes in land use, pollution, the water balance in the context of food policy and security).

Similar examples can be found in other prominent American institutions; for instance, at the Massachusetts Institute of Technology, geographers participate in research that examines global climate change, while at Columbia University, climate change is supplemented with biogeography and paleogeography in close collaboration with geologists and representatives of other fields of study.

Within the structure of American universities, institutes of geography usually form part of Colleges of Letters and Science. For the most part, they are classified as belonging to the social sciences (Table 3). Research conducted in these institutes is diverse in its degree of specificity, but most of it is interdisciplinary in nature. For example, the University of California-Berkeley hosts research projects that fuse geography with architecture, archeology and history, culture and agricultural studies. Studies are usually conducted by groups of scientists and doctoral students that revolve around a professor who represents the appropriate area of research specialization.

Geographical research institutions have a highly diverse set of specializations, and the research projects executed within their walls are usually both interdisciplinary and strongly connected to contemporary issues of global (Nature-Society, Biogeographic Processes, Population Movement and Flows), regional (Economic Development in China, Multicultural Europe) or local (The Southern Border, California) concern. We are able to make a clear distinction between the two subfields of geography: physical geography and human geography.

As previously mentioned, human geography is commonly classified as a social science and tends to make up separate institutes of geography at universities, while physical geography is put together with geology, ecology and geophysics as a natural science and part of many an institute of Earth sciences or environmental studies. At some universities, however, these subfields do come together to jointly form centers of geographical research (e.g., University of California Berkeley, Boston University, Indiana University).

The scope of research in human geography is delineated by the degrees offered in institutes of geography. Physical geography, on the other hand, is harder to characterize in terms of scope because it interlocks and interacts profoundly with other natural sciences. Additionally, an overview of research strands and projects offered at American universities suggests that climatology and hydrology are better classified as geophysical than geographical sciences.
Table 3. Geographical research centers in the organizational structure of selected American universities and their main research strands.

<table>
<thead>
<tr>
<th>University</th>
<th>Structural unit</th>
<th>Research fields or strands</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of California Berkeley</td>
<td>College of Letters and Science; Division of Social Sciences; Department of Geography;</td>
<td>California, Economic Development in China, Natural Resources and Population, Meteorology, Climatology, Biogeography, The American City, Africa: Ecology and Development, Physiography and Geomorphology, Geographic Information Science, Cartographic Representation, Multicultural Europe, The Southern Border, Prehistoric Agriculture, Local and Regional Transformation, Development and Underdevelopment, American Cultural Landscapes;</td>
</tr>
<tr>
<td>University of California Los Angeles</td>
<td>College of Letters &amp; Science; Division of Social Sciences; Department of Geography;</td>
<td>Biogeographic Processes, Cultural and Historical Geographies, Earth Systems Science, Globalization, Urban, Political and Economic Geographies, Population Movement and Flows, Geographies of Nature and Society, Hydrological and Geomorphological Processes, Geographic Methods and Techniques;</td>
</tr>
<tr>
<td>University of Washington</td>
<td>College of Art and Sciences; Division of Social Sciences; Department of Geography;</td>
<td>Nature-society, The cities, Development, Mobility, Public participation, Racialization and Space, Social Justice, Sustainability;</td>
</tr>
<tr>
<td>University of Wisconsin-Madison</td>
<td>College of Letters &amp; Science; Division of Social Sciences; Department of Geography;</td>
<td>People-Environment Geography, Human Geography, Physical Geography, Cartography and GIS;</td>
</tr>
<tr>
<td>San Francisco State University</td>
<td>College of Science and Engineering; Department Geography and Human Environmental Studies;</td>
<td>Human Geography, Environmental Studies, Physical Environment, Resource Management, Techniques of Geographic Analysis, Urban Environment, Transportation and Land Use;</td>
</tr>
</tbody>
</table>

Source: own elaboration based on official website of each university.

3.2. Great Britain

In Great Britain, the organization structure of universities is usually three- and, in some cases, four-tiered. The university is divided into schools, which are further subdivided into faculties, and those in turn branch out even further into departments. Departments host research groups that conduct studies revolving around a specific research cluster.

