

A System Dynamics Approach to Enhance Tourism Service Delivery Performance through Value Co-Creation

Mona Soufivand ^{a, b, 1}, Marco Alessi ^b, Enzo Bivona ^a

^a *Department of Management, University of Palermo, Palermo, Italy*

^b *Engineering ingegneria informatica SPA, Palermo, Italy*

Abstract: *Value co-creation is shown to play a prominent role in performance improvement in various sectors ranging from manufacturing to service. However, its role in creating value and consequently improving the performance of service in tourist sector has not been investigated in the literature. In order to bridge this gap and considering the complex and dynamic nature of the tourism industry, this paper, using the SD simulation model, builds models aiming at developing a tourism engagement based value co-creation mechanism. It targets to improve cultural heritage sector performance in terms of service delivery system. Considering a specific case study, Sicily (Italy), the developed models intend to address the tourist's service delivery experience design. Although system dynamics has been applied to a wide range of problem domains, using it in co-creating value within service delivery design especially in tourism sector is relatively new and is considered one of the main contributions of this study. The main result of this study suggests that incorporating a value co-creation through engagement of tourists, ideation², would enable policy maker to stay in line with tourists needs and invest in accordance with their wishes which leads to significant improvement in quality of the services offered to tourists.*

Keywords: System Dynamics, service delivery, value co-creation

1 Introduction

In contrast with manufacturing industry service industry is characterized differently. Manufacturing and product-dominant theory relates to activities that physically transform raw materials to produce saleable goods, and include a transfer of ownership in this sale, whereas service-dominant theory relates to activities and processes concerned with the transaction of intangible benefits and where ownership of these activities is not transferred (Normann, 1991)

¹ Corresponding author: m.soufivand@gmail.com

² Ideation: is the creative process of generating, developing and communicating new ideas. Comprises all stages of thought cycle, from innovation to development, to actualization (Wikipedia, 2013).

At its most basic level, while a product is invariably concrete, a service is intangible and service experiences are depend more on people's experiences and expectations which means that influencing and understanding a user's expectations of a service is fundamental to their experience of, and satisfaction with, that

service—and that this experience then affects quite profoundly the effectiveness and impact of that service (Osborne, Radnor & Nasi, 2013).

On the other hand, as customers' expectation is changeable and can be influenced by several factors such as personal needs, situational factors, word of mouth, past experiences etc. (Zeithaml, Berry, & Parasuraman, 1993a) thus it is extremely crucial to continuously monitor services, and note that changing them may alter receivers' perception of services. This requires service providers to stay in line with the rapidly changing conditions and customers' expectations in order to deliver decent services. Moreover, they must build capacity to operate effectively in such complex, interdependent networks of organizations, customers, and systems across the public and private sectors (Larsfälten, 2010).

The ultimate objective of service providers is to create value for the client (Dowson, 2007 and Michel et al., 2008) and this value can be generated in many different ways. Traditional firms and organizations provide “black box” services³ that create outcomes with minimal interaction and knowledge-sharing with their clients. By contrast, innovative firms and organizations are building knowledge-based relationships founded on collaboration and mutual knowledge exchange between operative organizations in the service system. Therefore, service providers can bring about many opportunities by designing inventive and innovative services that serve to create good customer service experiences. In designing such services, after customers' satisfaction, time and cost saving are placed as the higher importance objectives (Hsieh and Yuan, 2010 and Subbiah and Ibrahim, 2011).

One approach to create innovative services through customer involvement is value co-creation. Co-creation is the process by which products, services, and experiences are developed jointly by companies, their stakeholders and final customers, opening up a whole new world of value. Public and private organizations must stop thinking of individuals as just receiver of products, services and experiences (Ramaswamy, 2009 and Gummesson, 2004) but think as a source to create value. In Ramsawamy opinion, value co-creation is a “win more – win more” approach to value creation (in contrast to “win-win” collaboration) that opens up new sustainable growth, business advantage and innovation opportunities (Ramaswamy, 2004). Moreover, from the perspective of Vargo et al. (2008) and Eggert et al. (2012), the very process of co-creating value is responsible for innovation and marketplace developments. Thus, value co-creation would foster welcoming the quality, which depends on infrastructure for interaction to create innovative environment. In other words, value co creation is a form of collaborative creativity that is initiated by firms to enable innovation with, rather than simply for their customers (Roster and Samson, 2009). As such engagement becomes the core of any service related outcome.

³ “Black Box” is characteristic of no collaboration with clients.(Dowson, 2007b)

Within the service industry the focus of this research is on tourist sector. This sector plays a crucial role in today's economy. Moreover, as Binkhorst and Dekker (2009) explain, although people's wants and desires and consequently their quests for experiences are diverse, for many people in the developed areas, time spent on leisure and tourism has become an essential part of their quality of life and contribute more to happiness compared to other activities

Decision-making and policy developing in this sector are extremely complicated since it deals with human's desire, behavior, wishes and expectations. For example

Nowadays, tourists are in quest of particular and enjoyable experiences, which are a consequence of the alienation in everyday life. They are pursuing new destinations and new activities to quench their thirst for unique and novel experiences. Accordingly, the tourism industry is in constant sought for creative ideas and imaginative products/services in order to guarantee its long-term competitiveness and to survive in such an environment. Providing inventive products/services would help tourism service operators to differentiate themselves from the rivals and take competitive advantages over those competitors who continuously offer the same and old services and products without paying attention to the tourists needs and asking for their feedback (Azevedo, 2009). Moreover, tourism can be counted as one of the growing and developing sources of experiences, however, according to Morgan and Pamela (2007) there has been relatively little in-depth research into the experience of tourists, and the research that has been undertaken has been focused primarily on consumer behavior and consumer marketing. For instance, it is observable that Ramaswamy and Prahalad (2003) already pay attention to the co-creation experience environments in a variety of realms, while, tourism as one of the greatest experience generators is not mentioned.

In terms of tourism Industry, Binkhorst and Dekker (2009) stated that the concept of co-creation deserved to be taken seriously. They motivate this further by stating that tourists are rarely included as partners in the process of designing the tourism experience beforehand, reporting about it during the experience of it, or evaluating it afterwards. Only few examples of co-creation with tourists can be found. Furthermore, it is highlighted that considering tourism as a network and tourists as human beings operating from various experience environments, the concept of the value co-creation is very interesting to apply by implementing ICTs facilities. Bason (2010) stresses that where innovations are for citizens, then they should be designed and implemented in conjunction with them and not for them and hence the market necessarily plays a very important role in the development of public-sector innovation. This further highlights the importance of tourist involvement in designing service systems. Moreover, Cros (2001) explains that the lack of effective tourism planning that includes market appeal, economic factors and conservation policy/assessment is evident in the way many cultural heritage places are managed around the world. Such heritage places often require commodification to enhance the visitor experience and actualise the tourism potential. Additionally, Sawhney et al. (2005) investigate internet as a powerful platform for enabling tourist collaboration which allows heritage organizations richness of interaction

without physical proximity. Thus, using technologies such as ICTs for crowdsourcing⁴, enable service providers to collaborate with internal and remote intellectual capitals that would contribute towards a better work of both sides together across organizational boundaries to develop new ideas, allocate resources more effectively and create more values.

