Universiteit Leiden

ICT in Business

STEEP-M: a risk analysis framework

for e-Participation projects

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MASTER'S THESIS

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Executive Summary

In assessing a project, both an inside and an outside view is required in order to get the 360 ° perspective that allows a correct assessment. The inside perspective is included in the project's plan, since stakeholders require a project plan before committing. However, the outside perspective is equally as important and the success of the project depends on it as well. Therefore, this thesis proposes a framework for analysing external risk factors that may hinder the outcome of a project. It helps identify risks and the probability of them occurring, thus setting the starting point for risk management, which will also include the potential impact and mitigation actions. Given the current global context, this thesis focuses on Information Communication Technology (ICT) related projects and aims to provide a reliable framework for their external risk analysis. The proposed approach for such an analysis is the STEEP-M framework, which gathers six dimensions of the operating environment: Social, Technological, Economic, Environmental, Political & Legal, and Military. With this approach to external risk analysis, the scope of this thesis is to answer the research question: Is the STEEP-M risk analysis framework a reliable tool for identifying external risks for an e-Participation project?

The Puzzled by Policy project was selected to evaluate the validity of the framework. The results of the analysis will be compared with the official Evaluation Report in order to determine if the STEEP-M framework could have correctly assessed the risks that threatened the project when it started, in 2010.

Keywords : risk, risk analysis, STEEP-M, e-governance, e-participation

Acknowledgements

Introduction

In the global context, governments are starting to realize the need to enhance citizen's involvement in the policy making process in order to improve the quality of public policy. Glidden and Ruston (2013) correctly states that "many governments today recognize that to deliver effective public policy they need to enhance citizen and community involvement in the policy making process, particularly amongst the socially disadvantaged and hard to reach." With the rise of ICT (Information Communication Technology) notoriety and applicability into every day life, governments are also starting to tap into the benefits it brings. This way, they manage to directly address the current needs for democratic accountability and broad participation, which in turn leads to the emergence of a new dimension of governance: e-Governance. Scaling down on this dimension we find e-Participation, which enables, engages and empowers citizens to become active in the policy stream. Nonetheless, Smith and Dalakiouridou (2009) states that citizen's participation in the policy stream "became evident after 2001, and e-Participation was explicitly mentioned in 2007 as the Commission began to realize the participatory potential of ICT." Before then it was thought the citizen's participation in European politics meant access to legislative documents and more transparency of the process. This view, however, changed and opened the global and European environment for such projects to appear.

Therefore, the interest in e-Participation projects is expected to rise. This is why the focus of our thesis is to give such projects a correct first assessment in order to have a successful outcome. What makes a successful e-Participation project, according to Glidden and Ruston (2013) is if it succeeds in "bringing public authorities, civil society leaders and community representatives together to foster social cohesion". In order to ensure this successful outcome, a positive success rate among e-Participation projects a suitable approach to project planning needs to be taken.

Project planning and managing has been faced with many changes over the years leading to different approaches. The choice among them is based on the size, complexity and context of the project. However, the approaches fall under two main categories: Plan-Driven or Agile. While the Agile approach uses flexibility to manage risk, the Plan-Driven projects use structure.

Projects that apply for EU (European Union) funds require a great amount of documentation and planing. Therefore, an Agile approach that focuses mainly on increments would be more challenging for such projects. The Plan-Driven method would be more suitable, since it aims for predictability, stability and high assurance and required explicit documented knowledge (Washington (2003)). Planning ahead requires thorough investigation from the beginning on both inside risk factors, the ones that come within the project and that can be controlled more easily, and outside risk factors, the ones that arise from outside the project and are either difficult or impossible to control. The inside perspective must be included in the project plan, since stakeholders require at least the basics of a project plan (objective, budget, resources, time frame, etc.) and only a high level analysis of major possible risks. The outside risk factors, however, are equally important and can threaten the success of the project.

With this in mind, our thesis proposes an approach to external risk factors analysis for projects that apply to EU funding, in the form of a framework. It uses six dimensions of the environment (Social, Technological, Economic, Environmental, Political & Legal, and Military - thus the name STEEP-M) to determine possible arising risks. By analysing

those dimensions, our thesis's objective is to answer the research question:

Is the STEEP-M risk analysis framework a reliable tool for identifying external risks for an e-Participation project?".

A "reliable tool", in our vision would be a tool that successfully identifies the majority of the problematic areas for a project.

In order to answer the research question, a thorough understanding of the concept of risk is needed. Thus, the thesis was divided into two parts: first, a theoretical part, that deals with risk as a concept and proposes an approach to organizing the definitions discovered (STEEP-M); and a second part with a practical application of the first part's results.

The first part of our thesis has a more theoretical basis, but it integrates our personal reasoning and analysis of the definitions found. Therefore, the first section deals with the broad concept of risk and analyses 17 chosen definitions in order to decide on a working definition to be used throughout the thesis. The second section then defines one of the key concepts for the thesis, "risk environment" and elaborates on the importance of understanding and analysing it. It then gives overviews on the existing frameworks for conducting a risk environment as well as our choice for the most suitable one: STEEP-M. The last part goes more into depth on the advantages and disadvantages of using STEEP-M and propose corrective actions to minimize the cons of the framework. The third section of the theoretical part is meant to give a more through understanding of the chosen framework. Thus, for each dimension of the framework a number of definitions were selected from the literature and international organizations; however, there were no predetermined number for the definitions selected. The analysis resulted in a working definition for each of the six dimensions. The purpose of these definitions is to provide guidelines for correctly identifying risk factors and conducting the analysis in the second part of our thesis. The end of this section introduces the Risk Matrix, which will serve mainly as a visualization tool for our framework, making it easier to see under which category each factor falls and decide upon appropriate actions.

The last part of the theoretical part defines other two key concept for the thesis: e-Governance and e-Participation. It clarifies the common misconception between e-Government and e-Governance, and positions the latter into the current global context (which has as main attributes globalization, economic competition and state transformation). The end of this fourth section makes the transition into the practical part of the thesis by defining e-Participation and introduces the study case, with subsection 4.3 pointing out the importance of e-Participation projects.

The second part of our thesis will focus on applying the STEEP-M framework on the Puzzled by Policy project. The focus for a project search was EU, since it is an important actor in the global environment and is dealing with new challenges regularly. Those challenges get tougher due to EU's complex operating methods. The European Union scenery is becoming more and more populated with projects related e-Participation: currently, there are 21 ongoing e-Participation projects recognized by the European Commission[1]. The Puzzled by Policy project was funded under the Information and Communication Technologies Policy Support Programme (ICT-PSP)[2]. We choose this programme

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[1]Europe's Information Society Website - accessed on 20.07.2014
[2]European Commission Website on CIP - Competitiveness and Innovation Program - accessed on 30.06.2014

because, like many other EU funding programs, requires a great amount of documentation. For their 3rd call for proposals 2009, (Plan Type B) it asked for Part A of a project - Summary, Participants, Budget; and a Part B - ICT PSP Objective identifier, Project Profile, Relevance, Impact, Implementation, Work package list, Deliverables list, Work package description, Summary of staff effort, Performance monitoring. The Puzzled by Policy project had an execution time span from 01.10.2010 to 30.09.2013, with a total cost of €3.89m, of which €1.95m were provided by the EU (Sanchez-Niels et al. (2011)).

We will then proceed to conduct the STEEP-M analysis, by using the definitions decided upon section 3. Given the overwhelming amount of factors to be considered and the limited time span we will focus on the Technological dimension of the framework and propose corrective actions for the factors that fall under Extreme Risk. The results of our analysis will be compared with the official evaluation report of the Puzzled by Policy project. Because the the project has ended, the Evaluation Reports submitted to the EU at the end of 2013 are available online and will serve as main documents for the final comparison.

The Discussion part of the thesis deals with this comparison which will determine if the STEEP-M framework could have correctly assessed the risks that threatened the project when it started, in 2010 and thus provide an answer to the research question. We expect the Evaluation Report to have more information about the outcomes of the project and its internal limitations, but it will be possible to identify the main external obstacles it encountered to reaching its goals. By doing this we expect to have a clear answer to the research question.

The conclusion section will discuss main limitations of our research and propose future research and analysis directions. Moreover, following the results of the Discussion it will also be possible to make recommendations on the applicability of the framework for future e-Participation projects. Provided that the STEEP-M framework delivers the correct evaluation of possible risks of the e-Participation project, it can be adopted as a continuous process for assessing external threats. The overall success rate of the projects using it will increase since they will be able to spot raising uncertainties and address them accordingly. This will encourage and sustain future e-Participation projects and help reduce democratic deficit by enabling, encouraging and empowering citizens and communities to actively participate in the policy stream.

1 Risk in a broader concept: a high-level review of definition

In this first chapter we will focus on the concept of "risk" on a high level. We conducted a literature review to identify definitions of "risk" in the specialized papers. The first part elaborates on the methodology used for finding the papers and definitions; describing how was the research conducted and what databases were accessed.

The second subsection presents our choice for "the base definition" (the definition on which the analysis will be based) and the reasons behind this choice. The third part, as the title suggests, represents the analysis that was conducted on the selected definitions by placing them into four categories based on the similarities they have with the "base definition".

The forth and last section of this chapter builds up on the outcome of the analysis, with a summary of the findings and argument for the working definition to be used from now on in this thesis.

1.1 Methodology used for selecting definitions

A quick search on Google Scholar on the topic of "risk" gives about 3,740,000 results, of which 32,500 from the beginning of 2014 [3]. Leiden's University online database holds 4,754,849 peer-reviewed articles on risk from fields like economics, healthcare, environment, technology, computer science, etc. University of Bundeswehr has its online database divided per category. Research for relevant articles was conducted in the following databases: Computer Science, Military Affairs, Political Science, Sociology, and Economics. However, in all categories from the database there are articles that either address directly the subject of risk or mention certain aspects or influences risk may have on that field.

It goes without saying that risk represents a modern issue, which is discussed, analysed, researched or assessed throughout the specialized literature. The number and variety of results found in the first step of our research shows that there are different perspectives on risk and therefore different definitions. Authors like Fischhoff et al. (1984); Kraemer and Kazdin (1997), have tried to clarify the meaning of the term, or to at least find a common understanding for it, while others have analysed risk characteristics. In conducting our analysis we reviewed both stand points and categorized them according to a reference definition of our own choice.

To get a first overview of the meaning of risk we searched for the definition in the Oxford dictionary. There, risk is defined as "a situation involving exposure to danger", or as "the possibility that something unpleasant or dangerous might happen".

Next we selected 12 papers from Leiden's University online database, University of Bunderswehr's online database and Google Scholar that focus on "risk". These papers gave either a straight forward definition of risk (as a result of an analysis and from the author's perspective), or guidelines for defining risk. In the end we used in our analysis 17 definitions or viewpoints on risk and categorized them according to our reference definition.

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[3]on the 19th of March 2014

1.2 Base risk definition for analysis

To get a better understanding of the concept of "risk" and how it is defined by researchers, an analysis of the selected definitions was conducted. In order to give a structure to our approach we selected the paper of Aven (2010) and his definition of risk, which from now on will be referred to as the **base definition**. The choice was based on how the author decided to formalize the definition, by using a function. This gives a straight forward explanation of the concept, easy to follow and apply in an analysis of other definitions.

Thus, the elements that we are using in our analysis are provided by the definition:

"Risk = (A; C; P); where A represents the events (initiating events, scenarios), C the consequences of A, and P the associated probabilities.

For consistency reasons we will also use the definition for "probability" given by the same author: "Probability P is a measure of uncertainty about future events and consequences, seen through the eyes of the assessor and based on some background information and knowledge. Probability is a subjective measure of uncertainty, conditional on the background knowledge." (Aven, 2010)

The papers and definitions selected were grouped based on their similarity to the above mentioned definition. For a clear grouping we decided on four main groups:

- **Group 1**, for the papers that give no clear definition, but a framework or guidelines for explaining risk. However, these lead to the identification of the same concepts or interpretation of the definition
- **Group 2**, for when one or more concepts are missing from the definition, but they can be inferred from the context.
- **Group 3**, for when all three concepts or synonyms of them are mentioned.
- **Group 4**, for the definitions that use the same concepts and same logic, function, to explain "risk".

1.3 Analysis of selected definitions

Group 1

Out of the selected definitions we considered two of them to be the less similar to the definition given by Aven (2010).

From a Policy Science point of view, **Fischhoff et al. (1984)** recognize risk as being "inherently controversial", and stated that the choice of definition can ultimately affect the decision process, the decision itself and the outcome of the event under analysis. In order to aid the policy makers who deal with risk in making their decisions, the authors have conducted an analysis of "the key sources of controversy" in the definition of risk.

They, however, do not give one definition of risk, "because there is no one definition that is suitable for all problems". Nonetheless, the paper brings to light characteristics that need to be kept in mind when deciding on, or constructing a definition of risk. It elaborates on the distinction between objectivity and subjectivity; on the dimensionality of risk (more specifically on the consequences of a decision) and its measures (statistics, concerns). The authors state that definitions of risk should include the consequences of

that event happening because it will influence the decision and therefore the outcome of the event. From our interpretation of the paper we identify "consequence" and "event" as part of a risk definition, while "probability" is part of the definition of one element of risk, "expected utility" (which is defined in the paper as being "the product of a consequence's utility and the probability of it being incurred if a technology is pursued"). Staying faithful to its statement in the abstract of the paper, the authors gave no definition of "risk", but construct a framework for a definition which fits the problems and value systems encountered by decision makers.

In the field of sustainability management, policy, and related social science, **Luhmann (1990)** defines risk as "the possibility of future damage[..] that is attributed to a decision. Risk is the hopefully avoidable causal link between decision and damage. In other words, it is the prospect of post decisional regret[..]. Danger, on the other hand, is the possibility of future damage which is attributed to external events".

In the context of this paper, we consider danger as part of the definition of risk and therefore its definition needs to be given in order to have a full understanding. Thus, we can conclude that the term "probability" is evidently present in the overall definition. "Event", on the other hand, is used in defining damage, but based on our previous interpretation we can include it in the definition of risk. The third concept, "consequence", is deduced as being "future damage" or "outcome" and thus has a negative connotation. It was safe to draw the three concepts from the definition of danger because the authors have linked risk with danger.

Group 2

Most of the definitions included in our analysis were found to be part of the second group and roughly the same as the base definition. We judge six of them to be part of this category since, with our interpretation, the analysed concepts can be deduced.

In the context of managerial decision problem -risk analysis - the paper of **Kaplan and Garrick (1981)** clarifies misconceptions found in the literature from that period and make their own assessment for risk by using quantifiable measures. In doing this, they mention three concepts that are commonly used in relation with risk: uncertainty, hazard and probability. First, the authors make a distinction between risk and uncertainty, since the authors consider risk as being a sum between uncertainty and damage. "The notion of risk involves both uncertainty and some kind of loss or damage that might be received". Second, the authors make a distinction between risk and hazard, since "risk includes the likelihood of conversion of that source into actual delivery of loss, injury, or some form of damage. As for the last term, the authors use it to define risk, but adapt the definition so as to fit the framework and findings of the paper. Thus, "risk is probability and consequence: NOT risk is probability times consequence". Two out of the three terms that we selected to be assessed are present in the paper ("consequence" and "probability"), while the third one, "event" is inferred from the definition of "probability" ("the cornerstone of our approach is the idea that given two meaningful statements -or propositions or events-, it makes sense to say that one is more (less, equally) likely than the other).

In the psychiatry area, the paper of **Kraemer and Kazdin (1997)**, based on empirical documentation, is set out to analyse the concepts of risk and risk factors. The authors conclude that risk factors should precede the outcome of interest and give the

following definition for risk: "risk will always mean a probability of an outcome within a population of subjects. The term risk factor will be used to indicate an agent or exposure.

The concept of "event" is not part of the definition explicitly, but they can be understood from it, from the phrase "probability of an outcome". "Consequence", on the other hand, is not as obvious, but it can be inferred from the paper, where the authors discuss the importance of the policy-maker, who makes the decision, based on an analysis of risk factors and therefore consequences of his/hers judgement.

In the managerial decision making context, as part of the concept of Post-Normal Science[4] **Rosa (1998)** defines risk as "a situation or event where something of human value (including humans themselves) is at stake and where the outcome is uncertain". This explanation of risk specifies only two of our concepts: "event" and "consequence" (as outcome). However, we can deduce the missing concept from the phrase: "something of human value is at stake", which can be interpreted as the probability of an event, of a certain risk, to happen and influence something of human value.

In the same context of managerial decision making, more specifically in purchasing and supply management, **Harland et al. (2003)** discuses the types of risk associated with supply networks, risk assessment, and risk management, but starts with a comprehensive view of the term risk. The paper states that "risk can be broadly defined as a chance of danger, damage, loss, injury or any other undesired consequence". Our interpretation of this perspective links "chance" with "probability" and the terms "danger, damage, loss, injury" with "event". The only concept in our assessment which is used per se is "consequence", but with the negative nuance.

From the point of view of assessing systemic risk and governance, in the fields of health and safety, environment, economy, and society at large[5], the International Risk Governance Council's white paper Renn (2005) gives the following risk definition: "An uncertain consequence of an event or an activity with respect to something that humans value (definition originally in :**Kates, R. W., Hohenemser, C., & Kasperson (1985)** . Such consequences can be positive or negative, depending on the values that people associate with them. Two out of the three terms used in our analysis are also used in this definition, "event" and "consequence", with the later having both positive and negative values. The third concept, however, is not part of the definition, but appears in the ones evaluated by the author.

The perspective of social sciences is highlighted by the paper of **Aven and Renn (2009)**. The authors analyse the concept of risk with the help of other definitions from the literature which they split into two categories: "risk expressed by means of probabilities and expected values" and "risk expressed through events /consequences and uncertainties". From the first category we selected the definition given by Lowrance in "Of Acceptable Risk: Science and the Determination of Safety" in 1979: "Risk is a measure of the probability and severity of adverse effects. The term "probability" is clearly mentioned in the definition and "consequence" can be considered as a synonym for "effects". We make this assumption based on the definition provided by the Oxford dictionary for the word

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[4]Post-Normal Science "focuses on aspects of problem solving that tend to be neglected in traditional accounts of scientific practice: uncertainty, value loading, and a plurality of legitimate perspectives. PNS considers these elements as integral to science. By their inclusion in the framing of complex issues, PNS is able to provide a coherent framework for an extended participation in decision-making, based on the new tasks of quality assurance. The shift to a post-normal mode is a critical change" Funtowicz and Ravetz (2003).

[5]International Risk Governance website - accessed on 03.04.2014

"effect": "a change which is a result or consequence of an action or other cause". The term "event", however is not used in this definition explicitly.

Group 3

Our reasoning led to placing six definitions of risk in this category since the three terms for which we are conducting the analysis are either directly present, or their synonyms are included in the definitions.

From the viewpoint of Industrial Engineering and Engineering Management, in the context of Reliability Engineering & System Safety, **Paté-Cornell (1996)** agrees with Kaplan and Garrick (1981) and states that "risk has a variety of common meanings: probability of an undesirable event (e.g., floods), probability of death (individual risk), maximum thinkable loss, etc. The notion of risk generally comprises two (or three) elements. After identification of the failure or damage scenarios (what can go wrong?), the questions are: what are the potential consequences and their likelihoods?". Following the same train of thought, we identify the concept of "event" as being represented by "scenarios" (since scenarios are according to Wang and Williams (2011) "the possible outcome or event associated with a risk"). "Probability" is used as "likelihood", while "consequence" is used per se.

In the same area of managerial decision making but from the perspective of Social Science, we selected from **Harland et al. (2003)** the definition given by the Royal Society [6]. It claims that "risk is the probability that a particular adverse event that occurs during a stated period of time, or results from a particular challenge. As a probability in the sense of statistical theory, risk obeys all the formal laws of combining probabilities." Two out of our three concepts can be distinctly depicted from the definition ("event" and "probability") while "consequence" can be deduced from the phrase "results from a particular challenge".

The paper, **Renn (2005)** provides us with another viewpoint on risk, from a political perspective. The UK Government Handling Risk Report define risk as "the uncertainty of outcome, whether positive opportunity or negative threat, of actions and events. It is the combination of likelihood and impact, including perceived importance. We identify "consequence" with "outcome" once more, and having both positive and negative connotation (opportunity or threat); and "probability" is the synonym of "likelihood". The term "event", is used explicitly used in this definition.

From the same perspective and the same paper, The International Risk Governance Council's white paper **Renn (2005)** the US Presidential/Congressional Commission on Risk Assessment and Risk Management also defines risk, as "the probability of a specific outcome, generally adverse, given a particular set of circumstances". The definition clearly uses the term "probability", while "consequence" is understood as "outcome" and the last part of the definition (given a particular set of circumstances) extrapolates to "event".

From a military perspective, the paper of **Mandel (2007)** used the definition of risk given by International Organization for Standardization and the International Elec-

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[6]The Royal Society for the encouragement of Arts, Manufactures and Commerce, with the purpose of finding practical and innovative solutions to today's social challenges by bringing great ideas to global audiences, cutting across traditional political battle lines, carrying out cutting-edge research and development projects, undertaking practical innovation itself and by mobilizing the talents and commitment of its 27,000 strong Fellowship. The RSA is registered as a charity in England and Wales no. 212424 and in Scotland no. SC037784. (http://www.thersa.org/)

trotechnical Commission (ISO/IEC) 2002 guide on risk management vocabulary. It notes that "the term 'risk' is generally used only when there is at least the possibility of negative consequences". In the ISO/IEC guide, risk is defined as "[the] combination of the probability of an event and its consequences". Also, according to the ISO/IEC standard, "risk refers to the combination of the probability estimate of an event and the signed estimate of the magnitude of the event's consequences. The terms we are analyzing are all explicitly used in the definition, although with some new attributes; e.g. consequence is evaluated by its magnitude and probability by its estimates.

Group 4

Following the same train of thought for identifying the terms we concluded that three of the definitions convey to our base definition.

The Flood Risk Net Newsletter provides us with more definitions of risk, highlighted by Fischhoff et al. (1984). Of those we selected the environmental perspective on risk and the definition given by **Sayers et al. (2006)**'s paper which says that "risk is a combination of the chance of a particular event, with the impact that the event would cause if it occurred. Risk therefore has two components the chance (or probability) of an event occurring and the impact (or consequence) associated with that event. The consequence of an event may be either desirable or undesirable." All three concepts are used in the definition and give same function as the one by (Aven, 2010).

The International Risk Governance Council's white paper **Renn (2005)** highlights another definition for risk given by the Society for Risk Analysis [7]. "The potential for realization of unwanted, adverse consequences to human life, health, property, or the environment; estimation of risk is usually based on the expected value of the conditional probability of the event occurring times the consequence of the event given that it has occurred." The definition distinctly includes all the terms we are searching for, and in the same function as given by (Aven, 2010).

In the area of Computer Science, published in a conference of Social Computing **Wang and Williams (2011)** conducted an analysis of risk definitions in order to make their own working definition from the perspective of intelligent systems. Thus, "a risk is a combination of the uncertainty of occurrence of a possible outcome from an initial event and the associated positive or negative pay-off of the outcome on our intelligent agent with respect to achieving its goal(s)." The first concept of our analysis, "event", is evidently present, while the second one, "consequence", is depicted by its synonym, "outcome", and the third one by "possibility".

The authors used in the formulation of their working definition the one given by ISO 31000:2009, "Risk is often expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated likelihood of occurrence". The formula we are applying for our analysis is clearly deduced from this definition, with all three concepts present: "event", "consequence" and "probabilities".

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[7]"The Society for Risk Analysis is a multidisciplinary, interdisciplinary, scholarly, international society that provides an open forum for all those who are interested in risk analysis." -source: The Society of Risk Analysis website - accessed on 04.04.2014

1.4   Outcome of the analysis

We based our research and analysis on the definition provided by (Aven, 2010) because it gave a straight forward explanation for the concept. Moreover, the conclusion of our analysis is similar to the one given by the authors: "What is common for all these definitions is that the concept of risk comprises events (initiating events, scenarios), consequences (outcomes) and probabilities. Uncertainties are expressed through probabilities."

The formalization of this conclusion is the function presented at the beginning of our analysis:

"Risk = (A; C; P); where A represents the events (initiating events, scenarios), C the consequences of A, and P the associated probabilities."

By following this association of concepts to define risk, we analysed the selected articles and the definitions of risk they explicitly provide or can be inferred from them. The three terms "event", "consequence" and "probability" were generally used as such. If not, we interpreted the explanations and evaluated the concepts in favour of our referenced definition. However, common knowledge and definitions given by the Oxford dictionary, other research papers and research organization helped our analysis to stay on track and not get critiqued for bias towards (Aven, 2010)s definition.

Therefore, the analysis revealed other synonyms or interpretations of the concepts like: outcome and effect for "consequence", chance and possibility for "probability", and danger, damage, loss, injury and scenario for "event". The definitions also brought to light attributes of the concepts, like positive or negative for "consequence" or the associated term for "event", danger, damage, loss, injury which clearly has a negative significance.

Even though not all definitions proved to be part of the last group, meaning they had the most similarities, and only three of them had the same association of concepts, we decided to have the base definition as our working definition of risk. The decision was based on the fact that the terms are straightforward and can be found in the other definitions as well, either used per se, their synonyms or deduced from the paper.

2 Risk environment analysis frameworks

The second chapter of the master's thesis goes into the subject of "risk environment" *(not to be confused with the biophysical environment, but closer to what a system environment represents)* and the different frameworks that are currently being used. Therefore, in the first section we try to explain what is a risk environment by providing the reader with high level definitions. Adding to this, we present the reasons we identified in our research that stand behind conducting such an analysis.

The next step we took is to give some background information about the existing frameworks for a risk environment analysis. Followed by our choice for the most suitable framework and the reasoning behind it.

The forth and fifth parts of this section elaborate on the selected framework and give pros and cons of it. Moreover, we try to find ways to avoid or minimize the downsides and lay them forward in the last subsection.