Centers for the study of geography are present at most of the top-tier British universities, but their place in the organizational structure of the institution is not the same across the board. Typically, the geographical research unit is part of a larger structure comprising a diverse array of research fields (physics, chemistry, geology or history, sociology, economics etc.). Depending on the university, geography can form part of natural sciences departments (e.g. at University of Cambridge, University of Birmingham) or fall within the humanities (e.g. at University of Oxford, University College London). Geography can sometimes even function alongside law, philosophy and literature (University of Dundee). However, in the most common scenario, geography exists alongside related disciplines such as geology, ecology, biology or sociology and economics.

An overview of research agendas in British institutions reveals that, in most cases, studies are conducted in three primary subfields: physical geography, human geography and cartography with GIS. That said, there is a certain imbalance in the topics covered according to the general profile of the department: geographical research units operating within humanities departments focus their work on human geography. Physical geography plays a much more limited role here, and primarily deals with interactions between human beings and their environment. Departments that deal with natural sciences boast a range of topics and research strands in physical geography, at the expense of advanced research in human geography.
Research teams in British universities carry out both “base studies” and research on contemporary transformations in the natural and socio-economic environment. The names of these working groups are strictly connected to the specific problem under examination (e.g. Social Research Methods Group, Globalisation, Development and Place Research Group, Research Group of Spatial Modelling).

The choice of topic is usually made with the premise of conducting an interdisciplinary study on relevant, pressing contemporary issues (globalization, climate change, transformation of the environment etc.), with particular emphasis on the interplay between man and the environment and the modern-day dynamics of environmental changes as a result of human activity.

Table 4. Geographical research institutions in the organizational structure of selected British universities and their main research strands.

<table>
<thead>
<tr>
<th>University</th>
<th>Structural unit</th>
<th>Research fields or strands</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Cambridge</td>
<td>School of Physical Sciences; Faculty of Earth Sciences and Geography; Department of Geography;</td>
<td>Historical and Cultural Geography, The Glacial and Quaternary, The Spaces of Economy and Society, Society, Environment and Development, The Environmental Processes;</td>
</tr>
<tr>
<td>University of Oxford</td>
<td>Division of Social Sciences; School of Geography and Environment;</td>
<td>Biodiversity, Ecosystems and Conservation, Climate Systems and Policy, Landscape Dynamics, Technological Natures: Materials, Cities, Politics, Transformations: Economy, Society and Place;</td>
</tr>
<tr>
<td>University College London</td>
<td>Faculty of Social and Historical Sciences; Department of Geography;</td>
<td>Cities and Urbanisation, Environment, Landscape and Society, Environmental Change, Environmental Modelling, Mobility, Identity and Security;</td>
</tr>
<tr>
<td>The University of Manchester</td>
<td>Faculty of Humanities; School of Environment and Development; Geography</td>
<td>Geographical Political Economy, Space, Culture and Society, Environmental Processes, Quaternary Environments and Geoarchaeology, The Centre for Urban and Regional, The Centre for Urban Policy Studies;</td>
</tr>
<tr>
<td>The University of Edinburgh</td>
<td>School of GeoSciences; Human Geography Research Group;</td>
<td>Just Geographies, Nature's Geographies, Materialising Geographies, Lived Geographies;</td>
</tr>
</tbody>
</table>

Source: own elaboration based on official website of each university.

3.3. Canada
Geographical research centers exist in most renowned institutions of higher education (Table 5). Depending on the university, they can form part of humanities or natural sciences departments. In the former, they deal primarily with human geography, while physical geography is the focus of those that fall within the latter.

An overview of available research strands in selected institutions indicates that physical geography garners greater interest among Canadian geographers, but further studies on a larger sample of universities would be needed to corroborate this. Much like in the United States, Canadian geography has deep-running ties with the natural sciences and often falls under interdisciplinary institutes and departments. One good example of this is the Department of Earth and Atmospheric Sciences at the University of Alberta, where research is conducted a range of topics, from geology to geochemistry, geophysics, oceanography and geomorphology.

The Department’s research profile is clearly directed toward holistic studies of the natural environment where it is difficult to distinguish specific research subfields. Interestingly, within this eclectic set, there is a place for human geography, comprising the following research foci: water governance, the social aspects of extreme natural phenomena and suburbanization processes. Socio-economic research remains, however, primarily complementary to standard environmental studies. McMaster University exhibits the same
trend of relative marginalization of human geography with respect to the main current of research in physical geography and other Earth sciences.

