PERCEPTION OF ALLUVIAL RISK AND ACCEPTANCE OF THE PALCACOCHA EARLY WARNING SYSTEM AMONG MICRO-ENTREPRENEURS OF HUARAZ –PERU

Edwin Hernan Ramirez-Asis, Universidad Nacional Santiago Antúnez De Mayolo
Juan Emilio Vilchez-Carcamo, Universidad Nacional Santiago Antúnez De Mayolo
Misael Erikson Maguiña-Palma, Universidad Norbert Wiener
Rosario Mercedes Huerta-Soto, Universidad Cesar Vallejo
Martha Esther Guerra-Muñoz, Universidad Popular Del Cesar
Eva Delfina Zarzosa-Marquez, Universidad Nacional Santiago Antúnez De Mayolo

ABSTRACT

This research aimed to establish the relationship between the perception of risk of alluvium and the acceptance of the early warning system in the Palcacocha lagoon among micro-entrepreneurs of the city of Huaraz. 386 micro-entrepreneurs were surveyed who live or have their business in the alluvial zone or quadrant of the Quilcay River, 4 dimensions and 20 items are proposed for the acceptance level. Likewise, for perception of risk, there are 3 dimensions with 16 items. The normality test was performed with Kolmogorov-Smirnov, obtaining a p<0.05, which shows that both variables do not have a normal distribution, and then using Spearman's Rho 0.974 and a value of sig. With 0.000, it is concluded that there is a direct and significant relationship between the perception of risk of alluvium and the acceptance of the early warning system in the Palcacocha lagoon among micro-entrepreneurs, Huaraz city.

Keywords: White Mountain Range, Palcacocha Lagoon, Micro-Entrepreneurs, Alluvium Risk, Early Warning System

INTRODUCTION

In the last two decades, the number of disasters recorded has doubled, from approximately 200 to 400 annually and nine out of ten of these climate-related disasters (Xu et al., 2017). According to current climate change forecasts, this trend will continue (Kelman, 2017), and weather-related dangerous situations will become increasingly frequent and unpredictable (Winsemius et al., 2018).

The increase in volume due to deglaciation and heavy rains becomes a risk of overflow in the face of the fall of an ice block of the snow ledges that presents fissures, aggravating in the presence of a sism that when and how it is impossible to determine (Daene et al., 2014). However, it is clear "that where there was a major earthquake, a similar earthquake will happen again because earthquakes are cyclic" and Huaraz was the scene of one of the largest disasters in the history of Peru on May 31, 1970.

The population of the city of Huaraz and Independencia, according to the 2017 census, has a population of 132,902 (in Huaraz 57,827 and in Independence 75,075), and under the Sub-Box of Quillcay, Population of 86,457 representing 65% of the total population, undoubtedly overflowing

Citation Information: Ramirez-Asis, E.H., Vilchez-Carcamo, J.E., Maguiña-Palma, M.E., Huerta-Soto, R.M., Guerra-Muñoz, M.E., & Zarzosa-Marquez, E.D. (2022). Perception of alluvial risk and acceptance of the Palcacocha early warning system among micro-entrepreneurs of Huaraz –Peru. *Academy of Strategic Management Journal, 21*(S4), 1-12.

the Palcacocha lagoon, would directly impact a population of 28,916 living in the hallvionic cone (16,523 in the city of Huaraz and 12,393 of the District of Independence) representing 22% of the total population, indirectly 100% would be affected because the overflow of the Palcacocha lagoon would start the city in two, leaving Huaraz isolated on the one hand and on the other side to the Independence district (INDECI, 2018). The population of the city of Huaraz and Independencia, according to the 2017 census, has a population of 132,902 (in Huaraz 57,827 and in Independence 75,075), and under the Sub-Box of Quillcay, Population of 86,457 representing 65% of the total population, undoubtedly overflowing the Palcacocha lagoon, would directly impact a population of 28,916 living in the hallvionic cone (16,523 in the city of Huaraz and 12,393 of the District of Independence) representing 22% of the total population, indirectly 100% would be affected because the overflow of the Palcacocha lagoon would start the city in two, leaving Huaraz isolated on the one hand and on the other side to the Independence district (INDECI, 2018).

