

First Steps to Enhance Resilience in Machalilla National Park

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2014 - 2018

1. Summary

Tourism represents an opportunity to create wealth and could result in countless benefits for the community, but there are also costs attached to the physical and economic development of tourism (du Cros&McKercher, 2015; Williams & Lew, 2015). In addition, the tourism activity is highly dependent on the community resources (human, natural, cultural, etc.), and consequently allocations of resources and efforts to increase the resilience of the community is not only ethically correct but in favor of the tourism industry. It has been appointed for many scholars (Basurto-Cedeno& Pennington-Gray, 2016; Pennington-Gray &Pizam, 2011; Pennington-Gray et al., 2011; Pennington-Gray et al., 2013.) that the tourism industry is vulnerable to disasters either natural or man-induced, and is affected by factors like (1) strong exchange rate fluctuation, (2) variations in the price of the oil and other commodities, and (3) increase global concern about safety and security (UNESCO, 2016). To reduce the risks in the tourism industry and therefore ensure the integrity of the tourism business and the tourists, several destinations have adopted a crisis management and risk reduction framework. The aim of those frameworks is to identify possible source of crisis and provide a guideline of what to do in case of disaster in order to reduce the negative impacts in the destination. Despite the many benefits of those kind of approaches, recent research has appointed that crisis management by itself, as a separated component, will not ensure the improvement of the recovery capacity of tourism enterprises in case of disaster, neither will effectively reduce the vulnerability of a destination (Basurto& Pennington-Gray, 2016). Thus migration to a more holistic framework is needed, and the disaster-resilience model provides a more comprehensive context to integrate the tourism industry with the community in order to build recovery capacity and reduce vulnerabilities. Most resilience studies conducted in the tourism field have focused on the economic resilience of the tourism business after a major disaster (Dahles&Prabawa, 2015; Biggs, 2011; Biggs et al., 2012; Lew, 2014). Despite of the valuable outcomes provided by such studies, they tend to study tourism as a separated component of the social and ecological systems which ignores one of the main characteristics of the resilience paradigm where the acknowledgement of complexity and connectivity of the system are pillars. For that reason, the goal of the proposed research is to develop an empirical instrument that will permit the identification of key indicators of destination resilience, so better strategies could be implemented and will provide pivotal information to destination managers, allowing them to be

more efficient in risk reduction, disaster planning and improving the recovery speed in case of a disaster. The destination selected for the study is Machalilla National Park in Ecuador. The reason is Machalilla is one of the main tourism destinations in Ecuador and it is also listed in the tentative list of World Heritage Site, because of its natural beauty and the importance of the archeological remains situated in the national park.

The mentioned destination also faces risks and vulnerabilities that could interfere with the development and functionality of the tourism sector and compromise the resilience of the community. The main threats identified are mudslides, river overflows, El Niño Phenomenon, earthquakes, epidemic outbreaks, and climate change. Due to the characteristics of the destination, it constitutes an ideal scenario for the implementation of the study.

Introduction

Tourism is one of the fastest growing industry in the world, capable to generate the 10% of the global GDP and direct responsible of one in every eleven jobs according to the World Travel Organization (UNWTO). It has been catalogued as one of the main source of income in developing countries and a key shaper of community development. Despite of the major economic impact of tourism in the world, the industry is also vulnerable to natural disasters, technological / man-made disasters, health related disasters, and conflict bases incidents (Pennington-Gray & Pizam, 2011). In order to reduce the risks in the tourism industry and therefore ensure the integrity of the tourism business and the tourists, several destinations have opted to adopt a crisis management and risk reduction frameworks. The aim of those frameworks is to identify possible source of crisis and provide a guideline of what to do in case of crisis in order to reduce the impacts in the destination.

Despite of the many benefits of those kind of approaches, recent research has appointed that crisis management by itself, as a separated component will not ensure the improvement of the recovery capacity of tourism enterprises in case of disaster, neither will reduce the vulnerability of a destination (Basurto & Pennington-Gray, 2016). Thus migration to a more holistic framework is needed, and the disaster-resilience model provides a more comprehensive context to integrate the tourism industry with the community in order to build recovery capacity and reduce vulnerabilities. It is necessary to explain that within the resilience paradigm many frameworks have been developed in the past decades creating an amalgam of options and a diversity of studies when studying the phenomenon. However, there is a common agreement among researchers that the first step in a resilience study is to determine the resilience of what to what; in the case of the present proposal the **focus is the resilience of the tourism business to disaster**. Under that umbrella the resilience approach adopted is the SCR “*Scale, change, resilience*” developed by Lew in 2014, where resilience is a characteristic of the industry that allows for change and improvement after facing a stressor that could be a major disaster like an earthquake or a slow driver of change like climate change.