**Table 5.** Geographical research institutions in the organizational structure of selected Canadian universities and their main research strands.

<table>
<thead>
<tr>
<th>University</th>
<th>Structural unit</th>
<th>Research fields or strands</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Toronto</td>
<td>Department of Geography and Program in Planning;</td>
<td>Cities and Everyday Life, Nature, Society and Environmental Change, Political Spaces,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biogeochemistry and Contaminants, Climate Processes and Climate and Carbon Cycle Modelling,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Earth-Surface Processes and Hydrology, Paleoclimate and Biogeography;</td>
</tr>
<tr>
<td>University of British Columbia</td>
<td>Faculty of Arts;</td>
<td>Climate and Global Change, Cities, Forests and People, Geographical Analysis, Geopolitics,</td>
</tr>
<tr>
<td></td>
<td>Department of Geography;</td>
<td>Biopolitics and Security, Globalization and Development, Nature, Society and Sustainability,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Social Theory, Water, Snow, and Ice;</td>
</tr>
<tr>
<td>McGill University</td>
<td>Faculty of Science;</td>
<td>Earth System Science, Political, Urban, Economic and Health Geography, Environmental</td>
</tr>
<tr>
<td></td>
<td>Department of Geography;</td>
<td>Management, Land Surface Processes, Environment and Human Development, GIS and Remote</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sensing;</td>
</tr>
<tr>
<td>McMaster University</td>
<td>Faculty of Science;</td>
<td>Hydrologic Sciences, Spatial Analysis, Environment and Health, Social Geography;</td>
</tr>
<tr>
<td></td>
<td>School of Geography and Earth Sciences;</td>
<td></td>
</tr>
<tr>
<td>University of Montreal</td>
<td>Faculty of Arts and Science;</td>
<td>Fluvial dynamic, Asian study, Biodiversity and Ethnoecology, Transport geography, Marine</td>
</tr>
<tr>
<td></td>
<td>Department of Geography;</td>
<td>Geography;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: own elaboration based on official website of each university.

3.4. The Netherlands
In the Netherlands, specialized geographical research centers are active at five universities (University of Utrecht, University of Nijmegen, University of Groningen, University of Amsterdam i University of Wageningen). Studies in physical geography are also conducted at the Vrije Amsterdam University (Faculty of Earth and Life Sciences), but geography does not have a separate research unit attached to it there.

Research centers in the form of institutes or faculties (Table 6) are integrated into the structure of natural sciences departments (e.g. Faculty of Geosciences, Utrecht University, Faculty of Environmental Sciences, Wageningen University). The predominant research focus, however, is socio-economic, which is probably a result of physical geography being much more closely connected with institutes of Earth and environmental sciences.

One the basis of this information, we can conclude that Dutch geography is divided into two subfields: physical geography and socio-economic geography. One indication of this are the main topics of research in academic institutions, from which we can glean that the relations between these two subfields seem weaker than, for instance, in British geography.

The specific research foci of Dutch institutions goes beyond local contexts and national outlooks, often transcending into the continental or the global. At the same time, researchers tackle highly relevant an highly current problems related to migration flows, urbanization and environmental management. Much attention is also given to land and spatial management as well as regional planning.
Table 6. Geographical research institutions in the organizational structure of selected Dutch universities and their main research strands.

<table>
<thead>
<tr>
<th>University</th>
<th>Structural unit</th>
<th>Research fields or strands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utrecht University</td>
<td>Faculty of Geosciences; Department of Physical Geography; Department of Human Geography and Spatial Planning;</td>
<td>Urban Geography, Economic Geography, Geography and Development, Cartography, Regional and Cultural Geography, Environmental Governance for Urban and Regional Planning;</td>
</tr>
<tr>
<td>University of Groningen</td>
<td>Faculty of Spatial Sciences; Department of Cultural Geography; Department of Economic Geography;</td>
<td>Social and Cultural Geography, Landscape Studies, Rural Studies, Social Impact Assessment, Tourist Studies; Economic Geography, Regional Labour Market, Methods of Spatial Research, Real Estate, Planning, Development and Management of Work Location;</td>
</tr>
<tr>
<td>Wageningen University</td>
<td>Faculty of Environmental Sciences; Cultural Geography Group;</td>
<td>Tourism, Leisure and Migration Studies, Landscape, Community, Heritage;</td>
</tr>
<tr>
<td>University of Nijmegen</td>
<td>Department of Human Geography;</td>
<td>Governance and Places, Border Research, Migration and Development;</td>
</tr>
<tr>
<td>University of Amsterdam</td>
<td>Faculty of Social and Behavioural Sciences; Amsterdam Institute for Social Science Research; Human Geography, Planning and International Development Studies;</td>
<td>Geographies of Globalization (Political Geographies of Globalization and Re-territorialization, Changing Geographies of Urban Economics, Comparative Financial Geography), Urban Geography (New Urban Dynamics, Live courses and Time-space Behaviour, Spatial Inequalities and Segregation);</td>
</tr>
</tbody>
</table>