One factor that increases vulnerability is disorderly growth, it should be remembered that since the earthquake of 1970, the reconstruction of the City of Huaraz, was gradual, but in the last decade, by the presence of two Mining Companies Barrick Gold Corporation and Antamina the City of Huaraz and the district of Independence, geographically separated by the Quillcay River, have suffered a demographic explosion currently with 150,000 inhabitants, increasing its vulnerability by a growing invasion of marginal areas of rivers (Auqui, Paria, Quillcay, Casca, Santa, among others), landslide zones and groundwater filtration (Shancayán high and medium, Acovichay among others), ravin branches in both the white mountain range and black, added to the construction and expansion of homes, without taking into account the study of Sustainable Cities : Plan of Prevention and Use of Soils in the city of Huaraz, in which it recommends that the soil of this area of Peru, is suitable for the construction of homes of 2 to 3 floors, but have been built up to 8 to 9 floors in certain cases, added that a large part of the population does not have construction licenses.

There are Early Warning Systems installed in Peru: SAT Nacional Ante Tsunamis: Peru has the National Tsunami Early Warning System, of which the Geophysical Institute of Peru (IGP), Directorate of Hydrography and Navigation (DHN) and National Institute of Civil Defense (INDECI) are part. With the aim of strengthening the system and establishing levels of responsibility for each member, in the face of the occurrence of an earthquake with characteristics to generate tsunami, in 2015 the Operational Protocol of the National Tsunami Alert System was signed and officialized, the same one that was updated in 2018. SAT Local to landslide and flood: the Rimac River basin is one of the areas of greatest recurrence of landslide and flood, generating a great impact on the population and its livelihoods (Vázquez & Riofrío, 2017). Faced with this situation, in 2015, the Memorandum of Mutual Understanding was signed between the Korea International Cooperation Agency (KOICA), the District Municipality of Chosica and INDECI for the realization of the project: "Implementation of the Early Alert System for landslide and flood in the La Libertad, Corrales and Pedregal raves of Lurigancho – Chosica district".