Regardless of the wide acceptance of the resilience framework as the new path of development to cope with the many changes that the world is experiencing, there is a limited number of studies that have empirically tested resilience in tourism destinations. Furthermore, previous research has appointed that seems to be a confusion between the constructs of resilience and sustainability (Lew 2016). In the present study the authors will approach the concept of resilience as the ability of a destination to bounce back or change (evolved) when facing a disaster. I argue that the traditional approach of sustainability where the aim is to maintain the same structure is not always viable in the tourism arena, due to the intrinsic characteristic of the industry (constantly in change) and the external factors that influence it. Within the established parameters, the study will empirically test the resilience of the tourism industry in Machalilla National Park, a major tourism destination in Ecuador.

Literature Review

The concept of resilience in has its beginnings in 1973, when Hollings proposed a new way to understand the ecological systems and introduced the “adaptive cycle” (Walker et. al, 2004; Folke, 2006; Hollings, 1973; Biggs, 2015; Galloping, 2006; Ruiz Ballesteros, 2011) in which different components of the system might influence change in other components, or even in the whole system. Hollings also introduced to the world the “ecological resilience concept”, and defined it as the time required for an ecosystem to return to an [equilibrium](#) or steady state following a perturbation. The addition of the social component became necessary in the late nineties, when researchers acknowledge the major force that is humanity when shaping the ecosystem dynamics from local environment to the biosphere (Folke, 2006). Since then, the notion of resilience has been adopted and adapted by several fields resulting on a wide variety of terminology and concepts.

Engineering resilience for example focuses on the ability of something to face stress and bounce back to a pre-designed stage or function prior disturbance, in other words is about maintaining efficiency of function, constancy of the system and a predicable world near a single steady state (Folke, 2006).

Ecological resilience allows for change of the stage of an ecological system after the present of a stressor as long as the new stage is desirable. It is about survival of the ecosystem after an unexpected event, and its focused on reducing the vulnerabilities (Fabry&Zeghni).

Social – Ecological resilience includes humans and their influence in the analysis of the systems, it is seeking for adaptive capability, learning and innovation capabilities in a dynamic context, mostly focusing in planning and resource management, and concerning the viability of the tourism industry as well as the authenticity of the local culture (Tyrel & Johnson, 2008).

Community resilience is an attribute of the population which is characterized by the active participation of the community's members in anticipation and response to crises (social or environmental) in order to recover full functionality.

Evolutionary resilience is focused in the social world, and its ability to deal with constant change through capacity adjustment and adaptation, it deals with several levels (individual/collective, local/regional) within a destination and its governance, adopting an inclusive stakeholder perspective with a networked and/ or multilevel governance (Fabry&Zeghni).

Despite of the variability in definitions of resilience, most of them emphasize the capacity for successful adaptation in the face of disturbance, stress or adversity (Norris et al, 2008).The implementation of a resilience framework is coherent in the study of communities, destinations and the tourism sector because it is not linear and recognizes the connections among different components of a system, when at the same time allowing for change and improvement in order to face different types of stressors.

2. Background and Motivation

Heritage destinations are places of incredible beauty and representations of the cultural and natural legacy of specific locations. They have an enormous sentimental value for the community and for the visitor, and their significance exceeds the economic benefits that in most cases generate, their importance transcend to become a symbol of proud at the local and international level (du Cros&McKercher, 2015; Timothy,2011)

The tourism industry is highly dependent of the cultural and natural resources of a destination (attractions) as well as the quality of supporting infrastructure, and most importantly depends on the people of the within a community. This statement is particular true in the case of heritage tourism destinations where the community as a whole constitutes (sites, intangible cultural manifestations, food, etc.) the driver of visitation. Thus, the tourism industry has an ethical responsibility and a duty to start thinking outside of the box and engage in actions that allow the enhancement of its own resilience and the resilience of the community. The rationale behind that is the tourism is part of a bigger system and cannot survive without it. Previous researches has focused in developing the resilience of the industry without including the community and vice versa, the present study aims for the identification of areas of investment (not only economic investment) where the tourism sector could engage in order to improve its resilience and the resilience of the tourism community.