Source: own elaboration based on official website of each university.

3.5. Australia

Geography is a popular area of study and research in Australia. All of the leading institutions of higher education offer degrees in geography, but not in every case do they function within separate structural units. For the most part, schools of geography fall under departments of natural sciences (e.g. Melbourne School of Land and Environment, Faculty of Science The University of Queensland), but there are also those that include house geography within the humanities (e.g. Arts Faculty of Monash University).

The placement of the field in a given department conditions the research profile of each geographical institute, although in natural sciences departments there is a clear preference for physical geography while humanities departments are more inclined towards human geography (Table 7).

In general terms, the natural strand of research predominates once again. Among all the analyzed countries, Australian universities exhibit the greatest concentration on environmental aspects, which is expressed through an evident focus on ecology and issues related to environmental protection.

The monitoring of modern-day environmental processes plays a significant role, as do landscape planning and spatial management methods. With respect to regional studies, research centers prefer to focus on Australia and Oceania as well as Asian countries (primarily the Far East).
Table 7. Geographical research institutions in the organizational structure of selected Dutch universities and their main research strands.

<table>
<thead>
<tr>
<th>University</th>
<th>Structural unit</th>
<th>Research fields or strands</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Melbourne</td>
<td>Melbourne School of Land and Environment; Department of Resource Management and Geography;</td>
<td>Animals, Cities, Climate Change, Environment, Land, Fire, Food, Society, Water;</td>
</tr>
<tr>
<td>University of Queensland</td>
<td>Faculty of Science; School of Geography, Planning and Environmental Management;</td>
<td>Landscape Ecology and Conservation, Biophysical Remote Sensing, Climatology, Cleaner Production, Environment and Social Planning, Population, Housing and Regional Analysis, Earth Systems Science, Information and Management;</td>
</tr>
<tr>
<td>University of Sydney</td>
<td>Faculty of Science; School of Geosciences; Geography Research Unit;</td>
<td>Asia-Pacific geographies, Social, Economic and Environmental Sustainability in Regional Australia, Landscape Evolution and Processes, Sustainability, Citizenship and Cultural Spaces in Cities, Geocoastal Research;</td>
</tr>
<tr>
<td>University of Western</td>
<td>Faculty of Natural and Agricultural Sciences; School of Earth and Environment; Geographical Sciences Center;</td>
<td>Environmental Geomorphology, Coastal and Estuarine Processes, Biogeography and Landscape Ecology, Climate Change, Disaster and Hazard Planning and Management, Geographic Information Systems and Remote Sensing, Marine Ecology and Biogeochemistry, Regional Development, Economic and Social Geography, Development Geography, Urban and Regional Planning;</td>
</tr>
<tr>
<td>Australia</td>
<td>Arts Faculty; School of Geography and Environmental Science;</td>
<td>Environment and Society, Geographical Information Systems, Indigenous Archaeology, Physical Geography, Urban and Economic Geography;</td>
</tr>
</tbody>
</table>

Source: own elaboration based on official website of each university.

3.6. Germany

The primary structural unit in German universities is the faculty, subdivided into institutes, which in turn further branch out into smaller organizational cells or research teams. The system has a structure that is complex, but most of all transparent and well-organized. The structure of one university is often akin to that of another (Table 8).

Geography usually appears as a separate institute operating within a department with a diverse academic profile (e.g. Faculty of Geosciences, University of Munich; Faculty of Mathematics and Natural Sciences II, Humboldt University Berlin; Chemistry and Earth Sciences Faculty, Heidelberg University), but mostly follows the general trend of association with the natural sciences. An analysis of the organizational structure of ten German universities verifies this. Based on the information obtained, we can stipulate that geography in Germany is a natural science.