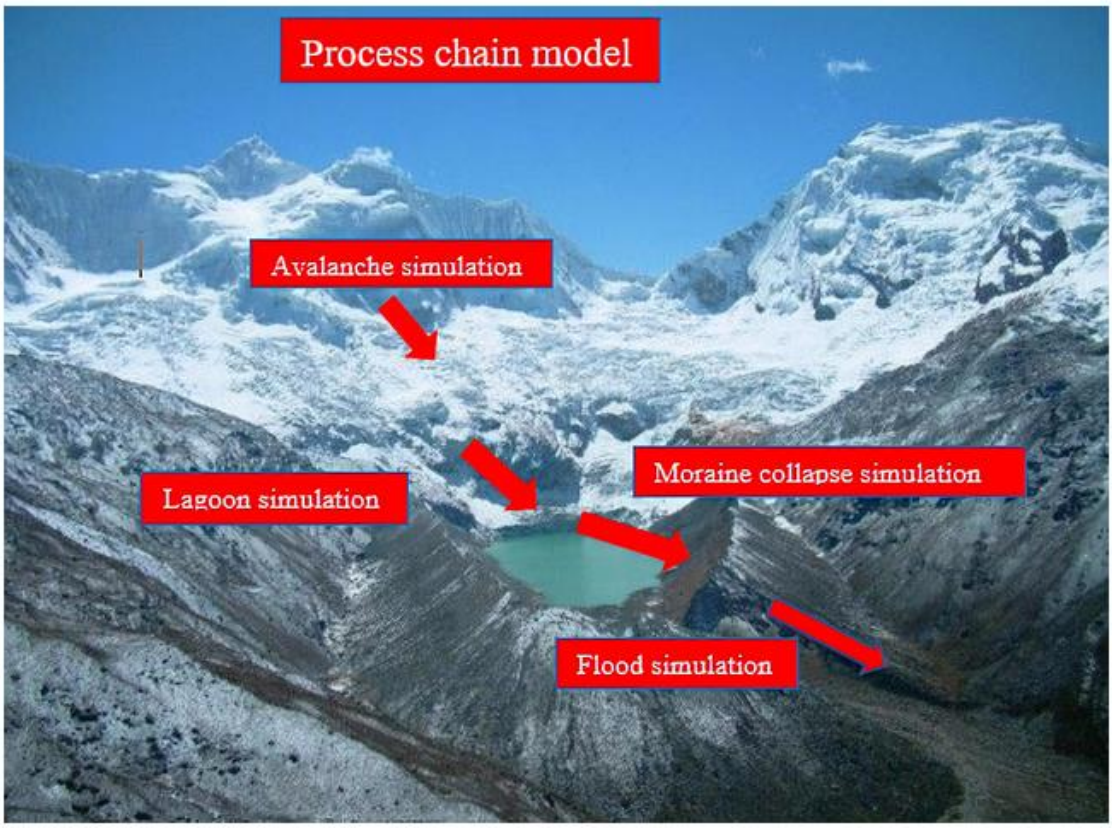
Micro-entrepreneurs who have a business and stay overnight in the quilcay river quadrant have little knowledge about the implementation of the early warning system they are installing in the box lagoon, and the little information they know or have access to is when in the rainy season they hear in the news about the possible overflow of the lagoon Palcacocha. In addition, very few measures to spread and communicate with respect to the early warning system in the population at risk (Jiménez-Denis et al., 2017). On the other hand, micro-entrepreneurs have difficulty identifying the responsiveness of the early warning system in the Palcacocha lagoon.

Risk perception can be classified according to three points of view and therefore include: threat characteristics, risk sensor characteristics, and the use of heuristics to guide risk decisions (Siegrist & Ervai, 2020). This study considers the characteristics of threats, *i.e.*, micro-entrepreneurs living in the Quilcay River Quadrant, to be aware of the characteristics of the threat

Citation Information: Ramirez-Asis, E.H., Vilchez-Carcamo, J.E., Maguiña-Palma, M.E., Huerta-Soto, R.M., Guerra-Muñoz, M.E., & Zarzosa-Marquez, E.D. (2022). Perception of alluvial risk and acceptance of the Palcacocha early warning system among micro-entrepreneurs of Huaraz –Peru. *Academy of Strategic Management Journal, 21*(S4), 1-12.

of alluviality, but they are justified by the need to continue the business or to leave their homes, but despite this situation prevention measures or evacuation measures to safe areas are not clear at the time of possible alluvialness (Jongman, 2018). With regard to the level of awareness of micro-entrepreneurs it is observed that it is very low because most are not aware of the level of risk that runs in the Aluvionic Quadrant. In addition, it is accompanied by a cultural level of risk that does not help when preventing a disaster of these magnitudes (Trelles et al., 2019; Raza, et al., 2020).

If this situation continues, the negative effects of an alluvial would be fatal and the most harmed would be the micro-entrepreneurs of the quilcay River quadrant, and there is also a possible flood by the outbreak of the Palcacocha lagoon in the White Mountain range, Peru threatens Huaraz, as seen in Figure 1. Therefore, the objective of this research was to establish the relationship between the level of acceptance of the early warning system in the Palcacocha lagoon and the perception of alluvial risk by micro-entrepreneurs.