The main objective of this study is to understand how to improve the delivery of touristic services, i.e. tourism performance, according to a tourist-based perspective. This can be achieved by involving tourists in service value co-creation actions, as one of the main actors along this supply chain. To do so, this study will underline practical insights by developing a framework of tourism service provision in Sicily and by relating the emerging framework to tourist' role in the value co-creation processes. As such, this study will concentrate on the following critical issues:

- What systematic approaches would help service providers to generate more value through designing memorable service experiences?
- How can service providers effectively co-create value with respect to fulfilling tourists' expectations considering all resources limitations?
- Which strategies and policies can be suggested to both policy makers and service providers in order to pave the path for increasing tourists in Sicily by using value co-creation processes?

In accordance with what has been mentioned above, the experience design process is so complex and can be regarded as a dynamic and comprehensive system (Shostack, 1984b). On the other hand, due to the fact that linear thinking only depends on dependent variables it could generate bias and imperfect outcomes. Thus, in order to understand and analyze the dynamic behavior of service delivery, a system thinking rather than linear thinking is highly conforming. Concurrent with considering dynamical concept in value creation, the whole designing process has to be considered as a system. Systems thinking is a framework for managing the strategies, operations, and implementation of comprehensive and diverse systems (Fowler, 2003). Following a system thinking perspective, the main approach employed to answer the research questions is system dynamics. System dynamics is suited for analyzing the complex and huge systems with non-linear and multifarious relationships, which is also partially qualitative and dynamic (Sterman, 2000). Furthermore, owing to the fact that human behaviors is influenced by time and context factors, Forrester (1994) proposed system dynamics, as an analytical tool to propose a macro viewpoint to analyze the nature of problems and raise the capability of solving problems. Therefore, it could be a proper methodology to evaluate particular social systems like service delivery systems in tourist sector. System dynamics is also used to comprehend the different service operation strategies and policies through simulating the system dynamics model of the situation being

⁴ "Crowdsourcing" which can be defined as the act of outsourcing a function or task, traditionally performed by a contractor or employee, to an undefined network of people using a type of open call. Today, the term is used for various notions like open innovation, user generated content, social engagement, knowledge aggregation, or prediction. Crowdsourcing can be viewed as one particular instance of co-creation, which more generally refers to the joint creation of value involving various stakeholders."(Rosemann, 2011)

studied, so it would be a proper tool for service providers to obtain some insights related to the future strategies and decisions and therefore achieve their business goals by avoiding the failures of policies and standards and strive for applying more efficient policies.

The rest of this paper is organized as follows. Section 2 briefly describes the problem. An overview of the related literature is provided in section 3. Our model is presented in section 4. Section 5 concludes the paper, states the limitations and provides some directions for future research.

2 Problem Description

This chapter intends to conduct an explanatory case study for the cultural heritage sector of tourist supply of the particular touristic area in the south of Italy, Sicily. Nowadays, attentions of policy makers to different branches of tourism industry, specifically cultural tourism, is increasing (Cuccia and Rizzo, 2012). It is due to two reasons. First, given the current economic situation of Italy and its facing scarce financial resources, we need to be extremely careful to consume those resources in an effective and efficient manner. Secondly, the importance of tourism as a strategic economic issue, which is representative of the main source of income for residents in a large part of the country, has been widely acknowledged.

With its 70 museums/*antiquaria*⁵ and 65 parks/archaeological sites⁶, Sicily is among the Italian regions with the biggest endowment of archaeological resources and its cultural endowment and has no fear of comparison with other Italian regions and main tourism competitors. Bizarre though it may sound, tourists can enjoy some of the most beautiful Greek temples and amphitheatres right there in Sicily. As it is mentioned by (Provenzano, 2009a), Sicily follows the below ranking which the survey was carried out for fifteenth report on Italian tourism⁷ intended for identifying the most important parameters of tourism attractiveness in Italy (See Table 1).

Table 1: Ranking result of tourism attractiveness in Sicily (Mercury, 2006)

Rank	Parameters descriptions
2nd	Sea and the beauty of coasts
3rd	Cuisine and wines
1st	Welcoming nature, culture and charm of its inhabitants
3rd	Local lifestyle
4th	Affordability of a vacation

Accordingly, these positions imply on an inherent potential of Sicily to boast a highly qualified tourism market. However, in terms of tourism presence it is placed at the tenth

⁵ *Antiquaria* is the plural form of the Latin word *antiquarium*.

⁶ A complete and updated list of *antiquaria*, archaeological sites and museums in Sicily can be downloaded from the web page of the Assessorato Beni Culturali, Ambientali e P.I. – Dipartimento Beni Culturali, Ambientali ed E. P. www.regione.sicilia.it/beniculturali (in Italian).

⁷ DOXA, Mercury and Touring Club Italiana, Mercury (2006), XV Rapporto sul turismo italiano (fifteenth report on Italian tourism),

Italian region (among twenty in Italy) and the second in the Southern Italy (Provenzano, 2009b). Moreover, In spite of the richness and variety of its cultural heritage sector, coasts of this island are still the most important parameters of its attractiveness and the region is mainly perceived as sun, sand and sea.

However, when it comes to tourist policy, the research results of Kudo (2012) imply on the lack of intergovernmental coordination between the region and the local government which consequently leads to the weak coordination among implemented policies and sometimes contradictions between them. In terms of tourism sector, this poor coordination refers to tourism promotions policy and cultural policy including cultural heritage management and environmental policies. As such, many cultural heritages and natural reserves are in risk and vis-à-vis some tourism promotions are stuck. In order to promote these policies the coordination between the region and municipalities through interaction and interrelation must be taken into consideration.

In spite of the huge amount of European funds, which has been allocated to the region, the evaluation analysis of their impacts on its territories is not positive. It is observed that many infrastructures, which have been created by these funds, are not fully utilized. Moreover, many of training courses are often, without giving knowledge and information, used only to give youngsters a temporary occupation. This discouraging data, nevertheless, could be interpreted as the possibility for service providers in order to develop and improve tourism business in this area. This paper intends to establish the customer service experience design model and consequently to realize the potential problem and clearly understand the relations of causal factors within experiences design in tourism sector. It is motivated by the fact that there is no lack of financial resources but mismanagement of these resources. We are keen to investigate the role of value co-creation in this setting because co-creation is shown to be an effective concept in directing financial resource allocation towards customer satisfaction. This is mainly achieved through involvement of tourists by various means such as getting feedback, in order to co-create value in the tourism value network. It would be a key factor to boost the considered development. In this context, a consumer-oriented service experience design to involve tourist as a receiver of touristic services is indispensable. We believe that such approach can be employed in order to change the wrong perception about this island and consequently develop the tourism sector in this region by putting more effort in cultural heritage sector.