Unlike in British and American research units, the names of German departments and research teams correspond to the classic breakdown of geography into subfields (e.g. Department of Human Geography, Soil Science and Geomorphology Research Group, Department of Geography of Transport).

A more in-depth look at the research foci of selected universities led me to believe that, broadly speaking, research is slightly less interdisciplinary than in universities that are heirs to the Anglo-Saxon tradition – that is, it is more reluctant in venturing out of the thematic confines of geography and assumes a smaller degree of individualism. The issues that are tackled are of a broader, more general dimension. These observations are inherently difficult to quantify, and they should be seen exclusively as contributions to the discussion, and emphasizing that they constitute the subjective impressions of the author.
Most Germany research centers include departments or research teams dedicated to cartography and GIS. Universities in the other countries under analysis do not give cartography and GIS so much attention as to make it a subject of study in itself, but rather a tool used for other research. Another distinctive element of the German system are separate research teams that focus on teaching geography and land management.

**Table 8. Geographical research institutions in the organizational structure of selected German universities and their main research strands.**

<table>
<thead>
<tr>
<th>University</th>
<th>Structural unit</th>
<th>Research fields or strands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georg-August University Göttingen</td>
<td>Natural Sciences, Mathematics and Informatics; Faculty of Geoscience and Geography; Institute of Geography; Department of Human Geography; Department of Landscape Ecology; Department of Cartography; GIS and Remote Sensing; Department of High-Altitude-Mountain Geomorphology;</td>
<td>Geography of tourism, Cultural landscape development Terrestrial Biogeochemistry, Ecosystem Processes Global change, Climate Change challenge Geomorphology, High Mountain Geomorphology, Didactics in Geography;</td>
</tr>
<tr>
<td>University of Munich</td>
<td>Faculty of Geosciences; The Department of Geography;</td>
<td>Physical Geography and Remote Sensing (Hydrological Processes and Remote Sensing), Geography and Landscape Ecology (Land Use Change, Environmental Problems, Climate, High Mountains Region), Human Geography (Human-Nature Relations, Economic Geography and Tourism (Business and Geography, Tourism Economy);</td>
</tr>
<tr>
<td>Heidelberg University</td>
<td>Chemistry and Earth Sciences Faculty; Institute of Geography;</td>
<td>Physical Geography, Human Geography, Economic and Social Geography, Geography of North America, GISciences;</td>
</tr>
<tr>
<td>University of Bonn</td>
<td>Faculty of Mathematics and Natural Sciences; Institute of Geography;</td>
<td>Climatology and Landscape Ecology, Geomorphology and Hydrology, Geography of Developing Regions, Urban and Regional Geography, Spatial Socioeconomics, Historical Geography, Remote Sensing, GIS and Cartography;</td>
</tr>
<tr>
<td>Humboldt University Berlin</td>
<td>Faculty of Mathematics and Natural Sciences; Institute of Geography;</td>
<td>Physical Geography: Geomorphology, Soil Geography, Quaternary, Climate and Vegetation Geography, Hydrology, Human Geography: Economic Geography, Applied Geography/Planning, Geography of Transport, Geography of Metropolis and Innovation, Social and Population Geography Geomatics;</td>
</tr>
</tbody>
</table>

Source: own elaboration based on official website of each university.

### 3.7. Other Countries

The basic structural unit of the Spanish university is the faculty, branching out into institutes of two different kinds. Geography is represented on the faculty level, typically in conjunction with history (e.g. Faculty of Geography and History, University of Barcelona; Faculty of Geography and History, University of Sevilla, Faculty of Geography and History, University of Santiago de Compostela). Universities occasionally have departments of environmental studies (e.g. Faculty of Environmental Sciences, University of Alcala), where geography is a component at the institute level. Larger universities typically subdivide a department into two geographical institutes – one that focuses on physical geography, and another that examines the socio-economic aspects of the field – while smaller universities usually have one general geography profile.

Within the structure of the institutes we can distinguish laboratories and research groups. Depending on the institution, the research profile of the department may concentrate on one
of the standard specializations of geography or be connected to specific aspects of the region in which the university is located.