The tourism industry is a major booster of the economy of tourism destination, especially in the case of heritage sites, where the profits generated by the industry are in many cases invested in the maintenance and preservation of the resources (du Cros&McKercher, 2015; Timothy,2011; Basurto –Cedeno&Pennington-Gray, 2015). The tourism industry is also an important generator of jobs for the community, and therefore promoter of wellbeing and quality of life for the members of the community. However, it is important to consider that the tourism industry is also highly dependent of the resources provided by the community and not just the sites, therefore there is not just a moral obligation to ensure the viability of those resources, but also it is also in favor of the industry to ensure its own viability in the long term. As mentioned before in this proposal, there are many risks that can affect both the tourism and the community, however, despite of the nature of the risks, resilience of this study is focused on the ability to overcome a possible interruption and/or decrease of tourism activity.

An interruption and/or decrease of the tourism activity is considered a crisis in a tourism destination mainly because it would create a domino effect that would affect greatly the economy of the community and the availability of resources for preservation in case of heritage destinations. There is an obvious existing linkage between the community and the industry and a need for adopting a resilience framework that identified the actions that should to be implemented by the industry in order to increase the resilience of the community to face any type of disaster that could possibly have a negative effect in the tourism activity. Studies of this nature

have not been done, but researchers have acknowledge the importance and need for these types of researches (Biggs, 2011; Biggs et al., 2012; Lew et al. 2016). Moreover, the majority of the studies conducted in the tourism field have focused on a steady state as returning point after a disaster. Approach that is contradictory to the proposed in the theory.

3. Gaps in the knowledge

Most of the resilience studies in the tourism field have focused on the speed of the economic recovery of the tourism industry when facing a crisis. Those studies recognize resilience as the capacity of the sector to bounce back after a disaster, but most of them ignore that tourism is part of a bigger system, therefore strategies to increase resilience need to include the community. Many researchers have identified the need for a new path of research that marry the tourism sector and the community. However, there is still a gap about how to identify the key areas in the community where the tourism sector could intervene to increase the resilience of the system. Theoretically after the intervention the resilience of the whole community should achieve higher levels of resilience. The purpose of the present study is to provide a first step to empirically validate the previous statement.

Research Questions

The research questions that drive the present study are the following:

RQ1: How tourism dependent communities might be affected by a crisis?

RQ2: In what the tourism industry needs to invest in order to ensure the resilience of the destination?

RQ3: What benefits the tourism sector will receive from those investments?

RQ4: What benefits the community will receive from those investments?

4. Expected Significance

The product of the research proposed here will contribute to the understanding of resilience in tourism industry, and will help Destination Management Organizations (DMOs) and tourism enterprises to identify key areas of investment, so better allocation of resources could be

implemented.

5. Goals and Objectives

The long term goal for this proposal is to develop empirical tools to measure resilience in tourism destinations. The overall goal for this application, which is a logical step towards attainment of this goal is to determining what are the components and areas of a destination that are crucial to build resilience. The central hypothesis is that **destinations who invest in resilience bounce back faster than those who do not**. Investments in resilience in the context of the present study are the dedication of resources from the tourism sector. This hypothesis has been formulated on the basis of preliminary data, as well as work by Lew et al. (2016), Lew (2014), Fabry&Zeghni, Tyrell and Johnson (2008), and Folke (2006).

Three main objectives drive the present study:

- Identify domains in a destination where investment will lead to better disaster resilience Scores
- Identify specific areas of investment within the domains
- Implement an empirical resilience measurement

6. Methodology

Due to the nature of the present study the mixed method design is best to address the research problem, given that it allows for exploration and identification of independent variables that would drive resilience, and at the same time takes into account the opinion of experts and stakeholder within the destination to be studied; This type of approach allows for the understanding of the relationship among variables. Finally, the mixed method design provides possibility to achieve greater validity of the results due to triangulation, and completeness of the understanding of the phenomenon (Creswell & Clark, 2011).