3 Literature review

This part proceeds by providing an overview on various streams in the literature related to our work. First, we provide an overview on the studies applying co-creation concept in tourism industry. Later, since system dynamics is the main methodology used in this paper, we briefly review the studies that applied this approach to investigate tourism related subjects. Finally we review the works specifically related to the tourism in Sicily.

3.1 Studies about co-creation in tourism

Minkiewicz & Evans (2009), consider holistic nature of co-creation. They develop three dimensions of co-creation namely personalization, engagement, co-production. Using these they conceptualize the co-creation experiences in heritage sector. By doing so they moved beyond the value co-creation and focus on experiences co-creation. They conclude that managing visitors would help to co-produce the service experiences rather than value co-creation. For example, National gallery of London by increasing the level of engagement of the online users, enables them to co-create their own experiences. Moreover, it offers its online visitors the ability to review each painting in incredible details using its zoomable pictures facility and enables printing of pictures from its permanent collection on demand (Bartak, 2007).

Focusing on public services, Alves (2012) emphasize on the role of value co-creation on enhancing , fostering and driving public-sector innovation. It is achieved by means of literature discussion about the examples drawn from the United Nations awards for best public-sector practice and innovation. Discussion of the results shows how this engagement positively impacts the restructuring of public services and consequently the design and implementation of new processes, products and methods of service provisions. Moreover, it highlights the implication of such engagement for gaining quality, efficiency and effectiveness.

3.2 Studies about system dynamics approach in tourism industry

A generic tourism system dynamics model is presented by Xing in Dangerfield (2010). This system is informed by the South European island tourist economies. It is presented together with a set of policy analysis examples related to testing the alternative scenarios for policy analysis and stakeholder collaboration. Using classical tourism multipliers and system dynamics models, Loutfi & Moscardini, (2000) analyzed the economic impact of tourism revenue on the Egyptian economy.

A system dynamics structure for snowmobile tourism in the Keweenaw Peninsula was proposed during the 19th international system dynamics society by Jambekar & Brokaw (2001). Their studies ended up with a preliminary conceptual framework to build a simulation model in order to support the system-based inquiry for this specific snowmobile destination.

As the first attempt to present a complete system dynamics model to understand the effect of several external policies to obtain more international tourists, the work of Honggang and Jigang (2000) must be taken into account. The study focused on Guilin. Besides, in 2003 Georgantzas with the aim of evaluating the Cyprus' hotel chain present a system dynamics simulation model within the island's tourism customer-supplier value chain.

Lewis (2007) also presents a system dynamics-based tourism model. The paper mainly focuses on the dynamic interdependencies between hospitality sector, labor sector and the manufacturing sector. The model has been developed to incorporate a generic value-chain structure, which allows modeling the tourist-supplier value chain.

3.3 Tourism studies in Sicily

Following the vital indicators of the development of sustainable tourism, Santonocito (2009) offered theoretical basis in this regard and described the initiatives which were taking place in Mediterranean area focusing on Sicily. Moreover, Cuccia and Rizzo (2012) addressed the beneficial effect of cultural tourism in Sicily to reduce the tourism flow seasonality in Sicily and finally explored how different institutional arrangements are able to contribute positively in this direction. With a system dynamics approach, the most important determinants of tourism flow in Sicily have been presented in the work conducted by Provenzano (2009). Formulating the relations in the economic model, gravity functions, enables him to investigate the tourism demands within a dynamic environment.

To the best of our knowledge and investigating various streams of related literature, we clearly observe that, none of the studies integrate two major concepts namely tourism, value co-creation using system dynamics approach. Given its importance and the proven effectiveness of value co-creation in service industry we aim at bridging this gap in the literature. Next section provides a further discussion of our proposed model aiming at employing value co-creation concept in tourist industry using a system dynamic approach.

4 Modelling and Analysis

Proven to be a powerful approach in dealing with complex problems, system dynamics is the implemented method in this study to answer the research questions which follows the phases of the demonstrated flowcharts in below (Figure 1).

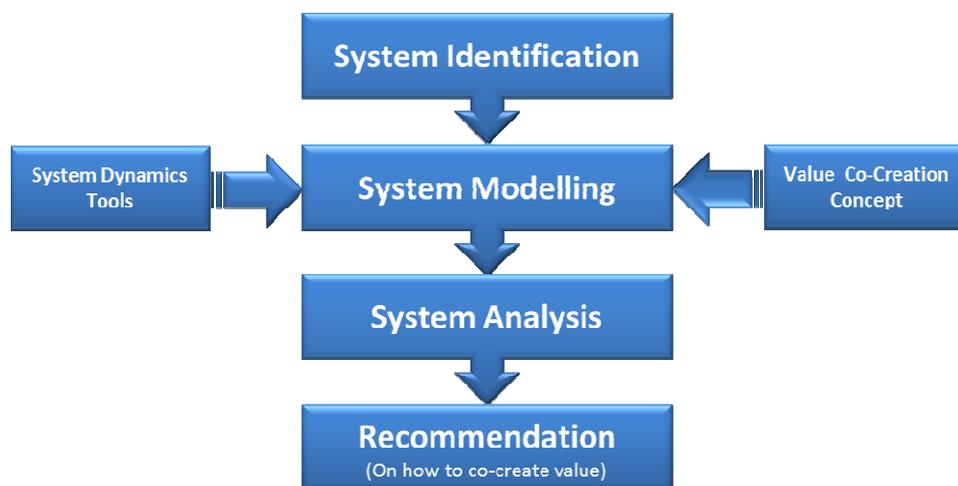


Figure 1: Phases of analysing the system

4.1 Qualitative System Identification

This paper intends to establish the customer service experience design model and consequently to realize the potential problem and clearly understand the relations of causal factors within experiences design in tourism sector. To do so, this section is going to present the developed causal loop diagram of the service delivery in cultural heritage sector to better understand the process of tourism service experience and find the causes and problem of this specific service system. The model illustrates the major loops that can affect the performance

of service delivery system to pave the path for quantitatively exploring the critical decision factors that significantly influence the performance management. The diagram depicts the general overview of the traditional relations in managing cultural heritage sector (Figure 2).