In Japanese universities, geographical units are universally a part of a larger department, usually environmental sciences (e.g. Faculty of Urban Environmental Sciences, Tokyo Metropolitan University; Graduate School of Environmental Studies, Nagoya University). Moreover, universities often maintain two separate tracks – research and teaching – of which the former deals with research exclusively while the latter handles the education of students in the field. However, research foci and available degrees are identical between the two, and correspond to those offered by European universities.

Geographical institutes in Russia are structurally equivalent in most universities. Geography is usually represented at the department (that is, first-tier) level, which subdivides into institutes. A three-tier structure consisting of a department, an institute and a faculty can sometimes be found. The names of institutes and faculties reflect the classic fields of specialization in geography (e.g. Department of Geomorphology and Paleogeography, Lomonosov Moscow State University; Department of Economic and Social Geography, Lomonosov Moscow State University; Division of Cartography and Geoinformatics, Saint-Petersburg State University).

4. THE ORGANIZATIONAL STRUCTURE OF GEOGRAPHY IN POLAND

Poland hosts 15 institutions of higher education that carry out research and education activities for future faculty on a Master’s or Doctorate level, as well as 1 scientific institution – the Polish Academy of Sciences. Two universities have established separate departments for the study of geography (University of Warsaw and University of Łódź), while the remaining 13 institutions host geography either within their departments of Earth sciences or as institutes that form part of larger departments. In those cases, geographers work alongside researchers and scholars in the geological or biological sciences.

The size of geographical research center, estimated by the number of research units and the number of the research staff, varies greatly (Table 9). Each center has its unique research profile that results from both “base” and regional studies.

The research specialization of different institutions is primarily a factor of belonging to different traditional “geographical schools” developed by distinguished geographers as well as a result of location. Most institutions carry out geomorphological research, a staple of Polish geography. Other subareas of physical geography are also amply represented, although individual institutions reveal clear regional specializations. It is easier to point out differences in specialization in socio-economic geography, which is much more limited with regard to number of researchers.

The commitment and activity of researchers as well as the quality of published work differ by university. One of the ways of assessing research units is the so-called parametric value, which is assigned based on researchers’ academic activity (number of papers, number of grants, right to award academic titles and degrees, etc.) as well as the palpable effects of their studies (implementation of recommendations, new technologies, patents and other practical results).

The primary goal of assigning a parametric value is to give support to the strongest and most competitive institutions, while those that obtain worse results must fend for themselves. The undisputed leaders here are the Adam Mickiewicz University in Poznań and the Institute of Geography and Spatial Organization of the Polish Academy of Sciences, followed by the other universities, which amongst themselves are highly diversified in terms of research potential.
**Table 9.** Basic data on centers of geographical study in Poland in 2008.*

