COMMUNICATION & SOCIETY

José Flecha
flechaj1@suagm.edu
Professor. School of Bussiness and Entrepreneurship. Universidad del Turabo, Puerto Rico.

Maribel Ortiz
mortiz126@suagm.edu
Professor. School of Bussiness and Entrepreneurship. Universidad del Turabo, Puerto Rico.

Virgin Dones
vdones@suagm.edu
Professor. School of Bussiness and Entrepreneurship. Universidad del Turabo, Puerto Rico.

Risk Communication. The Media Content effect on Brain Drain: The Case of Puerto Rico

Abstract
The economic crisis affecting Puerto Rico for the past years resulted in the migration of qualified talents (Brain Drain). This fact has been a public discussion taking covers in the media. This type of discussion is called risk communication. This work is based on the Cultivation theory, Framing and the Agenda Setting theory, by which the researchers developed a model that was applied through a survey, to 340 participants and it was analyzed under the PLS technique. The objective of the study is to analyze the impact of risk communication, through the framing and Agenda Setting on political, economic and social factors of brain drain in Puerto Rico. The results reflected that political and economic factors influence the interest to migrate out of the country, while social factors are influenced when the framed news presented in the media are present as moderating variables. This study contributes by presenting empirical evidence on the role of the media as influencers in the development of attitudes. The framing of the news and the projection of the information (setting) will induce an attitude that will result, in this case, in the interest of qualified talent to migrate out of the island.

Keywords
Framing Theory, Agenda Setting Theory, Risk Communication, Migration, Public Opinion

1. Introduction

The media utilizes a subtle process of selecting certain aspects of information, which are presented as more important, while making positive or negative evaluations of the subject. The media induces the public, not only to think about a specific topic but also suggest what to say about the facts, how to interpret and evaluate them (Rubio, 2009; Entman, 1993; McCombs, 2006; Goffman, 2006 and Baumer et al, 2017). On the other hand, it is established that the images created by the media have an impact on the formation of public opinion. (Gregorio, 2004; Herrera et al, 2004; McCombs, 2006; Goffman, 2006; Lecheler et al, 2016, and Baumer et al, 2017).

From the perspective of migration, García (2009), states that a relationship exists between the media and the effects of migration,

which could be related to the effects of the public opinion. Sejías (2014), established that public opinion is mostly realized, with the intervention of the media and the people who created the opinion. Currently, Puerto Rico is going through a fiscal crisis that has led to the mass migration of a large part of the qualified talent. The most recent data were presented by Garcia (2014), where it was identified that 46.6% of the Puerto Rican migrants had undergraduate, master's or doctoral studies and that 96% of these displacements are permanent.

Figueroa (2013), on the other hand, explains that the motivation of skilled migration in Puerto Rico is associated with Political, Economic and Social Factors. This problem has transcended into a public discussion throughout the media; on the front cover of print media, radio and television. The discussion of the problem is heightened by the publications in the media as noted by Krueger, Teja and Wolf (2015), in which it presents serious economic, political and social problems and increases even more with the recent discussion of the approved PROMESA project, which imposes a Fiscal Control Board for Puerto Rico, by the United States Congress.

Therefore, the problem of the degree of influence of the media on individuals and society has had different answers. Studies on communication confirm that the media has significant effects on the society, although there is little consensus about the nature and scope of such effects (Rubio, 2009), which motivates further research. The present quantitative study aims to explain, through a model that has never been presented, if the motivations to migrate within the specialized workforce are driven by political, economic and social factors and to also investigate if the process of risk communication through Media strengthens the relationship between these factors and the interest to emigrate. Through theoretical framework exposed, this study is interested in studying how the media can influence the intention to migrate by professionals. The researchers presented a model that evaluated the impact of news framed by the media as a moderating variable. In the end, this moderating variable is analyzed on the effect of political, economic and social factors and the interest of qualified talent to emigrate outside the country. This study contributes to the theory since there is a limited amount of research which mostly focuses on how the company should communicate the message, but there is no study demonstrating the effect that the message has on the receiver. On the other hand, most of the literature found is directed to how the message is constructed (framed by the news) and the strategy of how they are going to focus it (the agenda). It is for this reason that this study presents a significant contribution, as it proves the effects that the media framed news on political, economic and social factors has on the interest of qualified talent to migrate outside their country of residence. The research provides a model that has never been proven, where evidence shows the effect that the communication media can have on brain drain.