2.1 Risk environment

This thesis is focused on finding a suitable framework for analysing risk and risk factors of the operating environment. Therefore, it is important to have an understanding of what "risk environment" means and decide on a working definition for the concept. In this regard, we propose to quickly look at some definitions and the reasons behind conducting such an investigation. In the business vocabulary "environment" is synonym with external environment, meaning, the "conditions, entities, events, and factors surrounding an organization that influence its activities and choices, and determine its opportunities and risks" (according to the Business Dictionary)[8].

2.1.1 Definition of the risk environment

The environment is defined by Oxford dictionary as "the surroundings or conditions in which a person, animal, or plant lives or operates".

The literature proposes similar definitions of the term, eg. "anything outside an organization which may affect an organization's present or future activities. Thus, the environment is situational it is unique to each organization" (Kew and Stredwick (2005)).

Duncan (1972) defines the environment as "the totality of physical and social factors that are taken directly into consideration in the decision-making behaviour of individuals in the organization". He also makes the distinction between internal and external environment, with the internal being defined as "those relevant physical and social factors within the boundaries of the organization or specific decision unit that are taken directly into consideration in the decision-making behaviour of individuals in the system". The external environment on the other hand consists of "those relevant physical and social factors outside the boundaries of the organization or specific decision unit that are taken directly into consideration". These definitions, however, do not mention the factors that influence or have the potential to influence the performance of the organization/company. Based on the available literature on the topic it is inferred that macro-environment (external environment) is composed of factors that influence a company, organization, state,

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[8]Business Dictionary website

product development, etc. but which are outside its control. Therefore, the factors can be described as being both external and uncontrollable.

Rhodes (2002) gives the definition of risk environment from a medical perspective, but we consider it to be easily adjusted to fit the purpose of this thesis. Thus, we can define the risk environment as the space whether social or physical - in which a variety of factors interact to increase the chances of drug-related harm".

For the purpose of this paper we will consider the environment as being **relevant factors that are taken directly into consideration in the decision-making behaviour of individuals in the system**.

The concept of "risk environment" also forces a clarification between micro and macro environment. We decided to follow the distinction and definitions given by the award winning author, Philip Kotler, in its book "Principles of Marketing". There, he defines the micro environment as the "internal" environment, made up of the small forces within a company that affect its ability to serve to the customers.

In order to have consistency within the perspectives we decided to look into the same author's definition for macro environment: "Companies and their suppliers, marketing intermediaries, customers, competitors, and public all operate in a macro environment of forces and trends that shape opportunities and pose threats. These forces represent "noncontrollables," which the company must monitor and to which it must respond. In the economic arena, companies and consumers are increasingly affected by global forces" (Kotler and Keller (2006)).

2.1.2   Why analyze the environment?

Kozlinskis and Guseva (2006)) discuss in their paper the importance of Business Macro Environment (BME) monitoring and evaluation. Economic globalization is turning BME assessment and forecasting into a relevant and important issue for developing countries. The growing role of the government, the business community and the attractiveness of the foreign investments are the main reasons behind it, according to the authors.

Ginter and Jack Duncan (1990) divide the macroeconomic environment into four forces (social, economic, technological and political/regulatory). They also define the analysis of such an environment as the study of the current and potential changes in those areas and how those changes impact the overall performance of the company/organization. The macro-environmental analysis consists, in their perspective, of four steps: "scanning macro-environments for warning signs and possible environmental changes that will affect the business; monitoring environments for specific trends and patterns; forecasting future directions of environmental changes and; assessing current and future trends in terms of the effects such changes would have on the firm."

Moreover, Babbar and Rai (1993)) state that the dynamic business environment needs an effective scanning (analysis in our case) in order to effectively use all its available resources, including information. The main advantage of conducting an environment scanning is that it allows for quick reactions to "windows of opportunity" and to "global shifts".

The same context, of globalization, is raising the importance of environment analysis in all scenes and domains, not only the business one. Moreover, a 360° view of the environment is needed if the decision-maker wants to cease an opportunity and minimize

the future risk of his /hers decision.

2.2   Background information on analysis frameworks

The term of "risk" is present in almost all fields of research, from social sciences (like economics, psychology, sociology, etc.) to applied sciences (like law, engineering, military sciences, etc.). Therefore, when conducting a literature review on this topic, the range of definitions can be overwhelming. In order to address this issue, an approach to manage the information available was introduced. Given the authors background in Economics and Business Administration, the framework PESTLE came to mind (which is common knowledge in the marketing area) and was used as a starting point for the literature review. Later, this approach was analysed and adapted to serve the purpose of this paper and its study case.

An analysis of any kind should be organized, even more if it will end up influencing the direction of the company/organization/state or its future strategy. One way of having an organized analysis of the external macro-environment is by identifying the factors which shape it and by conducting an analysis for each of them. This allows for the investigation to be split into three separate steps:

1. Identifying the factors with the highest impact on the operating environment;
2. Evaluating the impact of each factor on the subject being analyzed;
3. Planning future actions in order to minimize the threats and/or maximize the opportunities.

In order to find the right approach for the paper, we looked at the background of the PESTLE framework and discovered the following dimensions for it:

PEST analysis (STEP analysis) - Political, Economic, Sociological, Technological
The reference to such an analysis can be traced back to 1967, when Francis K. Aguilar presented in his book "Scanning the Business Environment" his approach to analysing the environment by using four sectors: Economic, Technical, Political and Social, under the acronym of ETPS. The acronym first changed in the early 1970s when Arnold Brown reorganized it as 'STEP' (Strategic Trend Evaluation Process) and outlined the factors as STEPE Social, Technological, Economic, Political, and Environmental).[9][10]

A number of other acronyms followed with new factors being added to the analysis depending on its field of application (marketing, business planning and strategy, product development, product launch, research, organizational). Among the multitude of acronyms, the following can be mentioned:

- PESTLE/ PESTEL analysis- Political, Economic, Sociological, Technological, Legal, Environmental. This is the most common version of the framework for the business environment. It is also the framework which is taught in marketing and business courses. However, this version is not set in stone and professors adapt it to fit their course content, either with reference to the latest literature or publications in the field or based on their personal experience. Thus, the following acronyms can also be found:

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[9]RapidBI Blog website
[10]Bright Hub Project Management website

- PESTLIED analysis- Political, Economic, Social, Technological, Legal, International, Environmental, Demographic
- PESTELD analysis- Political, Economic, Social, Technological, Legal, Environmental, Demographic

STEEP analysis Social, Technological, Economic, Environmental, Political.

Similar to the PEST acronym, it is used for external analysis of the (macro) environment by gathering information about environmental trends, potential developments or events, relate those events to the subject of the analysis. Moreover, this type of analysis suggests adding a new step to the analysis: forecast the future direction of the subject of analysis and extract the implications. Microsoft Office Labs used this approach "to inspire forward-looking scenarios" for the 2011 Microsoft Global High Tech Summit and identified three factors to have a significant impact on its business: blurred work/life divide; increase of available data; rise of the cloud.[11]

- STEEPLE analysis Social/Demographic, Technological, Economic, Environmental, Political, Legal, Ethical
- SLEPT analysis Social, Legal, Economic, Political, Technological
- STEPE analysis Social, Technical, Economic, Political, and Ecological

PMESII (Political, Military, Economic, Social, Infrastructure and Information systems) and **DIME** (Diplomatic, Informational, Military and/or Economic).

These frameworks are used by the U.S. military in analyses for modelling Irregular Warfare or in planning humanitarian aid and civic services missions. It is also used by the Department of Defence to analysis the external environment in order to improve its strategy development process.

2.3   Selecting the most suitable framework

The choice of the acronym STEEP-M instead of PEST was based on a language reasoning and we consider it to be a better fit with the purpose of the thesis.

The language and how some acronyms can be interpreted lead towards the STEEP-M choice. Oxford dictionary defines "pest" as "a destructive insect or other animal that attacks crops, food, livestock, etc". Moreover, in German, "pest" is associated with the Black Plague and considering that this paper was researched and written in Germany, it is only fair to adjust the terms used to the socially accepted ones.

Adding to this, it is this thesis' aspiration to get the readers of this paper to have a positive perception of the framework as a whole, starting with its name. Once again, Oxford dictionary defines the term "steep" as "(Of a slope, flight of stairs, or angle) rising or falling sharply; almost perpendicular". This definition, together with a positive application of the framework, will guide the readers towards a favourable attitude for the framework.

The Military factor of the framework will provide a 360° view to the analysis. In a purely business oriented analysis, the Military factor would be included in the Political one, but since this paper will deal with more than just an analysis of the macro-environment of a corporation/ organization, we felt it was important to add a separate

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[11]Drew Gude, Director, U.S. High Tech and Electronics at Microsoft

factor. Given that the study case will go into the government field, we strongly believe that this addition will enhance the value of the framework. So, the best approach for the intention of this paper, the framework to be used from now on in our analysis will be **STEEP-M**(Social, Technological, Economical, Environmental, Political, Military).

Moreover, given the study case analysis a project in the area of immigration and migration, which justifies the choice to include the military dimension into the framework. The Center for Immigration Studies gives the explanation to support this decision: "Many governments are justifying the use of military force in immigration and refugee matters because of the massive logistical challenges posed by managing large groups of people. Military troops, they argue, can create refugee camps or temporary housing centres complete with health clinics and dining facilities on a scale and at a pace that simply cannot by duplicated by other government agencies."[12]

2.4 Articulating advantages and disadvantages of the STEEP-M framework

Specialists in the environment analysis have discussed the advantages and disadvantages of using such a framework. Although no relevant literature is available, information, opinions and debates can be found in magazine articles, specialized forums or corporate websites. STEEP-M risk analysis framework benefits:

- **Accessibility**. First of all, the framework is easy to use, the factors are straightforward and the person conducting the analysis will encounter no misunderstandings when assessing the dimensions. The reviews conducted in section 3 for each individual element clarify potential confusions about them and working definitions serve as a guideline for the analyst describing the area of research he needs follow.

- **Efficiency & Effectiveness** With only six elements to analyse, the framework may seam at first not very thorough, but the six elements give a 3D view of the environment. This way of looking at the framework introduced the comparison of STEEP-M with a cube. With six dimensions, the cube display gives a multidimensional visualization of the risk environment that the analyst has to investigate by addressing the six cells.

- **Supportive** Allows a more in depth understanding of the operating environment. By encouraging the analyst to look at the factors that most influence the environment, the STEEP-M framework provides also a first insight into the possible risk that may surface from those factors. This way, the stakeholders become more aware of existing opportunities, and cease them, or of possible emerging risks and turn them into opportunities.

- **Anticipatory** Derived from the previous point, another benefit of the framework is its ability to deliver a better view of the future and possible scenarios of it. By developing scenarios about the future, the stakeholders get more information about the uncertain future which will help the them be more prepared to overcome possible obstacles. By brainstorming the bigger picture, the analysis gets a context

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[12]The Center for Immigration Studies Website - accessed on 01.07.2014

for a more detailed planning which will unfold possible threats, in time to avoid them, and opportunities, in time to take advantage of them.

- **Cost effective** This type of analysis does not require expensive software or hardware, or special training. Conducted on a high level standard, it can become the starting point of a much thorough analysis, with focus on the factors that have a direct influence on the outcome of the project. This is not to say that the analysis cannot stand on its own, without the need of a more detailed follow-up investigation.

Looking on how the framework is constructed and how an analysis that follows this framework will develop, we concluded the following disadvantages, or weak points for the STEEP-M framework:

- **Subjectivity** Since there is no mathematical formula, or generally accepted guidelines, analysts rely on assumptions and hypothesis that they make from the gathered information. Objectives measures of all the factors in the STEEP-M framework do not exist, and trying to come up with them would be Sisyphic work, since the operating environment changes so frequently. Newly emerged influences are the global warming, the Internet, the Arab spring, Big Data, and the list continues.

- **Paralysis by analysis** Given the amount of information available on the Internet, analysts need to be able to scan through it without forgetting that the purpose of the inquiry is to discover those factors that will pose a risk to the desired outcome of the project. In 2010, the Economist[13] stated that the amount of digital information increases ten times every five years. We are no longer faced with information scarcity, but have to deal with its opposite, information explosion. The change from information generated and stored manually to digital information has brought to light a new concept, of BIG DATA and has raised new challenges for Information Management.

- **Data quality** The information drawn from external sources can be treated as knowledge, regardless of their source. Also, users prefer the first found information and since quality external data sources are either costly or time consuming, the first found information might not be most reliable one.

- **Regular updates are needed** Since the operating environment (the business environment) changes frequently, even more in this digitized world, the analysis needs to be updated and adapted to present events. Only by doing this it will be a valuable asset in the decision making process.

2.5 How to reduce the disadvantages of the STEEP-M framework

It is important to understand that there is no right way of reducing the disadvantages of this framework. If this was the case, then they will not still be disadvantages, and the framework would work smoothly and with no weak points. Like in many analysis projects,

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[13]The Economist website - accessed on the 05.05.2014

there are certain actions that can make the process as reliable as possible. For the STEEP-M approach we consider the following: *hiring a competent project manager, using cross functional teams, using casual linkages, setting deadlines.*

The following visualization of the actions and disadvantages helps for a better understanding of the proposals we make for minimizing them.

Table 1: Disadvantages of the STEEP-M framework and mitigation actions

Action ⟍ Disadvantage	Hiring a competent PM	Using cross functional teams	Using casual linkages	Setting deadlines
Subjectivity	■	■		
Paralysis by analysis			■	■
Data quality	■			
Regular updates	■			■

- Subjectivity can be overcome by having a qualified project manager that can identify the relevant events noted in throughout the analysis that will have an impact on the desired outcome. The project manager should not be short or narrow minded and have at all times in mind the project's vision. Another way of minimizing subjectivity is by using cross functional teams to get a more in depth view of the subject under analysis. By bringing together people with different backgrounds and view points, the data that will be included in the analysis will be filtered through many mindsets and therefore less subjective to one perspective that could jeopardize the decision making process.

- Paralysis by analysis can be reduced by using casual linkages. Whenever the amount of information gets too overwhelming, the analyst can categorize the identified factors and link the ones that have the most in common under the same category.

  Also, the paralysis by analysis can be minimize by using deadlines to keep the analysts on track and have deliverables to hand in. Based on those deliverables, the project manager can set the focus of the analysis, and come up with guidelines to aide the person conducting the analysis in the right direction and not get lost in the amount of information.

- Data quality can be managed also with the help of a project manager. He is responsible for the information that will end up being part of the end analysis and influence the decision. The project manager can pass the final judgement on the factors, can establish guidelines to help the analyst identify the right information, or can do both. It is also part of the PM's responsibilities to manage the budget and time allocated for the analysis and attribute more, if necessary to the STEEP-M analysis.

- Regular updates should become part of the company's /organization's ongoing processes for keeping track of the current changes in the environment. Risk analysis should be an ongoing process, not only in the beginning of a project, in order to identify its possible weak points. Moreover, used frequently, the framework can help unravel emergent threats or opportunities more easily and thus have the organization react quickly to them.

In order to make the framework more reliable, we also propose to add measurements to our STEEP-M analysis, based on the potential impact (high, medium, low), time-frame (0-6 months, 6-12 months, 12 months +), type (positive, negative, neutral). [14]

To conclude, we decided to use this framework because it provides a structured approach for identifying the most important domains from where risks can emerge and influence the project. It helps identify those projects that are more likely to fail due to external risks and avoid investing in them from the very beginning.

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[14]Health Knowledge website - accessed on the 5.05.2014

3 Risk definitions that follow the STEEP-M framework

The third chapter of the thesis will elaborate on the six dimensions of the selected framework for risk analysis. We conducted another literature review to find relevant definitions of each dimension in order to get a better understanding of how to use the framework. There was no predetermined number of definitions to be included in the investigation, but each reasoning had to be finalized with a working definition.

The working definition was either selected among the definitions found throughout the research or as a result of our own interpretation of the findings. The end result has to fit the purpose of this thesis and help correctly assess the risks of E-participation within the E-governance context.

3.1 STEEP-M dimensions defined

This subsection will present the findings of definitions for each dimension of the framework. An evaluation and analysis of the findings will be conducted with the purpose of choosing a working definition for each element.

3.2 Social Risk

Includes aspects related to the culture, population, health, etc. as well as trends in both social and cultural factors, like changes in population, distributions, and demographics, and the impact of different mixes of cultures. The social attitudes to changes in the environment resulted for example from government policies.

In deciding on a working definition for social risk, the two definitions of social risk that we established as being relevant to the research and included in the analysis both underline the importance of the distinction between old and new social risk. Moreover, a third definition was included, of demographic risk, which we consider to be part of Social Risk, in order to bring the build a better understanding of the term.

To start with, Armingeon and Bonoli (2007) makes the distinction between old and new social risk. They analyse it from a welfare perspective and identify as important old social risks the ongoing disposition of people to get "sick, disabled, and unemployed". As for the new social risk, the authors highlight family instability, trends in earning inequality, labour market instability. Also, they enumerate the following new social risks:

- Reconciling work and family life
- Single parenthood
- Having a frail relative
- Possessing low or obsolete skills

Daraio (2009) say that "social risks emerge at the intersections between the different life dimensions of an individual. There are three relevant dimensions: family, labour market, and welfare." According to the report, changes in more than one dimension lead to inequalities. Among the social risk factors, the report includes: changes in demographic structure and in patterns of behaviour; the diffusion of atypical jobs (part time and temporary) and a high level of unemployment; globalization and technological progress. They also mention the new social risks found in the literature and in Armingeon and Bonoli

(2007): reconciling work and family life; single parenthood; having a frail relative; possessing low or obsolete skills. Moreover, three other factors are suggested as having an influence on the evolution of social risks:

- "Transition to a post industrial and knowledge based economy", because according to the same authors it "has tightened the link between education and employment and has widened the gap between high skilled and low skilled workers";
- Labour market transformation (greater flexibility and destabilisation of workers, since work stability is not as easily obtained by employees as it used to be in the past), earnings inequality and labour market instability
- Changes in size and composition of families (decrease in the number of large families, dual earners couples, and one parent family represent challenges and transformations that will impact how social risks are being analysed.)

Demographic risk, part of social risk, is being explained by Strack et al. (2008) as follow: "around the globe, workforces are steadily ageing, thanks to declining birth rates and the growing of the baby boom generation. Soon, boomers will be retiring in droves, taking critical knowledge and skills with them. And older employees who remain may become less productive[..] In coming years, corporations will face two categories of demographic risk: risks having to do with retiring employees and risks having to do with ageing employees."

To conclude, as a working definition for social risk that fits the purpose of this paper will be one that incorporates all three meanings and explanations given by the previous mentioned definitions. Therefore, **we will define social risk as events that disrupt the current social conditions. The event will have to be relevant to one of the three dimensions: family structure, labour market, welfare, or demographic structure. Thus, leading to disruptions in the form of changes in demographic structure and in patterns of behaviour; the diffusion of atypical jobs (part time and temporary) and a high level of unemployment; globalization and technological progress.**

3.3   Technological Risk

Includes factors like technology incentives, technological change, R&D activity, etc. The technological dimension of the framework looks at the current and emerging technologies that are relevant to the analysis taking place. The tendency is to investigate only on software trends (focus on the digital and internet related areas), but hardware trends are not to be disregarded since they also pose risks to meeting the goals of the project.

Stoneburner et al. (2002) provides the following interpretation in one of the steps used in assessing risk: the determination of risk for a particular threat/vulnerability pair can be expressed as a function of:

- The likelihood of a given threat-source's attempting to exercise a given vulnerability
- The magnitude of the impact should a threat-source successfully exercise the vulnerability
- The adequacy of planned or existing security controls for reducing or eliminating risk.

Gardner and Gould (1989) states that risk is evaluated with the help of three aspects related to that specific technology: "(1) their catastrophic potential, (2) how much

people dreaded them, and (3) the degree to which they were understood by scientists and technologists". Thus, technological risks arise from the impact that technology has, how it is perceived by its stakeholders, and from how it is understood by them (if the technology is new or complicated).

Smith et al. (2004) defines technology risk as "the risk that the project will not achieve its objectives due to an underpinning technology not maturing in the required time frame". The same paper makes the distinction between technology and technical risk, with the later being defined as "the likelihood that the system will not reach its goals for capability performance, cost or schedule due to technology risks, to risks which arise in the integration of critical technologies and/or sub-systems dependent on them, or to the system integration into the ADF (Australian Defence Force)."

Orman (2013) doesn't define technological risk, but discusses its implications and consequences. "Risk rises when many technologies are introduced in rapid succession and their social effects interact with each other, leading to compound effects". Moreover, he states that "the real issue with all technologies is that they introduce risk. The risk is difficult to estimate at the time of adoption, and it may be too late to alleviate the ill effects after the adoption."

Having these four perspectives and papers in mind, **the working definition for technological risk to serve the purpose of this thesis from now one will be the likelihood that the system will not reach its goals for capability performance, cost or schedule due to technology risks, or its user-friendliness attributes (how it is understood by all its stakeholders).**

3.4 Economic Risk

Characterized by the influence that economic factors like exchange rates, inflation rate, etc. have on how the business operates or makes decisions. Other factors to be included in this section of the framework are: interest rates, monetary policies, economic growth rates, levels of unemployment, from a governmental perspective or funding mechanisms and streams, internal funding models, budgetary restrictions,pr business directives from the business's perspective.

Three papers were selected from peer reviewed articles that either elaborate on economic risk or just mention it briefly.

Meldrum (2000) defines economic risk as "a significant change in the economic structure or growth rate that produces a major change in the expected return of an investment. Risk arises from the potential for detrimental changes in fundamental economic policy goals (fiscal, monetary, international, or wealth distribution or creation) or a significant change in a country's comparative advantage (e.g., resource depletion, industry decline, demographic shift). Economic risk often overlaps with political risk in some measurement systems since both deal with policy."

From an accounting perspective, economic risk is defined by Galasyuk and Galasyuk (2007) as "not an abstract "uncertainty" or "possibility of failure" or changeableness (variability) of the outcome. The economic risk is a monetary amount which might be under-collected and/or over-paid"

WorldEconomicForum (2014) defines economic risk as "risks in the economic category include fiscal and liquidity crises, failure of a major financial mechanism or institution, oil-price shocks, chronic unemployment and failure of physical infrastructure on

which economic activity depends." Examples of such risks are income disparity, fiscal crises, failure/shortfall of critical infrastructure, failure of a major financial mechanism or institution.

Considering the three perceptions, we conclude towards a working definition to be used from now onward. **Economic risk is a change in the economic structure that influences in a negative way the expected return of an investment.**

3.5 Environmental Risk

Ecological and environmental factors which have an impact on how business operates and/or on the decision making process. Example: climate change, water, limited natural resources, waste disposal, recycling procedures etc. Also included in the analysis are the factors which may have an impact on climate change since they influence how companies and organizations work, with consequences for market structure.

Since the papers and definitions were straight forward and the concept itself of environmental risk is interpreted the same way throughout the literature, we decided to go include only two definitions to help us build the working definition for this thesis.

Therefore, Jones (2001) states that "environmental risk refers to the damage degree of emergency environmental pollution accidents to ecological environment system. It is an emerging field in environmental protection, coupling with the urgent demand of environmental protection and the inevitable consequence of subject developing of environmental science. It indicates the strategic turning of environmental protection, from "treatment after pollution" to "forecasting and effective management before pollution". It draws more and more attention from national environmental protection agencies and related researchers."

In Ting et al. (2010) paper we find that "environmental risk refers to the harm extent of emergent accidents to environment (or health) during the process of constructing, producing and living. Environmental risk can be described by Risk Value (R), which can be defined by the product of the Risk Probability (P) and the Harm Extent (C) to environment (or health).

$$R = P * C$$

We can see that environmental risk includes two aspects: one is the probability that the risk may happen and the other is the harm extent that the risk may cause."

Based on the above mentioned explanations and having in mind the working definition for risk in general that we selected in chapter 1 (Risk = (A; C; P); where A = events, C = consequences of A and P = probabilities), the working definition for this thesis will be the one given by Ting et al. (2010), **Environmental risk can be described by Risk Value (R), which can be defined by the product of the Risk Probability (P) and the Harm Extent (C) to environment (or health), with the equation R=P*C.**

3.6 Political & Legal Risk

We decided to take Political and Legal dimensions together because they complement each other. Political factors refer mainly to attitudes and approaches. On the other hand, the legal factors are the ones that have become regulations and have to be complied with.

Political factors are not mandatory to abide by, but have to be taken into consideration since they shape the risk environment.

Political risk is determined by the degree of political stability and how political parties react to current movements. This leads to government's involvement in the economy, in areas like trade, tariffs, labour market, etc, involvements that are analysed in relation to the business's/organizations'/ project's objectives. Legal risks include the different laws which influence the same objectives, for example employment laws, consumer laws, discrimination laws, etc.

We decided to include four definitions of political risk in our analysis for choosing a working definition.

Kobrin (1979) present the definition given by Weston and Sorge (1972) for political risk "which arises from the actions of national governments which interfere with or prevent business transactions, or change the terms of agreements, or cause the confiscation of wholly or partially foreign owned business property."

Fitzpatrick (1983) presents political risk by highlighting political nature. He states that "usually political events or constraints imposed at the specific industry or specific firm level. The political events typically are changes in government or heads of state and violence, both focused and non focused, such as riots. Constraints on the firm typically encompass expropriation, restrictions on remittance of profits, discriminatory taxation, and public sector competition."

Meldrum (2000) defines political risk as "risk of a change in political institutions stemming from a change in government control, social fabric, or other non-economic factor. This category covers the potential for internal and external conflicts, expropriation risk and traditional political analysis."

Bekefi and Epstein (2006) states that "generally, political risk can be understood as execution of political power in a way that threatens a company's value. Two types of political risk are relevant to companies doing business internationally: industry- or firm specific political risk and country-specific political risk. On the one hand mass anti-government protests, then, may not pose a political risk to a firm if they do not affect a) government policies towards business, or b) the firm's current or future operations or value. On the other hand, changes in the legal framework governing contracts could have a significant negative impact on the company."