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>University/Academy</th>
<th>Faculty</th>
<th>Institute</th>
<th>No. of depts and labs</th>
<th>No. of full profs</th>
<th>No. of Ph. D. profs</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMU</td>
<td>Adam Mickiewicz University in Poznan</td>
<td>Faculty of Geographical and Geological Science</td>
<td>Institute of Physical Geography and Environmental Planning Institute of Socio-Economic Geography and Spatial Management Institute of Geoeconomy and Geoinformation</td>
<td>21</td>
<td>35</td>
<td>122</td>
</tr>
<tr>
<td>UW</td>
<td>University of Warsaw</td>
<td>Faculty of geography and Regional Studies</td>
<td>Institute of Physical Geography Institute of Socio-economic Geography and Spatial Management Institute of Regional and Global Studies</td>
<td>18</td>
<td>13</td>
<td>90</td>
</tr>
<tr>
<td>UJ</td>
<td>Jagiellonian University</td>
<td>Faculty of Biology and Earth Sciences</td>
<td>Institute of Geography and Spatial Management</td>
<td>13</td>
<td>11</td>
<td>44</td>
</tr>
<tr>
<td>US</td>
<td>University of Silesia</td>
<td>Faculty of Earth Sciences</td>
<td>-</td>
<td>29</td>
<td>5</td>
<td>66</td>
</tr>
<tr>
<td>UL</td>
<td>University of Łódź</td>
<td>Faculty of Geographical Sciences</td>
<td>Institute of Urban Geography and Tourism Science Institute of Earth Sciences Institute of Socio-economic Geography</td>
<td>25</td>
<td>9</td>
<td>No data</td>
</tr>
<tr>
<td>UG</td>
<td>University of Gdańsk</td>
<td>Faculty of Oceanography and Geography</td>
<td>Institute of Geography</td>
<td>10</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>NCU</td>
<td>Nicolas Copernicus University in Toruń</td>
<td>Faculty of Biology and Earth Sciences</td>
<td>Institute of Geography</td>
<td>13</td>
<td>7</td>
<td>42</td>
</tr>
<tr>
<td>UMCS</td>
<td>Maria Curie-Skłodowska University in Lublin</td>
<td>Faculty of Biology and Earth Sciences</td>
<td>Institute of Earth Sciences</td>
<td>12</td>
<td>9</td>
<td>63</td>
</tr>
<tr>
<td>UWr</td>
<td>University of Wrocław</td>
<td>Faculty of Earth Science and Environmental Management</td>
<td>Institute of Geography and Regional Development</td>
<td>8</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>USz</td>
<td>University of Szczecin</td>
<td>Faculty of Geosciences</td>
<td>Institute of Marine Sciences</td>
<td>10</td>
<td>10</td>
<td>32</td>
</tr>
<tr>
<td>PUC</td>
<td>Pedagogical University of Cracow</td>
<td>Faculty of Geography and Biology</td>
<td>Institute of Geography</td>
<td>7</td>
<td>3</td>
<td>34</td>
</tr>
<tr>
<td>UHS</td>
<td>Jan Kochanowski University of Humanities and Sciences</td>
<td>Faculty of Mathematics and Sciences</td>
<td>Institute of Geography</td>
<td>16</td>
<td>4</td>
<td>23</td>
</tr>
<tr>
<td>PU</td>
<td>Pomerania University in Słupsk</td>
<td>Faculty of Mathematics and Natural Sciences</td>
<td>Institute of Geography</td>
<td>8</td>
<td>2</td>
<td>27</td>
</tr>
<tr>
<td>KWU</td>
<td>Kazimierz Wielki University in Bydgoszcz</td>
<td>Faculty of Natural Sciences</td>
<td>Institute of Geography</td>
<td>No data</td>
<td>No data</td>
<td>No data</td>
</tr>
<tr>
<td>IGSO</td>
<td>Polish Academy of Sciences</td>
<td>-</td>
<td>Institute of Geography and Spatial Organization</td>
<td>6</td>
<td>10</td>
<td>45</td>
</tr>
</tbody>
</table>

* The source for this table was the Ekspertyza o stanie nauk geograficznych w Polsce w okresie 1995-2008 (Assessment on the State of the Geographical Sciences in Poland in the 1995-2008 Period). PAN Committee on Geographical Sciences (by Kostrzewski and Roo-Zielińska), which did not include the University of Economy in Bydgoszcz.
Geography in Poland does not belong to the “mainstream” of science, and thus on a theoretical level it is more of a “receiver” than a “giver”. The opportunities offered by the synthesis of diverse sources of knowledge that is inherent to geography are countered by the modern-day trend to specialize and differentiate research areas, which are becoming increasingly fragmented as a result. The best example of this is the creation of subject committees within the Polish Geographical Society and the foundation of new societies (e.g. the Association of Polish Geomorphologists or the Polish Association for Landscape Ecology), or others that are increasingly specialized (Association of Polish Geography Teachers).

On the institutional and organizational level, a debate is currently being played out on dividing geography into two separate subfields: physical geography and socio-economic geography. The reasons for this are several. First, observers have noted the increasing duality in the subareas of geography. The links between the two disciplines are sometimes weaker than those between each of the two individually and other disciplines in the social and natural sciences. In Poland, socio-economic geography is more keen on entering into informal alliances and maintaining affiliations with social disciplines, but often makes use of physical geography when investigating the spatial diversity and temporal variability of socio-economic processes and phenomena. By contrast, physical geography establishes partnerships with the physical sciences, making use of achievements in economic geography (Bański 2010).

A second problem lies in the process of awarding degrees and academic titles, which are subsequently verified by the Central Committee for Academic Degrees and Titles. This committee is composed of several sections, among which are the Economic Sciences section, responsible for awarding degrees and titles in socio-economic geography and other areas, and a separate Mathematical, Physical, Chemical and Earth Sciences section, responsible for physical geography and other areas. Classifying the candidates into the appropriate section is a common problem. Thirdly, similar issues haunt the bodies that assess research projects in the National Science Center.