Source: McKinney et al., (2014) "Map of Potential Alluvial Hazards in Huaraz, Peru" The University of Texas at Austin

FIGURE 1
LAGUNA PALCACOCHA PROCESS CHAIN MODEL
GEOGRAPHICAL LOCATION OF PALCACOCHA LAGOON

The Palcacocha lagoon is located in the heart of the White Mountain range, so the access is a bit rugged and complex. From the city of Huaraz, a trolley tour is made until you reach the Pitec hamlet, where the glacier valley of the Cojup River begins (3833 meters above sea level). From there, a horseshoe pedestrian path is followed for approximately 5 hours (34 km), where it rises to 4,450 meters above sea level corresponding to the base of the frontal moraine of the Palcacocha lagoon, as shown in Figure 2.

Citation Information: Ramirez-Asis, E.H., Vilchez-Carcamo, J.E., Maguiña-Palma, M.E., Huerta-Soto, R.M., Guerra-Muñoz, M.E., & Zarzosa-Marquez, E.D. (2022). Perception of alluvial risk and acceptance of the Palcacocha early warning system among micro-entrepreneurs of Huaraz –Peru. *Academy of Strategic Management Journal, 21*(S4), 1-12.

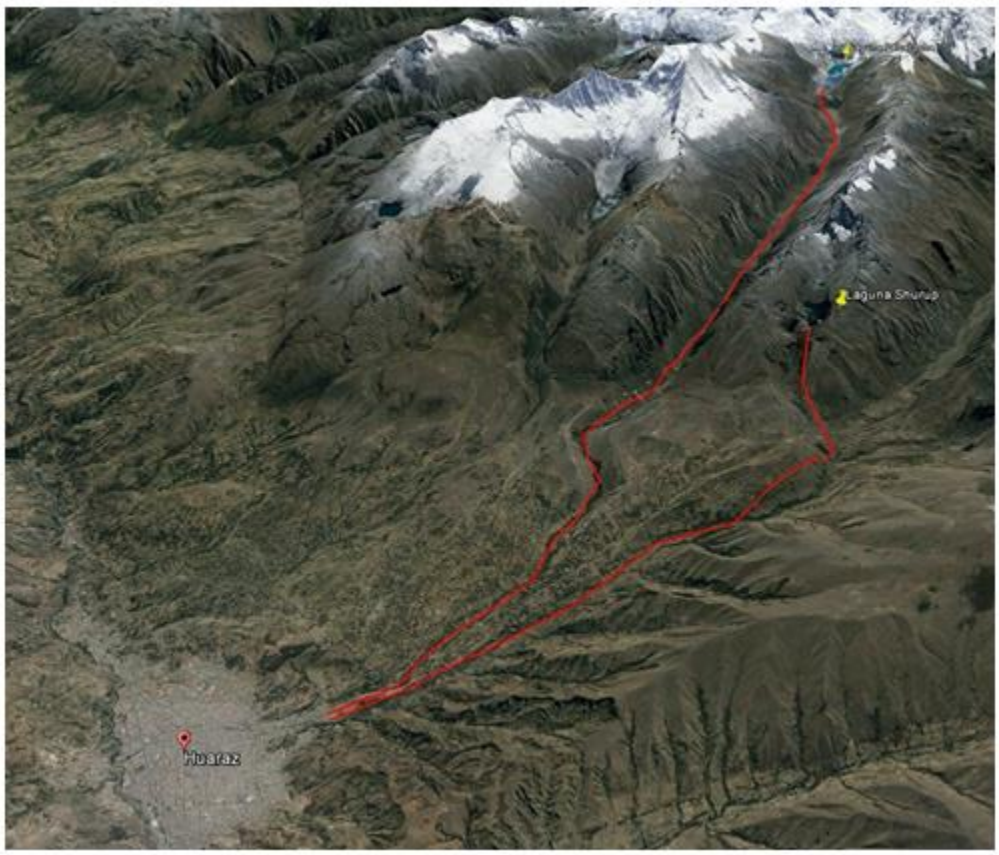


FIGURE 2
GEOGRAPHICAL LOCATION OF LAGUNA PALCACOCHA –HUARAZ

To reach the artificial dam of the Palcacocha lagoon, a small path must be followed by the rupture of the frontal moraine (produced by the flood of 1941) until reaching the dam the lagoon at 4566 meters above sea level; an average of 20 minutes of walking.