All four perspectives are similar and they converge towards one view of the term political risk. Therefore, we decided that the thesis working definition for political risk from now on will be **risk that arises as a result of political changes or instability in a country's political scene, and which has consequences on the desired outcomes of an investment or project.**

We decided to add legal risk to this part of the framework because we consider it to be complementary to political risk. Legal factors represent the applicability of political factors. The actions taken by the government are put in a legal/ regulatory structure.

Terblanche (2012) states that "legal risk includes, but is not limited to, exposure to fines, penalties, or punitive damages resulting from supervisory actions, as well as private settlements."

Mahler (2007) on the other hand highlights the importance of uncertainty when defining legal risk and links it to legal uncertainty. He states that "a risk is a legal risk if its source involves a legal norm. Thus, the risk needs to be the manifestation of a legal

norm's potential detriment. Both factual and legal uncertainty may influence legal risk."

To conclude and decide on a working definition, we agree with Mahler (2007) on **legal risk being defined by uncertainty, it involves a legal norm and it is the manifestation of the possible damage caused by that norm**.

3.7 Military Risk

Federation of American Scientists (FAS (2011)), when talking about risk, military risk mentions also the existence of "a hazard, danger, or peril; exposure to loss or injury; the degree of probability of loss.[] A measure of the extent to which a recommended countermeasure has been historically effective in eliminating vulnerability, given a certain level of susceptibility and threat. Risk is characterized by the probability and severity of a potential loss that may result from hazards due to the presence of an enemy, an adversary, or some other hazardous condition."

Moreover, the paper discusses risk as a measure of the inability to achieve program objectives within defined cost and schedule constraints. Risk is associated with all aspects of the program, e.g., threat, technology, design processes, work breakdown structure elements, etc. It has two components:

- The probability of failing to achieve a particular outcome.
- The consequences of failing to achieve that outcome.

In dealing with such risk, Briggs (2012) states that "military planning does take into account probable risks, but very often contingency planning is also made for events that are of unknown probability, yet entail severe consequences. The priorities in military training and education are to reduce surprise when possible, and to prepare appropriate responses for when novel conditions and situations are encountered.Risk also functions according to uncertainty, where greater uncertainty surrounding a potential action translates into greater risk."

United States Department of Defence (DoD (2011)) also defines risk as "the probability and severity of loss linked to hazards". Among the characteristics of risk, it mentions the degree of risk, which are defined as "specified by the commander, the risk to which friendly forces may be subjected from the effects of the detonation of a nuclear weapon used in the attack of a close-in enemy target; acceptable degrees of risk under differing tactical conditions are emergency, moderate, and negligible."

From this perceptions and definitions of risk, we selected as base definition given by the Federation of American Scientists, where risk is **"the probability and severity of a potential loss that may result from hazards due to the presence of an enemy, an adversary, or some other hazardous condition."**

3.8 Risk Matrix assessment

Going through all six dimensions of the framework and identifying relevant risk factors from the external environment gives an overwhelming amount of information, difficult to visualize. In order to correct this, we will use a Risk Matrix to plot the factors from each dimension.

We choose this approach because it is a simple and efficient way of placing risks on a matrix, which follows our base definition of risk, decided upon in the first section:

"**Risk = (A; C; P); where A represents the events (initiating events, scenarios), C the consequences of A, and P the associated probabilities.**"

The two criteria used to plot the factors are probability and consequences. Probability is based on the likelihood of that factor occurring and it will be measured on a scale of 0 to 1, and split into five categories:

- Rare with weights assigned from 0 to 0.1, which are not expected to occur during the execution of the project
- Unlikely from 0.1 to 0.25
- Moderate from 0.25 to 0.5
- Likely from 0.5 to 0.75
- Almost certain are events expected to occur during the development of the project from 0.75 to 1

The second criteria is based on the evaluation of the consequence of that risk and is measured on a scale from 1 to 100, split also into five categories:

- Insignificant ranked on a scale from 0 to 10 and considered to have a low impact on the outcome of the project;
- Minor consequences are those that will influence in an almost insignificant amount the project, but should still be considered, and are ranked from 10 to 25;
- Moderate are ranked from 25 to 50 and are those that pose a threat to the project, but the threat is not significant neither in size nor in depth;
- Major consequences are ranked from 50 to 75 and lead to great loss and hinder the success of the project significantly.
- Catastrophic ones are ranked from 75 to 100 and are, as the name states it, the ones that will add delays to the development of the project and has the potential of stopping the project all together.

By using a Risk Matrix, we will improve the visualization of the risk making it easier to prioritize them. However, the tool has limitations as well, most of them being linked to the ones discussed for the STEEP-M framework (**??**). Subjectivity is, once again, a downside of both the framework and the visualization tool since there is no mathematical formula or function for weighting the risks or assign numbers for probability or consequences. Informed assumptions and details about the judgement used to assign weights and plot the risk factors needs to accompany each Risk Matrix, so that the reader understands the reasoning behind the decision. Linked to this disadvantage is the one concerning the quality of the data used to assign the weights and plot them accordingly. A drawback which can be tackled by using the same methods as for subjectivity: accompany each matrix with explanations about the decisions taken.

4 e-Governance

The chapter is split into two parts: first it will address the concept of e-Governance, after which, it will define and position e-Participation within e-Governance.

Thus, the first part will present and analyse the definitions found in the scientific articles and considered relevant to this thesis. For a better understanding, and as a subsection, the main characteristics of e-Governance will also be highlighted; they were identified following an unstructured literature review. Our analysis brought to light a common misunderstanding between e-Governance and e-Government which we will address and clarify in one of the subsections of this chapter. The reasoning which we followed for the first part of the chapter ends with a positioning of e-Governance in the current context. We followed the approach of Misuraca (2007) on the contemporary context and considered as its main attributes *globalization, economic competition and state transformation*.

The second part of the chapter investigates on the main movements, or trends, of e-Governance, and identifies e-Participation as being one of them. It will then follow the same reasoning as the first part of the chapter, with an unstructured literature review that presents and analyses the definitions and characteristics of e-Participation, followed by its main characteristics. The last part will position the concept in the context of e-Governance and give reasons as to why is it important to have a risk analysis of it.

4.1 Defining e-Governance

Firstly, we need to clarify the concept of governance, which is defined by UNESCO as "the exercise of political, economic and administrative authority in the management of a country's affairs, including citizens articulation of their interests and exercise of their legal rights and obligations."[15]

Based on this definition, again UNESCO defines e-Governance as "the performance of this governance via the electronic medium in order to facilitate an efficient, speedy and transparent process of disseminating information to the public, and other agencies, and for performing government administration activities."[16]

The Council of Europe defines e-Governance as "the use of information technology to raise the quality of the services governments deliver to citizens and businesses. It is hoped that it will also reinforce the connection between public officials and communities thereby leading to a stronger, more accountable and inclusive democracy".[17]

The two definitions give straightforward explanations about the term and it coincides with our perspective as well. Therefore, e-Governance represents an improvement of governance, which, with the help of ICT, brings new benefits to the relationship government-citizens-business. It improves the access to information and the quality of the services provided by the government, which leads to simpler, more efficient and effective ways of reaching its objectives. This helps meet the current demand of having a governance that mirrors the modern methods of operating, while increasing accountability and participation for all three parties of the relationship (government, citizens, business).

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[15]UNESCO Website - accessed on 07.05.2014

[16] idem

[17]Council of Europe Website - accessed on 07.05.2014

4.1.1 Clarifications of common misconception

The most common confusion is made between e-Governance and e-Government. In order to clarify it, we are looking into the definitions of e-Government proposed by either organizations or the scientific literature.

Therefore, the Canadian Journal of Administrative Sciences According defines e-Government as "the next step in the natural evolution of how government services respond to changes in the broader economy and society", or more simply put, "the application of the tools and techniques of e-Commerce to the work of the government".(Howard (2001))

Fang (2002) also defines e-Government as an evolution step, more specific, as "a way for governments to use the most innovative information and communication technologies, particularly web-based Internet applications, to provide citizens and businesses with more convenient access to government information and services, to improve the quality of the services and to provide greater opportunities to participate in democratic institutions and processes." From a technological perspective, e-Government focuses on the infrastructure, the solutions and the exploitation of public portals, services or policies.

Palvia and Sharma (2007) makes a distinction between the two terms based on their focus. While e-Government is focused on the outside, managing interactions between governmental agencies, citizens, and business ; e-Governance is concerned with the management of organizational resources (like capital, material, machines, human capital) and the policy making process. E-Government handles the delivery of online services to and from external stakeholders, e-Governance is more concerned with the relationships that forms between those stakeholders.

This being said, e-Governance can be considered a wider concept than e-Government, since it can bring about a change in the way citizens relate to governments and to each other. E-Government is focused on the administration and delivery of online services, while e-Governance is focused on the online services characteristics, their quality, and implications. E-Governance represents the necessary steps that governments have to take in order to have a successful implementation of the services provided by e-Government. Therefore, both terms complement each other, with e-Government having a more narrow meaning and area of applicability than e-Governance.

4.1.2 Positioning e-Governance in the current environment

Since the scope of the thesis is to assess the STEEP-M framework of risk environment analysis, we consider that it is important to identify the factors which lead to the development of e-Governance and that are still influencing it. Based on Misuraca (2007) (page 67) and Rossel and Finger (2007) we identify four influential phenomena: **globalization, economic competition, technology evolution, state transformation**.

Globalization has been bringing people closer by encouraging and supporting easy access and constant exchange of products, goods, services, information, knowledge, and culture. In many views, globalization represents human progress and even though it introduces benefits like economic growth and widely available information, it also raises challenges and problems that range from exploitation of labour, or unfair economic gains to disease spreads. However, it is a phenomenon that once set in motion cannot be stopped and it influences every aspect of our lives, with governance being one of them. Easier information access and sharing, along with broader products, goods and services availability has increased the quality of life and has brought new demands from all stakeholder for the

political operating methods. The step from governance to e-governance can be attributed to these new demands.

Economic competition can be said to have been brought on by the previous phenomena. Nevertheless, it has become a prominent presence in daily proceedings and influences service and product quality, price and distribution, as well as costs levels and innovation engagement. Economic competition has had an impact not only on the business environment but also on the political one, with governments competing among each other or competing with themselves, trying to achieve progress as often as possible.

Technology in the form of tools, machines and crafts has been around for centuries, while technology as information technology is representative more for modern society. From the inception of the Information Age onwards, technology has evolved at an impressive rate, creating new fields and applications of it, like the Internet, Computer Science, Telecommunications, etc. Becoming such a constant presence in daily operations and domains like education, medicine, communication or business, technology has also influenced how governments perform. By becoming part of the governmental operations, technology is transforming governance in e-Governance, as the definitions presented in section 4.1 describe it.

State transformation is explained by Misuraca (2007) in three dimensions: growing number of non-state actors (like transnational corporations, non-governmental organization, multinational organization, that forces governments to share power), growing number of levels of managing public affairs (supra-national -EU, continental union-, infra-national -local, regional-), growing differentiation of the main functions of the State (service delivery, rule-making, regulatory, which are becoming more separate and can be shifted and attributed to different actors or different levels). These transformations prove that the state is a living organism that adapts to current conditions and changes in the environment. E-Governance is one way of supporting all three dimensions and ensuring that political operations reach their goals.

4.2   Defining e-Participation

Galligan and Roberts (2007) talks about "the lack of terminology unity" and the "overlapping meaning" between the terms that use new communication technology. Examples of such terms include e-Democracy, cyber-democracy, online democracy, virtual democracy, online governance, tele-democracy, e-Participation and e-Deliberation. Of those, this thesis deals with the term of e-Participation, more specifically, e-Participation in the European context. Therefore, the definition of the term is going to be the one given by the EU, "the means of ICT-supported participation in processes concerning administration, policy making, decision making, service delivery, information provision, consultation, deliberation, etc." [18]

Misuraca (2007) defines e-Participation together with e-Democracy as complementary concepts to e-Governance, that "deal with how the citizens interact with government and influence the legislative or public sector"(Macintosh (2004)). Moreover, it has the potential to empower citizens, through active participation, as well as to help distribute power among politicians and citizens, and not having it concentrated only in the hands of the policy makers.

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[18]The Interregional Cooperation Programme on e-Participation Website - accessed on 9.05.2014

Objectives of e-Participation

In order to get a cleared definition of what e-Participation is, we followed the reasoning of Macintosh (2004) and its findings on the OECD book "Citizens as partners: Information, Consultation and Public participation in policy-making". It defines as main objectives of e-Participation the following:

1. reach a wider audience to enable broader participation;
2. support participation through a range of technologies to cater for the diverse technical and communicative skills of citizens;
3. provide relevant information in a format that is both more accessible and more understandable to the target audience to enable more informed contributions;
4. engage with a wider audience to enable deeper contributions and support deliberative debate.

In trying to understand how e-Participation reaches these objectives, different authors and institutions as well have broke the concept into three phases, or steps. Thus EU divides it into three major levels: Information (informative public participation); Consultation (consultative public participation); Cooperation (cooperative public participation). This view is supported by Macintosh (2004) that identifies from OECD also three levels of e-Participation: Information (one-way flow of information, from government side to the citizens and communities); Consultation (two-way flow of information, where citizens are encouraged to contribute to the policy making process, similar to a feedback); Active participation (where citizens are not only consulted on policy matters, but they are engaged in the process and set agendas for discussion, even though the final decisions are made by the government).

Secondly, Misuraca (2007) and Macintosh (2004) set as main characteristic phases of e-Participation the following three: e-Information, e-Consultation and e-Decision Making. These levels define the flow of information between the decision maker (policy maker) and the users. E-Information gives a one way flow in which "government produces and delivers information for use by citizens" (Macintosh (2004)). E-Consultation represents a "two-way relationship in which citizens provide feedback to government.[..]Governments define the issues for consultation, set the questions and manage the process, while citizens are invited to contribute their views and opinions." (Macintosh (2004)). E-Decision Making, or "Active Participation" represents "a relationship based on partnership with government in which citizens actively engage in defining the process and content of policy making. It acknowledges equal standing for citizens in setting the agenda, although the responsibility for the final decision rests with government"(Macintosh (2004)).

The three perspectives (EU, Macintosh (2004), Misuraca (2007)) have the same reasoning for characterising e-Participation and divides it into three phases, all of them focused on the relationship citizen-policy maker. The first one is about bringing information closer to the citizens, the second one gives citizens the means and tools to give their feedback about the information received in the first step, and a third phase which allows citizens to have an active role in the policy stream by making their own proposals and taking a stand for what interests or influences them.

4.3   Importance of e-Participation projects

Glidden and Ruston (2013) correctly states that "many governments today recognize that to deliver effective public policy they need to enhance citizen and community

involvement in the policy making process, particularly amongst the socially disadvantaged and hard to reach."

Digital technology and digital tools are affecting and transforming everything we do. Internet and ICT in general can help make the transformation from Governments to e-Governments. Dutta and Mia (2010)identifies (in Chapter 1.5. Fostering the Economic and Social Benefits of the main advantages of ICT)the benefits of the ICT industry that range from economic growth to better healthcare (by improving the quality of the medical services through patient-tailored assistance, by facilitating healthcare professionals communication, by improving patient safety with complete medical history ready available, etc.), better education (by improving access to remote learning resources, by overcoming the limits of time and space, by improving communication channels, by increasing the quality of lessons taught, etc.), better government(by increasing citizen's access to information, by customizing the services provided and enhancing their quality, by conferring transparency to the political system, by increasing responsibility and accountability of both citizens and governments, etc), while minimizing costs, bureaucracy and corruption. The tools brought forth by ICT also bring new ways for citizens to stay informed, to communicate, and to connect. Neelie Kroes, the Vice-President of the European Commission responsible for the Digital Agenda spoke at the Local and Regional Information Society Conference, on the 7th of April 2014 about the importance of having a connected continent that supports top-quality e-Government. She stated that as the digital world moves forward, so do the needs of the citizens, which will have to be met by government. As the continent becomes connected, open and secure, it is part of the government's responsibilities to build confidence and cut confusions. By encouraging the development of potentially successful e-Participation projects, the EU is making the policy stream easier to understand and influence in an active way by both citizens and communities.

Nonetheless, opinions are divided and Millard et al. (2009) gives the three different perspectives on e-Participation. "Some see e-Participation as a saviour to many democratic challenges, others as a threat particularly because of digital divide challenges, whilst others see it as largely irrelevant." However, there is a constant need for a better decision making process and a better communication between governments and citizens, which can be addressed by e-Participation projects.

Bringing together 28 countries, an estimated population of approximately 510 million citizens, speaking 24 official languages, the EU is confronted with a complex method of operation which is leading to democratic deficit.[19] The complex operating method is indicated by the vast array of institutions (the European Parliament, the Council of the European Union, the European Commission - the three representatives of co-decision -, the Court of Justice of the EU, the Court of Auditors, the European Central Bank, the European External Action Service, the European Economic and Social Committee, the Committee of the Regions, the European Investment Bank, etc[20]), the law making procedure ("the Commission proposes new laws, and the Parliament and Council adopt them. The Commission and the member countries then implement them, and the Commission ensures that the laws are properly applied and implemented[21]"), and its unique political nature as both an international organization and a supranational one. Moreover, EU is constantly changing and adapting to political landscape, and democratic deficit is one

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[19]European Union Website - Legislation Summaries - accessed on 06.05.2014

[20]European Union Website - about Institutions - accessed on 06.05.2014

[21] idem

of the challenges that the current landscape is posing. An answer to this problem is e-Participation, which is enabled by ICT and "makes governments more democratic and participatory through new channels for democratic involvement".(Millard et al., 2009)

However, not every e-Participation project has been successful, states Sanchez-Nielsen and Lee (2013). The authors identify as main obstacles the lack of interest in policy issues or politics, low levels of trust in politicians, a large and diverse range of policy actors, varying levels of technical skill, a lack of integration of e-Participation strategy into actual government organisation structures, language difficulties or privacy issues. As they also highlighted, the problems are not from a technical perspective, but rather "the same old problems", like lack of interest in policy issues or politics, a complex policy making process with diverse and large number of actors, lack of trust in politicians, that stop people from being active citizens offline as well.

What makes a successful e-Participation project, according to Glidden and Ruston (2013) is if it succeeds in "bringing public authorities, civil society leaders and community representatives together to foster social cohesion and community bonds in the culturally diverse neighbourhood" of the European Union.

If it achieves all those goals, an e-Participation project brings many benefits, identified by Smith (2008). Among them are the following: tapping into "local" knowledge and innovation, increasing awareness and understanding, reducing transaction costs, making policy more enforceable by embedding it in social norms, increasing social inclusion or cohesion, making programmes more sustainable by generating community ownership, etc.

Nevertheless, an e-Participation project has to be successful in order to deliver all those benefits. The rate of success of the project increases if there is an accurate and complete first assessment. Projects that apply for founding from the European Union have to deliver a thorough plan of all specifications, requirements, and desired outcomes; this represents the inside view of the project. We consider that an outside view of the project is also needed in order to correctly assess it and thus, the STEEP-M risk analysis framework is design to fit this purpose.

In order to evaluate the viability of the framework, the "Puzzled by Policy" e-Participation project will be run through the STEEP-M framework. The results will then be compared with the Evaluation Reports submitted to the European Union after the end of the project, at the end of 2013.

In doing this we are aiming at answering the following question:

Is the STEEP-M risk analysis framework a reliable tool for identifying external risks for an e-Participation project?

If the STEEP-M framework can provided the correct evaluation of possible risks of the e-Participation project, it can be adopted as a continuous process for assessing external threats. The overall success rate of the projects using it will increase since they will be able to spot raising uncertainties and address them accordingly. This will encourage and sustain future e-Participation projects, which, as stated before, are part of e-Governance, and can, therefore, improve the overall deliverables of e-Governance.

5 Risk analysis of Puzzled by Policy using the STEEP-M framework

This chapter will investigate on the risk analysis of e-Participation project "Puzzled by Policy" following the STEEP-M framework and with the defined steps for a risk analysis (risk assessment, risk management, and risk communication).

By using the working definitions established in the third chapter we will analyse the risk environment of PbP through all the six levels of the STEEP-M approach. The analysis will be conducted on the 2009-2011 global scenery and will include risk factors from that period. Also, the research was done using time filters for papers, websites and articles written before 2011.

5.1 Description of "Puzzled by Policy"

The European environment has been faced with many changes from the Second World War onwards, most of them brought on by the European Union. With each enlargement, new challenges and transformations emerge: funding policies, enlargement policy (countries aspiring to join EU need to adhere also to its policies: Rule of Law, Freedom of Expression and media, Civil Society, Regional Cooperation), etc. "Immigration and migration" is also prone to frequent changes and adaptations to current conditions. It has been debated and tried to converge to a harmonized policy since the Amsterdam Treaty of May 1, 1999 when a new title head was introduces, "Visas, asylum, immigration and other policies related to free movement of persons".

However, the common policy is still not finalized and one approach to it and one of its other challenges (democratic deficit) is the "Puzzled by Policy" (PbP) project. To understand the need for such a project, the issue of "immigration and migration" has to be clarified, as well as the policy on the matter. The European University Institute, in one of the deliverables for PbP, Mavrodi et al. (2011), presented the different types of immigration recognized in the EU: immigration for employment purposes (paid employment and self-employed economic activity; entry and residence of third-country national researchers; admission of high-skilled workers; circular migration[22] and seasonal employment ; seasonal employment[23]; intra-company transfer of third-country national employees), entry and residence for studying purposes and vocational training; immigration for reasons of family reunification; long-term resident third-country nationals in the EU; illegal immigration (also known as irregular migration[24]), re-admission and return

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[22]The simple definition of circular migration given by Wickramasekara (2011) is "temporary movements of a repetitive character either formally or informally across borders, usually for work, involving the same migrants". Circular migration is always a form of temporary migration. From a policy perspective, European Commission defines it as "a form of migration that is managed in a way allowing some degree of legal mobility back and forth between two countries." - source EU Press Release database - accessed on 03.07.2014

[23]EU, more specifically the Eurofound defines seasonal employment, or work as "a form of temporary employment linked to specific periods of the year and sectors: for example, in agriculture (fruit pickers) or the tourist industry (cleaners, etc. in holiday resorts)." -source: Eurofound Website - accessed on 03.07.2014.

[24]The International Organization for Migration defines irregular migration as "movement that takes place outside the regulatory norms of the sending, transit and receiving countries" - source: International Organization for Migration Website - accessed on 30.06.2014

policies.

Figure 1: Puzzled by Policy logo

Given the complexity of the subject itself, the policy requires more attention and involvement from decision makers, policy makers and citizens. In order to do this, the project build on the three levels of participation identified by Macintosh (2004): e-enabling, e-engaging, and e-empowering. From these, three objectives dimensions for the project can be derived, with separate objectives (inform - consult - empower citizens), to be detailed later. However, the project has an overall goal, which is summarized in Sanchez-Nielsen and Lee (2013)'s paper as "to reduce the complexity of decisional making within the EU and reconnect citizens with decision makers and policymaking by introducing new technical applications to bring policymaking on the hot topic of "immigration and migration" to the citizens, stakeholders and decision makers in an engaging manner."

PbP is focusing on four pilot countries (Greece, Italy, Hungary and Spain) which represent two concerns of the subject. On one hand East European countries, preoccupied with its citizen's rights when relocating, they represent the origin country's point of view, and on the other hand, the Mediterranean countries that are dealing with a growing number of immigrants and minority community challenges, they represent the destination country's viewpoint. These two perspectives bring under the same umbrella the two regions of E.U. (East-West) and provide the project data from both angles.

The PbP was funded under the Information and Communication Technologies Policy Support Programme (ICT-PSP)[25] on the 3rd call for proposals, in 2009, under ICT for government and governance. The execution time span was from the 1.10.2010 to 30.09.2013, with a total cost of €3.89m, of which €1.95m were provided by the EU Sanchez-Niels et al. (2011), one of the deliverables of the project, states that the online platform will combine three e-Participation tools:

- EU Profiler where users will be informed about the current immigration policy. They are encouraged to take a stand by completing an online questionnaire and discovering their views against the current immigration and migration policy. The user's results are plotted on a scatter chart with that of the positions of all national and/or European stakeholders. This allows citizens to visualize their position and understand the immigration policy landscape, making it easier to engage in discussions.
- u-Debate works as a continuation of the Policy Profiler by providing the user with the environment to engage in debates and discussions. The tool is described as "a multilingual, pan-European deliberation forum, where participants can view,

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[25]European Commission Website on CIP - Competitiveness and Innovation Program - accessed on 30.06.2014

discuss, and share ideas on immigration policy." An important characteristic of the u-Debate is that the threads can be translated into any language.

- PbP widget helps raise awareness of the project, since it can be embedded and can thus serve as a viral distribution tool for the project.

A representation of the three tools can be seen in the English brochure[26] used to raise project notoriety and give users and stakeholders information about the project :

Figure 2: PbP tools representation

By using these three tools, PbP aims to make a positive contribution to the immigration and migration policy drafting by providing EU decision makers a structured and consolidated version of the citizen's views on the matters. By also encouraging decision makers to give feedback on the reports they receive, PbP ensures a two way communication stream between them and the citizens.

5.1.1 Objectives

The goal of PbP is "to help ensure that discussions surrounding immigration in Europe are as balanced, informed and inclusive as possible." PbP combines different media tools with researched and tested e-Participation concepts and tools, as well as Web 2.0 and mobile technologies. The main objective that PbP is trying to achieve is "to enable as broad and diverse a cross-section of citizens as possible to form and express their opinions about EU Migration and Immigration Policy."Glidden and Ruston (2013)

By focusing on the multi-stream model proposed by Kingdon and Thurber (1984) for correctly addressing a policy making process, and on the Macintosh (2004) categorization for levels of participation, the PbP splits the policy making process into two phases. However, the Macintosh (2004) levels are adapted to the PbP approach of Inform-Consult-Empower. The objective of PbP is to encourage a continuous process between the two phases and have target citizens participate in all sub-steps of each phase. Therefore, each level of participation is linked to a layer of the multi-stream model and its specific objectives:

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[26]Puzzled by Policy website - accessed on 30.06.2014

- Inform level (e-enabling) is correlated with Problem Stream since citizens are given up to date information on current issues. It also allows policy actors to get indirect feedback from citizens on what could become future problems based on user interaction with the e-Participation platform.
- Consult level (e-engaging) related to both Problem Stream and Policy Stream has the objective of activating the relationship between citizens (users of the platform) and policy makers by engaging both parties in top-down consultation sessions on the subject of "immigration and migration". At this level, problems may be redefined and new, undiscovered before solutions may emerge.
- Empower level (e-empowering) which is correlated with all three streams: Problem, Policy and Politics. At this level, the communication stream is defined as bottom-up and the objective is to allow citizens to have a direct influence on the policy-making cycle[27]. Users have direct influence over the policy actors and are able to determine them to act according to their needs by identifying the problem and proposing their visions for possible solutions. Citizens also have an impact on how the government agenda is set and how political interests impact the overall policy. Therefore, the goal is to have the policy window [28] accessible to citizens as well as policy makers, since they will be the ones influenced by the policies implemented by the latter group.