It is likely that in institutional and organizational terms, Polish geography will maintain the status quo, because it is in the interest of both subfields. Geographers are conscious of their disadvantageous position with respect to other disciplines and are afraid to lose their sovereign identity. Both subfields have too little clout in the Polish academic and scientific arena to individually face the challenges set forth by contemporary science. Geography in the elementary (primary) and secondary school system is also on the wane, and a noticeable drop in the number of geography classes has been noted in schools nationwide.

A consequence of the lack of a clearly defined place for geography in the Polish system of education are the diverse membership patterns of geographical institutes within the structures of academic institutions. For instance, the Polish Academy of Sciences’ Institute of Geography and Spatial Organization, which had previously belonged to the Department of Earth Sciences with the Institute of Geophysics, the Institute of Geological Sciences and the Institute of Oceanography, among others, was incorporated into the Department of Technical Sciences in 2011, now appearing alongside the Institute of Water Construction, the Institute of Biocybernetics and Biomedical Engineering, the Institute of Chemical Engineering and others.

A separate part of the Polish Academy of Sciences is the Committee for Geographical Sciences, which represents Polish geography in national and foreign institutions and formulates general research and development goals in Polish geography. However, the

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5 The Polish Academy of Sciences is divided into Departments that include different research Institutes.
Committee belongs to yet another Department of the PAS – the Department of Natural and Earth Sciences.

Polish geography faces a number of significant choices that will indicate the path of its future development. These primarily refer to research strands, their character and structural form. Experiences and conclusions deriving from the development of world geography will be instrumental in making the right decisions.

5. CONCLUSIONS

In the organizational structure of the university, centers of research in geography are typically in the second tier. Only in the case of Spain, Russia and several universities in Poland do we see separate departments of geography – first-tier units. Undoubtedly, this is connected to the nature of the organizational structure of universities in countries where academic tradition has produced a large number of independent departments. In the remaining countries, the first-tier category is reserved mostly for a broad range of sciences and arts (e.g. the humanities, natural sciences, social sciences, the arts), and it is only in a lower tier that the distinction is made between units dealing with a specific science (geography, physics, sociology) or set of related sciences (e.g. Earth sciences, environmental sciences).

With the exception of American universities, separate geographical institutes are present at most top national universities. This may translate into the popularity of geographical studies and research. However, this conclusion is weakened by the fact that the highest-ranking universities in the world (e.g. Harvard University, Stanford University, Columbia University, Princeton University, Yale University) do not have geographical institutes within their organizational structure. Perhaps this is a sign of the declining role of geography as a science or the emergence and breaking away of independent subfields that are more and more distant from geography.

Centers for geographical research are most often associated with departments of Earth sciences or departments of natural and environmental sciences, which also accommodate other sciences such as geology and ecology or, more rarely, biology, geophysics and chemistry. This encourages the conclusion that geography is primarily seen as a natural science. Geography is encountered much less frequently in social sciences and humanities departments. In cases where it does appear there, studies on physical geography are largely marginalized.

An in-depth examination of the structure of geographical institutes and their main research topics also suggest that the processes of disintegration of the discipline are stronger than those that flow in the direction of its integration. This was confirmed by the observations on the institutional and organizational problems of Polish geography. Research teams that engage in research on physical geography display a clear affinity for and tendency toward the sciences, especially the natural, while those that specialize in socio-economic geography are drifting toward the humanities.

The ties between physical geography and its related fields (geology, ecology, geophysics) seem to be stronger though, leading to the proliferation of interdisciplinary research teams that take on environmental issues of great relevance to both present and future. Laffan’s (2010) work provides interesting data on the disintegration and disaggregation of geography, spotlighting the internal relations within the discipline and its connections with related areas based on citations in academic journals. Studies have shown that the links between journals of physical geography and socio-economic-geography are weaker than those that connect each of the two to their related non-geographical subfields. Similar conclusion have been drawn by Thrift (2002) and Johnston (2003).
The thematic structure of geographical research is very diverse. Looking at the two basic subfields of geography, we can conclude that the most “balanced” research in terms of topic among the analyzed countries can be found in Great Britain and Germany. Institutes in those two countries have equally rich and fruitful research agendas in physical and socio-economic geography. American and Dutch universities place more emphasis on socio-economic geography. In the United States, this results from the concentration of research on physical geography in institutes of Earth sciences along with a host of other disciplines.

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