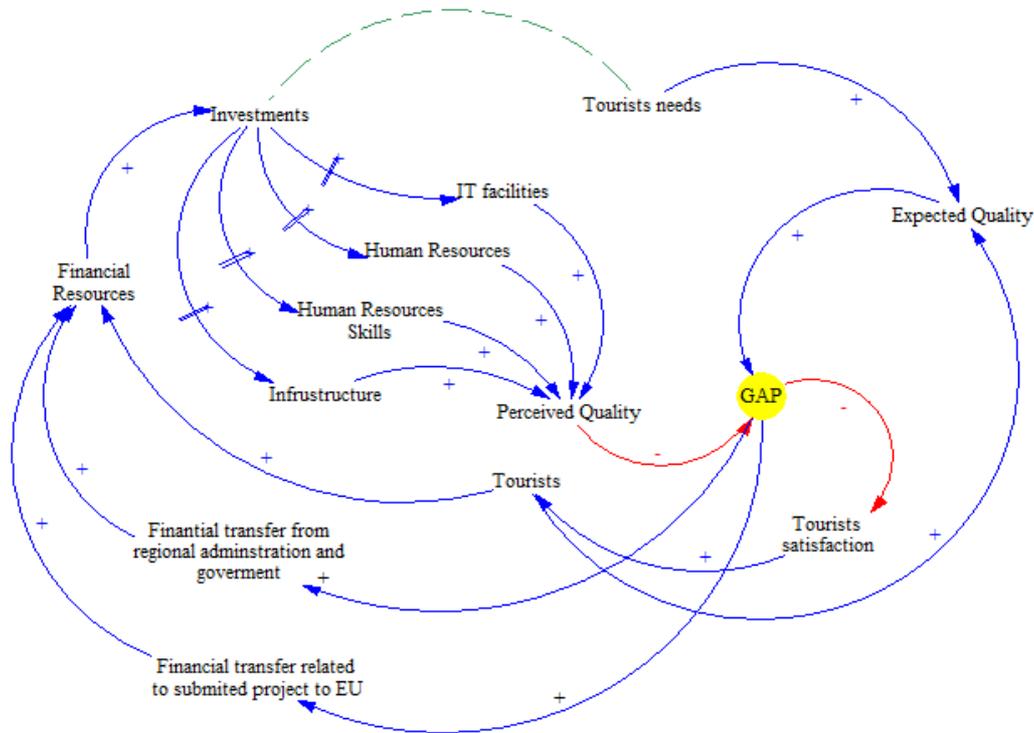


Figure 2: CLD of current situation of cultural heritage sector in Sicily

Owing to the fact that the ultimate goal of service provider is to satisfy the tourist as much as they can so this diagram was developed based on two main variables as the central topic of cultural heritage management (CHM) interest, tourists' satisfaction and number of tourists, which are considered as the main gauges of measuring the performance in cultural heritage sector. Since the number of tourists is affected by tourists' satisfaction, we start with adopting the model of customer satisfaction developed by Parasurman et al. (1991).

First, a brief description of all the variables incorporated in the model is provided as follows:

- **Tourist expectation and perception of service quality:** According to Voss et al. (2008) and Zeithaml et al. (1993), the concepts of customer expectation and customer perception play the important roles in designing the service experience delivery. It is because the customers' satisfaction is derived from the difference between their expectation and their perception of the services delivered. In this study, tourist expectation refers to their desires within their mental mind and, in contrast, their perception refers to the experiences in which they get from the actual service in practice.
- **Tourist's satisfaction and Gap:** Once the tourists faced with the specific services, they start to judge the quality of the delivered services and compare them with their expectations. This would lead to form a gap, which is the representative of the level of

their satisfactions. The bigger is the gap, the lower is the satisfaction they can have and vice versa.

- **Infrastructure, Employee Quality, Number of Human resources and IT facilities** As it is shown in the Figure 2, perceived service quality, as a core element of service system, directly has a significant impact on the gap between tourist expectations and their perception. While the service quality get better the gap becomes smaller (Hsieh & Yuan, 2010b). Tourists can easily obtain excellent and memorable service experiences, if the service operations be well implemented to fulfil their actual needs (Donovan & Rossiter, 1982). The atmosphere that can be built by service operations contains some critical elements and just the major ones such as quality and quantity of infrastructures, employees' quality, number of employees and information and communication technologies have been considered in this study.⁸
 - ***IT facilities:*** A key capability that the government will develop is in business analytics. With the ever growing volume of digital data collected through computerisation over the years, equipping public officers with the right tools and competencies in business analytics will allow them to generate intelligent insights to enhance agencies' performance and improve service delivery and policy formulation. However, on the one hand, using ICTs require a large budget for designing, piloting and implementing of the system. The main areas of investment are the procurement of hardware, software, communication network, user and operators training activities, system operation, and maintenance (Th et al. 2010).
 - ***Enjoyable Infrastructures and Public services:*** In spite of the fact that Sicily is increasingly popular because of its cultural resources and infrastructure, natural endowments and etc, there are some sites and cultural locations which are still closed and are not back to the public enjoyment. Although because of the increased tourism demand for these resources, there has been a greater attention paid towards the exploitation of the cultural heritage of Sicily, still lack of care to restore and maintain them can be observed.
 - ***Number of employee and Employee's skills:*** These variables refer to the quantity and quality of workers in this sector. In terms of quantity, the number of employees working in front-line is a big issue for tourists and they do not care about how many employees exist in the back-office. As an example, number of available tour guides has a big effect on their perception of delivered services. Regarding the quality, how well skilled are the front-line employees would have an impact on tourists satisfaction. For instance, the more knowledgeable tour guides who are fluent in English and other languages positively increase tourists, satisfaction.
- **Investment and Investment Policies:** These variables indicate how financial resources are assigned to the different investment areas. A bigger share of liquidity to be invested in tourist sector can lead to an increase in service quality and perceived quality of

⁸ These four indexes are derived from comments of tourists, through different websites such as Tripadvisor.com, Slowtra.com, etc. after their travelling.
As an example: http://www.slowtrav.com/italy/sicily/pm_traveling.htm

services if it is implemented effectively. Therefore, it is crucial for decision makers and managers to understand how and when they must invest in different areas.

- **Financial resources:** Certainly, service providers need enough budgets to invest in their service operation settings and their capabilities. In cultural heritage sector, this amount of money is provided by the national government, European organizations such as UNESCO and the tourists' expenditures in this specific sector such as the fees they pay for entrance tickets. These funds are not fixed but variable and are dependent on some indexes such as number of tourists and the existed gap. As service providers currently interpret the low quality of delivered services in this sector as a lack of financial resources they are always trying to apply for different regional and national funds to get more money and this is the logic behind the direct link between gap and financial resources.
 - **Financial transfer from regional administration and government and Financial Transfer related to submitted project to EU:** The amount of these resources depends on different factors. Sometimes the resources are fixed, for example in order to maintain cultural resources, every year this sector receives some money from national administration or there are some specific resources, which are exclusively assigned for facilitating the libraries.
 - **Revenue from ticket sales:** All cultural assets like museums, heritage theme parks, etc. relying also on gate fees benefit from increased visitation. Hence, more tourist satisfaction leads to a higher number of tourists and consequently larger financial resources from ticket sales. This enables the service providers to enlarge their investment in order to reduce the gap.
- **The green dashed line:** Represent the missing relation in current state of the system. Due to the lack of direct and proper interaction between service providers and tourists. Undoubtedly without the decent interactions, service providers would not be able to effectively invest and efficiently carry out service operations and cope with tourist expectation.