2. Risk Communication

Communication is a process through which two or more subjects exchange messages with response capacity through media or signs (Single, 2004). Luque (2004), indicates that the media seek to establish a connection between the suppliers and users of information. The author defines it as a type of communication that stands out for its globality since it involves the entire society and its consequences could affect the community. On the other hand, in establishing the term Risk Communication, it is defined as an interactive process that involves exchanges between different groups of actors and the public (Infanti et al, 2013). Sheppard, et al. (2012), clarified that historically, the vision of risk communication was focused on understanding responses to organizational risks amid a crisis, rather than how communication impacted the public and their behaviors. O'Donnell (2010), on the other hand, presents highly relevant results, showing that risk communication is a result of

judgments about the risks based individual's own perceptions and the way in which they observe the risk. The author explains that these individual perceptions can lead to subjective differences in opinion and the level of uncertainty that it causes. Another author clarifies that the effect of new media and technologies could turn a crisis into a major event (Rojas, 2003).

Several investigations (Heath et al, 2009; Chess & Clarke, 2007; Leichtfuss, 2004 and Vaughan & Tinker, 2009) have focused their studies on the management of risk communication with an emphasis on health management. However, the literature is limited to the study of other social phenomena that it does not even address the impact of communication on the society's behavior. According to Tigao (2015), risk communication is practically an unexplored research area, especially in relation to migratory studies; even though migration aspect have been an important issue for the construction of media risk and is clearly outstanding in public debates. Of the few researchers who seek to explain how the media influences the social perception of risks are: Albert et al (2010). The authors established two theoretical approach of special influence: Agenda Setting theory (Agenda-Setting) and the Cultivation Theory. They also explained how these theories impact the Framing Theory (Framing Effect).

2.1. Agenda-Setting

The agenda setting theory postulated by McCombs (2006), establishes that the media cannot tell a person what they should think about, but they can educate or direct them towards the topics that they should consider. Their study focused on individuals having the need to know about everything that happens in the environment, however, the media can have the effect of persuading them on topics that interest them. That is, the media has a great influence on the public in determining which stories are of interest and how much importance they should be given. Giménez (2006), adds that under the agenda setting, individuals employ what he calls contextual cues when making decisions, formulating judgments or issue opinions. Therefore, agenda setting highlights that once the individual has assumed a position at any point in the process and for whatever reasons, the resulting information will influence the way individual sees and thinks about the ideas and issues that are discussed.

Rodríguez (2004), for its part, emphasizes that the process of interpretation of agenda-setting is developed in a three point analysis. First, there is the media agenda, which talks about the table of contents that will occupy front pages in the media for a period of time (McCombs, 2006). Second, the public agenda (Rodríguez, 2004); which contemplates the degree or hierarchy of importance that the public gives to certain news aspects over a period of time (McCombs, 2006). The last point is the political agenda, it measures the type of actions that governments adopt and the different social institutions that will later be part of the debate and will result in public discussion (Rodriguez, 2004 and McCombs, 2006).