EARLY WARNING SYSTEM

According to INDECI (2018), the early warning system is the set of articulated capabilities, tools and procedures for generating and disseminating alert information in a timely manner, in order to enable people, communities and organizations exposed to danger to prepare and act appropriately and in advance to reduce or prevent loss of life. On the other hand, the SAT is an autonomous mechanism, which does not need to be connected to another system, its function is to give notice about water levels and warn the community of areas with high irrigation of torrential avenue in the face of the possible manifestation of a natural phenomenon (Vazquez & Riofrío, 2017).

As referred to by government agencies and competent emergency compliance and specifically the early warning system, they state that this is a set of procedure which aims to monitor a natural or anthropic event for data collection, which will allow forecasting and predicting future events. For the design and implementation of a SAT, the following aspects should be considered: (1). It must be addressed from a comprehensive perspective: with its 4 components and ensuring sustainability. (2). Implementation at the district, provincial or regional level should be led by the GRD Working Group, with the technical assistance of technical-scientific institutions, universities and INDECI. (3). Directly engage the population and authorities. (4). The early warning system should be incorporated into institutional management plans and documents (OECD, 2013).

Citation Information: Ramirez-Asis, E.H., Vilchez-Carcamo, J.E., Maguiña-Palma, M.E., Huerta-Soto, R.M., Guerra-Muñoz, M.E., & Zarzosa-Marquez, E.D. (2022). Perception of alluvial risk and acceptance of the Palcacocha early warning system among micro-entrepreneurs of Huaraz –Peru. *Academy of Strategic Management Journal, 21*(S4), 1-12.

In Peru, through R.M. No. 173-2015/PCM (2015), the "Guidelines for the Formation and Operation of the National Early Warning Network (RNAT) and the formation, operation and strengthening of Early Warning Systems" were approved. This document states that the SAT is structured on the basis of four components: (A). Risk Knowledge: It consists of the collection and analysis of information about the dangers and vulnerabilities existing in a community or population. It is necessary to visualize the context where the risk occurs, to do so, a risk map of the community or the area where it is inhabited must be developed. Once the map is drawn up, you should do an analysis of the problem the community has based on your threats (López-García et al., 2017), (B). Assurance and Alert: It consists of the permanent monitoring of hazards, on a scientific technical basis providing the service of forecasts and alerts during 24 hours of the day. Development of event monitoring and early warning services, so that the following questions can be answered: are the correct parameters being monitored, is there a solid scientific basis when predictions are made? And can appropriate and timely notices be generated? (Yabar, 2018).

Also, they have (D). Dissemination and Communication: It consists in warning the authorities and population about the proximity of a dangerous through alerts and alarms in order to implement the preparedness and response measures. Communicate risk information and early warning to answer the following questions: do the notices reach everyone at risk; do you understand the existing risk and such warnings? And is the information clear and usable? (Ittelson, 1978). (D). Responsiveness: It consists of carry out preparation activities to strengthen the responsiveness of the authorities and the population to the issuance of an alert and alarm. Build a national capacity and at the community level. The following questions need to be answered: are response plans up to date and tested, is local capacity and knowledge used? And is the population ready and ready to react to warnings? (OAS, 2010).

Peru, being located on the eastern edge of the Pacific Ocean Fire Belt, by the presence of the Peruvian Current, proximity to the Equatorial Line, the influence of the Amazon and the presence of the Andes Mountains, is exposed to various dangers of natural origin, such as: earthquakes, tsunamis, landslides, landslides, volcanic activity, precipitation, intense winds, and frost, among others. In this context, SATs are an important operational tool, aimed at disseminating and alerting authorities and the population to the proximity of a danger to reduce or prevent loss of life (Vargas et al., 2016).