To get such capable, enjoyable infrastructure, skilled and expert employees and consultants, high IT facilities and service quality, which are identified through the lens of tourists, are required. To achieve this, a collaborative government with an interaction platform empowered by ICT at the heart of that government is needed. Such system supports the inter relation and collaboration. To embody this suggestion Figure 3, demonstrate the same interactions with respect to co-creation concept, when tourists are asked to contribute to create value, with intention to redesign a service system based on tourists' feedback and ideas.

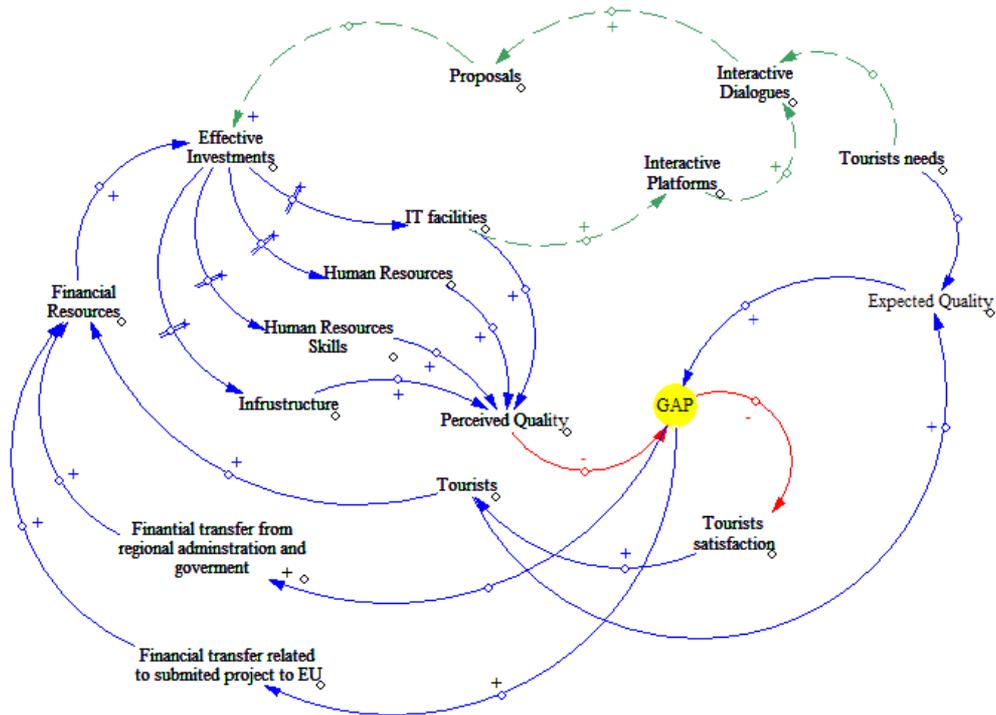


Figure 3: Suggested CLD model with the respect to concept of Co-Creation

4.2 System Modelling

This section is dedicated to the simulations of both the current situation and suggested new design of this sector for future. All the simulations have been conducted in Powersim software.

After validating the models, they are run for 8 years (2012-2020) and the time step has been set for 1 month. Simulation processes in this study includes 3 different steps as explained below.

- Firstly, the model is run for current situation as a base and benchmark scenario
- Secondly, six other simulations were conducted each one representing a policy to be implemented in the future. As it can be found in section 4.2.2, a major change has been made in the structure of the model to incorporate suggested e-engaging part of the system. This basically revolves around the notion of value co-creation. These six simulations are corresponded to the six different possible investment policies, which are assumed that decision makers in this sector may take into account.
- Thirdly, through sensitivity analysis the effects of applying different investment policies on the simulations results are going to be expressed and compared with the current investment policy. This is done in order to better understand which policy has the highest influence on the simulation results and could cause improvements.

When it comes to the verification of the numerical values assigned to some parameters we should note that the most accurate data come from the high quality information service data bases provided by the local, national and international statistical offices. Some data are the result of personal elaborations of official data and some others have been personally

collected. For instance in this study, all “Effect” variables as in the few others have been estimated using common sense. During all simulation procedures, following parameters have been taken into consideration as the most important indicators of the systems behaviour:

1-Quality 2-Tourists Satisfaction 3-Gap 4-Number of tourists in Sicily 5-Financial Resources.

4.2.1 Modelling of the Current situation

Regarding the complete structure of the current situation of the system, in terms of stock and flow, the model is constructed as it is depicted below (Figure 4)⁹.

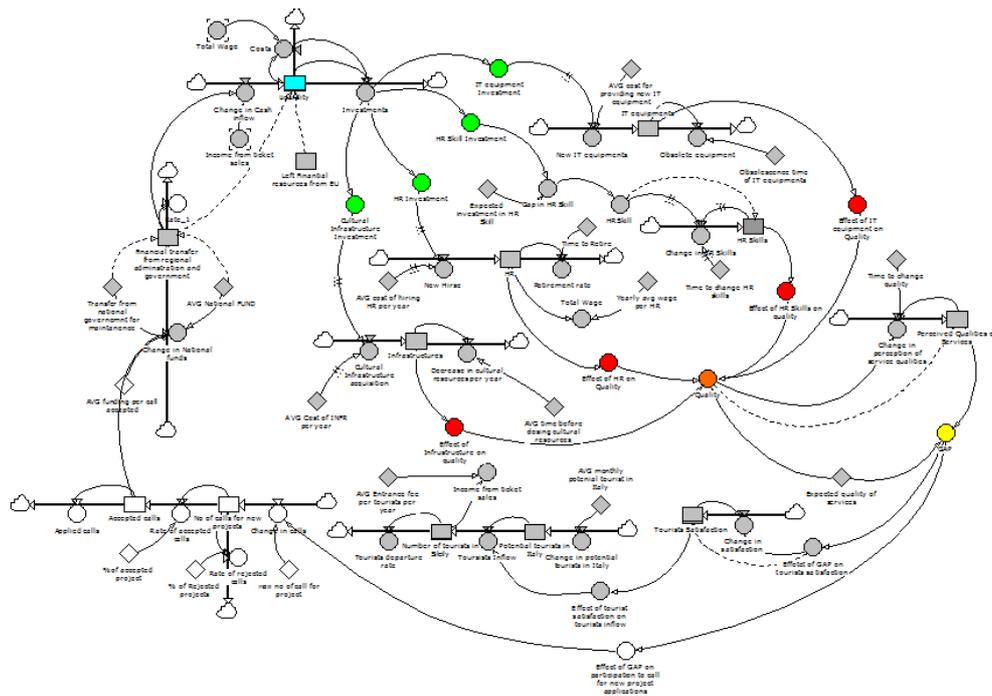


Figure 4: Snapshot- Complete stock and flow current Cultural Heritage sector

After subtracting the total wage of employees from the liquidity, the sector conventionally plans to invest the rest of the liquidity in different areas. According to the annual report of expenses¹⁰ of this sector in 2011, some assumption for traditional investment policies are listed as below (green variables) (Table 2).