2.2. Cultivation Theory

Igartua et al (2011), who cited Shrum (2004), where they explained that the analysis of the cultivation theory is to determine empirically, the influence of the contents on perceptions. The works of Gerbner's Cultivation theory, established that the more the exposure to television, the more the individual is captivated by the judgments of social reality (López, 2015). Therefore, the media seeks and provokes perspective, cultivates images of reality, produces acculturation and sediments belief systems, mental representations, and rational and emotional attitudes (López, 2015). Cheng and Igartua (2013), on the other hand, found that exposure to different media content and the intensity of exposure to the media contributes to different levels of perception and attitudes of the individual. Another

instigator explained that the results of cultivation theory are directly determined by perception and are related to the intensity of exposure to the medium and how it affects the behavior of the individual through the media process (Heimann, 2004).

2.3. Framing Effect

Lopez and Chihu (2011), explained the work of Goffman and detailed that the study of Framing aims at investigating how people define situations and activities in social action. The authors explained the communicative process at three levels. First, the "Frame" this stage defines an inserted message in the context of a communicative process (Goffman, 2006). Druckman (2010), describes that this stage is not entirely a communication, but rather describes an individual's perception of a situation; the framework reveals what an individual considers to be relevant to understanding a situation.

The second level is "to frame" where the individual seeks to select some aspects of perceived reality and highlight them in a communicative text, in such a way that promotes a definition of the problem, an interpretation, evaluation and recommendation to solve the problem (Lopez & Chihu, 2011; and Goffman, 2006). Hallahan (2008), states that this level is a critical part because it helps to understand perceptions and how information is processed. Communicators use message boxes to create prominence for certain elements of a topic and focus attention on them while excluding other aspects. Now (Lopez & Chihu, 2011; and Goffman, 2006) explained the last level as "Framing" that happens when a source of communication defines and constructs the subject.

The "frames" allow journalists to process large amounts of information and through their application, decides what is news and what is not (Koziner, 2013). The author detailed that the resignations of the problem are then added to other elements determined by the individual's perceptions and the social construction of these meanings.

2.4. Media Influence on Qualified Migration (Brain Drain)

Qualified migration is known as brain drain and is used to identify the migration of highly skilled people with a high level of education and technical training (Riveros, 2013; De Miguel & Solana, 2007; De Angelis & Peyrano, 2008; Casañas, 2007; Bermúdez, 2010; Widmer, 2012; and Nica, 2013). In order for qualified migration to be considered as a problem, Tigau (2015), who cites Lowell et al. (2004), explained that there must be a migration of individuals with higher education that exceeds 10% and that causes adverse economic consequences for the country.

The motivations for migration can be diverse. Several studies (De Angelis & Peyrano, 2008; Pol, 2011; Button & González, 2009; Solimano & Allendes, 2007) have agreed that the Political Factors: instability of country, laws, actions (Reza, 2011; Morales, 2015); in the case of Puerto Rico, and its relationship with the United States (Enchautegui, 2008), Social Factors: instability, quality of life in general, crime, lack of health services, education, reference groups, nuclear family, security and welfare, etc. (Ayvar & Armas, 2013; García, 2014) Economic factors: lack of adequate and specialized jobs, wages, unemployment, welfare payments, unemployment payments (Figueroa, 2013; Garcia, 2014), could be the factors that are encouraging qualified workers to make the decision to leave their country of origin.
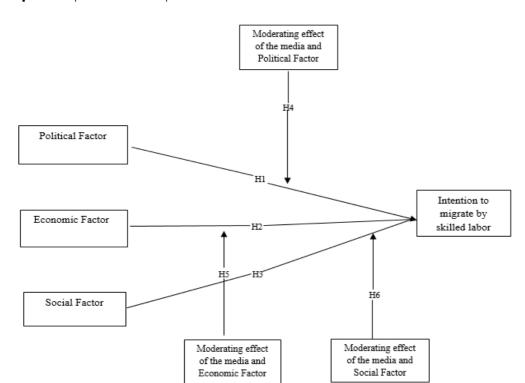
Echevarría (2010), explained that the media plays an important role in the way they educate and describe information since this communicative dimension could help to reduce uncertainty towards the new migratory destination. On the other hand, the visual aspect used by the media influences migratory issues (Gaona, 2004). The author explains that its execution is achieved through content strategies focused on two aspects: (a) the protagonism generated by the image or video and (B) content that presents a large

information burden through cognitive information and exhortative or conative information. However, the literature that addresses the effect of the media on political, economic and social factors on the theories exposed is not identified, therefore, the researchers put forward the following hypotheses:

- H_1 Political factors influence the interest to emigrate outside the country by skilled labor.
- H_2 Economic factors influence the interest to emigrate outside the country by skilled labor.
H_3 Social factors influence the interest to emigrate outside the country by skilled labor.
- H_4 The interpretations through the exhibition of contents framed in the media moderates the relation between the political factors and the interest in emigrating outside the country by skilled labor.
- H_5 Interpretations through the exhibition of content framed in the media moderate the relationship between economic factors and the interest in emigrating outside the country by skilled labor.
- H_6 Interpretations through the exhibition of content framed in the media moderate the relationship between social factors and the interest in emigrating outside the country by skilled labor.

Given the established hypotheses the researchers establish the following relationship map between variables.

Graph 1. Map of Relationship between variables

3. Method

3.1. Design and Participants

This explanatory research used quantitative methodology under a field study via an applied survey. The first step was the design of the research instrument. The design was made after an extensive literature review and adapted according to the research objectives. Once the first draft of the instrument was completed, the researchers proceeded to validate the instrument. To achieve this objective, the instrument was presented to a panel of three experts. After the recommendations were received, the meanings and expressions were clarified to ensure that the words and the questions used were clearly written. After validation, a pre-test was performed on 30 elements with characteristics similar to those of the sample. On analyzing the results of the pre-test, the final version finished with 17 reactive segmented for the following variables: Political Factor, Economic factor, social factor and means of communication was released.

For the determination of the participants, a criterion was established for the participation to be in the range of 25 to 46 years. García (2014) explains that the highest rate of professional migration in Puerto Rico is at a median age of 25 to 34 years. On the other hand, the author explained that at the age of 25, a person has successfully completed a Bachelor's degree and is part of the labor force. However, the researchers extended the age range up to the age of 46 in order to be able to observe if the trend transcends to groups of older professionals. The selection of participants was through a non-probabilistic process with the use of a platform for collecting electronic surveys ("Survey Planet"). The researchers were invited to participate in the study via social networks such as Facebook, Twitter and Linkedin. Before responding to the survey, the participants observed a fact sheet that provided a brief explanation of the research focus, age range to participate, and as a requirement that they had completed a minimum undergraduate degree. In the end, a total of 410 participants were collected, of which 340 questionnaires (83 percent) were useful for statistical analysis. Statistical analysis was performed using the SMART PLS statistical (partial least squares structural equations modeling) program.

3.2. Validity of the Study

By the nature of the latent constructs involved, the interrelations between the independent and dependent constructs, in addition to the predictive intention of the research, the technique of structural equations adjusted by partial least squares (Partial Least Squares – PLS) was applied. This technique was preferred since PLS-SEM does not assume data normality, and it does not condition the minimum sample size and is more appropriate for the prediction and/or generation of theories (Hair, Ringle, & Sarstedt, 2011).

Prior to the interpretation of the results of the validity, internal consistency was measured via Cronbach's alpha coefficients. We can see in Table 1.0 that all variables obtained an alpha coefficient greater than were .794. And is satisfactory according to the criterion of .70 (Nunnally's, 1978; Malhotra, 2010; Hair, et al, 2016). The second step is to analyze the indicators of the measurement model. These indicators should also show reliability. In order to validate this fact, we used standardized loading (factor loading), which according to Hair et al. (2011) and Haenlein and Kaplan (2004), must have values greater than 0.70. The PLS shows that each asseveration considered for the analysis has a standardized load of about .736 demonstrating a high level of consistency in each asseveration included. Finally, the diagnostic validity of the reflexive measurement models focuses on convergent validity and discriminant validity. In the case of convergent validity, the values of the average variance extracted (AVE) must show values greater than 0.50 in all constructs. This investigation reflected AVE values higher than .633 indicating high convergent validity.