SUSTAINABILITY OF THE EARLY WARNING SYSTEM

In terms of socio-ecological sustainability: It is important to note that in the Andean glacial basins the approaches of risk management, water resources and adaptation to climate change should be considered in an integral way in their design and operation. It is vital to assess and integrate technical and professional looks, which not only analyze glaciers quantitatively (Daene et al., 2014). A baseline of information on cultural, social and historical aspects of the territory will allow a better response to the needs and dangers identified by the beneficiaries.

In terms of financial sustainability: The scale of the operation and maintenance of a SAT in all its components must be clear. The justification for achieving greater budgets can be achieved through cost-benefit studies that help to understand, in economic terms, the importance of an operational SAT (Stuart-Smith et al., 2021). The SAT implemented in its four components not only provides responsiveness on the glacial hazard, but strengthens the institutionally of management spaces, which are functional to respond to any type of danger. Another important point is that alert systems are labeled not to be "palpable", as this is a non-structural measure to manage disaster risks. Prejudice must be overcome that the SAT is just a team (Vazquez & Riofrío, 2017). Value added does not pass through your instruments. A SAT allows entities to efficiently manage their human resources and physical capital to prepare for a disaster.

Citation Information: Ramirez-Asis, E.H., Vilchez-Carcamo, J.E., Maguiña-Palma, M.E., Huerta-Soto, R.M., Guerra-Muñoz, M.E., & Zarzosa-Marquez, E.D. (2022). Perception of alluvial risk and acceptance of the Palcacocha early warning system among micro-entrepreneurs of Huaraz –Peru. *Academy of Strategic Management Journal, 21*(S4), 1-12.

In terms of technical-scientific sustainability: The development of agreements between technical institutions with developed capacities such as the National Research Institute in Glaciers and Mountain Ecosystems (INAIGEM) and the Glaciology and Water Resources Unit (UGRH) is vital for the operation of a SAT. Technical-scientific evidence allows for better decision-making, reducing public management uncertainties. In addition, scientific-level international cooperation should be encouraged or allowed to participate to improve these systems (Riama et al., 2021). The participation and experience of national entities in the implementation of the SAT is vital to avoid problems in its implementation.

In terms of political sustainability: It is essential to identify the lead player who can lead or facilitate risk management processes at the political and public agenda level. This role can be interchangeable and rotate its personification in different organizations (public or private) within the territory. It can be represented by some regional government management, a specific municipal office and even a public inter institutional cohesion entity such as a commonwealth. Institutionalization goes through the trust of decision makers and their respective technical teams (Vargas et al., 2016). A financial strategy should be considered to enable resilience to changes in political decisions or commitments. Currently, within the government, one can use the public investment system or the Natural Disaster Intervention Fund (FONDES) to provide financial viability to a SAT in the face of any kind of danger.

PRECEPTION OF THE RISK OF ALLUVIAL

The perception of risk is framed in the psychological or subjective probability, related to the Bayesian School of statistics that emphasizes the degree of confidence or belief that an individual possesses in the face of the occurrence of a phenomenon Ramos, et al., (2014). According to Pidgeon & Gregory (2008). Mentions that subjective probability may vary from individual to individual in relation to the subject's own knowledge of an event. On the other hand, social perception of risk is a set of beliefs, attitudes, judgments and feelings; as well as broader social and cultural values and provisions, which people adopt in the face of potential sources of danger and their consequences (Molina, et al., 2018). In this context, people's perception of the potential risks at present is evident, despite not having a firm source to support, it seems that the same judgment or the conjectures of people would be worth more when pouring and spread false information, which at the time my cause some kind of panic or some social shock that adversely affects peoples socially and economically (Lechowska, 2018). Clearly, you must have some degree of certainty in order to release some kind of information.