The stages defined a priori in the present proposal are: a pre-stage (1), a first stage (2), a second stage (3) During the pre-stage or preliminary stage the author of this proposal will identified through literature review indicators for the social, environmental, and components of a

destination where engagement and investment of the tourism industry will lead to significant improve the resilience of the tourism community. The pre-stage also includes the development of a model applicable to tourism destinations considering the resilience and crisis management literature. The components of the model as well as the indicators to be tested for each one of them have been derived from the resilience literature.

Analysis of the data to test hypothesis

The proposed statistical analysis to test the hypothesis is the hierarchical multiple regression. The mentioned analysis allows the identification of statistical significant predictors of resilience, using independent variables introduced in the analysis as blocks. For the proposed study 3 blocks of variables will be entered in the analysis that will represent the three domains drawn from literature. Contribution of each domain and each variable will be provided by the analysis. The sample needed to perform the analysis is going to be determined by the recommendation of Pallant (2013), using the formula:

$$N > 50 + 8(m)$$

Where “m” is the number of independent variables used in the study. In the present paper we have identified 14 variables (see preliminary results), confirmation of the validity of the variable need to be conducted, but I will use the 14 variables in this paper to determine the minimal number of observations needed in order to have a meaningful multiple regression analysis.

$$N > 50 + 8(14)$$

$$N > 162$$

Achievement of a 100% response rate is very hard, and because of the possibility than some of the observation could not be used (like for example if there were outliers, or missing information) a larger sample than the proposed in the formula is highly advised. For this study a link with a survey will be send to at least 325 participants, with the aim to have a response rate of nor least than 50%.

After analysis the statistical significance of each independent variable will be assessed, and this will indicate possible efficient areas of investment. Moreover the analysis will provide information of how much each domain contribute to the model and the resilience score.

7. Limitations

The propose study has many strengths in comparison to previous studies conducted in the tourism resilience field. For instance, the proposed study includes a qualitative and quantitative approach to identify the areas where investment of the tourism sector will lead to resilience of the tourism community. Therefore results drawn for the study will have empirical validation. Additionally the study will include a large data to perform the analysis, something that until now has been a problem of previous studies (mostly qualitative studies have been conducted in the social ecological resilience framework in the tourism field). Moreover, the proposed study will result in an empirical tool that could be used in other studies in destinations with similar characteristics (heritage tourism destinations in developing countries). Besides, because the study uses as a context a destination in a developing country its applicability is noteworthy, in order to contribute to the greater good. Finally the study uses a measure of resilience that is aligned with the theory and its assumptions.

In the other hand, there are some limitations of the proposed study. First the study is time consuming and it will demand high cost in comparison to other studies conducted in the field. In order to perform the study the researcher need to go to the destination and stay there at least for three weeks in order to collect the data needed for the analysis. Moreover to have access to the information needed the researcher needs to have connections at the management level with public and private organizations within the destination. Fortunately, for the study proposed those constrains have been overcome, but could compromise the possibility of replication of the study for other researchers in other destinations. Finally the major weakness of the study is that in order to see if the recommended areas of investment are truly predictors of resilience the destination need to adopt the recommendations proposed by the researcher, and after a determined time the quantitative part of the study needs to be replicated in the destination to confirm the increase in the resilience score. In some cases destination managers or the tourism sector could not be committed to adopt this type of long term approach, or could be removed of

their functions due to change in the country's government.

8. Preliminary Studies

None preliminary studies have been made in this area of research, however previous studies have appointed the need to engage in this path of research to provide actionable outcomes to achieve resilience in tourism destinations. For the proposed study the researcher has made a preliminary study to determine the domains, variables and operationalization to be implemented in the data analysis.

a. Pre stage: Domains, Variables and Operationalization

Three domains will be assumed in the propose study (1) social, (2) environmental and (3) economic domain. Each domain has been selected based on resilience literature review, and determination of mutually exclusiveness after deep analysis. Additionally under the community planning approach there is a needs to go beyond economic benefits and include the three bottom principles of sustainable development which are economic, social and environmental development. (Leigh and Blakely, 2013). These three pillars of sustainable development are in line with the mentioned domains of the resilience literature.