5.1.2 Stakeholders & Users

In general, the policy making process approaches to increase participation has two broad targeted user groups Sanchez-Nielsen and Lee (2013): **audiences who are willing but unable** and **audiences who are able but unwilling**. The first one includes the citizens who want to be active, but due to a series of reasons (language or cultural barriers, geographical distance, disability or socio-economic status) are unable. The second group consists of people who are able to participate, but who are either not interested in politics, or lack confidence in politicians.

The stakeholders of PbP are specific for each of the four countries (Greece, Hungary, Italy, Spain) and are from the following categories: Political parties, Guvernmental Organizations, Non-Governmental Organization (NGOs), Trade Unions, Industrialists, Labour Unions and Employer Organizations.

The project elaborates on its stakeholders in document D3.1 (Mavrodi et al. (2011)) where it explains the institutional dimensions and maps "the eco-system of stakeholders in immigration policy and their policy position both at the national and EU levels". As high level categories, the document identifies institutional actors, political parties, key decision-makers and actors of the civil society. The document then describes specific stakeholder for each country, which we will classify in the categories mentioned before.

"Immigration and migration" concerns more than one area of interest and has implications for both the economic and the social environment in a country. Therefore, we cannot divide between **institutional actors** and **actors of the civil society**, since they have to work in the best interest of citizens, government and business. Thus, by joining

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[27]Defined according to Giannakoudaki et al. (2013), "Best Practice Guide to Piloting" deliverable, as having six steps: agenda setting, drafting of policy, decision-making, implementation of policy, monitoring and reformulation of policy.

[28]"Unpredictable openings in the policy process that creates the possibility for influence over the direction and outcome of that process." Kingdon and Thurber (1984)

these categories, the stakeholders per country identified were *immigrant associations* (IT-The National Association Across Borders, SP - the Association of Immigrant Moroccan Workers in Spain, RUMINAHUI, Spanish-Bolivian, GR- Greek Forum of Migrants, HU-Hungarian association for migrants), *NGOs* (SP- ACCEM, Asociacin Comisin Catlica Espaola de Migracin, CEPAIM Foundation, Pro-Peace Movement; GR- Hellenic League of Human Rights; HU- DEMOS Foundation, the Hungarian Helsinki Monitor), *labour unions & employer organizations*(IT- Confindustria[29]; SP- General Union of Workers, The Workers' Commission, representing the employees, and Spain Confederation of Employers, Spanish Confederation of Small and Medium Sized Employers, representing the employers; GR- General Confederation of Workers of Greece), *trade unions* (IT- the Italian Confederation of Labour, GR- the Economic and Social Committee of Greece and *the representative churches of each country* (The Catholic Church of Italy, The Catholic Church or Spain, The Orthodox Church of Greece)

Another category of stakeholders is represented by **the political parties** of each country that included the policy in their program. Mavrodi et al. (2011) also explains their positions towards policies concerning immigration and migration. For Italy, political party stakeholders are the People of Freedom, the Democratic Party (PD), North League, Future and Freedom, Italy of Values, Union of Christian and Center Democrats. The Spanish Socialist Worker's Party and the People's Party for Spain (PP) represent the stakeholders from Spain in this category. For Greece the Panhellenic Socialist Movement (PASOK), New Democracy (ND), Communist Party of Greece (KKE), Popular Orthodox Alarm (LAOS), Coalition of the Left, Movements and Ecology (SYN). And for Hungary: Hungarian Socialist Party (MSZP), Movement for a Better Hungary (Jobbik), Christian Democratic People's Party (KDNP), Politics Can be Different (LMP); while FIDESZ - the young democrats who won the elections- don't address the policy directly in their program.

Key decision makers for each country will represent the political parties mentioned before, as well as the ombudsman (the public advocate) mentioned for Spain and Greece. They are considered key decision makers because they have the power to influence policies with their recommendations (In Spain, "based on the Ombudsman's recommendation the Law 2/2009 gave migrants the right to free legal aid" -Mavrodi et al. (2011) page 64)

At the EU level, stakeholders are described as Social Partners, and are defined by the representatives of the partners from the national level and also by "umbrella organizations". Union of Industrial and Employers' Confederations of Europe (UNICE/ Business Europe) is one of such organizations that gathers 40 industrial and employers' federations from 24 countries of the European Economic Area and the Balkans. The European Trade Union Confederation (ETUC) is also a social partner in the consultation process or the European Commission on legal and illegal immigration. ETUCs' collaborations brings forth another category of stakeholders, at the European level - NGOs: SOLIDAR and PICUM (Platform of International Cooperation on UUndocumented Migrants). Their collaboration on irregular immigration got support from the European Women's Lobby (EWM), the European Network Against Racism (ENAR) and the International Catholic Migraton Commision (ICMC).

As for end-users, Sanchez-Niels et al. (2011), document D4.1.1, of the deliverables,

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[29]the Italian employers' federation, which groups more than 113.000 voluntary member companies Mavrodi et al. (2011) -page 53

identifies the following four: the NGOs (that are trying to lobby the extension of clandestine immigrants to their own country back to 6 months, from 3 months), the anti-immigrant citizens; the pro-immigrant citizens; the decision-makers.

5.1.3 Technical Requirements & Implementation

According to the "Pilot Operation Plan" (Sanchez-Niels et al. (2011)), the implementation of PbP will take place in two stages, a first, technical set up working in parallel with raising awareness within the target group, and a second one which will focus on the e-Participation process by engaging users to participate, deliver results to decision makers and ensure their feedback.

The "Replication/User Manual" (Klitsi et al. (2012)) develops on the technical specifications of the implementation phase, previous to the official launch.

The PbP was developed on the DotNetNuke (DNN) framework with a modular architecture. The PbP modules configured with DNN are Policy Profiler, u-Debate, User management and Other utility. The first two included adjustable parameters with special configurations, like the questions for the Policy Profiler who's answers were plotted on scatter charts against the positions taken by the stakeholders. This module was linked with the u-Debate module by configurable algorithm in order to define which topic will be presented to the users after they complete the Policy Profiler. Moreover, the configuration can be updated according to the feedback received from the end users and the project stakeholders. The third module, user manual, included all information about the users, which is managed through the core "Html" module. The last module allows for configuration of the presentation layer with skins and containers.

The PbP web services (Get categories of a language; Get questions of a language for a specified country; Get countries of a language; Get languages; Get translations for a language; Get an answered questionnaire; Post an answered questionnaire) were implemented on the Windows Communication Foundation (WCF) and are mainly used by the PbP Widget which requires constant communication between the user and the PbP Server while being installed on a variety of platforms.

Both the DNN framework and the underlying database system need specific requirements in order to be deployed, as mentioned also in the Klitsi et al. (2012):

- Hardware specifications: CPU speed (Minium 2Ghz), Disc space (20Gb or more); RAM (Minimim 3GB); Internet connection (speed greater than 2Mbps).
- Software specifications: Windows Server 2008; MS SQLSERVER 2008; .NET 4; IIS 7 with WCF support enabled; DNN 6 framework.

The parameterization options of the modules makes it possible for two out of the three tools of the PbP platform, Policy Profiler and u-debate, to be linked to each other and provide the user a customized experience. The user's answers and the u-Debate topics are connected to each other and the main platform, which has uninterrupted connection with the Widget. This allows the project to better reach its target users as well as the three targets of the participation approach Inform-Consult-Empower, or as Macintosh (2004) names them: e-enabling, e-engaging, e-empowering.

5.2 STEEP-M risk analysis

This subsection will identify risk factors for the PbP project, from the 2008 -2009, when the project plan was written, to be submitted to the ICT-PSP 3rd call for proposals. An analysis of those risk factors will be conducted, based on the general definition agreed upon in section 1.2, **"Risk = (A; C; P); where A represents the events (initiating events, scenarios), C the consequences of A, and P the associated probabilities"**. Each factor will be plotted on the risk matrix and in order to do so, it will be evaluated and given an attribute for probability (almost certain, likely, possible, unlikely, rare) and consequence (insignificant, minor, moderate, major, severe).

The risk factors will be identified by analysing the risk environment from the beginning of the project (2008-2009) and based on Delakorda et al. (2011), deliverable [D4.2] of the PbP. In section 5 of [D4.2] the authors identify potential risks, weight their impact and probability and propose mitigation actions. However, the factors address "the Pilot Dissemination and Communication as well as engagement strategy that could endanger the implementation strategy", which gives a high level perspective of future uncertainties that may evolve into risks. Moreover, the authors do not separate between external and internal factors. The STEEP-M framework is focused on the external factors and will thus differentiate internal from external and concentrate only on the external ones.

To assess the level of risk, we proceeded in plotting the identified factors onto a risk matrix. The matrix model was developed with Stoneburner et al. (2002)'s matrix in focus and was inspired by some other risk management solutions and tools used for risk assessment. Some examples of such software, tools or methods includes ISCaDE PRO, System Safety Engineering, Safety Management Services, CGE Risk Management Solutions. Based on the working definition selected in section 1 for risk we established two dimensions - probability and consequence-, with five levels each: almost certain, likely, moderate, unlikely (for the first dimension) and insignificant, minor, moderate, major, catastrophic (for the second dimension). Weights will be assigned to each level as followed: for the probability dimension from 1.00 to 0.76 for Almost Certain, from 0.75 to 0.51 for Likely, from 0.50 to 0.26 for Moderate, from 0.25 to 0.2 for Unlikely and from 0.1 to 0 for Rare; and for the consequence dimension from 100 to 76 for Catastrophic, from 75 to 51 for Major, from 50 to 26 for Moderate, from 25 to 11 for Minor and from 10 to 0 for Insignificant. The weights will give a better visualization of the factors on the matrix, but because this is a qualitative method, they are not real mathematical representation of the reality. Given the infinite factors/ actors and events that exists or may surface in the future, unbiased numerical weights is difficult to assign and unrealistic of our part to assume that such and analysis will be fully objective. Therefore, the weights represent educated guesses from analysing the environment.

Each dimension of the framework will be analysed and relevant risk factors for the Puzzled by Policy project will be identified. Those factors will then be assigned weights, as discussed previously, and plotted on the Risk Matrix. However, due to the short time span and the overwhelming amount of information to be analysed, we will **focus mainly on the technological factors and propose mitigation actions for those that fall into the "extreme risk" category**.

5.2.1 Social Risk

As agreed upon previously, in section 3.2 social risk represents **the events that disrupt the current social conditions. The event will have to be relevant to one of the four dimensions: family structure, labour market, welfare, or demographic structure. Thus, leading to disruptions in the form of changes in demographic structure and in patterns of behaviour; the diffusion of atypical jobs (part time and temporary) and a high level of unemployment; globalization and technological progress.**

Therefore, using the risk working definition, we are analysing the risk environment and looking for events (A) that are in the area of family structure, labour market, welfare, or demographic structure. The consequences (C) will represent disruptions that those events cause in the social conditions, in the form of changes in the demographic structure and in patterns of behaviour; or changes in job structure which lead to atypical jobs or higher levels of unemployment; globalization with its social implications; technological progress with ramifications to the socio-cultural conditions.

The social risk factors were selected from the European environment. The relevant factors for the PbP project, as an e-Participation project, were selected based on the DemographyReport (2010) of the European Commission (from where the data was also selected), as well as trends found to be compatible with the 2008-2009 social context.

Therefore, the following factors (or events, as they were described in the definition) were selected for each of the four characteristics of the social dimension of the framework.

Changes in the **family structure** bring possible risks to the PbP project. Those changes are characterizes by fewer marriages and more divorces, with 2.4 million marriages and 1.2 million divorces in EU-27 in 2007 show a greater fragility of the marriage structure. This fragility and lack of trust can be interpreted also as a disbelief in the officialism of society, which may lead to a disbelief in the regulations in general, including political regulations. Extramarital births, lone parents and even childlessness all produce shifts in the current social conditions. The same applies for changes in household structure, with families becoming smaller (approximately 2.4 members per family), and young adults leaving their parent's house at an older age (40% of men aged 25 to 29 are still living with at least one parent and no spouse/partner). The household structure is also modified by the change in leadership, with women and men becoming equal in employment chances and career advances, they become equal also in private life decisions. These transformations produce alterations in the way society is organized and will influence also its values and beliefs. As people become more autonomous and independent, they are less inclined to trust politicians and policy issues, thus leading to fewer participants to the PbP project. As mentioned before, this is not specific for an e-Participation project, but it is stopping citizens from being active in the traditional political environment. However, the changes in family structure can be overcome by promoting e-Participation projects as empowering projects for citizens, that allows them to customize the policy making process. PbP should be promoted as a project that gives citizens the opportunity to get informed, consult and be consulted.

In order to plot it in the risk matrix, we have to assign a probability and a consequence level for the "family & household structure" social risk factor. We consider it to be unlikely to happen throughout the development of the PbP project, with minor consequences, since the possible problems are already known ("the same old problems"

of participation projects) and will require some disruptions in the process. The communication plan will need improvements and more aggressive promotion of the three levels (Inform, Consult, Empower).

From the **labour market** the following events occur and are part of the risk environment: improvements in healthy life expectancy enables workers to stay active and productive for a longer period of their life span which leads to changes in working time. By making it more flexible, it allows people to extend their education period,take occasional breaks in working years (sabbatical, longer vacations, or breaks to take care of family members), and make use of productive retirement through volunteering and engaging activities in the civil society. These new styles of working encourage also "circular migration" (defined in section 5.1), which reduces the available time that the worker has to get involved in policy making stream. PbP is tackling this issue with a PbP widget, that can be embedded into third party websites and social networks, and an online tool for debates, U-debate, which provides structured and facilitated online consultations. Therefore, in order to control this social risk, the usage of the PbP widget should be encouraged and promoted through multiple communication and engagement strategies, like Web pages, Facebook, Video campaign, Live events and public media),as D4.2 suggests (Delakorda et al. (2011)). The platform and online tools should be designed to be visually attractive and user friendly in order to stimulate its citizens and encourage them to spend more time using them. The atypical job structure has a moderate probability, with the world adapting at a fast pace to current trends (e.g. the Internet is making it possible to "work from home") and bringing new changes to the way we work with the introduction of new technologies (e.g. augmented reality). We evaluate its consequences to be moderate, since citizens are becoming more flexible and encouraged to customize their time, they will extend this power to the regulations that affect them, meaning the government and the policy making process.

Another factor, more specific to the PbP project, is the need for a more inclusive job market, since women, immigrants and older people are becoming more engaged in the current labour market, they need to be integrated and treated as one of Europe's resources. This will raise the awareness of an e-Participation project because it allows citizens to get engaged in the Problem, Policy and Politics Stream while getting informed on the existing policies on issues of their concern. For PbP project, the level of interest will be even higher since it deals with "immigration and migration" and part of their stakeholders are Labour Unions and Employer Organizations. This means that citizens can use the project to make a difference and adjust the policy in their favour. However, if the partners (stakeholders) from the labour market are not chosen right, the Policy Stream will not be adapted to the needs and requirements of the citizens and the labour market will remain rigid to current social changes. Decision makers need to understand their role in the project and the importance of their participation. In order to control this risk, they will be informed about the topics discussed on U-debate as well as the benefits of participating to the debates. Moreover, the pilot partner will maintain an ongoing communication through e-mails and include them in the National PbP project events, as suggested in D4.2 (Delakorda et al. (2011)). The possibility of such an event happening is likely, since EU is becoming more cohesive (e.g. work permits between EU countries are getting easier to obtain and regulations on work permit change every year in the EU). The consequences will be moderate since it requires more resources to manage the increase of users using the tool to either get informed on "immigration and migration" policies or

give their feedback on the matter.

The last century has brought changes in the structure of our society, from its values, to the way it is organized. These have lead to transformation in **welfare** as well. Oxford dictionary defines welfare as "the wealth, happiness, and fortunes of a group of persons; or the statutory procedure or social effort designed to promote the basic physical and material well-being of people in need". The minimal accepted living conditions have been raised significantly due to improvements in the quality of life, primarily enabled by technology [30]. Part of the welfare is the welfare state, where the government is also involved in the well-being of its citizens. Therefore, changes in welfare will have an influence on government's way of operating and thus on e-Participation project, as well as the other way around (e-Participation project will bring new changes in welfare that can be perceived as risks). With an improved global welfare, expectations raise and citizens expect more from their governments, giving policies higher importance and impact on daily lives. For the PbP project it raises risks on the consult and empower level, since users will expect transparency, accountability, and clearness from policy makers, while the latter will expect the same from the report delivered to them from u-debates. Therefore, the moderators of the debates and the people responsible for the reports need to be carefully selected, with skills similar to those of a Project Manager. With a focus on ICT, we define these skills according to the International Social Security (2004) Association, that separates them into soft skills (e.g. communication, commitment, leadership, fair & flexible) and hard skills (e.g. solid working knowledge, awareness of professional responsibilities - telling the truth in reports, conversations and other communications; following the right process; managing conflicts of interest and controlling the emergence of potential new conflicts of interest).

We consider the improved welfare factor to be almost certain to happen, but with insignificant consequences, since the project will run for only two years and even if small changes are bound to happen, their influence on the project is not major. If the project continues for more than two years, the impact will increase as the expectations of a better cared for society increase as well.

Demographic structure has suffered many changes over the years, and they have had a great impact on productivity and economic growth, as well as on social security systems. Changes with the demographic structure that influence e-Participation projects are: decrease in population, ageing population, improvements in life expectancy. The decrease in population raises challenges for the business sector to find employees. Since net migration outnumbers births, they start to represent the majority in workforce. This change triggers a shift in focus for the policy makers and citizens as well, raising the importance of PbP. Increase interest in the project is desired, but it also implies more debates, and more conflicts (clash of opinions between users). In order to prevent the online discussions from turning into a forum and becoming unreliable for drafting the end report for policy makers, the moderators, masters of the debates, need to be carefully selected (according to the Project Manager skills previously mentioned) and motivated throughout the development of the project. The decrease in population has an almost certain probability, since there is no found solution for this that can be used. However, in the next two years it is unlikely that it will have a major impact on the project, and thus we consider its consequences to be insignificant.

Next, the ageing population and the improvements in life expectancy (the median

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[30]the Institute; the IEEE Website - accessed on 21.05.2014

age of men in EU - 27 was 76.4 in 2008, and for women 82.4) bring implications not only related to the labour market, but also to the demographic structure, making it more unbalanced, with more elderly people needing to be integrated in the society and taken care of. Having a bigger group of elderly people than of young citizens, the target users specifications need to change as well. Older citizens are less prepared to use the tools of e-Participation and will require assistance. However, given that they will represent the significant portion of the population, their input will weight more in the final decisions and their opinions will influence other users, ending up overshadowing the voices of smaller target groups. Therefore, the elderly will represent the majority of the users of the e-Participation tool. The risk of "unbalanced representation of views and opinions" was also identified in [D4.2] as influencing the participation of every day citizens. As mitigation actions, Delakorda et al. (2011) proposes to broaden the range of stakeholders, users of the online tool plus a more careful user segmentation and targeting. The impact on the project is evaluated as moderate because it can lead to biased results that prove to be irrelevant to policy makers. Based on the authors evaluation and on our own , we conclude that the growth in the older population segment is likely to happen (given the slight increase in fertility in Europe - from 1.51 in 2005 to 1.60 in 2009[31]), and its consequences will be moderate, because it will require a change in the way debates are moderated and reports are drafted, in order to include all visions and opinions on the matter, not just the majority. Adding to this, the target groups will also have to be adjusted to include a broader range of views and opinions.

To conclude, the social risk analysis of the STEEP-M framework outlined six risk factors that can influence the PbP project and were assessed on probability and consequences. In order to plot them on the risk matrix, the results are summarized bellow and weights are given for each dimension. For a better visualisation on the matrix, we will label them from S1 to S6, where S = social, and assign weights for each level:

- S1 - family & household structure, with unlikely probability, and minor consequences (0.2; 8)
- S2 - atypical job structure, with moderate probability, and moderate consequences (0.5; 55)
- S3 - a more inclusive job market, with likely probability of happening, and moderate consequences (0.80; 60)
- S4 - improved welfare is almost certain to happen, but with insignificant consequences (0.9; 10)
- S5 - decrease in population has also an almost certain probability, and insignificant consequences (0.8; 8)
- S6 - ageing population is likely to happen, and has moderate consequences. (0.75; 70)

These six factors were plotted on the risk matrix described at the beginning of this chapter as followed:

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[31]Eurostat database

Figure 3: Social Risk Matrix
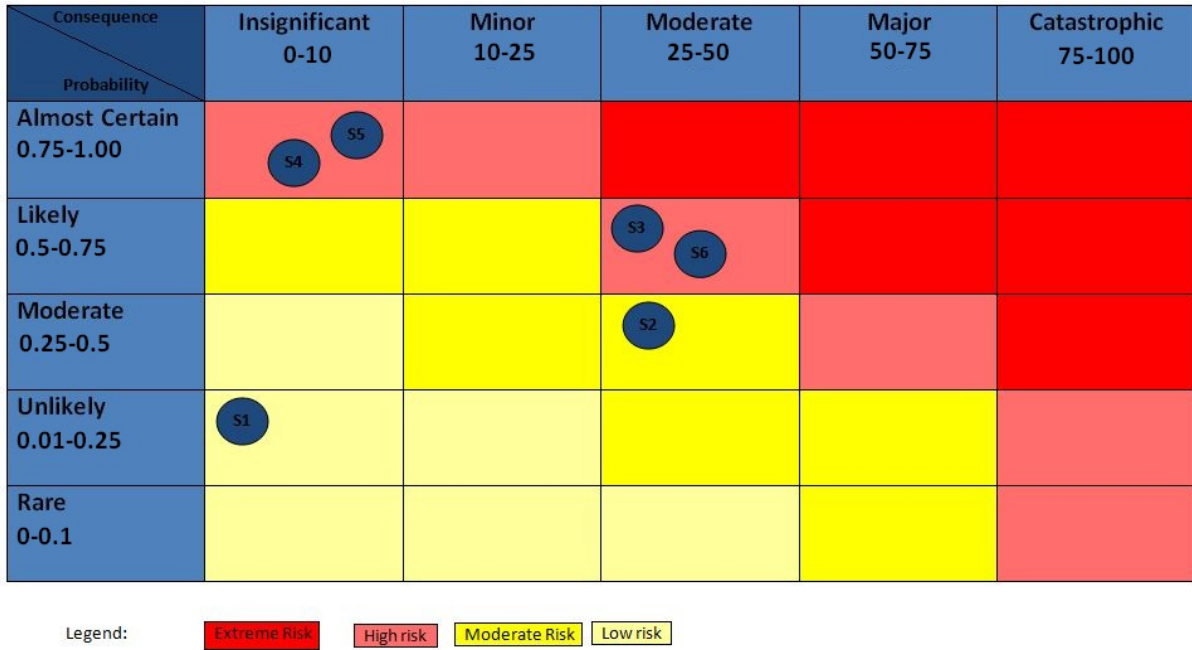
The Matrix shows that four out of the six factors fall under High Risk, and we advice towards close monitoring of these factors since they have the high potential of threatening the success of the PbP project. Their impact lies, as assessed before, on two areas: the level of participation and the citizens expectations and trust for the project and the government officials.

5.2.2 Technological Risk

As defined in section 3.3, **technological risk represents the likelihood that a system will not reach its goals for capability performance, cost or schedule due to technology risks, or its user-friendliness attributes (how it is understood by all its stakeholders).**

In order to identify external risks that may affect the technological dimension of the project, the analysis will be conducted with Stoneburner et al. (2002)'s paper as a guideline, focusing on the specifications of risk management for the system development life cycle (SDLC), phase 1 - Initiation. The characteristics of this phase are identified by the authors as the expression of an IT system need and the documentation of the scope and purpose of that IT system. Since the purpose of this thesis is to evaluate the reliability of a STEEP-M analysis of the initial operating environment, the analysis will be conducted only for this phase. The purpose of this evaluation is "to support the development of the system requirements, including security requirements, and a security concept of operations (strategy)".

We conducted a Document Review of design and requirements documents in order to gather the needed information for the analysis. However, since this is an analysis of the external environment, we will take into consideration only possible threats, and not the vulnerability aspects (that are part of internal analysis).

Stoneburner et al. (2002) defines threat as "the potential for a threat-source to exercise (accidentally trigger or intentionally exploit) a specific vulnerability; with threat-source being defined as "any circumstance or event with the potential to cause harm to

an IT system". The analysis will look for events related to technology or technological capabilities that can potentially damage the overall performance, costs, or schedule of the project. Given the scope of the analysis, the short time span of the project, three years, and the technological context of that period 2010-2013 we identified the following seven risk factors: R& D investments and maturity technology; technology legislation and intellectual property; transfer technology; emerging technologies; and technological security. Each of these factors need to be assessed in relation to the project as a whole as well as its technical specifications; therefore, we will investigate on their impact on the three e-Participation tools used by PbP: EU Profiler; U-debate; and PbP widget.