With regard to the psychological perception of the common danger, individuals select, organize and interpret subjectively or unrealistically, information regarding a particular natural event and, instead of relying on objective or real information, these generate judgments that for some make sense, but that are not necessarily consistent with the characteristics of the event (Roder et al., 2019; Ha, 2019).

DETERMINANTS OF DISASTER RISK PERCEPTION

The perception of risk relates to the construction of human thoughts, being a social and distinct outcome according to the contexts experienced by individuals or groups, which generate multiple interpretations of the event (Garcia-Acosta, 2005), also, the perception of risk, is like a kind of tool for civil protection services, as well as, other security entities in decision and action processes, is like a kind of tool for civil protection services, as well as other security entities in decision and action processes, the social perspective of risk is undoubtedly an important instrument

Citation Information: Ramirez-Asis, E.H., Vilchez-Carcamo, J.E., Maguiña-Palma, M.E., Huerta-Soto, R.M., Guerra-Muñoz, M.E., & Zarzosa-Marquez, E.D. (2022). Perception of alluvial risk and acceptance of the Palcacocha early warning system among micro-entrepreneurs of Huaraz –Peru. *Academy of Strategic Management Journal, 21*(S4), 1-12.

in its management; it also involves preparation, self-protection, level of awareness, knowledge or culture of risk, modification of perception in the face of events (Bodoque et al., 2019).

In relation to the risk perception criterion, the following related factors are considered: (A) Preparation Factor: Responds to the feeling of preparedness to face a natural threat in the future, and according to Spielberger, et al., (1970). It is concerning the state of distress caused by having had such an earlier experience and the image that will be made of the subject of the natural threat in question. (B). Self-protection factor: refers to an appreciation of interactions with respect to the individual's consciousness and their ability to feel self-sufficient or self-sufficient to deal with an event characterized as natural risk (Liu et al., 2018; Fuster-Guillén et al., 2020). In this area, account was taken the familiarization of the subject with the source of the danger, according to Weber, et al., (2000), since it was concluded that if the subject is permanently exposed to the natural threat as slovic explains (1999), it may in some way or may not generate a feeling of greater preparation regarding self-protection. (C). The Awareness Level Factor: It can be defined as the perception of subjects about natural threats (Ramos et al., 2014), also conceptualize certain characteristic forms adopted by certain individuals in terms of avoiding facing threatening situations, which cause distress, through defense mechanisms, which in the case study would correspond to the sub criteria of risk denial (Gotham et al., 2018). (D). The Risk Culture Factor: Refers to the knowledge possessed by the subject concerning natural threats, it does not merely involve that learned through formal education, but also raises the possibility that an awareness has been created over the years and the sum of experiences in this regard. In itself, the culture of risk refers to a social construction as proposed by Douglas & Bestard (1996); this is generated in the relationship with the environment in which the subject has lived for much of his life.

METHODOLOGY

The type of research used was descriptive and correlal, with non-experimental, cross-cutting design as it focuses on identifying the relationship between two variables at a specific time (Nel-Quezada, 2019), the research was carried out in the quadrant of the Quilcay river of the city of Huaraz, 386 micro-entrepreneurs were surveyed, the data for the level of acceptance of the early warning system was collected using the adaptation made by (Riama et al., 2021). The questionnaire proposes 4 dimensions consisting of: identity, capacity, knowledge and attitude, and consists of 20 questions. Likewise, to study the perception of alluvial risk, an adaptation of the risk perception scale questionnaire (Salvador-Ginez et al., 2017) has been made; the dimensions are (4): Preparation, self-protection, level of consciousness and culture of risk. It consists of 16 questions. A Likert scale ranging from 1 to 5 was used for each indicator for both questionnaires. The data obtained was analyzed using the SPSS (Version 24), the questionnaires went through content validation through three experts and reliability with cronbach alpha (Supo & Zacarias, 2020), for the acceptance of the early warning system with a value of 0.868, and for the variable perception of alluvial risk a value of 0.891, the normality test was performed using Kolmogorov-Smirnov, obtaining a $p<0.05$, which shows that both variables have no normal distribution, then by using Spearman's Rho is 0.794 and a value of sig. 0.000.