These data showed that the latent variables account for more than half of the variance than their indicators (Hair et al., 2011).

Table 1. Summary of Validity results on Variables, AVE values, Composite Reliability and Cronbach alpha

Dimensions	Asseveration	Standardized Loading (Factor loading)	AVE	Composite Reliability	Cronbach alpha coefficient
	I think that, although the government tries, Puerto Rico is not going to progress and that is the reason why I considered leaving the country.	.758			
	Puerto Rico's current political status has given me the freedom of movement to migrate to the United States, as my perfect alternative.	.782			
	Service management in government agencies (licenses, tags, water, electricity) are completely inaccessible versus other places and this aspect has made me think of moving out of the country.	.818			
	The current political status of Puerto Rico has no solution which has forced me to think about migrating	.778			
Political Factor	I think that the political leaders of Puerto Rico, do not have the capacity to correct the current economic situation now and in the near future; that has made me think of moving from Puerto Rico	.860	.640	.899	.860
	To emigrate would be the perfect alternative to my current personal situation	.788			
	I think that the high cost of living in general that exists in Puerto Rico has made me think about the decision to emigrate.	.849			
	I have thought of emigrating from Puerto Rico because salary scales are better in other places	.874			
Economic Factor	My current income does not give me the opportunity to meet my needs and as such, I thought about moving to improve my economic situation.	.806	.689	.898	.849
Social Factor	I think public services in other countries are better than in Puerto Rico.	.756	.633	.896	.855

	The high incidence of crime in Puerto Rico has made me consider leaving the country.	.834			
	I thought about emigrating to seek better education for my children	.736			
	The simple lack of basic health services has boosted my decision to emigrate.	.814			
	Faced with the problems of Puerto Rico, I do not see a clear future for my family and friends so that has made me think of moving from Puerto Rico.	.833			
	The high taxes in recent years on the part of the government and as published in the media has gotten me thinking about relocating from Puerto Rico.	.876			
	The confrontations of political parties, which I observe in the media, have rethought my intention to emigrate.	.821			
Communication Effect	The current unemployment situation, which I observe in relatives, friends and the general discussion that is observed in the media, has led me to think about the alternative to emigrate outside of Puerto Rico.	.826	.708	.879	.794

Second, the researchers conducted a Collinearity analysis. Collinearity refers to the non-independence of prediction variables; that, in general, arise in types of regression analysis (Dormann et al, 2013). The situation of collinearity occurs if two or more indicators are perfectly correlated (Hair, et al, 2014). As a result, this leads to an erroneous identification of relevant predictors in a statistical model (Dormann et al., 2013). To avoid the problem of Collinearity, as a general rule, one must have a variance inflation factor (VIF) rating of 5.0 or lower. The data in Table 1.1 reflect the non-existence of Collinearity, being at a level below 5.0 (Hair, et al, 2014; Wong, 2013).

Table 2. Collinearity Analysis (VIF)

Variables	VIF
Political Factor	4.820
Economic Factor	3.895
Social Factor	4.280
Communication Effect	4.631

4. Results Analysis
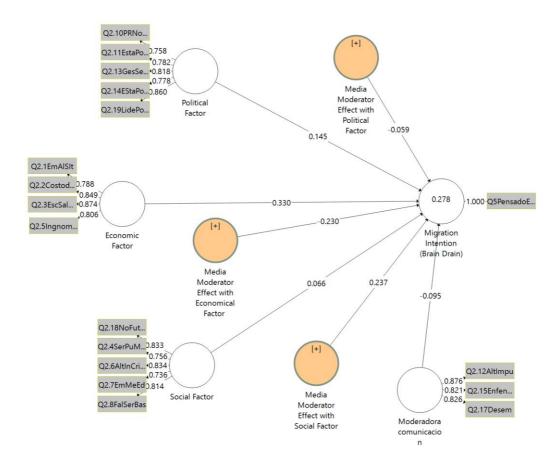
4.1. Descriptive Analysis

The descriptive results show that 60% of the respondents were female while 40% were male. In terms of age, 28% are between the ages of 25-30, 26% between the ages of 31-35, 21%