In order to identify the events (A) related to **communication technology** and determine their impact, consequence (C) and probability (P) of them happening, we are looking at the developments from 2000 onwards, as well as the main global actors and their roll-out pace. The following trends were identified:

R& D investments and Maturity technology

According to Turlea et al. (2009), the ICT sector is the largest R& D investing sector in the economy, in 2005, it accounted for 26 % of the overall business expenditure in R& D in EU. The same year, the public expenditure in R& D was of 81.7 billion €. The continuous investments in technology and R& D projects lead to improvements in the levels of maturity of the technology.

Our analysis of the factor will focus on the software used to develop the e-Participation tools of PbP, in order to determine their level of reliability. We consider this to represent the maturity level and it is linked with R& D investments since a low maturity level raises the risks for the overall project. The analysis will first look into how were the three tools developed and then assess their maturity level.

The EU Profiler and u-Debate tool were both developed on a DNN framework, with a modular architecture (each module with its own specifications and adjustable parameters). DNN first version was IBuySpy, launched in August 2001 as a Microsoft ASP.NET [32] reference application with full source code. However, it was only in 2003 that the rebranded DotNetNuke is launched as an open source community, mainly used for web content management. Until February 2009, the framework saw seven releases and the born of the DotNetNuke corporation. It is on the same month that the Professional Edition was also launched which includes technical support from specialized engineers and extra features. Apart from this two Editions, DNN has also an Enterprise Edition, that targets more complex organizations with complex architecture and infrastructure and therefore more sophisticated requirements. However, the PbP development was developed on DotNetNuke 6.0.0 Community Edition [33]

The Community Edition of the DotNetNuke used by PbP is an open source software. In order to perform an analysis on the products, a definition and an overview of the concept open source is needed. Thus, an open source is defined by the Open Source Initiative (OSI) [34] as "a development method for software that harnesses the power of distributed peer review and transparency of process. The promise of open source is better quality,

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[32]ASP.NET represents a free web framework, developed by Microsoft that allows building Web sites, Web applications and Web APIs (dynamic Web pages) by using HTML, CSS, JavaScript - ASP.NET - accessed on 27.05.2014

[33]PbP Installation Guide

[34]Open Source Website

higher reliability, more flexibility, lower cost, and an end to predatory vendor lock-in". This type of approach raises both benefits and risks. Among the benefits, Gonzalez-Barahona and Daddara (2000) specifies: "the availability of the source code and the right to modify it, the right to redistribute modifications and improvements to the code, the right to use the source code in any way". It also helps tackle some of the problems imposed by traditional proprietary software, like no one with the power to restrict in a unilateral way how the software is used, no single entity on which the future of the software depends, it provides a new forum for democratic action, etc. However, there are also disadvantages that may hinder the success of the PbP project by using it: no guarantee that development will happen (it depends on the commitment of the developers and their willingness to participate), problems connected to intellectual property (since it is possible now to patent software and algorithms, the community can become guilty of intellectual property infringement without knowing if they are not up to date with relevant patents); difficult to know that the project exists, since there are no marketing costs or activities assigned to it).

A proper assessment of the software used to develop the platform will bring light to the maturity level of that software. It will also give feedback on the status of that technology as well as on the risk associated with it, since immature technologies can give warning signs for significant capital investments, and possible future R& D investments, on the long run if the technology proves to be unreliable. Therefore, in order to serve the scope of this project, we will consider **R& D investments and the maturity level of technology** to be part of the same risk factor.

In order to establish the maturity level of the DNN framework we will use the assessment model proposed by Capgemini - Open Maturity Model (OMM) for Free/ Libre Open Source Software (FLOSS) development[35]. They evaluate a software based on 12 trustworthiness elements[36]. The DDN framework will be analysed by going through all twelve of them for DotNetNuke Community Edition:

- Product Documentation (PDOC) has to be available for both the developer and the user, with documentation on the design, specifications and troubleshooting. This is the case only for DoTNetNuke Professional Edition, which comes with an administrator manual and a user manual that are up to date. However, the Community Edition, used by PbP does not provide the same amount of documentation as the Professional one. Nonetheless, the DotNetNuke community has created over forums and blogs a significant amount of documentation, videos and books. The free, up to date, documents available for users are: Installation Guide, Quick Administration Guide, DotNetNuke User and Superuser Manuals, Online Help, DotNetNuke Core API Help File. There are also videos available in the form of tutorials, as well as two books that came out in 2009 and cost together 100 $ ("DotNetNuke 5 User's Guide: Get Your Website Up and Running ", "Professional DotNetNuke 5: Open Source Web Application Framework for ASP.Net")

- Popularity of the Software Product (REP) shows a higher level of trust from the user side. According to the DotNetNuke website, at 2009 they had over 6 millions

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[35]Quality Platform for Open Source Software Website

[36]"A trustworthy element is as a specific factor or aspect of the software development process, or of product results that indirectly influence the perception of the trustworthiness of the FLOSS development process. Two different scenarios were considered when identifying the trustworthy elements: software integrators and development communities." - source: Quality Platform for Open Source Software Website

downloads. Compared to other CMS technologies like WordPress or Drupal it may not be much, but considering it is in its first releases, the trend is moving up. The DotNetNuke 6.0.0 Community Edition released in July 2011 had 19.522 downloads, while the previous edition, Version 5.6.3 had 10.548 downloads, which shows an increase in popularity.

- Use of established and widespread standards (STD) is also applicable to DotNet-Nuke, which uses security standards like LDAP (Lightweight Directory Access Protocol), XML (Extensible Markup Language), and SOAP (Simple Object Access Protocol).

- Availability and Use of a (product) Roadmap (RDMP): DotNetNuke specify the elements that they take into consideration when developing a roadmap for the software, among which they mention: feedbacks from customer prospects, investors, experts in Open Source, Web Content Management, enterprise software, consultants, designers in the ecosystem, surveys, etc; industry, market and technology trends; enhancement requests logged in Gemini, etc. The decision about the new features to be included in either the Community, the Professional or the Enterprise Edition are made based on this data and after evaluating time, cost and return on investment (for the paid version).[37]

- Quality of Test Plan (QTP). The difference between the editions of DotNetNuke is that the Community one is not tested in a professional environment, but by a the community audience selected among the developers who participated. Stability of the product, however, is reached after the release, when users give feedback on their experience and improvements can be done. The paid for editions share the framework and codebase with the Community one, but ad support and functionality.

- Relationship between Stakeholders (STK) -users, developers- being open source, DotNetNuke relied heavily on its community members, not only for the coding and design, but also for the documentation. The community started with a Core Team and external contributors, but as of 2004, the team split into two, the Core Team Trustee and the Core Team Member, who were differentiated by the privilege to write access to the source code repository.(Walker et al. (2009)) The community is engaged in forums; blogs (written by members of the DotNetNuke Corporation and the members of the Core team), some of which are incorporated into DotNetNuke-Blogs.com; DNN Galery. Adding to this, the community comes together for conferences and events over the year, like DotNetNuke Connection & DevConnection, DotNetNuke OpenForce Europe, Dat of DNN. Developers are free to participate to the project on the DotNetNuke Forge at CodexPlex, Microsoft's open source project hosting web site. However, in order to preserve the intellectual property of the project, anybody who contributes to the source code has to sign a Contributor License Agreement.

- License (LCS) has to be managed and license properly and needs not to incorporate any commercial components. DotNetNuke Community Edition is shared with the MIT License, which is a permissive free software license, but conditioned to include a copy or the MIT license terms. DotNetNuke Community Edition fills the license requirement and has no additional commercial feature, like the other two Editions of DNN. According to Walker et al. (2009), the intellectual property of the project is protected by the Contributor License Agreement that developers need to sign in

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[37]DNNSoftware community

order to add code, and this also ensures consistency of its licenses throughout the application. In the case of third party contributors, the intellectual property rights are owned by the external party. However, a Software Grant Agreement is in place to provide both the contributor and the third party with full copyright of intellectual property. It means that the intellectual property is split into two versions, one held by the contributor who is allowed to modify or license it.(Walker et al. (2009))

- Technical Environment (Tools, OS, Programming Language, Deve Environment) (ENV) is important in order for the integrators to determine if it is compatible with their needs. DotNetNuke is designed in VisualBasic.NET on a Microsoft Windows operating system. It requires Windows server 2008, IIS 6 (Internet Information Service) and ASP.NET (v2 or v4) and supports at least SQL Server 2000. A more detailed presentation can be found on the CMS Matrix website, from where we extracted the system requirements:

Table 2: System Requirements DotNetNuke

System Requirements	
Programming Language	C#
Application Server	IIS/.Net
Operating System	Windows Only
Web Server	IIS
Database	MSSQL
License	Open Source
Approximate Cost	$0
Root Access	Yes
Shell Access	Yes

source :CMS Matrix on DNN Platform

- Number of Commits and Bug Reports(DFCT) are an indicator of the FLOSS product popularity and if the product is actively developed and supported. On the DNN dashboard from Atlassian[38] there are two groups of issues dedicated to bugs: Bugs Content and Bugs Platform. However, the board is kept up to date and refreshed on a daily basis, which makes it impossible to find the status of bugs from 3 years ago. But we can extrapolated based on the information found for one month (28.04.2014 - 28.05.2014), when out of the 131 issues created, 127 were closed; which shows commitment from the community and the changes and improvement in the different versions are being integrated. Moreover, DotNetNuke is licensed under the MIT License and keeps control over the code by using Version Control, and shared repository. It allows the code to be kept clean and organized, while tracking the website for possible bugs. Also, the support of Microsoft allowed DotNetNuke to use the free WorkSpace service on the GotDotNet website, which provided also a Bug Tracker application to help them manage the issues and enhancement requests.
- Maintainability and Sustainability (MST) helps integrator to evaluate the FLOSS product. Based on the official DotNetNuke.Codeplex.com platform the DotNetNuke

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[38]Atlassian for DNN tracker Website

6.0.0 Community Edition has its stable release on the 20th of July 2011. Between 2009 and 2010, the stable Community Editions ranged from 5.0.0 to 5.6.0. In an interview from 2010, Shaun Walker, the co-founder of DotNetNuke stated that they encourage their community to be as active as possible, they provide "a number of key communication channels like forums, blog, wiki, issue tracker, roadmap and public source code repository" (which we detailed in the sixth trustworthiness element - relationship between Stakeholders STK)[39]. Adding to this, the community receives inputs from open source developers in the form of code contribution, which helps improve product quality and gives it the characteristics of maintainability and sustainability. Moreover, according to Walker et al. (2009) apart from sponsoring the project and community, Microsoft also gives access to its resources for mentoring and guidance.

- Contribution to FLOSS Product from software companies (CONT) improves the product's quality and shows implication from other software or IT companies. One of the contributors to DotNetNuke is Mindfire Solutions with a range of services that include, but are not limited to: Module Development, Skin Design, Custom web application development, Business logic and data integration, etc. From 2003, DotNetNuke was sponsored by Microsoft, that encouraged the development of enhancements in key areas in order to improve the image of ASP.NET. Reasons behind this sponsorship include the exclusive usage of the Microsoft platform by the DotNetNuke application and the promotion of the .NET framework that encourages developers to migrate to the new development platform.

- Results of Assessment of the Product by 3rd Party Companies (RASM) represents the peer-reviewed comments and testimonials of either known users of the product or 3rd party companies from the software development industry. Although DotNetNuke is being used for websites of companies like NASA, Sears, Mitsubishi, Heineken, etc, a professional assessment has not been done. The evaluation of the product is done usually on blogs and forums of acknowledged developers (eg. tbhcreative.com)[40].

Quality Platform for Open Source Software plots the twelve trustworthy elements as follow:

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[39]Fierce Content Management Website - accessed on 01.07.2014
[40]thbCreative Blog - accessed on 01.07.2014

Figure 4: Open Maturity Model Overview
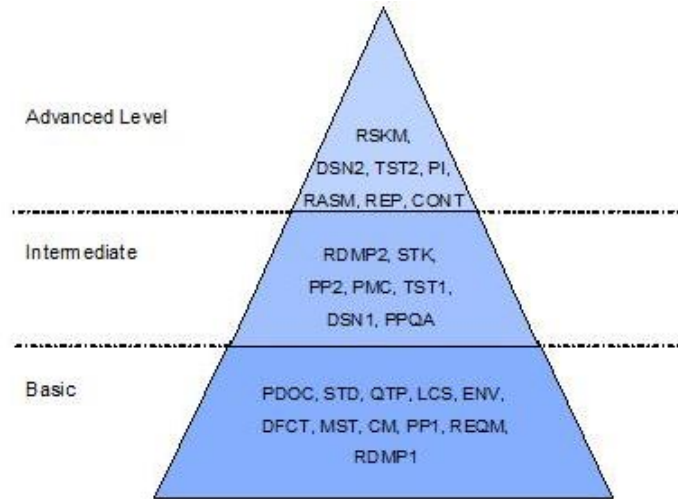
Where, apart from the twelve trustworthy elements evaluate previously, for each lever there are a few more elements, specific to each project. These elements have to be analysed as well and included in the final assessment of the DotNetNuke Community evaluation.

For the **Basic level**:

- PP 1 represents the Project Plan with the main goal of estimating and planning project activities. Given that DotNetNuke Community edition is an open source product, the project code base can be altered by developers as the project is evolving. However, there is a level of trust among the community that needs to be reached in order for patches or enhancements to become part of the source code repository. DotNetNuke has the core framework plan separate from the module plans and this lead to the formation of the DotNetNuke Projects program, which is presented by Walker et al. (2009) as "a new organizational concept modelled after the Apache Foundation that allowed many complementary projects to thrive within the DotNetNuke ecosystem." This allows developer teams to organize themselves according to each individual project.

- REQM represents the requirements of the project that have to be understood, committed to, managed, and levelled with the project plan; DotNetNuke uses its modularity characteristic of the architecture to manage requirements from business side. Its interfaces are easily customized to assure that business needs are met.

- CM is configuration management with the purpose of establishing and maintaining the integrity of the work products and the product itself, it established baselines and releases. DotNetNuke has had fewer major public releases than other open source products which follow the concept "release early, release often" because it is a plugin framework application that has a different set of requirements. Therefore, the core-releases are lower in number but the product is better in quality and more stable. The work that is being done on the product and modules is being tracked on the DNN dashboard from Atlassian previously mentioned.

- RDMP 1 will define the next releases as well as the responsibilities of the developers involved. As mentioned before, for DotNetNuke the releases are lower in number

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than the usual open source products. The core framework has a different roadmap, separate from the modules connected to it. Since the implementation of the DotNet-Nuke Projects program each module has a team of developers with its own roadmaps for enhancements and its own release schedule. Also, the organization of the contributors to the code comes with a set of roles and responsibilities for Core Team Trustees and Members.

For the **Intermediate level**:

- RDMP 2 which represents an update of the previous RDMP 1, with the roll out of the product. This is being done on a module project basis, each project has its own roadmap and release schedule.

- PPQA which stands for Process and Product Quality Assurance and is an objective evaluation of the process, work products, and provide objective insight. DotNetNuke uses product review service in order to evaluate quality assurance. This is not an objective method and its outcomes cannot provide a correct assessment of either the process or the product.

- PMC represents project management and control which has the purpose to monitor the project and product and based on progress reviews, risks and commitments, implements corrective actions and manages them accordingly. PMC is done by each development team of the modules as well as the core framework. A straight forward project management and control plan is not laid out, but it rests within the responsibilities of team managers, or the team itself.

- DSN 1 is the first phase of the design which is done based on bilateral dialogue between customers/users and developers. The design phase of an open source product leads to elongated schedules, but improves the architecture and extensibility of the architecture. Since Walker et al. (2009) stated that DotNetNuke does not follow the usual open source "release early, release often", the design phase is given priority to the number of releases.

- TST 1 is a continuation of DSN 1 and allows requirements stated in the design phase are correctly put into action, and prepares the project and product for verification. Volunteers that participate to the open source DotNetNuke are easier to engage in consumer-oriented tasks like testing, support or minor defect corrections. A large community audience participated in the testing phase of DotNetNuke 4.0 (Walker et al. (2009)).

- PP2, the continuation of PP 1 which includes the deployment phase, as well as data management with requirements that have to be met by the end product (security, privacy, etc). According to Walker et al. (2009), DotNetNuke development and integration phases are followed by an "incubation" period for each model, to make sure it conforms with the official DotNetNuke project standards. In addition to this, the model is reviewed to ensure that "it does not contain any security flaws or serious defects that could affect the general community".

For the **Advanced level**:

- RSKM represents the risk management element that allows for the identification of risk sources and categories, and plans and implements risk mitigation actions. The core managerial team is responsible for the identification and mitigation of possible risks for the DotNetNuke community, while individual teams are responsible for their own project risk management. The community adapted to each release and managed arising risks. One example is when the contributor number grew and

their background became more diversified, and at the same time the notoriety of the project increased. It was no longer acceptable for inexperienced team members to access the code as they wanted and possibly compromise the stability of the project. Therefore, project roles were reorganized and accountability was added to them, while the Core Team was divided into Trustees and Members. This proves that DotNetNuke as a community is able to identify risks and implement corrective actions, a characteristic that can be extrapolated to the smaller projects and versions of the product DotNetNuke.

- DSN 2 aims at maintaining the alignment between requirements through product architecture. By using modularity as an architecture principle, the community is able to meet business requirements and provide them with a customizable product.
- TST 2 the second part of testing has to prove that the product is successful and fulfils its intended use. Even if the community is involved and dedicated to the testing phase, stabilization is reached only after release, when the application becomes extensible.
- P1 represents the delivery of the solution, the end product. The DotNetNuke 6.0.0 Community final edition used by PbP was released on 20.07.2011 and includes a major feature release, the DotNetNuke Extension Feed (making it easier for users to find and install extensions), as well as new modules like Page Manager (to replaced previous Page Manager module) and Rad Editor Provider & Configuration Module (Replaced previous Telerik HTML Provider).

In order to assess the maturity level of the DotNetNuke 6.0.0 Community Edition we evaluated all twelve trustworthiness elements introduced by OMM plus the elements found in the OMM Overview (figure 4). QualiPSO OMM states that in order to have a correct assessment of a FLOSS, all twelve elements must be implemented at each level, since "high level of process maturity cannot be achieved without first fulfilling all the trustworthy elements of lower levels"[41]. Each element is given a priority level and grade. For the Basic level, the priority one elements should be assessed first, in this order: CM, PP, PDOC, QTP, LCS, STD; then the priority two elements: DFCT, ENV, MST, REQM. Based on our previous analysis, the DotNetNuke 6.0.0 Community Edition has successfully implemented all those elements and it can receive the Basic Level. Moving to the next level, the remaining elements have the same priority, priority one, in the following order: RDMP, STK, PMC, PPQA, REP, CONT. Of those six elements, we found that PPQA is not implemented according to all the guidelines provided by QualiPSO. The analysis of quality is done by the community itself or by user reviews. However, being an open source software, this is the usual approach taken for product and process quality and we can consider the element as being implemented to the best of their ability. Therefore, the 6.0.0 Community Edition passes to the next level, the Intermediate one. Of the last level elements, the testing cannot be considered as being fully implemented, since we established, based on the information provided by Walker et al. (2009) that stabilization of the product is achieved after release. Therefore, testing will continue even after P1 is completed and improvements will be added to this version, or as part of the next version.

To conclude, we assess the DotNetNuke 6.0.0 Community Edition to be an almost advanced FLOSS, with work still being done on by the team in charge of its core devel-

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[41]Quality Platform for Open Source Software Website - accessed on 01.06.2014

opment or modules developments. Thus, the technological risks that might arise from the R& D investments and maturity factor have a moderate probability to happen. However, their impact is catastrophic, since the project is highly dependable on the timely and successful execution of the platform development, as well as having all the tools working around the clock.

Technology legislation and intellectual property

The usage of FLOSS product brings forth risks associated with intellectual property, some of which were briefly presented in the analysis of the first factor. The challenges come from the current legislation context, since it is possible now to patent software and algorithms, the community can become guilty of intellectual property infringement without knowing if they are not up to date with relevant patents.

However, DotNetNuke 6.0.0 Community Edition is an open source product which is being licensed under MIT license, but ads its own specifications in order to address the before mentioned challenges. The developers who participate to the code have to sign a *Contributor License Agreement.* In the case of third party contributors, the intellectual property rights are owned by the external party. However, a *Software Grant Agreement* is in place to provide both the contributor and the third party with with full copyright to the full intellectual property. It means that the intellectual property is split into two versions, one held by the contributor who is allowed to modify or license it.(Walker et al. (2009))

In order to assess possible risks that the open source characteristic of the software may pose, we will use the Risk Grid presented by Coughlan and Katz (2009) in the International Free and Open Source Software Law Review (by selecting the relevant issues for the DotNetNuke 6.0.0. Community Edition) and the comparison between types of licence provided by the oracle blog[42]. DotNetNuke, being a MIT[43] licensed software does not make public the code. However, the license has two conditions: "The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software", which means that the user will be notified about the work being done on it, when it conflicts with restrictions, and a second condition[44] that serves as a warranty disclaimer. From the issues presented in the Risk Grid, we decided to skip the ones related to publicly-available code, since they are not representative for DotNetNuke. Moreover, we will consider only the risks that fall under the Customer side, since the customer is the PbP and the focus of this analysis is on risks for the PbP project. Therefore, risk identified as posing a possible threat to the project from the MIT license type chosen by DotNetNuke are:

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[42]Available at Oracle Blog

[43]An MIT License means that the person who is obtaining the copy of the software and the associated documents has the permission to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so -source:Open Source Website - accessed on 02.06.2014

[44]"THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABIL-ITY,FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARIS-ING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

- Infringement by misuse of third party code by the Customer (in this case the PbP developer teams) addresses the scenario when the PbP distributes the code in the future, and it needs to make sure that its own subsequent use, modification or redistribution is in accordance with the license agreement of DotNetNuke. When the software is distributed, PbP has to display copyright notice, provide copy of the license, disclaim warranty and liability.
- Trademarks should be protected or incorporate an explicit license that permits the use of trademark in relation to the DotNetNuke code only if it is not modify in any way.
- Replace or Rewrite of the "Original portion" of the code, which was licensed in the beginning to the PbP will bring risk to the project. However, if the replacement or the rewritten code is correcting previous code, DotNetNuke should not be kept responsible for the mistakes in the "Original portion". This type of agreement protects the DotNetNuke community rather than the PbP project, because it allows for improvements without taking responsibility for previous mistakes.

The risks that may surface from intellectual property and technology legislation (in this case FLOSS licence characteristics) have a rare probability of occurrence because of the different customizable contracts and agreements that can be closed between the two parties. Their impact will be moderate since there are a number of other open source WCMS (web content management systems) to which PbP can migrate.

Transfer technology

According to Roessner (2000), technology transfer represents "the movement of know-how, technical knowledge, or technology from one organizational setting to another". This technology exchange needs a source, an owner, or a holder and a destination, a buyer, or a user, and thus, the paper also identifies the sources of technology as "private firms, government agencies, government laboratories, universities, nonprofit research organizations, and even entire nations", while users includes "schools, police and fire departments, small businesses, legislatures, cities, states and nations".

Technology transfer is closely linked to innovation and R& D investments, which were previously assessed with major probability and catastrophic consequences. The exchange of information and knowledge was proved to generate innovation, Demarest (1997) describes innovation as being the result of knowledge creation and application. Internet technology facilitates the transfer of knowledge and therefore encourages innovation. It is also through internet technology that open source projects came to life. Even thought investments in FLOSS projects is lower than traditional projects, since there is no financial direct gain from them, they represent a reliable method for knowledge transfer. Moreover, FLOSS can be considered a technology transfer product itself since it is developed through cooperation among developers. The development of such a project is based on "information, comments, test results, features, and requests exchanged between developers and user" (ANIS and NOORI (2008)).

In case a new FLOSS project is evaluated as being more suitable for the purpose of the PbP project, the costs associated with the transfer will be part of the risk and need to be assessed. However, these costs are lower in the case of technology transfer of FLOSS projects than traditional technology transfer. They include the time and money spent in

adapting the base code to the project's requirements and the additional resources to be involved in the new base code.

Nonetheless, the PbP project has a time span of three years and the DotNetNuke community is in continuous evolution and improvement. Thus, we evaluate that technology transfer will have a positive impact on the DotNetNuke 6.0.0 Community Edition product because it will support knowledge transfer among developers and encourage them to add to the base code. The motivation for developers behind the FLOSS type of technology transfer is, according to ANIS and NOORI (2008), gaining more knowledge through knowledge exchange and achieving recognition from their peers.

We, thus evaluate the probability of technology transfer events to occur as being almost certain, but with insignificant consequences on the project (consequences to be understood as negative impact).

Emerging technologies

We identified the events related to **emerging technologies** by analysing the trends from 2009 and previous years and trying to extrapolate future trends. Thus, based on the paper of Peristeras et al. (2009) and the information found on online journals from the years 2009 to 2011 we label as "emerging intelligent technologies, tools, and applications" relevant to the PbP project the Semantic Web, social computing, cloud computing, and virtual reality.

Semantic Web is defined by Berners-Lee et al. (2001) as "an extension of the current web in which information is given well-defined meaning, better enabling computers and people to work in cooperation". By enabling content and service integration among applications and web sites and across platforms, Semantic Web will support the development of e-Government. It also has the potential to improve the working environment by making it more collaborative and dynamic while enhancing information management. However, like all new technologies, apart from benefits it also comes with risks and challenges. Analysing the publications, formus and blogs from 2009 to 2011, helped us identify the most important ones. A fully developed Semantic Web will reduce individual privacy and freedom of speech because it will diminish anonymity which in the end will discourage citizens from participating in online debates. By adding intelligence to web services and encouraging the development of collaborative information society, the users have to let go of their anonymity in order to increase the level of trust in the information they are providing. Moreover, with data being shared and reused across applications and communities, users will have all their information linked and thus staying anonymous on one forum/ website while revealing your identity on another would be impossible. Semantic Web would also encourage censorship by allowing, for example, to replace one word across multiple platforms and websites. This aspect also raises the risk of lower participation among targeted users of PbP.