Table 2: Assumed current investment policy in Cultural heritage sector of Sicily

Investment areas	Investment policy
Invest in new IT equipment	20% * Investment
Invest in hiring new employees	35% * Investment
Invest in human resources' skills training	25% * Investment
Invest in Infrastructures	20% * Investment

⁹ Magnified version can be found in Appendix

¹⁰ All the expenses can be downloaded from:

http://pti.regione.sicilia.it/portal/page/portal/PIR_PORTALE/PIR_LaStrutturaRegionale/PIR_AssessoratoEconomia/PIR_DipBilancioTesoro/PIR_RendicontoGenerale/PIR_Annofinanziario2011/3%20-%20Beni%20cult..pdf

4.2.2 Modelling of the perspective situation with respect to the value co-creation concept

In order to avoid complexity, co-creating the value with only tourists, rather than all actors, has been considered in this study. In addition, the e-engaging, using ICTs, is the suggested method to involve the tourists as a decent way to create the value (See section **Errore. L'origine riferimento non è stata trovata.** to find more details in this regard).

Regarding the complete structure of e-engaging system and different possible policies to display the co-creating process, a major change has been made to the current structure of the system. The change mainly made by adding new structure to the investment policy. This new structure would be representative of the e-engaging platform and decision-making centre of this sector (Figure 5)¹¹. In addition, it corresponds to the missing part of the CLD which has been demonstrated through green dashed-arrows in Figure 3.

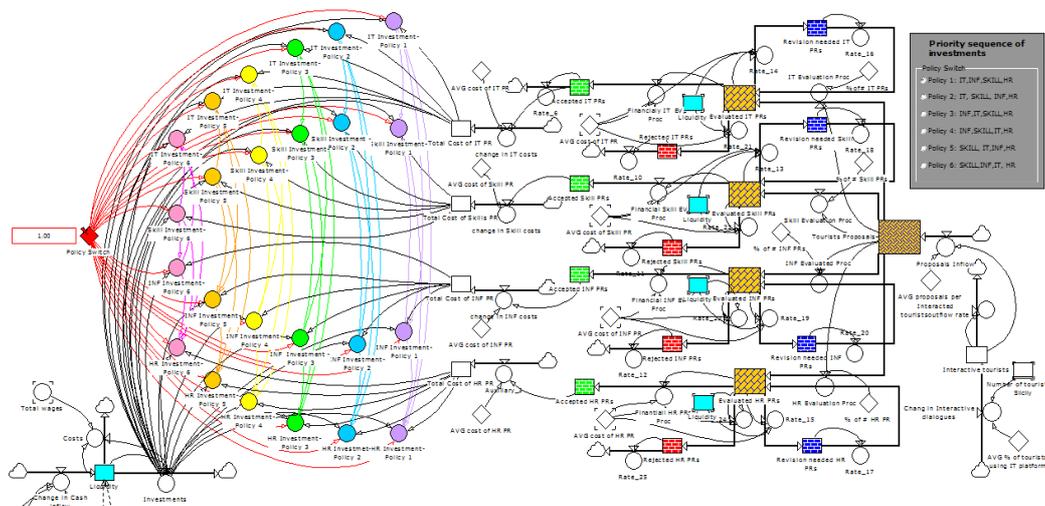


Figure 5: Snapshot-Stock and Flow diagram of the co-creation section

The information and material in new part of the construction are flowing from right to left. The assumptions are as below:

- Just 50% of Sicily visitors willing to share their experiences and propose ideas for improvement.
- On average each visitor would generate one proposal.
- The proposals are categorized in four different groups as the investment areas.
- The percentage of proposed ideas are scaled according to the comments gathered from recent tourists in Sicily during last years¹².
- Evaluation process is based solely on costs and quality criteria are ignored.

4.3 System Analysis

In addition to the current investment policy of the sector, there are six main policy analyses reported in this study. The Policy analysis was carried out changing the priority of investments in different areas to clarify which policies has strong influence on the behaviour

¹¹ Magnified version can be found in Appendix

¹² Source: http://www.slowtrav.com/italy/sicily/pm_traveling.htm

of models. These six policies chosen from 24 (4!=24) possible combination of policy parameters. The implemented priority of policies are as following:

- Policy 0: Current investment policy
- Policy 1: Invest in IT, Invest in Infrastructure, Invest in HR SKILL, Invest in HR
- Policy 2: Invest in IT, Invest in HR, Invest in HR SKILL, Invest in Infrastructure
- Policy 3: Invest in Infrastructure, Invest in IT, Invest in HR SKILL, Invest in HR
- Policy 4: Invest in HR, Invest in HR SKILL, Invest in IT, Invest in Infrastructure
- Policy 5: Invest in HR, Invest in Infrastructure, Invest in HR SKILL, Invest in IT
- Policy 6: Invest in HR SKILL, Invest in Infrastructure, Invest in IT, Invest in HR

The rest of this chapter aims at identifying and explaining the results of simulating from a quantitative point of view. Results of each new policy are reported together with the results of the current situation of the cultural heritage sector to better understand which policy is the most influential one (current situation is set as the benchmark and in diagrams it is depicted by the red lines).

4.4 Simulation results¹³

Implementing all considered policies shows that policy 1, outperforms all other policies and the conventional, current, policy generates the worst result (Figure 6). It is not surprising as the first policy is completely in line with tourists needs.