The social domain:

The social component is one of the most recognize domains of the resilience literature (Cutter et al., 2008; Walker and Salt, 2012; Walker et al. 2004; Carpenter et al. 2001; Holladay and Powell, 2013; Biggs et al., 2015; Biggs, 2011; Norris et al. 2008; Lew et al., 2016; Cai et al., 2016). It acknowledges the power of humans in shaping the capacity to deal or provoke change in the destination to ensure resilience. Per Walsh (2007) family and community networks can be essential resources of a society in the recovery process after a traumatic event, and having a comprehensive plan and inclusion of different social institution within a community can help to increase the speed of recovery after disaster, improving the probabilities of adaptation and migration to a better state. The social domain therefore needs to be an area of investment of the tourism sector to compensate the burden of tourism development in the community (Tyrell and Johnson, 2007) and ensure the viability of a favorable state of the system that allow for sustainability of the tourism industry within the destination. Under the resilience theory the

social component includes all human interactions, and characteristics of the population that could affect the state of the system (Walker and Salt, 2012).

The variables selected to measure investment in the social domain have been taken from literature. And have been carefully chosen considering the applicability in the context of the study. Validity of such selection needs to be done as part of the qualitative part of the proposed study.

The economic domain:

Based on literature review and experience of destinations after a major disaster the availability of resources could lead to faster levels of recovery after a sudden change (Basurto and Pennington-Gray, 2016), however it is necessary to understand how are the economic resources distributed among the community members and different stakeholder. For that matter the economic domain can not only be measured by the economic growth (traditional linked to the GDP contribution) but it also need to includes the income distribution, availability of resources for recovery, job creation and number of business. The economic, as well as the social domain has been also recognized extensively in literature (Cutter. et al., 2008; Basurto and Pennington-Gray, 2016; Holladay and Powell, 2013; Norris et al. 2008; Cai et al., 2016; Biggs, 2011). And is a domain that allow for the implementation of recovery strategies after a disaster, or to finance intervention to increase the adaptive capacity of the tourism community. Finally, the economic domain is an area when intervention and investment of the tourism sector could lead to increase the levels of tourism community resilience.

The variables selected in order to measure investment in the economic domain have been taken from literature. And have been carefully chosen taking into account the applicability in the context of the study. Validity of such selection needs to be done as part of the qualitative part of the proposed study.

The environment domain

According to the oxford dictionary, environment is defined as “The surroundings or conditions in which a person, animal, or plant lives or operates”. Under this definition environment includes both natural and built resources available in a determined area where people live. In the proposed study I adopted this definition and include under the domain of environment two subdomain: (1)

Built environment or infrastructure, and (2) Natural or ecological environment.

The infrastructure domain:

This domain refers to the unique infrastructure of the heritage destination, and the infrastructure of the tourism sector and community. For its analysis variables need to be oriented to measure the quality of the resources and availability in face of the tourism demand. This domain has been recognized in the resilience literature by many researchers (Lew et al., 2016; Cai et al., 2016; Tyrell and Johnson. 2007; Biggs, 2011; Walker and Salt, 2012; Folke et al 2006; Walker et al. 2004). And has been studied broadly through the infrastructural resilience framework. The proposed study will identify areas where intervention and investment of the tourism sector will lead to preservation of the assets. Moreover, due to the particular characteristics of the destination (World Heritage Site) there is, in theory, (Du Cros, H., &McKercher, B. 2014) a high dependency of the economic tourism revenues for the maintenance of the cultural infrastructure.

The natural domain:

The ecological component is recognized as a core domain in the resilience theory in the majority of approaches that study the construct (Lew et al., 2016; Cai et al., 2016; Tyrell and Johnson. 2007; Biggs, 2011; Walker and Salt, 2012; Folke et al 2006; Walker et al. 2004). The ecological component provides the ecological services needed for the preservation and positive evolution of the destination in case of crisis or sudden change. In the proposed model is important to determine the ability of the destination of continuing providing with those services that in many cases are the main driver of tourism, quality of life and economic growth. For the purpose of this study this domain will measure using variables to determine the availability and quality of such resources (Cutter et al 2008; and Biggs et al 2015; Mayunga, 2007; Tyrell and Johnson, 2007; Lew et al. 2016).

Operationalization of resilience

How to operationalize the construct of resilience has been one of the challenges in the field. In order to align with the resilience assumption which establish that “Under the resilience paradigm the assumption of a *permanent* stage of equilibriums is discarded, instead the idea of

an adaptive cycle is assumed, where the system (any kind of system) passes through four stages: rapid growth and exploitation (r), conservation (K), collapse or release (Ω), and renewal or reorganization (α) (Carpenter et al. 2001)". And in concordance with the core resilience literature (Walker and Salt 2012, Folke et al. 2006). The measure of the resilience for the destination need to include 3 important aspects; knowledge of the system, adaptability of the actors (people) and identification of thresholds. In order to have one measure of resilience to be included in the statistical analysis, each one of the mentioned parts will have a score that will contribute to a final value, where 100 is the maximum score.