between the ages of 36-40 and 25% between the ages of 41-45. 43% were married while 33% were single. 58% are married or living together. About intentions to migrate out of the country 74% have thought about migrating while 26% have not considered it. Those who have considered emigrating, 88% expressed that they would do so towards the United States.

4.2. Estimation and measurement model results

Observing the results of the PLS (partial least squares structural equation modeling) the relationship between the variables can be observed. Figure 1.0 presents the results of the SMARTPLS program and data show that there is a moderate relationship between economic factors and the interest to emigrate (.330) and a mild-moderate relationship (.145) between the variable political factors and the interest to emigrate. Social factors had no relation to the intention to emigrate. When analyzing the moderating variables, the data reflect that only the media variable slightly moderates (.237) the relationship between the variable social factors and the interest in emigrating. The other variables such as communication on economic aspects and communication on political aspects do not moderate the relation of any of the independent and dependent variables. An important fact to mention is that 28% of the intention to emigrate is explained by economic, political factors and moderated by the effect of the media focused on social factors ($R_2 = .278$).

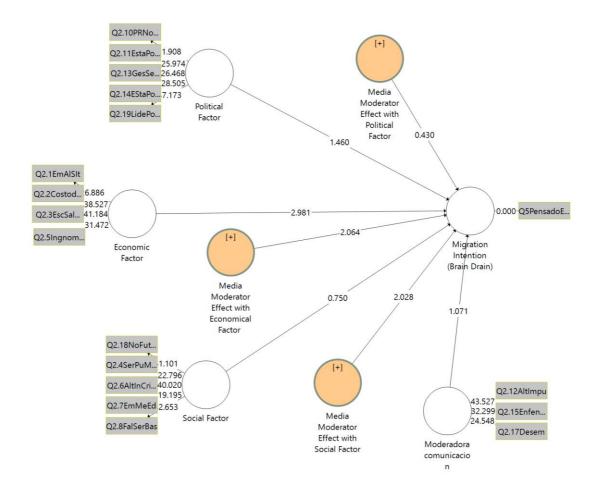**Figure 1.** Measurement Model Estimates

4.3. Hypothesis Verification

The internal model was estimated using SMARTPLS 2.0 (Ringle et al., 2005) using the Bootstraping algorithm. The results obtained are shown in figure 1.1. The quantities in the arrows of both the measurement model (external) and the structural model (internal) represent the values of the test t of the variables and indicators, which allows testing of the hypotheses and indicate the level of significance for 95 or 99% confidence levels, as well as to obtain conclusions and implications about the model (Wong, 2013). The result of Bootstrapping demonstrates the approximation of the data to its normality (Wong, 2013). According to Hair et al (2014), for an acceptable correlation and a significant effect to exist value t > 1.285 must be observed. If the value t > 1,285, the hypothesis proposed by the researcher is supported, otherwise, if t < 1.285, then the hypothesis is not supported.