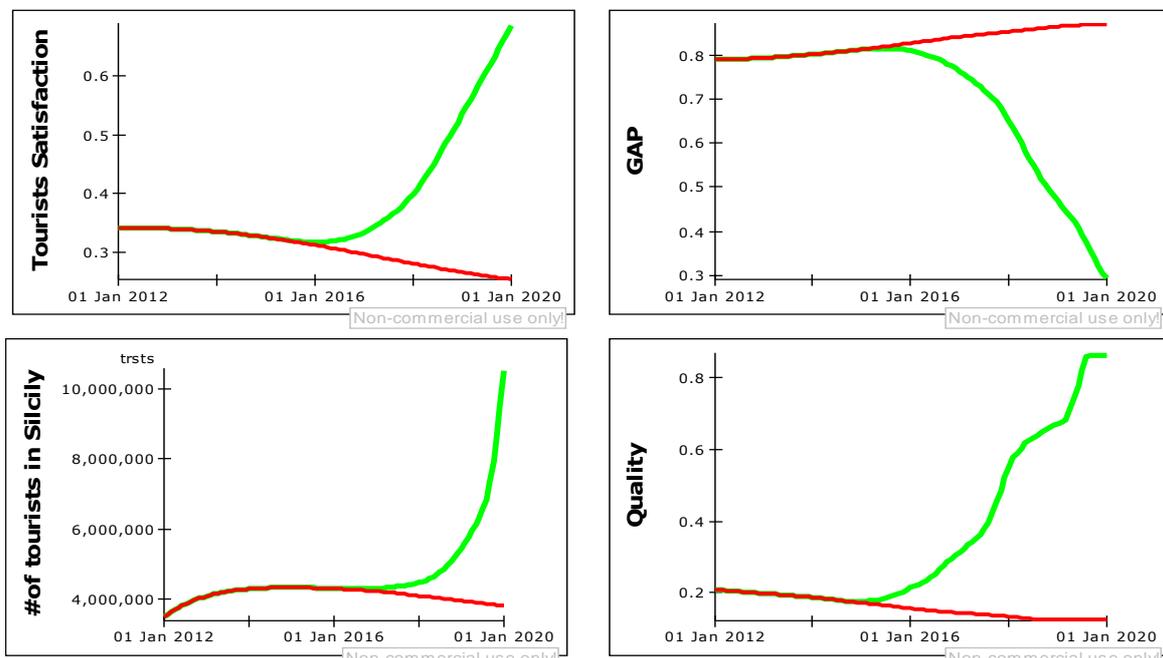


Figure 6: Comparison of the behaviour of Policy 0 and Policy 1¹⁴

Traditional Policy ————
 Policy 1 ————

¹³ 2011 is considered as the reference point of time when we develop the model of current situation.

¹⁴ Red curve and Green curve represent Policy 0(Traditional policy) and Policy 1 respectively.

Taking all results into account (See Table 3),

- Policy 1 would be suggested to the policy makers to follow. As it was set exactly according to the tourists' sequence of priority and exactly implies on the remarkable positive impact of creating value together with tourist so its final results are more promising and remarkable.
- Considering all received proposals, it is obvious that tourists would like to face with more improvement in relevant websites and infrastructures and of course more qualified employees such as tour guides with high level of English fluency and other languages proficiency and etc. The number of employees in this sector does not have a major and direct influence on their willingness.
- Moreover, the results imply on the improvement through applying priority sequence policy rather than just allocating some investments shares to different areas. Putting efforts in one area and completely satisfying the tourist needs in one area and after that concentrating on another sector would foster the service qualities and tourists' satisfactions rather than meeting the needs in all of areas at the same time imperfectly.

Table 3: Simulation results

Policy	Quality	Gap	Tourists' satisfaction	Number of tourists in Sicily
Traditional	0.13	0.87	0.25	3,814,833
<u>Policy 1</u>	<u>0.86</u>	<u>0.29</u>	<u>0.70</u>	<u>10,500,761</u>
Policy 2	0.50	0.53	0.57	6,697,026
Policy 3	0.61	0.44	0.62	7,079,917
Policy 4	0.25	0.75	0.40	4,810,153
Policy 5	0.59	0.57	0.50	5,363,300
Policy 6	0.53	0.51	0.58	7,127,100

4.5 Recommendations on how to co-create the value

The development of technological products and services creates new path of source for competence purpose between the business and world leaders. It implies using ICTs and Internet as a purposeful implementation that meant to improve overall organizational activities to create a platform for engagement. By doing so, managers and final customers and other partners can take advantage of partnership opportunities that allow them to be accomplished online (Cabiddu, Lui, & Piccoli, 2013).

Although innovative technologies have been applied before; there has not been a decent feedback network between service providers and customers and other players such as stakeholders, hence this investments may go awry and make the efforts not efficient. The same as other final costumers, tourists also enjoy providing feedback when they feel someone is listening. As such, feedback loops between service providers and tourists, has been taken into account and Ideation as a very powerful and cost-effective way to co-create the value with tourists has been recommended in this study.

Co-creating value with tourists through ‘Ideation’

Ideation is the capturing of customer feedback and input in a systematic way, identifying the most important ideas, and providing feedback and encouragement to keep the ideas flowing (Litium technologies Inc, 2011).

Advantage of Ideation through social web

- **Reducing costs:** Advances in technology together with strong cultural shift toward online social activities help to ideate with tourists and get their feedback wherever they are, in a very fast, easy, less and effective way.
- **Enhancing tourists satisfactions:** Establishing a feedback loop between tourists and service providers helps tourist hold a positive opinion of the service providers because they feel someone is listening to them and this feeling get stronger if service providers act on their feedback. Undoubtedly, considering rewards for those who gave the ideas in which are supposed to be implemented improve their sentiment and increase their satisfaction even more.
- **Diminishing risks:** Ideation process via Internet would help service providers in cultural heritage sector to validate their plans and to acquire cost-effective feedback faster than traditional way, which reduces the inherent risks of new service developments and new investment policies.

Ideate with tourists through social web

In this section some steps on how to ideate with tourists are going to be suggested in order to utilize tourist’s generated ideas.

1. Create a comprehensive structure using ICTs to engage the tourists.

This means giving the opportunity to the tourists to submit their ideas, discuss them, and vote on those they like the most. The goal is to encourage the visitors, even the first-time visitors, to deliver ideas, find other ideas and vote for them. Thus, a user-friendly engagement platform in terms of accessibility and easy to navigate, which allows tourists to readily find out the ideas related to the subject of their interests, is needed.

2. Define an internal evaluation group to evaluate the ideas

Needs for evaluation of the submitted proposals, decide whether they need to be revised, merit further research, meet the defined criteria or have to be rejected, push the system to make an evaluating group. The group must have the right members as key participants in evaluation process. Some key participants must be as following:

- Someone who provides management support, sets the direction of the project, oversee the budget and re-evaluate the mission and directions regularly to ensure that they remain relevant
- Someone who handles planning and day to day decision making
- Someone who provides feedback, enforces the rules and helps users
- Someone who is genuinely eager about ideation

3. Set the criteria and define the ideation focus to meet the criteria

Qualities of posted ideas together with their costs, are the most important evaluation process criteria for this sector in which have to be defined clearly. Therefore in terms of quality, the expectations of qualities and limits have to be defined clearly. Regarding financial resources limitations, to have an efficient and effective ideation focus process, the sector has to be transparent.

In order to promote transparency, an “IT Dashboard” must be developed. This tool allows tourists to monitor available financial resources and track the expenditures and activities using visualization tools and mapping to gain precise data leading them to generate ideas in line with available resources.

4. Define a comprehensive feedback loop for communicating with customers about ideas.

Providing feedback would shows how serious is the cultural heritage sector in listening, which has a significant positive impact on the overall productivity of the ideation process. Examples include:

- Considering rewards for visitor who propose the most proper idea which is supposed to be taken action on, foster visitors’ willingness to participate and let them know about the considered rewards in advance.
- Giving clear feedback to the owner of ideas which are not completely meet the whole requirements and asking to revise them also seems to be necessary in order to have an efficient feedback loop.
- Publishing the successes which are consequence of previous implementing of tourists ideas.