The measure of resilience proposed by this study is a small assessment targeted to the members of the tourism community that will include the following parts:

- Knowledge of the state of the system, cross scale connections, slow variables, and external risks
- Identification of possible thresholds
- Perception of adaptive capacity of the actors of the system (people)

The inclusion of each one of these domains is backed by the resilience theory. All domains have been identified as divers of resilience and they are different among each other.

a. First stage qualitative validation

The indicators to measure resilience in the study have been described in the previous section of this proposal. In order to achieve validity, the indicators need to be analyzed and confirmed by experts on the field. With that purpose in this stage a Delphi Study is proposed before continue with the empirical analysis

a. Second stage empirical validation

Due to the nature of the variables presented in this paper, the collection of data for the analysis needs to be primary data. The destination where the study will be conducted is the city of Cuenca in Ecuador. Cuenca has a population of 580000 habitants according to the last census conducted in Ecuador in 2010. The number of visitors of the destination were 830000 in 2015. Currently Cuenca has more than 50 hotels and more than 8000 employees in the hospitality sector. For the propose study the population of interest is the tourism community, this includes the hospitality sector (hotels and restaurants), the tour operators, travel agencies, tourism government

organizations, private tourism organizations, preservation organizations, and any organization that have any relationship with the heritage site, and universities that offer tourism programs. From that population of interest, a sample with enough representativeness of each subsector will be drawn. For the present study random sampling is not advised. The recommended approach is purposive sample.

Resilience Model

As a preliminary step for selection of the sample, some tourism organization of Machalilla National Park will be contacted and the destination visitor bureau (Turismo para Cuenca) and the destination manager organization (Ministry of tourism) have provided with the contact information of the tourism business official registered in the tourism inventory of the city. The next step, after conducting the qualitative study for determination of the final variables and development of the instrument, is to identified and contact the different member of the tourism community of the National Park and ask them to answer the survey (instrument). The survey will be sent in a link using Qualtrics. But that will also include the approval of the ULEAM as the institution in charge of the investigation in Ecuador, this way the participants won't be nervous about the procedure and higher level of response could be obtained.

9. Time Line

The timeline proposed for this research is detailed bellow:

Timeline

Activity	Fall 2014- Spring 2017	Summer 2017	Fall 2017- Spring 2018	Fall 2018
Literature review	Fall 2014 to Fall - 2015			
Development of the resilience model	Spring 2016 – Spring 2017			
IRB approval	Fall 2016 – Spring 2017			

Collection of Qualitative data		Summer 2017		
Collection of quantitative data		Summer 2017		
Analysis of Qualitative data			Fall 2017	
Analysis of Quantitative data			Fall 2017	
Results			Spring 2018	
Attempts of Publications 4 targeted publications: - Lit review and model - Qualitative analysis - Quantitative analysis - Case Study summary				Fall 2018

The time required to complete the project is four years, starting on Fall 2014 (Agosto 2014) and ending in June of 2018. The first stage of the project is to identify the items that will be used for the tool and validate them through a Delphi study with experts on the field of resilience, tourism and crisis management. This part of the study will be conducted during the Sprint of 2017. In summer of the same year collection the data for the analysis need to be collected in Ecuador, and regression analysis will be performed. Subsequently attendance to a international tourism conference is needed to present preliminary results to a panel of experts. If collection of more data is necessary for additional statistical analysis, this will be done in fall 2017, and validation of results with the destination stakeholder will be conducted in the same

period. Finally the report and presentation of results will be scheduled for Sprint 2018.

10. Budget and Justification

For the proposed study the following fund will be required:

- Funds are requested to attend one national scientific meeting per year to present data generated from this study (\$2500 per author interested in attending).

F. Participant Support Costs

- The authors of the present proposal are doing the mentioned investigation voluntarily.

G. Other Direct Costs

- Publication (\$1000 total)
- Other

H. Total Direct Costs \$3500

**** IMPORTANT: the cost generated by the mentioned proposal are going to be funded by the authors.**

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