Wang et al. (2007) defines **social computing** as "computational facilitation of social studies and human social dynamics as well as the design and use of ICT technologies that consider social context". Social computing is a cross-disciplinary field with theories from both social and computer sciences. Examples of tools from the field of social computing are blogs, wikis, or social networking sites. The emergence of such tools can both support or damage the PbP project. The improvements for the public sector that they bring are describes in Huijboom et al. (2009) as greater transparency and accountabil-

ity, improved accessibility of public services, improvement of efficiency, improvement of quality and effectiveness, new ways of organising and governance, stronger evidence-based policy, citizen empowerment and expression of diversity, improved digital competencies (bridge the digital divide), enhancement of independent living, self organisation and autonomy. These improvements will have an impact on the PbP project as well. The same can be stated about the risks concerning social computing:

- participation inequalities for community users, with the 90-9-1 rule 90% read but do not contribute, 9% contribute from time to time and 1% accounts for the majority of the contributions. This rule can also impact the success rate of the PbP project, with users filling in the questionnaire for the Policy Profiler, but refusing to participate in the online debates. A form of this risk was analysed as part of Social Risks, however, now it represents the technological perspective.

- shape political opinions of the citizens: since the number of online communities and tools rising, their impact and force will also rise. This bring forth the potential for damage of reputation since there is no central control over the content that is being published. Therefore, it will be easier for users to make unfounded assumptions about politicians or policy processes, to express themselves in a malicious way, and therefore to influence more naive readers. Such a risk can be mitigated by developing high-profile roles as mediators within the U-debate platform.

- information management can threaten the success rate of PbP if not done correctly. It is counter-intuitive to impose rules in a social computing environment according to Hall et al. (2008) since it will work against the "free" nature of the concept itself. Characteristics of information management that are considered risky are the quality of information, the means of archiving the information and access those archives, and proliferation of information sources and systems.

- identity theft on the online communities is easier than in real life. Identity theft is done usually for financial gains, but in the case of social computing and the scope of e-Participation projects, the gain is of political matters: change a policy debate in their favour by posing as an influential person and alter user's opinions which leads to an unreliable report that is delivered to the decision makers. This raises a major risk for the PbP project.

The third emerging technology to have an impact on an e-Participation project, specifically PbP is **cloud computing**, which is defined by Armbrust et al. (2010) as "both the applications delivered as services over the Internet and the hardware and systems software in the datacenters that provide those services. The services themselves have long been referred to as Software as a Service (SaaS). The datacenter hardware and software is what can be referred to as a Cloud". The risks of such a technology are discussed in the paper of Brodkin (2008). Based on those and other findings from 2009-2011 (articles, blogs, reports) we consider the following to be relevant to an e-Participation project like PbP:

- Availability of the data can become subjected to risk of service degradation in the case of the Cloud provider. Being an internet-based service it becomes more prone to malicious attacks. Another risk of availability is when there is too much availability, when there are no access right for accessing the data stored in the Cloud. Therefore, privileged user access needs special attention from both the Cloud service provider side and the customer side.

- Data privacy will bring risks to any project because the data will not be stored internally. The risks are related to: data being susceptible to cloud service provider organization rules, potential risk of discovery of data (by clients sharing the cloud service), cloud services providers claim ownership of the data stored in their Cloud, or face audit and censorship from the providers. Encryption can help mitigate these risks, but the cloud service provider has to prove that the appropriate encryption controls are implemented.
- Regulatory compliance risks arise because traditional physical controls are being replaced by virtual ones and both the customer and the provider need to keep track of the audit records and breach notices. Moreover, geographical data location is usually unknown, which raises the risk of legal or regulatory violation; a risk which can be mitigated by using metadata tags to help identify the origin of that data and make it susceptible to the laws of the country in which the servers are hosted. Also, by adding location restrictions, the data owner ensured that he will remain compliant with its regulation needs.

Cloud computing represents an emerging technology that is gaining more and more popularity among ICT projects and if used properly it can become an asset of e-Participation programs and projects. It can help both citizens have more real time access to data and information as well as project owners to lower deployment and management costs. By accessing these benefits citizens, organizations, enterprises and governments can get engaged in the policy stream process. However, for this to happen, the risks associated with Cloud computing need to be mitigated.

Oxford dictionary defines **virtual reality** (VR) as "a computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by a person using special electronic equipment, such as a helmet with a screen inside or gloves fitted with sensors". In the context of e-Governance and e-Participation, VR technologies are used to visualize data, create online communities, develop online projects or educating groups of citizens in a policy matter. An example of VR used for e-Governance purposes is the virtual headquarters that NIC[45] developed to show how VR can help governments present information, deliver training, and interact with constituents. The risks associated with VR are mainly technical, and require significant investments and commitment. The technical components of VR that still require development and that may pose a threat range from head mounted eye goggles, wired clothes or fibre-optic data gloves, virtual cockpits and workstations. From a human experience point of view, improvements need to be done in the telepresence characteristic, and bring it closer to the experience of one's physical environment, what we call "presence".

VR has the potential to influence human behaviour and interpersonal communication. Therefore, it will have an impact on e-Participation project and the risks associated with it have to be acknowledged and taken into consideration. The scientific literature gives little to no information about the risks of VR in the area of e-Government, e-Governance or e-Participation and thus the identification of possible risks is being done based on the papers of Steuer (1992) and Magoulas et al. (2007) as well as personal assessment. We identify as possible risks the following:

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[45]"the people behind e-Government", NIC builds official web sites, online services, and secure payment processing solutions for more than 3,500 federal, state, and local government agencies across the U.S. - source:NIC Website - accessed on 03.06.2014

- Identity theft is easier than in real life and political conspirators can infiltrate as users and instigate debates in the direction they want. Other aspects of the identity theft risk were presented as part of "social computing".
- Unsatisfactory technology literacy skills among users of the e-Participation tools that may include VR. Given that virtual reality is still in development phase, the number of people that are skilled in using it is low and training will imply investing additional resources into the project.
- From a psychological perspective, having a face to face debate (which VR will enable) tends to make people less open and less willing to share their views which reduces the value of the information gathered from u-Debates and the report submitted to decision makers.

Based on the risks identified and analysed for the four emerging technologies we evaluate the risk as being likely to happen. Technology is evolving at a fast pace and even in a time span of three years, the probability of emerging technologies influencing the PbP project is major, therefore also the consequences are judged as being major.

ICT security

Macintosh (2004) makes the distinction in between e-Voting and e-Participation. The first one addresses the electoral process and enables remote formal voting, while the latter enables opportunities for citizens and governments to consult each other and maintain a continuous flow of information between them by using IT tools. A categorization of such tools is presented in the paper of Andersen et al. (2007): chat rooms, discussion forums, virtual communities, e-Panels, e-Petitioning, e-Consultations, suggestion tools for planning procedures, etc. The authors make also a distinction between the levels of security technology required for these tools, like in the case of e-Voting a secure environment for casting votes, while on other e-Participation tools the focus is on the continuous and free exchange of information and open dialogue. Therefore, for the PbP project the technological security risks are going to be less challenging than if this was an e-Voting project.

Gilliam (2004) defines IT security risks in terms of *Confidentiality, Integrity, and Availability (CIA)*. The CIA principle is used for evaluating information system security. In order to assess the ICT security risk factor we will analyse the three component of the CIA against the requirements of an e-Participation project, PbP.

An IT system is considered to have *confidentiality* according to Gilliam (2004) if it succeeds in "assuring that information will be kept secret, with access limited to appropriate persons." Data privacy is the key element of confidentiality and the risks associated with not complying with data protection regulations will have a catastrophic impact on the PbP project. Having a clear data protection legislation about the platform will help participants gain trust on the project and become more active. (Sanchez-Nielsen and Lee (2013))

Integrity means "assuring information will not be accidentally or maliciously altered or destroyed." It also includes "source integrity" which ensures that the information is coming for the specified source. For an e-Participation project this principle is of high importance because apart from the citizens and moderators of the debate, decision and

policy makers can also participate in debates. Therefore, it is critical that their data integrity is kept safe and avoid any impostors or "identity theft" on the platform.

Availability is achieved when the information and communication services are accessible to the authorized viewer when he needs it. Unauthorised and unwanted withholding of data has to be avoided in order to have the ICT system compliant with this last principle of the CIA. For the PbP project it means that stakeholders should have access to the platform 24/7 and downtime should be avoided or kept at a minimum level.

The goal of security is to protect confidentiality, maintain integrity and ensure availability, and protect individuals and information resources of both companies and governments. Oxford dictionary defines security as "the sate of being free from danger or threat". Threats may come from both inside and outside a project or organization, but as it was established before, this thesis focuses on the external ones.

Antoon (2006) presents three common terms which are taken into consideration when discussing network and system security: vulnerability, threat and attack. He defines them as follow: "Vulnerability represents a weakness that is inherent in every network and device. Threats are the people eager, willing, and qualified to take advantage of each security weakness, and they continually search for new exploits and weaknesses". While attacks are the outcomes of threats, vulnerabilities come in the form of weaknesses of technology, configuration or security policy, thus coming from inside of the project. Since the focus of our analysis is on the outside perspective, we will not analyse weaknesses. Threats and attacks, on the other hand, are part of the external risks.

Both Antoon (2006) and Stoneburner et al. (2002) papers refer to threats as being the source of attacks. On a high level categorization, Sonteburner divides them into intentional acts (deliberate attacks) or unintentional acts (errors or accidents). In the same paper, Stoneburner et al. (2002) presents five categories of threat based on the type motivation, but also on the actions taken: *hackers* who usually act out of ego, rebellion, or as a challenge; *computer criminal*, who by system intrusion, computer crime, or fraudulent acts are motivated by destruction of information, illegal information disclosure, monetary gain or unauthorized data alteration; *terrorist* that are conducting system attacks, penetration or tampering with the purpose of blackmailing, destruction, exploitation or revenge; *industrial espionage* (in the case of companies, foreign governments) that are steeling information, intrude on personal privacy, access unauthorized systems with the purpose to conduct economic espionage or gain competitive advantage; *insiders* who are acting out of revenge, curiosity, monetary gain or even unintentional errors or omissions and cause fraud and theft, malicious code, system bugs, intrusion and sabotage, computer abuse, etc. Out of the five categories, the most obvious threats for e-Participation projects project are hackers and industrial espionage. However, hackers do not represent a threat to PbP, since the target of hackers is usually the target of such projects as well. The literature describes a new form of activism that include the Internet and divides its forms into three categories: online activism (exchange of information with the scope of lobbying towards decision makers), hacktivism (when online activists take actions online with hacking techniques)and cyber terrorism (sabotage of societal services and also politically motivated hacking operations)(Denning (2001)). Industrial espionage is regarded as government espionage and we consider e-Participation projects to be unlikely targets of such threats due to their transparency.

The paper of Antoon (2006) gives a different classification of threats and attacks, which is more straightforward and is also done based on motivation and source. The au-

thors define four main classes for threats: unstructured (from inexperienced individuals), structured (from hackers that are highly motivated and technically competent), external and internal. For the PbP project, we will evaluate each of them in the context of the project and assess them accordingly.

Based on the intent of the attacker, attacks can be *structured* or *unstructured*. *Structured attacks* have a specific target and are executed by professionals who are both motivated and technical educated. Their techniques are sophisticated and well developed, with the purpose of performing untraced attacks that cause damage and in most cases involve breaking the law. Considering the information managed through the PbP project we consider that structured attacks are less likely to occur since it is a pilot project, with the purpose of gathering and organizing citizen's opinions. The gain obtained from such an attack is unlikely to attract a knowledgeable hacker into carrying out a structured attack. *Unstructured attacks* on the other hand are random and performed by inexperienced hackers that are working on improving their skills. They are also the most common ones, because of how they work: usually on automated tools, some of which are freely available online, like Metasploit[46], w3af[47], Low Orbit Ion Cannon[48]. These attacks are seen as trials by attackers, but can still do extensive damage to a project. Thus, we assess these types of attacks to be likely to occur. For example a password crack would lead to data theft and corruption, which in turn can damage the confidentiality and integrity of the gathered data, from all users of the PbP platform: citizens and end-users, like decision makers.

From the source perspective there are *internal* and *external* attacks. *Internal attacks* are performed by people who have access to the network, and which, according to Secure State[49] are referred to as "ethical hacking" because are usually done by employers or people involved in the development of the project. For the Puzzled by Policy project, we consider these types of attacks to be unlikely for the same reasons as the structured attacks. The information managed by the project is not of high security and it has informative purpose. The *external attacks* are executed by hackers who do not have access to the network. In the context of the PbP project a direct malicious attack from external sources is rare to happen and thus we are considering an unstructured external attack to be more likely to occur, although for the purpose of scanning the information managed by the project.

Since the most important information given by the citizens on the platform is their account information and password, based attacks are most likely to happen. The follow up actions performed by the attacker are presented by Microsoft[50]:

- "Obtain lists of valid user and computer names and network information
- Modify server and network configurations, including access controls and routing tables
- Modify, reroute, or delete your data"

Thus, we evaluate the probability of breached in ICT security to be likely to happen, although from unstructured, external attacks, mainly in the password protection area. Since it might lead to unfitted system access, we assess its consequences as being major.

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[46]METASPLOIT Website - accessed on 01.07.2014
[47]W3AF Website - accessed on 01.07.2014
[48]Low Orbit Ion Cannon description on SourceForge - accessed on 01.07.2014
[49]Secure State Website - accessed on 01.07.2014
[50]Microsoft TechNet Library - accessed on 01.07.2014

In order to plot the five technological risk factors on the Risk Matrix, we summarized the results and assigned weights. For a better visualisation on the matrix, we will label them from T1 to T5, where T = technological, and assign weights for each level:

- T1 - R& D investments & maturity technology,with moderate probability of occurring, but catastrophic consequences (0.3; 80);
- T2 - technology legislation & intellectual property, which we assessed as having a rare probability of happening and moderate consequences (0.08; 40);
- T3 - technology transfer with an almost certain likelihood, but insignificant consequences (0.8; 8);
- T4 - emerging technologies were evaluated as having a likely possibility of happening and major impact on the project (0.5; 65);
- T5 - ICT security, also with likely probabilities (but higher than emerging technologies, since it threats data security of the project - password) and major consequences (0.6; 70).

These five factors were plotted on the risk matrix described at the beginning of this chapter as followed:

Figure 5: Technical Risk Matrix

The Matrix shows that three out of the five factors are situated in the Extreme Risk. As mentioned in section 5.2 we will propose mitigation actions for these factors.

T1: R& D investments & maturity technologyfactor will influence the development of the project. An immature technology, as mentioned before can give early warning signs for significant capital investments and an increase of the overall technology throughout the project if the technology used is proven not to be reliable. As mitigation action, we advise for a correct assessment of the technology to be used, as we did before, when analysing the factor for DotNetNuke 6.0.0 Community Edition. If the maturity is evaluated as being low, stakeholders involved in development should include some of the

following corrective actions, for which we used as source the Questionnaire made up by the State of Minnesota[51]

- Provide training on the new technology and ensure that the participants have no difficulty in understanding it. The use of images, videos, diagrams will help in this regard. We advice here to provide thorough training to decision and policy makers targeted to participate in the project, as well as to moderators of the online debates. This will ensure that the platform is used accordingly and all its functionalities are known by its users.
- Create procedures for how the platform should be used, in the form of user manual or "FAQ" for the technical aspects of the platform and tools in the project (EU Profiler, widget, U-debate). This will allow users to get informed fast whenever they encounter problems when using the platform.
- Assure a test environment for the platform before lunching it and allow both experienced and inexperienced users to assess it. Record their interactions with the platform and make corrective changes when needed.
- Get outside consultants to assess the technology used. Since the project will use external experts, it should also make use of their expertise before the start of the project and assess the technology to be used in the development of the platform and the tools.

T4:Emerging technologies are the second technology external factor to fall under the label of "extreme risk" since its impact will be major, influencing both the level of participation and the quality of participation. For the four emerging technologies identified, we propose mitigation actions to help mediate and possibly eliminate those risks. Thus, for *semantic web* we advice towards strengthening the relationship between the citizens that use the platform to get their opinions and ideas across and influence the policy stream, and the policy makers that were chosen and agreed to take part in the project. This will insure that the "voice" of the users is being heard. It is also important to make sure that all ideas and opinions are accepted and listened to. Freedom of speech should be preserved at all times as well as participation equality. The second emerging technology, *social computing* will have an impact on the project as well and we assess it as being related more to user participation. Therefore, we advice for more focus on the mediator's role and responsibilities. He should be committed to the project, preferably full time, in order to keep the debates active and ensure a continuous flow of information both between users and between users and decision-makers. *Cloud computing* risks can be corrected also. For this, we advice for the implementation of feasible alternative scenarios if the service becomes degraded as well as access rights for accessing the data stored on the cloud. The relationship with the service provider should be negotiated for him to provide disaster recovery and business continuity assurances; provider's agreement not to withhold services; data ownership rights and provider's commitment to regular data backups. It is also advisable that data protection solutions are in place both in collaboration with the provider as well as independently. In order to diminish *virtual reality* risks, we recommend to add psychologist experts to the project and have them identify when a debate is getting unbalanced and help the mediators balance discussions.

The last technology risk factor under the Extreme Risk label is **T5: ICT security**, which we evaluated as being under the form of external and unstructured attacks. Most

[51]A word document of the Questionnaire can be downloaded here

likely they will target personal information database or/ and the password process in order to obtain lists of the PbP users and their information, modify servers or network configurations, or alter user's data. One proposed mitigation action would be to ensure that passwords are checked for sensitivity and risk. Add minimum requirements to be filled when choosing a password. Moreover, the database of expired passwords should be updated regularly. Another recommendation for tackling ICT security risks is to have periodic security audits and more often than these, have security vulnerability scans. The audits can be performed either by external companies, or by using automated assessments of audit event logging. Some of the questions to be asked when performing such an audit include: How is backup media stored? Who has access to it? Is it up-to-date? Is there a disaster recovery plan? Have the participants and stakeholders ever rehearsed the disaster recovery plan? Are there audit logs to record who accesses data?Are the audit logs reviewed? Have custom-built applications been written with security in mind? etc.[52]

By implementing these mitigation actions into the risk management plan of the project, stakeholder will be able to at least diminish the impact that these technology risk factors may have on the Puzzled by Policy project.

5.2.3 Economical Risk

Section 3.4 of the thesis gave a working definition for economic risk, which was **"the change in the economic structure that influences in a negative way the expected return of an investment"**. The economic structure of the world has seen many changes, with shifts in economic powers every few years. Competitiveness among countries has led these types of changes that range from increase in urbanization, switch from primary production to services and manufacturing with technology intensive activities. Therefore, increased international competitiveness represents one the main driver for economic change. Based on the economic context of 2009-2010 in Europe and the publications of that period, we identified the following factors that may hinder the success rate of the project and that are brought by economic structure changes: **currency risk; economic trends; market trends; economic freedom**

Currency risk, also known as exchange rate risk is defined by Oxford reference as "the possibility of loss contingent on a future change in the foreign exchange rate". Out of the four countries involved in the project, three are part of the Eurozone, having euro as their national currency (Greece, Italy and Spain). Hungary, however is still using the Hungarian forint. In 2010, EU declared Hungary not ready for the adoption of euro and needs more fiscal and economical consolidation in order to comply with the objectives of Sustainability and Growth Pact regarding sustainability of its public finances[53]. Moreover, since the economic and financial crisis around the world and more specifically in Greece, both sides of the Eurozone are becoming more sceptical. The countries that want to be part of the Eurozone are starting to question the improvements that the euro can bring to an economy, while the ones that are already part of the Eurozone are strengthening the evaluation reports of admission criteria.

The project PbP is lead by the Digital Enterprise Research Institute (DERI) at National University of Ireland (NUI) Galway and was funded with European funds, in

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[52]Symatec Website on conducting a security audit - accessed on 10.07.2014

[53]Visegrad official Website (Visegrad Group of Czech Republic, Hungary, Poland, Slovakia, with the purpose of supporting the four countries' European Integration)- accessed on 13.06.2014

euros. This reduces the currency risk at a minimum level, which brings the economic impact of currency at a low level. Thus, the probability of such a risk arising is considered to be rare, as well as insignificant consequences.

Europe2020 (2010) report sets the vision for Europe for 2020 and puts forward three priorities for growth: smart, sustainable, and inclusive. In order to achieve progress, the report sets seven focus points, called flagship initiatives. These flagships can also be seen as **economic trends** for EU economic market since they are considered the main positive drivers for change in the market. Among those, we view the first three to be likely to impact the PbP project:

- "innovation Union" -to improve framework conditions and access to finance for research and innovation so as to ensure that innovative ideas can be turned into products and services that create growth and jobs. This will encourage the development of new projects in the area of e-Governance and e-Participation, making it easier to raise awareness and get citizens involved. However, it will also increase competitiveness among projects and will raise the standards of the tools used in reaching the targeted users.

- "youth on the move" -to enhance the performance of education systems and to facilitate the entry of young people to the labour market. Being related to the topic of PbP (immigration and migration), this type of change in the European Market will influence the level of user participation in the project as well as the outcome of those participations. The report submitted to the policy maker is directly influenced by the input of citizens, meaning their actions (distributing the platform through the PbP widget) as well as their views on the topic (be either offensive or defensive, depending on the current immigration and migration policy).

- "a digital agenda for Europe" - to speed up the roll-out of high-speed internet and reap the benefits of a digital single market for households and firms. The impact that technology has on the economic structure is described in Guerrieri et al. (2008), where ICT is recognized as a General Purpose Technology[54]. Three characteristics define GDP: commonness, technological dynamism, and innovational complementaries with other forms of advancements. The commonness determinant puts computers and technology in general as a common equipments used in all industries of the economy. By supporting technological developments, and the digital benefits it brings to both households and firms, EU is helping shape the European economy market. The focus on e-Governance will increase and more projects in this area are expected to emerge. This can be both beneficial and problematic for the PbP project. Beneficial because it opens the market for participation tools and supports their development, and it makes citizens more aware of such projects and their impact. However, there are risks that may surface from such focus like tougher evaluation of projects that apply for EU funding, more time spent on analysing the technological tools to be used in the project.

These three trends that are bound to influence the economy scenery will also influence the e-Participation projects. However, the PbP project does not have an economic goal and is not set to earn money from its participants. It is funded with European funds

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[54]GPT is defined by the authors with the help of "General Purpose Technology: Engines of growth" written by Bresnahan and Trajtenberg in 1995 as "radical new ideas or techniques that have the potential for important impacts on many industries in an economy"

and thus the economic risk factors that usually impact the outcome of a project, in this case will influence more the behaviour of participants and their input on the "immigration and migration" topic. These types of influences fall under Social Risks, which were analysed in section 5.2.1. Therefore, we assess the economic trend factor as having a likely probability of occurrence and a minor to moderate consequence for the project.

Market trends may be considered as a subset of economic trends, but for the chosen project and its topic (immigration and migration), we consider market trends to be a risk factor on its own. Orrenius and Zavodny (2009) states that immigrants "experience more volatility in economic outcomes than do natives [..] because they are more sensitive to business cycle fluctuations". One reason for this happening, is the volatility of industries chosen by immigrants and migrants to work in (e.g. construction, tourism, manufacturing), while services and government activities are more stable and sheltered from macroeconomic fluctuations. Immigrants are more present in blue-collar and service occupations, natives are more common in professional, clerical and sales occupations.(Orrenius and Zavodny (2009)) Also, immigrants and migrants are more commonly found performing seasonal work, when the level of demand in that industry increases. Seasonal worker is defined by the EU as "third-country nationals (non-EU citizens), coming to an EU Member State for the purposes of employment in a sector of activity dependent on the passing of the seasons (typically in agriculture, horticulture and tourism). Their work is regulated in one or more fixed-term work contracts concluded directly between the third-country national and the employer established in a Member State."[55]. The market trends and changes according to seasons can influence the level of participation of citizens as well as their opinions on the topic, which will impact the outcome of u-Debates as well as the implication of citizens on the matter. However, the project has a time span of three years, which will level the debates and bring a common understanding of the citizens' opinions. Therefore, we evaluate the risk factor as having a likely probability of occurrence, but with moderate impact.

The last factor that we are including in our analysis is the **economic freedom**, which according to the Index of Economic Freedom of Heritage Foundation[56], represents "the fundamental right of every human to control his or hers own labour and property. In an economically free society, individuals are free to work, produce, consume, and invest in any way they please. In economically free societies, governments allow labour, capital and goods to move freely, and refrain from coercion or constraint of liberty beyond the extent necessary to protect and maintain liberty itself." Based on this definition, we can state that a higher level of economic freedom leads to more involvement from the citizens part in e-Participation projects. By allowing them to be more assertive with their work and properties, citizens are also becoming more aware and engaged in e-Governance and e-Participation projects. A decreasing economic freedom may also influence the level of trust shown by citizens towards their governments and discourage them from getting fully engaged in the u-Debates, or using the Widget tool on social media websites. Therefore, including the economic freedom as part of the economic risk factors will give an assessment of the level of expected commitment to the project throughout its course.

The assessment is done with the help of qualitative and quantitative factors, grouped in four pillars: rule of law, limited government, regulatory efficiency, open markets. Although the first three pillars would place the factor under Political risk, based on the paper

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[55]EU Press Release database - accessed on 14.06.2014

[56]2014 Index of Economic Freedom-accessed on 09.06.2014

Berggren (2003) and its distinction between economic, political, and civil freedom[57], encouraged our decision to keep the economic freedom factor as part of the Economic Risk. Berggren (2003) also mentions as benefits of economic freedom economic growth; income equality; improve the quality of life.

In Gwartney and Lawson (2009) the rankings for Economic Freedom for the four countries involved in the pilot of PbP for 2007 (out of a total of 141 countries) were:

- Greece: 7.07 (number 50), with slight improvements every year.
- Hungary:7.28 (number 37), with a drop from the previous year, from 7.38, but overall positive improvements.
- Italy: 6.80 (number 68), which has been experiencing a decrease every year since 2000, from 7.09.
- Spain: 7.16 (number 45), which has also recorded a drop since 2005, from 7.33.