4.6 Conclusion

Owing to the fact that, the interest to learn about other cultures and visit amusing and adventurous places has grown, cultural heritage sector, as one of the most important means of increasing experiences economy, has been taken into account. Grounded in value co-creation concept, this study observes how using ICT and system dynamics approach would lead to a well-designed and higher quality service delivery process in tourism industry. The major conclusion, which has been drawn from the results of this work, suggests that, in order to attain superior performance in terms of service delivery, an integration of value co-creation and system dynamics approach is needed. Service operators, by providing the decent engagement platform using ICT, whereby tourists’ feedback and ideas can be achieved, must invest in line with their needs. In addition, by implementing SD method, this study builds models to analyse tourists’ feedback, considering existing constraints such as financial resources, to take the best action on given feedback and consequently improve cultural

heritage sector performance. Moreover, policy analysis enables service providers and policy makers to

- Increase the efficiency of their strategic decisions.
- Effectively predict and evaluate the possible results of design strategies and to work out details ahead of time.
- Attempt to clearly understand the relations of causal factors within the cultural heritage sector.
- Avoid the failures of policy and standards of this sector and strive for applying more efficient policies.
- Achieve a higher level of satisfied tourists.
- Allocate the financial resources to the different parts of the service supply chain more effectively.
- Design more customer-oriented service experiences.

Limitation of the work: When constructing the models and analyzing the results, some parameters have not been taken into consideration which must be stated as weak points of this research.

Although in an ideal CH system in which the value is co-created, cooperation and collaboration between all involved stakeholders, tourists and service providers is necessary for co-creating the sustainable value. However, in order to avoid complexity, the co-operation between only service providers and tourists has been considered in this system analysis.

Evaluation process is based solely on comparing the cost of proposals and available liquidity ignoring quality criteria. Moreover, financial resources were considered as the only constraint of the system and other constraints (such as energy) were neglected.

In terms of generating proposals, the model generates too generic proposals and is not able to specify and evaluate the proposals in detail. Furthermore, the model is not able to demonstrate the proper feedback loop between tourists and service providers which have been suggested and explained in detail within the context.

Future work: Our results provide a preliminary platform in guiding both future academic researchers and practitioners in the service delivery system in public and private sector.

Scholars looking to improve and complete our analysis and results in order to advance future research on integrating value co-creation mechanism and system dynamics approach should attempt to develop a proper model to overcome the limitations, which paves the path for taking advantages of aforementioned approach and concept.

Managers and system providers by taking all key actors in the system into account, which due to simplification were ignored in this system, should maximize the advantage of value co-creation concept. They may also put efforts in order to better understand to what extent and how ICT should be implemented to make an easy-to-use interface for multiple users to foster co-creating the value among them.

Employing cloud computing solution together with SD model should be considered as a smart way to leverage information through the whole system which, by providing a unified view across the system, facilitates real-time collaboration and led to effective decision making. It also helps to coordinate cross-organizations resources to respond to issues effectively.

Having all said above, constructing a more complete model which can somehow cover the indicated weak points in previous section (Limitation of the work), is highly appreciable.

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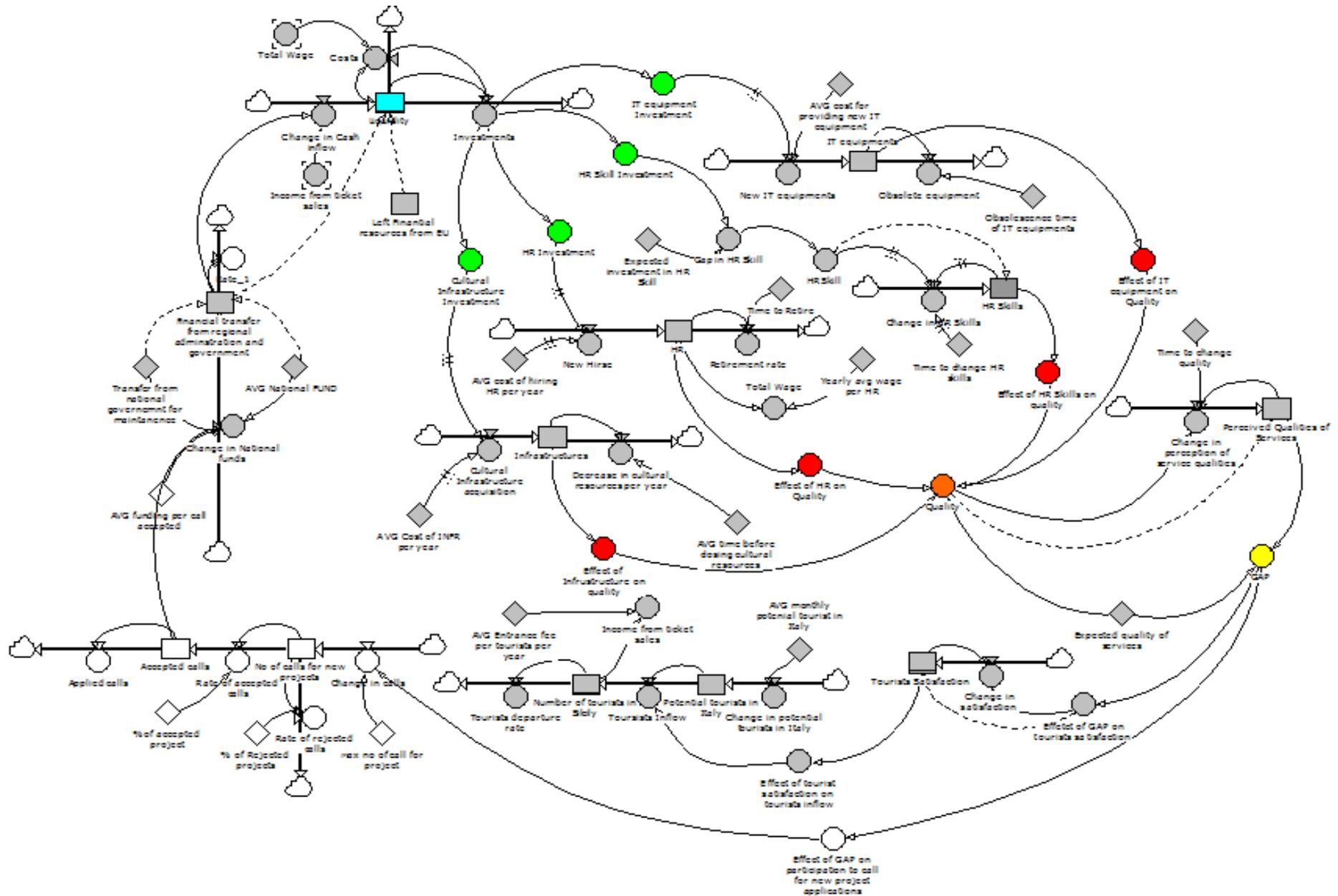
¹⁵ *All the data have been extracted and downloaded during the period of June, 2012-February,2013.

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Appendix 1: Magnified version of Figure 4: Snapshot- Complete stock and flow current Cultural Heritage sector



Appendix 2: Magnified version of Figure 4: Snapshot- Complete stock and flow current Cultural Heritage sector