For the hypothesis test the results reflected the following: For hypothesis 1: political factors influence the interest to emigrate outside the country by skilled labor, the results reflect an influence on the interest to emigrate with a result of t = 1.418 and for hypothesis 2: economic factors influence the interest to emigrate outside the country by skilled labor, the data reflect a result of t = 2.909, it is established that hypotheses 1 and 2 were supported. By observing the results related to hypothesis 3, related to whether social factors influence the interest to emigrate outside the country, by skilled labor the study shows a result of t = .0731 so this hypothesis was not supported. When analyzing hypothesis 4: interpretations through the exhibition of contents framed by the media moderate the relationship between political factors and the interest in emigrating outside the country, the study reflects a result of t = 0.436, which means that hypothesis 4 was not supported. However, hypothesis 5: interpretations through the exposure of contents framed by the media moderate the relationship between economic factors and the interest in emigrating outside the country, the study shows a result of t = 2.105, And the Hypothesis 6: interpretations through the presentation of content framed by the media moderate the relationship between social factors and the interest to migrate out of the country, presents a result of t = 1,979, thus establishing that hypotheses 5 and 6 were supported. It is important to note that moderation may occur in the presence or absence of direct effects between the independent and the dependent variable (Ato & Vallejo, 2011; Hayes & Darlington, 2016; Hair, 2017). It is for this reason, although the results reflect that social factors do not influence the interest in emigrating, being present, the interpretations through the exhibition of framed contents does rise an effect and strengthens the relationship between the variable social factors and the interest in emigrating.

Figure 2. Hypothesis Test

5. Conclusions

Puerto Rico is faced with a panorama where a qualified migration is on the increase. The study confirms what has been pointed out by several researchers (Figueroa, 2013; Marin, 2013; Ayvar & Weapons, 2013; Garcia, 2014; Cortés, 2015) economic and political factors can be associated with the interest to emigrate. The study reaffirms that the main factor influencing the interest to emigrate is the economic factor; high cost of living, salary scales, high taxes and rising unemployment, among others. This interest to emigrate can increase if the media frames the news highlighting the risks associated with high cost of living, salary scales, high taxes and the rise in unemployment, among others. The emphasis on risk can cause a greater level of uncertainty (O'Donnell, 2010), causing the central figure that drives the wealth of nations (Pellegrino, 2001), to decline thus affecting the economic development of the country.

It is relevant to mention that in the first analysis social factors did not appear as influencing the interest to emigrate. However, to the extent that the media framed the news related to risks that impact the quality of life, education, criminality, among others, then yes it strengthens the qualified professionals to consider leaving the country. Researchers identify a highly-limited literature on the topic of risk communication and its effect on brain drain. Therefore, this research presents results and contributions to the theory. The results demonstrate that the interpretation of the contents exposed on framed news

especially on issues such as crime (aspect associated with social factors) act as significant and highly sensitive cues to which the public responds with power (McCombs & Ghanem, 2001; McCombs, 2004). The framing of the news can influence the perception of the individuals on the importance of the social aspects. If the media cultivate social aspects of great transcendence (such as criminality), in contrast to places outside the country with better standards of living (Johnson, 2001) this causes an effect, by increasing the interest to emigrate outside of Puerto Rico.

Even though the study reveals significant results, it has some limitations to be considered in future studies. It did not identify which medium exerts a greater impact on the individual that drives them to emigrate. So, this may represent an opportunity for future studies. Another limitation is that the study was carried out in a country with specific economic, political and social conditions. Other studies can focus on whether the influence of factors may be different depending on the environment in different countries. A study of great relevance can be the effect of word of mouth comments of migrants through social media specifically and their impact on the intention or decision to emigrate.

The study presents major implications on the influence of media on perceptions of risk communication. The study provides evidence that the media play an important role as influencers with the framing of the news and the way in which they project the information (setting), will induce an attitude that will result, in this case, in the interest to emigrate outside the country (Happer & Philo, 2013). The framing of the news causes a significant impact on the aspects related to the migration (Brader, et al, 2004; Cho et al 2006). This impact can be increased if the media cultivate the risks, causing qualified talent to become more interested in emigrating. On the other hand, as the media educates society more about different points of view, they can help qualified professionals to make better decisions related to migration. From the perspective of the government, this body can use the media as a follow-up measure to identify aspects in the public discussion. This monitoring can help improve and minimize the factors that motivate migration.

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