Compared with the top three countries: Hong Kong (8.97), Singapore (8.66), New Zeeland (8.33) and the bottom three: Zimbabwe (2.89), Myanmar (3.69) and Angola (4.04) we can evaluate the rankings of the four focus countries to be acceptable. The mean between the extremities (top three and bottom three) is 5.11. Compared with the rankings of the pilot's countries we can see that the difference is not significant, however, they are still in the top middle. Over the past 10 years there were no significant changes in the rankings of the four countries, their score of economic freedom varied slightly, but stayed above the mean. This proves that the countries were consistent before the financial crisis of 2007. If we extract the data from the 2013 report (Gwartney et al. (2013)) we discover a drop in 2010 for Greece to 6.88 and for Italy to 6.79. Both countries were influenced by the Financial crisis and the outcome is no surprise. With citizens being less encouraged to make use of their private properties and labour rights, their opinions about policy matters and trust levels in the government will be influenced in a negative direction and so will the outcomes of PbP project. However, given the objective of the project, the three year time span and the components of the economic freedom factor we evaluate the probability of it changing and posing a risk to be unlikely with moderate consequences.

To conclude, the economic risk analysis of the STEEP-M framework outlined four risk factors that can influence the PbP project and were assessed on probability and consequences. In order to plot them on the Risk Matrix, the results are summarized bellow and weights are given for each dimension. For a better visualisation on the matrix, we will label them from Ec1 to Ec4, where Ec = economic, and assign weights for each level:

- Ec1 - currency risk, with rare probability and insignificant consequences (0.2; 10);
- Ec2 - economic trends, with likely probability of occurrence and moderate consequences (0.65; 30);
- Ec3 - market trends, in the same assessment level as economic trends, but with slightly more probability and consequence of happening than Ec2 (0.7; 45);
- Ec4 - economic freedom, which has unlikely probability of occurring and a moderate impact on the project (0.2; 30).

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[57]"Economic freedom is distinct from political freedom (participation in the political process on equal conditions, actual competition for political power, and free and fair elections) and from civil freedom (protection against unreasonable visitations, access to fair trials, freedom of assembly, freedom of religion, and freedom of speech)

These four factors were plotted on the risk matrix described at the beginning of this chapter as followed:

Figure 6: Economic Risk Matrix
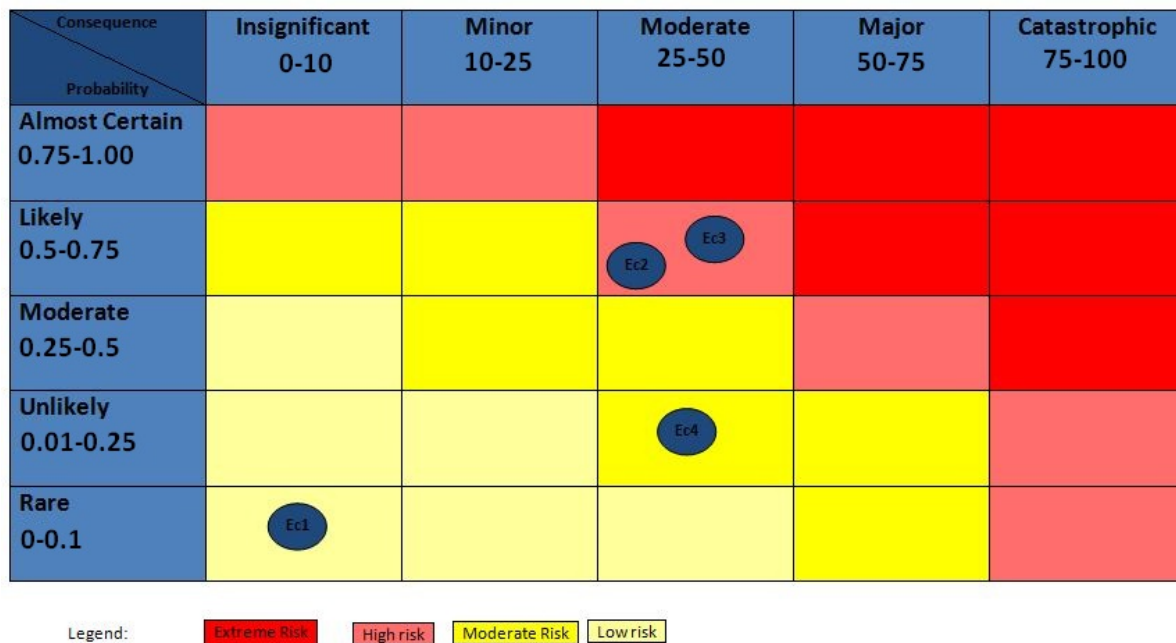
The Matrix shows that no Economic Risk is labelled as Extreme Risk, while Ec2 and Ec3 are of High Risk, Ec4 Moderate and Ec1 Low Risk. As stated in the description of the section 5.2, we will propose mitigation actions only for Risks that fall under Extreme Risk on the Risk Matrix, and that are part of the Technological dimension of the framework.

5.2.4 Environmental Risk

The working definition on which we decided in section in section 3.5 for environmental risk is **Environmental risk can be described by Risk Value (R), which can be defined by the product of the Risk Probability (P) and the Harm Extent (C) to environment (or health), with the equation R=P*C.**

Environmental obvious risks, specific to the European scenery, such as natural calamities: earthquakes, floods, etc. will not be included in the analysis since they represent the outliers events that may hinder the project. They can, however, be drawn from one of the stakeholder's plans in case of such environmental events occurring (e.g. from the coordinator of the project: the National University of Ireland, Galway). This being said, we will focus our analysis on two potentially risky environmental characteristics, **climate change** and **greenhouse gas emission**.

In the previous subsection we established that market trends in industries such as tourism can influence the PbP project, more specifically the seasonality characteristic of the industry. Therefore, **climate change** and weather in general impact tourism and therefore the demand for seasonal workers. Thus, the level of immigration will be indirectly linked to climate change. A low demand for employees in seasonal industries will generate low levels of immigration and migration, which impacts the importance of PbP for citizens and thus their participation. We evaluate this risk factor as having a likely probability of

occurring, although climate change is, at this moment, an irreversible process. The short timespan of the project and the indirect correlation between the risk factor and PbP supports our evaluation. The consequences of it happening will be moderate, as they were evaluated in the Economic Risk analysis section 5.2.3.

Greenhouse gas emission associated with ICT related products and tools will pose a threat to a project depending on technology. New regulations are bound to emerge in order to reduce the greenhouse effect and it will have an impact on how a technology is produced and thus on how it is chosen by its users. With the improvements in technology and increase in ICT tools, there has also been a growth in "networking and the data centre industry as providers of data processing (servers), data storage (storage equipment), and communication (network equipment)" (Steenhof et al. (2012)). Therefore, special attention needs to be paid to the environmental impacts of ICT products. Parallel to this, there has also been an increase in the power requirements of sustaining existing data centres. Adding to this the increase in electrical requirements, the greenhouse gas emission raises as well. Steenhof et al. (2012) arguments this by comparing the global carbon footprint of ICT sector from 2002 -0.53 gigatonnes of carbon dioxide, which represents approximately 1.25% of the global emission- with the numbers from 2007 -0.83 gigatonnes of carbon dioxide, which is 2% of the global emission. They extrapolate with projections for 2020, when the ICT global footprint will reach 1.43 gigatonnes, and 2.7% of total emissions. The impact on the environment of ICT related products will depend on how they are being used as well as their lifecycle, according to Plepys (2002). It is, however, the ICT products use phase that has the most negative impact on the environment and the e-projects that encourage the usage of technology, and ICT tools are adding to the ecological footprint.

In the same article (Plepys (2002)), the author states that an environment friendly production will not necessarily mean less greenhouse effect. The increase in production and consumption of ICT related products supported by reduced manufacturing costs obtained by energy-effective equipment will lead to a rebound effect. "If technological progress makes certain equipment more energy efficient, less energy is needed to produce the same amount of products or services, thus the cost per unit of production falls, which leads to increased demand for the product or the service."

However, based on the technology involved in the development and three year time span of PbP we assess the greenhouse gas emission risk factor as having an unlikely probability of influencing the project, with insignificant consequences. The current technology can support the participation of citizens in the project, and thus not add to the level of gas emission.

Given the low correlation between environment and PbP project, we will only include these two factors and plot them on the Risk Matrix, with the label Ev, which stands for environment and the following weights:

- Ev 1 - climate change, with likely chances of happening and moderate consequences (0.7;50);
- Ev 2 - greenhouse gas emission, which is unlikely to occur and influence the project, with an insignificant impact (0.2; 10).

The risk matrix with the two factors plotted looks as followed:

Figure 7: Environmental Risk Matrix

Consequence / Probability	Insignificant 0-10	Minor 10-25	Moderate 25-50	Major 50-75	Catastrophic 75-100
Almost Certain 0.75-1.00					
Likely 0.5-0.75			Ev1		
Moderate 0.25-0.5					
Unlikely 0.01-0.25	Ev2				
Rare 0-0.1					

Legend: Extreme Risk | High risk | Moderate Risk | Low risk

As the Matrix shows no Extreme Risk factor, which can be deduced from the beginning of the analysis, we will not proceed with drawing mitigation actions for these factors. Although special attention needs to be paid to climate change, which fall under High Risk. Its effects on migration and immigration levels may impact the level of participation as well as the ideas and opinions brought forth by the users/ citizens.

5.2.5 Political & Legal Risk

In section 3.6 we established two working definitions for both Political Risk and Legal Risk. Thus, **the risk that arises as a result of political changes or instability in a country's political scene, and which has consequences on the desired outcomes of an investment or project** represents political risk. While **the risk which is defined by uncertainty, involves a legal norm and it is the manifestation of the possible damage caused by the norm** serves as the base definition of Legal Risk.

In order to asses political risk we will analyse the environment in the following areas: **power distribution, government effectiveness and freedom of press**.

The **power distribution** factor of political risk will be analysed from the point of view of the EU, since the outcome of the project is targeted to influence the EU legislation on immigration and migration. Oxford dictionary defines it as "the capacity or ability to direct or influence the behaviour of others or the course of events". A behavioural definition of power associates it with the possession of resources (such as population, territory, natural resources, economic size, military forces, and political stability, among others), according to Nye (1990). In order to analyse the characteristics of power and its distribution, we first have to determine the current status of political power. Therefore, in the same article, the author also acknowledges the shift from the military force and territorial conquest, with "factors such as technology, education, and economic growth are becoming more important, whereas geography, population, and raw materials are becoming less important". In the same paper, the author states that "equal distribution of power among major states is relatively rare". We continue to analyse this concept

within the European Union and the power distribution among its institutions. Bindseil and Hantke (1997) describes the relationships and roles of the three main institutions of EU, the Council of the EU (which represents the governments), the Commission (which represents the interests of the union), and the European Parliament (EP- which acts on behalf of the citizens), as well as the decision making process and characteristics. The decision making process of the EU is defined by the co-decision procedure, which is summarized simply as approval between EP and the Council on EU legislation, that is later drafted and implemented by the Commission. A short description of the three main institutions is presented below, having as a source the official EU website[58], with the specification that we included data from before 2011, thus not including Croatia as part of the EU, which adhered in 2013.

The power distribution regarding voting matters for the *Council of the EU* is established based on the population of each country. The countries included in PbP have the following votes: Italy - 29, Spain - 27, Greece and Hungary - 12. The Council makes decisions based on the qualified majority, meaning when a majority of the 27 EU countries vote in favour (14 out of 27 countries) or when 255 (out of the total of 345) votes are in favour.

The *European Commission* serves four purposes: to propose new laws to the EP and the Council, to manage the EU budget and funding allocations, to enforce EU laws, to represent the EU internationally. It is made up of 28 Commissioners (one from each country) who is assigned a specific policy area.

The *European Parliament* is made up of directly elected representatives by the citizens of EU, every 5 years. The number of number of members of the EP (MEPs) for each country is assigned in proportion to its population. Between 2007 and 2009, the number of MEPs was of 785. Under the Lisbon Treaty no country can have fewer than 6 or more than 96 MEPs. It is under the same treaty the EP gained more power in content of laws in areas like agriculture, energy policy, immigration, and EU funds.

Thus, the distribution of power between the three main institutions of the EU impacts the project directly. We evaluate it as having an almost certain probability of occurrence, since EU is acting as a living organism, in continuous improvement and change in order to adapt to current conditions and include new countries. Moreover, its impact is major because it influences how the outcome of the project will be used in adjusting the current immigration and migration law, as well as how the citizens are going to participate in the project.

When assessing political risk, one cannot overlook the governance factors. We decided to follow the World Governance Indicators (WGI) project[59] and select from their six dimensions of governance: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. We will include in our analysis the dimensions which we consider relevant to the project, or variations of those options.

The first one that we analyse is **government effectiveness**, which "captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies". In the

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[58]European Union Website - about Institutions - accessed on 09.06.2014
[59]Worldwide Governance Indicators Website - accessed on 09.06.2014

world ranking, in 2009, Greece ranked on number 72, Hungary 73, Italy 67 and Spain 78. The countries with the highest rank in 2009 were Finland and Singapore (100) and Denmark and Sweden (99). Compared to 2008, Greece had the same ranking, Hungary had a better one (75), as well as Spain (79) and Italy had a lower ranking (65). Since the dimension analyses the perception of the quality of services provided to citizens, a decrease in this perception will raise risks for the PbP project. The level of impact on the policy stream of the project will decrease and so will its image among citizens and decision makers. If citizens do not perceive their government as being efficient and working in their best interest, their involvement in e-Participation projects will decrease as well. On the first half of the 2000-2010 decade the European Union saw an improvement in its image, with 10 new members joining in 2004 and 12 national currencies being replaced by Euro. However, the second half brought new challenges, either from outside Europe or within: Economic crisis (with Greece debt crisis), Arab Spring (that triggered the most expensive oil), WikiLeaks revolution. This shows how vulnerable the image of the government is and how political and non-political events can influence it. Therefore, we evaluate the probability of government effectiveness changing, and probably deteriorating, as being likely, with major consequences for the project.

Freedom of press, represents in our view another determinant of political risk for which we decided to include the Press Freedom Index, an annual ranking published by Reports Without Borders[60]. Freedom of press helps characterise the level of participation of citizens in selecting the government as well as in the policy stream, together with the freedom of expression and association. We decided on this particular freedom because of its influence on the PbP project: how the press communicates to the citizens and how it is seen by them impacts both the outcome as well as the input into the project. Moreover, freedom of press is correlated with corruption, according to Brunetti and Weder (2003), who explains the negative correlation between the two, with results that suggest that "an independent press may represent an important check against corruption". Corruption is part of political risk factors, taken into consideration when assessing country risk (Group et al. (2009)). Therefore, freedom of press although is related to corruption and country risk it can be taken into account for analysis separate from it, because of its impact to the overall project. From the WGI project, the freedom of press is closely related to the dimension of voice and accountability and control of corruption. A well informed electorate improves governmental performance and matters more than economic development for a good government.

The ranking for the Press Freedom Index is based on events from the 1st of September 2008 until 1st of September 2009 and looks only at press freedom violation. "It also measures the level of self-censorship in each country and the ability of the media to investigate and criticise. Financial pressure, which is increasingly common, is also assessed and incorporated into the final score"[61]. The Index states that the lower the score, the greater the freedom of press is in that country. For the four countries included in the project we have the rankings: Greece - 9.0, Hungary - 5.5, Italy - 12.14, Spain - 11.00.

Moreover, the European Charter of Freedom of the Press established on May 2009 ten articles or principles that define the freedom of the press from government interference, their "right to safety from surveillance, electronic eavesdropping and searches of editorial departments and computers, and to unimpeded access for journalists and citizens to all

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[60]Press Freedom Index 2009 - accessed on 10.07.2014
[61]Worldwide Press Freedom Index 2009 - accessed on 10.07.2014

domestic and foreign sources of information"[62]. This shows that Freedom of Press is being evaluated and protected by both the EU and international organizations. Thus, the probability of this risk happening is unlikely, but its consequences would be major, since it can influence the image of the project or the opinion of citizens who participate in PbP.

Legal risk was decided on the same subsection 3.6 that is **defined by uncertainty, it involves a legal norm and it is the manifestation of the possible damage caused by that norm**. Legal risks arise from inside the project, by the way the PbP project is brought to live, meaning how the documents and reports are being drafted and submitted to the decision maker. However, we evaluate as external risk, to be included in our analysis of the environment, the incompatibility between the different legislations.

The PbP project may suffer from external legal risk factors such as **incompatibility between legislations of member states**. Because it brings together four pilot countries that although are part of the EU still have their own laws and legislations which have to be merged with the EU ones. To help this process, the EU treaties provide the legal basis and framework. This way, the local legislations can be integrated and merged with the European ones more easily.

As explained by Encyclopaedia Britannica and the European Union's website, the EU's main challenge regarding legislation was bringing together different legal traditions, such as civil law, common law, and Scandinavian law. By providing autonomy to both institutions and processes to act in respect to norms and procedures that comply with the current environment and conditions. The European focuses on the citizen and gives him rights and duties. The law is defined as being supranational, "not determined or confined by national law. National rules on employment and industrial relations have been transformed by the infusion of rules having supranational origin: EU law."[63]. EU laws follow the Convention for the Protection of Human Rights and Fundamental Freedoms and as of year 2000, the EU Charter of Fundamental Rights.[64] Both the convention and the Charter have given EU more uniformity in how the public law is drawn and applied throughout the member states. The EU Charter helps also minimize the risk of distribution of power, since it controls the way the institutions and member states use or abuse their existing powers. By focusing on the relationship between the institutions and the member states and among citizens, the Charter brings transparency and accountability to how the union functions.

Therefore, the EU acknowledges this risk and works towards preventing it. "The EU institutions may create law, even where the Member State opposes the adoption of that law by those EU institutions, provided that a voting procedure based on a majority rule applies to that specific field. EU law must be enforced in national courts even where this

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[62]European Charter on Freedom of Press - accessed on 24.06.2014

[63]Eurofound Website on EU Law - accessed on 24.06.2014

[64]"It is the first formal EU document to combine in a single text the whole range of civil, political, economic and social rights and certain "third generation" rights such as the right to good administration or the right to a clean environment.

The Charter's prime objective is to make rights more visible. The text is not intended to establish new rights, but to assemble existing rights that were previously scattered over a range of sources including the European Convention on Human Rights and Fundamental Freedoms (ECHR) and other Council of Europe (COE), United Nations (UN) and International Labour Organisation (ILO) agreements." - source EU Charter of Fundamental Rights - accessed on 25.06.2014

involves overriding the national law produced by domestic law-making institutions."[65]

For e-Participation projects, the risk of incompatibility between legislations of member states still exists, but can be interpreted as having different implications, than legal ones. Because, even though any new law of European importance is implemented throughout all member states, the impact it will have on citizens and how they react to it cannot be imposed by the EU. Therefore, the incompatibility between legislations can be turned into a social risk, if citizen's reactions are not managed properly and if they are not kept informed from beginning to end of the legislation's development.

Thus, we evaluate the risk of incompatibility between legislations as having an unlikely probability of occurring, given the involvement of the EU institutions and representatives in the matter. The consequences however, would be catastrophic, because it will affect how the results of the PbP are implemented and followed through.

The four risks from the political and legal dimension of the framework are plotted on the Risk Matrix. They were given the label P for political and L for legal, as well as weights according to the evaluation of probability and consequences:

- P1 - power distribution, with almost certain of happening and major consequences (0.8; 55);
- P2 - government effectiveness, which is likely to occur and influence the project, and with a major impact (0.6; 70);
- P3 - freedom of press, with unlikely probability of occurrence, but major consequences for the project (0.2; 70);
- L1 - incompatibility between legislations, which we assessed as being unlikely to occur, but its impact to be catastrophic for the project (0.2; 85).

The risk matrix with the four factors plotted looks as followed:

Figure 8: Political & Legal Risk Matrix

[65]Eurofound Website on EU Law - accessed on 25.06.2014

The figure shows that the factors from the political and legal dimension of the framework are distributed more to the right side of the matrix and thus constitute a greater risk for the project. However, we will not pursue with mitigation measures and actions for them, since it does not fall within the before mentioned scope of the thesis.

5.2.6 Military Risk

In section 3.7 we established as working definition for military risk "the probability and severity of a potential loss that may result from hazards due to the presence of an enemy, an adversary, or some other hazardous condition."

E-Participation project's main objectives, as stated in section 4.3, is to "make governments more democratic and participatory through new channels for democratic involvement" (Millard et al. (2009)). Moreover, Macintosh (2004) breaks down the main objectives of e-Participation projects into four. The third one, however, brings into focus possible risks for these projects from a military perspective as well: "provide relevant information in a format that is both more accessible and more understandable to the target audience to enable more informed contributions". This will lead to increased transparency of the government's activities, which, although is desired, raises risks from legal restrictions like protection of personal and governmental data, security issues, as well as protecting military interests. When analysing military implications and risks of Puzzled by policy we will discuss the importance of **FRONTEX** (the European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union) and the **illegal migration trends and their implications from the military perspective**.

According to the their website[66], **FRONTEX** "promotes, coordinates and develops European border management in line with the EU fundamental rights charter applying the concept of Integrated Border Management". Its areas of activity includes joint operations, risk analysis, training, research, provide rapid response capability, assist member states in joint return operations, and information system and information sharing environment. These activities are focused on Schengen-area members and their external borders, although it cooperates also with non-Schengen-area countries that have transit routes for irregular migration. FRONTEX's importance has risen considerably since its inception in 2004, which can be supported by the increase in the budget allocated for its operating activities, highlighted in figure 9.

Thus, special attention needs to be paid to the current developments impacting the four countries used in the pilot of Puzzled by Policy and their problematic areas regarding the topic of immigration and migration. These areas are, according to FRAN (FRONTEX risk analysis network), in 2010[67]: the Aegean dispute (between Greece and Turkey), the Canary Islands (Spain - Senegal - Mauritania), Italy - Libya, Serbia - Kosovo - Hungary. The same report, FRONTEX (2009), lists the current needs clustered under a system of projects or services. Of the projects presented by FRAN, we identify the ones that have the potential to influence the four countries participation and opinions submitted to the PbP project: Poseidon Programme (Clustering border control activities at South Eastern maritime and land borders-focus on Greece), The Border Checks Development Programme (Covers activities supporting the Member States to develop improved capabilities for

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[66]FRONTEX Website - accessed on 04.07.2014
[67]FRONTEX Website, publication on Risk Analysis - accessed on 04.07.2014

Figure 9: FRONTEX Budget development 2006-2009
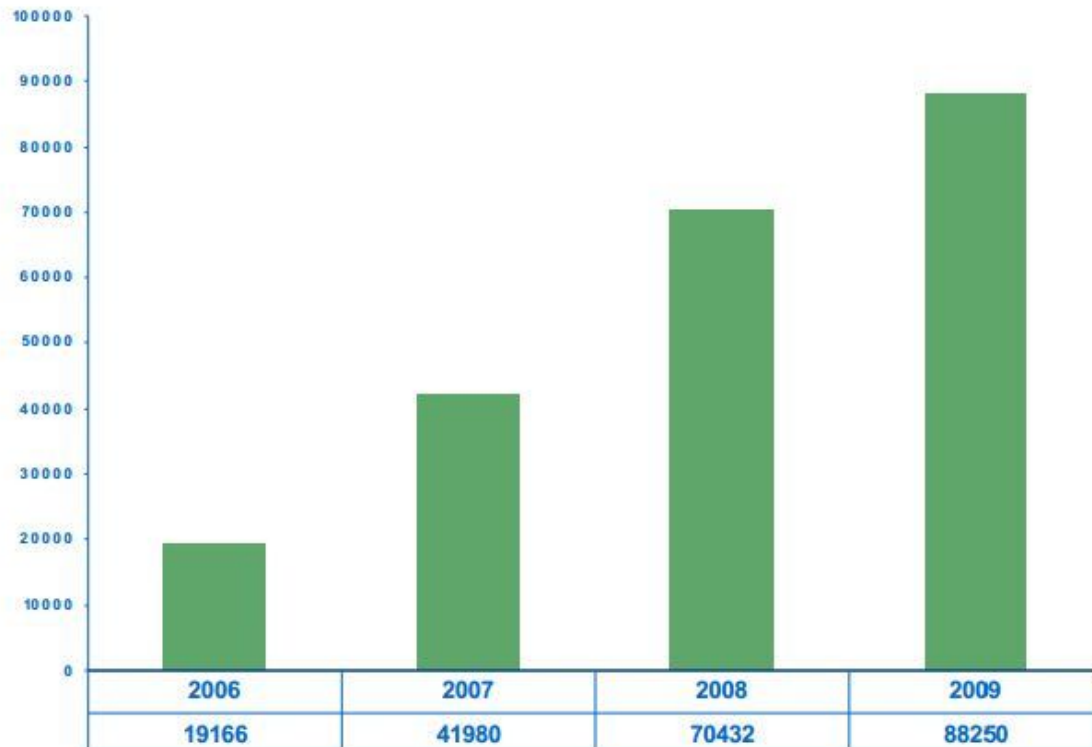
*numbers are in € 1 000
source: FRONTEX (2009)- page 22

border checks - Focus on all four countries), Border Surveillance Development Programme (Covers activities supporting the Member States to develop improved capabilities for border surveillance - focus on all four countries).

The importance of such programs can be given a military perspective by looking into military expenditures of the involved countries. NATO defines military expenditure as "all current and capital expenditures on the armed forces, including peacekeeping forces; defence ministries and other government agencies engaged in defence projects; paramilitary forces, if these are judged to be trained and equipped for military operations; and military space activities".[68]. From the same source, we discovered that the average military expenditure per countries in 2009 was 2.21230315 of the GDP, while Greece had 3.3, Italy - 1.8, and Hungary and Spain - 1.2. The high ratio expenditure by Greece was also analysed in Kollias (1996), who looked into the relationship between such expenditures from Greece and Turkey as part of their ongoing Aegean dispute. Even though the data is from 1996 (and the last two decades preceding this year), it can still be extrapolated to current situation. The paper highlights that the Greek military expenditures have been influenced and will continue to be influenced by the Turkish ones if the conflict between the two countries is not resolved.

The importance and involvement of FRONTEX in the illegal migration problems of

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[68]the World Bank Website - accessed on 04.07.2014

the four countries is the RABIT OPERATION 2010 (the precedent of Poseidon program) which reduced with 76% the number of illegal migrants along the 12.5 km of border near Orestiada, Greece. The operation included 175 strong forces with officers from 26 countries as well as representatives and officials of the Greek police. Together, they carried out foot and vehicle patrols with interpreters and experts in false documents in order to prevent migrants from crossing and catch the ones that do.[69]

FRONTEX has the ability to influence European citizen's perspectives and views on the issue of immigration and migration. By working towards an effective border control (facilitating the movement of legal travellers and discouraging irregular migration, which was defined in section 5.1) FRONTEX aims to improve security for the European citizens. This goal is being pursued also through the coordination of both experts and equipment to areas considered to be under pressure. If, however, FRONTEX fails at achieving this goal, the outcome of PbP project will also be damaged since European citizens will not feel secure enough to exercise their freedom of speech right.

We evaluate the FRONTEX military factor as being unlikely to happen. Since its beginning, the interest and investment in the agency has increased and continues to increase, thus we foresee no reason for it not to achieve its goals and improve its programs. The consequences of it occurring we estimate as being major for the quality of the participation. If citizens do not feel safe in their country, meaning that FRONTEX has failed to achieve its goals, they will have a negative attitude towards immigrants and migrants. Regarding the level of participation, the consequences will also be major. We see that if FRONTEX will not be successful, citizens will loose their trust in governments effectiveness and their trust in the public services they offer, even online.

The second factor identified as being relevant to our analysis is **illegal migration trends**. We are not focusing only on the incoming or outgoing flow of immigrants in and from Europe, but also on the actions taken by the EU to combat irregular migration, which will influence the landscape of European migration. Thus, Focus-Migration[70] states that "EU has allocated a total of € 4 billion from its budget for the framework programme "Solidarity and Management of Migration Flows" for the period 2007 to 2013. The priorities underlying this framework programme are reflected in the relative allocation of funding: the External Frontiers Fund is to receive € 1,820 million, the European Return Fund € 676 million, the European Refugee Fund € 699 million, and the European Integration Fund € 825 million." This increase interest in strengthening the implementation of policies for irregular migration demonstrates that the EU has a largely restrictive agenda for illegal immigration. Also, through the FRONTEX agency the continuous changing borders of the EU are being kept under more vigilant control. By focusing on non-military actions to reduce irregular migration, EU is increasing the safety of its citizens and thus the overall quality of life.

Morehouse and Blomfield (2011) presents seven main categories identified by FRONTEX as main migratory routes used to cross into the EU without authorization, of which we selected the ones relevant to the four countries in the pilot of PbP:

- Central Mediterranean route: from Tunisia and Libya to Italy and Malta;

[69]FRONTEX Website - accessed on 04.07.2014 & the Washington Post Website - accessed on 04.07.2014

[70]"An information service that offers up-to-date figures, data and analysis on immigration, migration, asylum and integration issues. The service consists of three core products: country profiles, policy briefs and the "Migration und Bevolkerung" newsletter (in German only)" - source: Focus Migration (Germany) Website -accessed on 04.07.2014

- Western Mediterranean route: from Morocco and Algeria to Spain;
- West African route: from the West African coast to the Canary Islands;
- Albania - Greece circular route: circular migration from Albania to Greece;
- Eastern Mediterranean route: largely from Turkey to Greece, by land or by sea.

They also state that the focus points of illegal immigration are in constant change because the borders of both the European Union and the Schengen-area are changing with each enlargement. The five migration routes and borders flexibility are part of the illegal migration trends risk factor that can become eventually external military risks.

However, the trend for irregular migration over the last 5 years has been to decline. The decrease, shown in Figure ??, can be assigned to a deteriorating financial situation of the South and South Eastern Countries like Spain, Italy, Greece. For the military perspective, the decrease implies less pressure for border control (both maritime and territorial). A decrease in militarized borders will lead to government financial savings as well as a decrease in usage of military capabilities and technologies. If however, the trend changes, likely to happen with the amount of bail-out money being invested in all three countries, the wave of migration will raise again and the military will once again have to get involved in domestic affairs. This may threat civil liberties and endanger not only the PbP project, but the overall European citizen welfare.

Figure 10: Number of detected Illegal Border Crossings at EU- and Schengen-associated countries' external borders 2007-2010
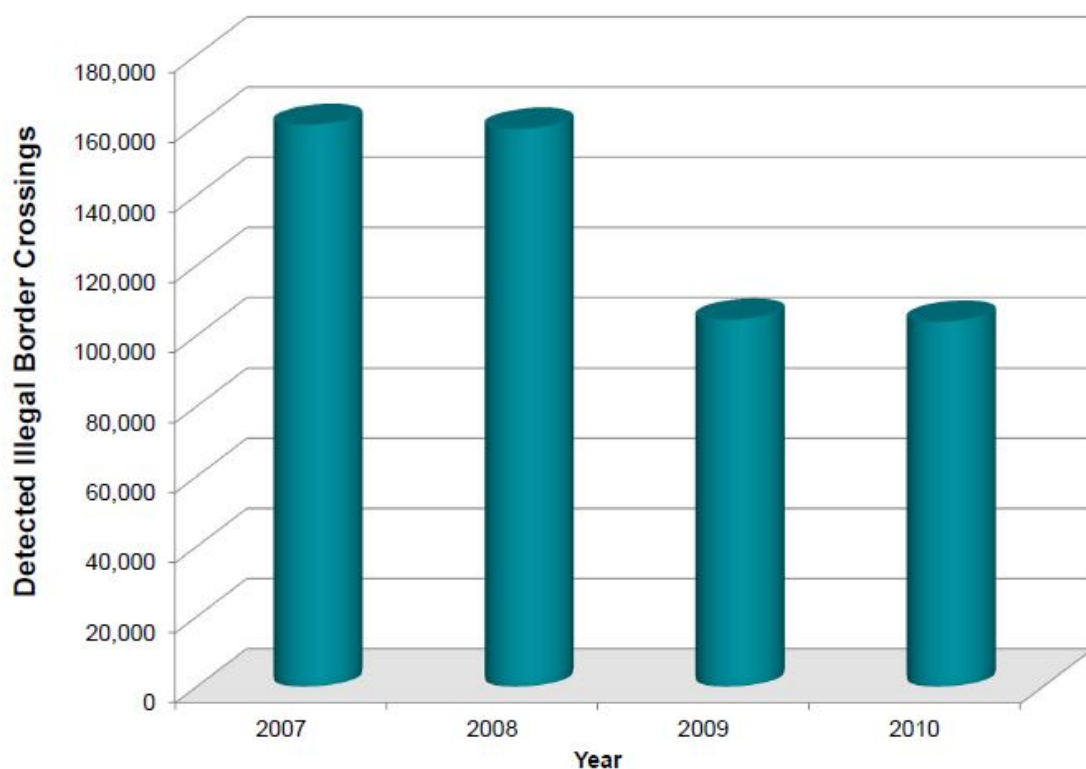
source: Morehouse and Blomfield (2011)

We assess the risk of illegal migration trends to have a moderate possibility of occurrence with major consequences, not only for the Puzzled by Policy project, but for the overall situation in all countries.

The two risks from the military dimension of the framework are plotted on the Risk Matrix. They were given the label M for military, as well as weights according to the evaluation of probability and consequences:

- M1 - FRONTEX implications for the project are assigned to have unlikely probability of occurrence, but major consequences (0.2; 50);
- M2 - illegal migration trends with moderate probabilities of happening and major implications for the project (0.3; 55).

The risk matrix with the two factors plotted looks as followed:

Figure 11: Military Risk Matrix
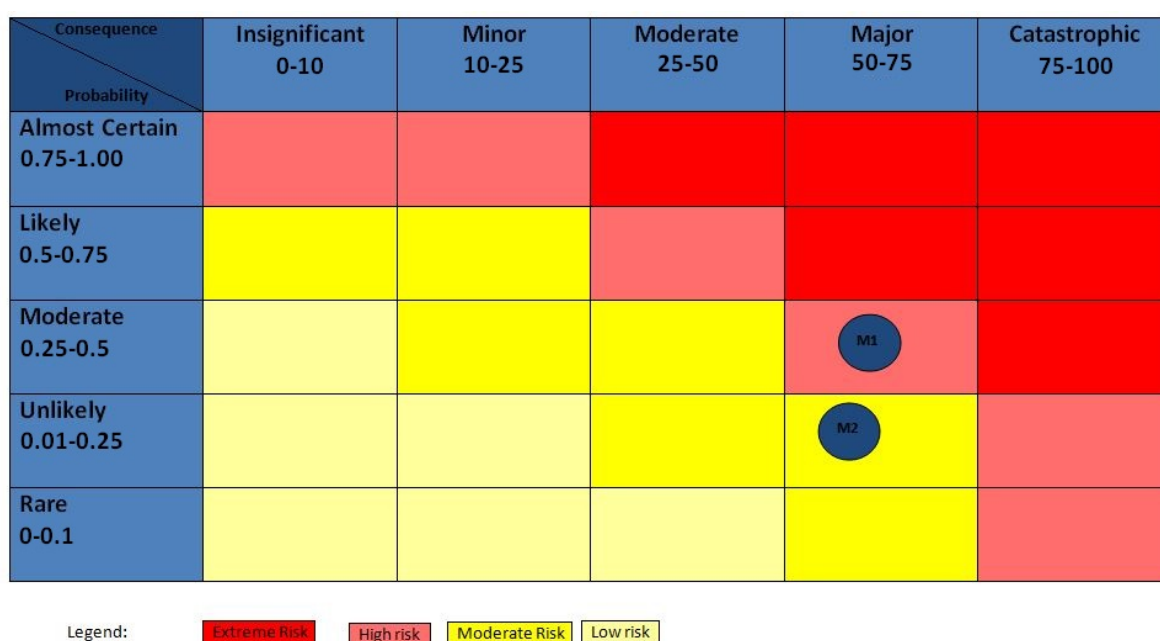
The figure shows that the two identified factors fall under High or Moderate risk and will have to be closely monitored in order not to damage the expected results for the project. M2 is labelled as High risk and will be linked with other social factors, since it includes also the social factor of immigration and migration trends.

6 Discussions

This section of the thesis will elaborate on the comparison between the results presented in the Evaluation Report(b) (GRNET et al. (2013)) and the the outcomes of the STEEP-M analysis conducted in subsection 5.2. In order to have an objective analysis, we read and analysed the Evaluation Reports only after conducting the STEEP-M analysis for the PbP project. The reports available online are written based on evaluation feedback given by the users, policy makers, NGOs, CSOs, media experts and partners from each pilot country. We will use in our comparison the results provided by the overall evaluation feedback, and underline individual feedback from pilot countries, in the case of significant differences. Moreover, the report is based on the project's activity from the 16th of January 2012 until November 2013, 13 months.

The report mentions the desired outcomes as well for the project regarding user participation, thus, for all four pilot countries, it envisioned 1500 users per each country nationally. However, only Spain managed to achieve and surpass these numbers, with 2.009 users to have completed the Policy Profiler, while the other three countries stayed below this target: Greece - 1.437, Hungary -1.265, Italy - 1.114. Of these users, the ones that filled in the evaluation questionnaire are even less, with 103 of the Greek users, 100 of the Hungarians, 78 of the Italians, and 252 of the Spanish ones. Given these big differences in the evaluation numbers and also the low EU evaluation and participation (with only 40 users filling in the questionnaire), the authors of the report decided to balance the report by selecting 91 evaluations from Spain, Hungary and Greece, 87 from Italy and 40 from EU. The selected evaluations are the most recent ones provided by the users. This selection ensures a fair representation in the overall evaluation for each country and for the unofficial EU project pilot, while the round number (400) supports and gives meaningfulness to the results.

The overall evaluation report states that 6.632 users have completed the Policy Profiler questionnaire in all pilots, but only 1.758 users decided to register. Those users created 1.320 u-Debate posts, in 35 topics and 118 threads. Total views during the pilot period exceeded 204.000. The evaluation brings to light that the platform, the Policy Profiler and the Debate tools are perceived as easy to understand and use (68.7% rate the Policy Profiler tool as easy and understandable, while 63.5% rate the platform the same way) as well as providing an effortless navigation (58.75% of users agree with this statement) and contribution (50% have a positive answer for this statement). However, the users showed indifference towards the PbP Widget, with 41.75% stating that they are neutral regarding the download and installation of the widget, more than the positive responses -39%). The tendency to answer neutral was evaluated by the authors as an impossibility from the user side to provide positive or negative answers since they did not download or install the widget. The majority of users state that the platform is useful for participation (62.5%), but they feel that they cannot influence the policy making through the platform (34.5%) and that government officials and policy makers do not participate in the platform, with only 25.5% disagreeing to this statement.

Also, the majority of users(58.25%) consider that the platform offers understandable content and high quality deliberation and 59.5% consider that the participation through the PbP platform is performed in a clear, open, equal and inclusive way, according to democratic values. They also trust the facilitator's (moderator's) abilities to perform high quality facilitation (44.75%) and trust the technology behind the platform in issues like

privacy and security and think that the platform manages their data with the appropriate attention and respect (55.5% have a positive attitude towards this statement). The numbers from the evaluation also show that the majority of the users are confident around technology and using the Internet and also motivated to use the tool now and in the future, for other policy issues.

The stakeholders find the tool and platform easy to use as well as understandable, but the debate tool should be improved and its complexity reduced. This will make it easier for people without deep understanding of migration topics to participate. They advice for "the platform to be integrated in the governmental processes mainly for legislation debates, specifically in agenda setting, policy formulation and deliberation stages" (GRNET et al. (2013)).

Overall, the report highlights the "hen and egg" dilemma because "users have reservations as regards platform usefulness and impact due to the lack of participation from government officials and decision-makers, while on the other hand policy makers have similar reservations on platform usefulness due to lack of a critical mass of users participating online." (GRNET et al. (2013)) This is also why the stakeholders stated that the most important factor that hinders the success rate of the platform is the low number of participants.

Moreover, the six PbP partners (two Greek, one from each of the other three countries and one Slovenian) have also evaluated the project and found it to be easy to use, except for the debate tool, which can be confusing. If guidance and assistance is provided by the facilitators, moderators of the debate (full time, in the partner's opinion), the platform's potential can increase significantly. They also highlight another problem about the project, the lack of public interest in immigration, which can be raised if partners disseminate the platform through "various channels, obtain the commitment and involvement of the political representatives" (GRNET et al. (2013)). If these two issues are solved, the project will obtain a more significant participation, which leads to a stronger representative sample to later be integrated in the governmental process.

The goal of the project was set "to help ensure that discussions surrounding immigration in Europe are as balanced, informed and inclusive as possible" and was elaborated in section 5.1.1. Following the Macintosh (2004) levels, the project was designed to focus on three levels of citizen participation: Inform, Consult, Empower; defined in the same sub section. The evaluation report allows us to assess if the objectives or part of them were achieved. Most users of the sample size for the overall evaluation (56.25%) stated that they feel more informed on immigration after using the platform and 58.25% state that the platform offers understandable content and high quality deliberation. This proves that the first level, Inform (e-enabling) was successfully achieved. The same applies for the second level, Consultation (e-engaging), since 40.55% have declared that by using the platform their engagement with public matters has increased. These statements, combined with the user's positive attitude towards the facilitators, their perception of the environment in which debates are performed as being secure, clear, open, allowing participation in an inclusive way, according to the democratic values, prove that the second level is also successfully reached through the PbP project. Then third level, however, cannot be labelled as the previous two, since most users believe that they cannot influence policy making through PbP, with only 34.5% stating the opposite. Moreover, they also believe that government officials and policy makers do not take part to an acceptable degree in the platform (35% agree with this, while 39.5% remain neutral).

The project owners tried to tackle the surfaced issues that were brought on in the Evaluation Report. One way was the report handed to the policy makers. In an interview for Open Democracy[71] about the project, Deirdre Lee from Insight-NUI Galway, the Coordinator institution of the project, stated that the report from the u-Debates passed to the policy makers has proven to be helpful, because even though the policy makers "were very enthusiastic about the idea and the whole project, realistically they had limited time and resources for becoming involved". This statement supports the findings of the Evaluation Report, that the policy makers' participation in the project was not as high as expected, or it was not perceived as such by the citizens. In order to address this discrepancy, the participant institutions and the appointed moderators established a "feedback loop", with the help of the summary reports, between the policy makers and the users of the platform and tools. This also highlights the importance of the moderator, the facilitator of the debates, since they are the ones that summarize the opinions and viewpoints that stand out from the debates and draw the report. The same Evaluation Report (GRNET et al. (2013)) states that the tool and platform is useful for gathering information and knowledge, but needs to be better integrated in the governmental policy stream. More specifically in "integration to the decision-making process, adequacy of government officials'/ policy makers' involvement, user input really getting across to them and potential to actually influence public policy."

Our STEEP-M analysis brought to surface the area of concern that were identified by the users and stakeholders as needing improvements as well as other factors, which either had no impact on the project's outcome or their impact was not perceived as relevant by the coordinators of the project. Among the risk identified by our reasoning and analysis and labelled with High or Extreme risk were:

- For the Social factor: a more inclusive job market, improved welfare, a decrease in population and an ageing population. We evaluated these factors as mainly influencing the level of participation of the citizens and the impact that their opinions will have on the outcomes of the u-Debates. The risk was included in the Evaluation Report, with concerns from all sides (stakeholders, policy makers, experts, partners) and requirements to raise the level of participation in order to improve the project.

- For the Technological factor: R& D Investments & maturity technology, emerging technologies and ICT security (for which we also presented corrective actions). The level first factor can be correlated with the fact that the debate tool was perceived by the partners and the stakeholders as being difficult to use, or even confusing. If the mitigation actions presented in section 5.2.2 are implemented, the level of confusion can decrease, when the facilitators become better prepared in operating with the technology at hand they can better assist the users and guide them in working with the tool. The second factor was evaluated as having an impact on both the level of participation as well as the quality of the input given by the citizens, which can be linked to two of the downsides discussed in the Evaluation Report as well, as the "hen and egg" problem and the complexity of the platform. ICT Security on the other hand was distinctly mentioned by GRNET et al. (2013), even though it ended up not being a risk; it was introduced in the evaluation questionnaire and evaluated as being satisfactory.

- For the Economical factor: economic trends and market trends. We assessed as influencing the level of participation, which were considered as the main impediment

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[71]Open Democracy website - accessed on 20.07.2014

for the project to reach its objective.

- For Environmental factors: climate change. With an indirect impact on the Puzzled by Policy project, this factor can influence the levels of immigration and migration, which in turn may end up influencing the notoriety of the project leading to either lower or higher participation levels.

- For Political & Legal factors: power distribution, government effectiveness and incompatibility between legislations. While the first and the last factors of this dimension were not identified in the Evaluation Report, the second factor, government effectiveness, can be linked with the users evaluation of how much their opinions are valued and how much government officials participate in the project, by answering questions like "I feel that government officials/ policy makers participate to an acceptable degree in the platform", or "I believe that my input to the platform gets across to relevant policy-makers and government officials" (GRNET et al. (2013)). To both questions, users responses were divided in three (positive, negative and neutral), being slightly more inclined towards the negative side (35% and 33.75%).

- For the Military factors: FRONTEX implications, which can also be linked to both the level of participation as well as the quality of citizen's input. Citizens that do not feel secure in their own countries because of failed FRONTEX border control actions will show a hostile attitude towards the subject of immigration and migration which will surface in the debates. Thus, once again we have to emphasise on the importance of the facilitator's role in the entire project (like the evaluation given by the policy maker of the Hungarian pilot GRNET et al. (2013) - page 54, who stated that the facilitator should be employed full time).

When comparing the two evaluations, STEEP-M framework and Evaluation Report, we identified two main drawbacks of our framework: *the time span needed and the amount of risk factors identified. Firstly*, when compared with the evaluation performed with the help of questionnaires, scanning the environment takes up more resources, both time and human. A questionnaire based analysis will need more resources when drawing up the questions and for interpreting the results; the middle part, however, the more time consuming part (users answering the question), does not require many resources. *Secondly*, the amount of factors we identified are not all linked individually with a problem identified in the Evaluation Report. Some problems were linked to more factors, while our analysis had factors that were left out or were not identified by the users as being problematic. Our approach has both advantages and disadvantaged: on the one side it breaks down the problem into sub-problems making it easier to deal with; but it may also give too much information at a time and even sub-problems which are not relevant for the project (eg. for the Political & Legal factors, the power distribution and incompatibility between legislations did not pose any threat for the PbP project).

Our thesis main purpose is to answer the research question decided upon in the Introduction: **Is the STEEP-M risk analysis framework a reliable tool for identifying external risks for an e-Participation project?"**. It is also in the Introduction section where we stated that a "reliable tool" is a tool that helps predict the majority of the problematic areas for the project. The Evaluation Report highlighted seven potential risk factors for which questions were introduced in the evaluation questionnaire:

1. The level of participation;
2. The participation of government officials;

3. The complexity of the platform from a technological perspective;
4. The complexity of the information distributed throughout the platform;
5. The impact that PbP has on the policy stream;
6. The role of the facilitator/ moderator of the u-Debates;
7. The level of ICT security.

Out of these seven potential risk factors, the results of the questionnaire established that five (numbers 1, 2, 3, 5, 6 and 7) need improvements in order for the Puzzled by Policy project to be successful. The STEEP-M framework analysis identified risk factors that addressed all of the seven potential factors from mainly three of its dimensions Social, Technological and Political. Moreover, by linking each risk factor of the STEEP-M analysis we can break down the seven factors from the questionnaire,thus making it easier to approach and deal with.

This answers the research question and proves that **STEEP-M risk analysis framework is a reliable tool for identifying external risks for an e-Participation project**. Therefore, projects can use the STEEP-M framework for assessing their potential risks and establish mitigation actions for them. By doing this, the outcomes of e-Participation projects will be closer to being successful and "bring public authorities, civil society leaders and community representatives together to foster social cohesion" (Glidden and Ruston (2013)).

7 Conclusion

The purpose of our thesis was to find a helpful tool for identifying potential risk factors from the external environment of an e-Participation project. As we stated in the Introduction the focus was for EU funded projects because of the amount of documentation project owners have to submit before starting the development phase. Our mission was to assess a risk analysis tool which can later be used to support e-Participation projects in reaching their goals and bring into the European and global scene some of the benefits identified by Smith (2008): tapping into local knowledge and innovation, increasing awareness and understanding, reducing transaction costs, making policy more enforceable by embedding it in social norms, increasing social inclusion or cohesion, making programmes more sustainable by generating community ownership.

In order to decide on a risk analysis framework we first looked into the concept of risk and risk environment. This approach helped to first understand the importance of conducting a risk analysis, by deciding on a base risk definition and elaborating on the benefits of conducting such an analysis. It laid the ground for choosing a suitable framework, and we selected STEEP-M as the most appropriate one and explained our reasoning in subsection 2.3. Moreover, the advantages and disadvantages were also presented as well as ways of reducing the drawbacks of the framework (Subsections 2.5 and 2.4). Section 4 went into a deeper understanding of both the framework and the concept of risk, by selecting working definitions for each dimension of the framework. The findings of this section will make it easier in the practical risk analysis (section 5) when we will identify risk factors by using the definitions for each dimension. To be assessed as being reliable or not, the framework has to be used in a real world case, thus, we had to select a project. Section 4.1 presents our reasoning for choosing an e-Participation project, by first positioning the e-Participation concept in the broader e-Governance concept and later explaining the importance of such projects for the current global context (4.3). The study case, the application of the STEEP-M framework for risk analysis, is detailed in section 5 which first described the chosen project, Puzzled by Policy, and then conducts a risk analysis following the dimensions of the framework and plots the identified factors onto a Risk Matrix for a better visualization. The focus, however, was kept on the Technological dimension, because of the ICT implication and the link to our studies (ICT in Business). It was also for this dimension that mitigation actions were suggested to help overcome factors that fall under Extreme Risk in the Risk Matrix.

The STEEP-M analysis brought to light a total of 23 potential external risk factors, of which five were assessed as having Extreme Risk and ten High Risk. These results were compared in the last part of the thesis, the 6th section, with the results found at the end of the project and submitted as a formal Evaluation Report, after conducting a questionnaire based analysis, targeted to users, stakeholders, partners and experts, that took part in the Puzzled by Policy project. By doing this, we discovered that the STEEP-M framework successfully identified risk factors for 6 out of the 7 the areas addressed in the questionnaire. Moreover, for some areas it helped break down the problem into sub-problems, which will ease the corrective action that should be put into place in order to mend those obstacles. These results answered the research question and determined that STEEP-M is a reliable tool for identifying external risks for an e-Participation project, since it discovered the majority of the obstacles that a project may encounter throughout its development.

However, the application of STEEP-M to analyse the external risk environment of the Puzzled by Policy project and the comparison of those results to the official Evaluation Report also unravelled two limitations of the framework, which we propose as future research. Firstly, the amount of time needed to conduct such an analysis, which can prolong the development phase of the project and thus threaten its inception. Secondly, from the great amount of information, the framework identifies a significant amount of risk factors, which can be associated with the "paralysis by analysis" disadvantage of the framework. Some of the factors can end up not influencing the success of the project at all. Thus, we suggest as future research the feasibility of a pre-defined STEEP-M framework for e-Participation project; for each dimension to have a number of factors which can be assessed as either being potential risky or not. This will help save time and diminish the amount of information used in the analysis and, therefore, identify the relevant risk factors.

With online presence becoming mandatory for most public services, it is time for a more interactive democracy and projects like Puzzled by Policy will become part of how politics are being done. This will help solve the democratic deficit we identified in the Introduction. Their first role can be that of a mediator between policy makers, politicians and citizens, as Deirdre Lee mentioned, and reconcile different views and opinions on policy matters by bringing them together in open discussions and debates.[72]

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[72]Open Democracy website - accessed on 20.07.2014

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