RESULTS

The results show: of the male gender they represent 51.43% and female 48.57%. The age of the participants 14.76% for children under 25, 26.38% who count the age between 26 and 45 years, 45.17% for those aged 46 to 65 and 13.69% of respondents aged 66 to over. In terms of the level of schooling of micro-entrepreneurs, 12% of respondents had primary education, 43% had secondary

Citation Information: Ramirez-Asis, E.H., Vilchez-Carcamo, J.E., Maguiña-Palma, M.E., Huerta-Soto, R.M., Guerra-Muñoz, M.E., & Zarzosa-Marquez, E.D. (2022). Perception of alluvial risk and acceptance of the Palcacocha early warning system among micro-entrepreneurs of Huaraz –Peru. *Academy of Strategic Management Journal, 21*(S4), 1-12.

education, 37% of respondents had technical studies, 8% of them at the university level, and you can see the distribution of micro-entrepreneurs by business types in Figure 3.

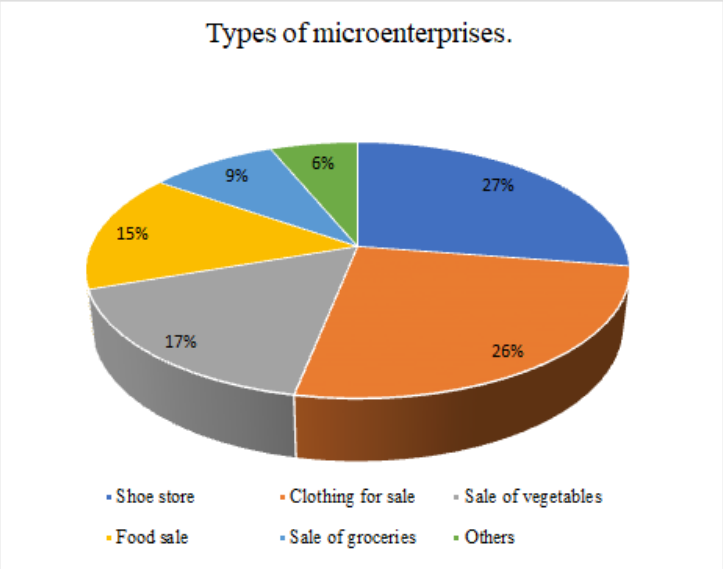


FIGURE 3
TYPES OF MICROENTERPRISES

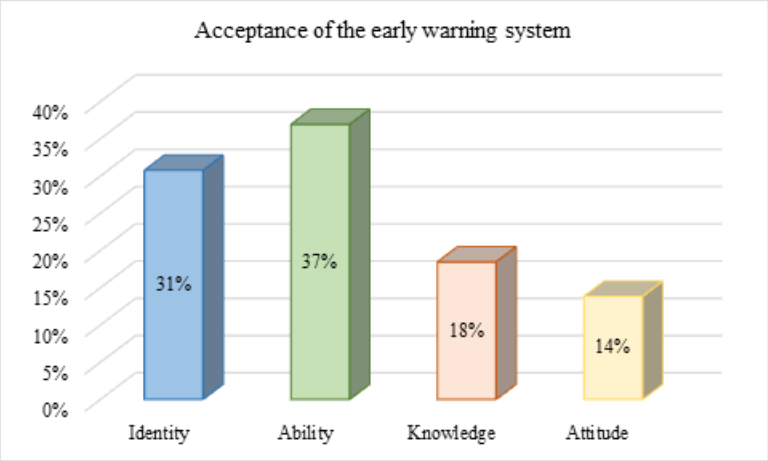


FIGURE 4
ACCEPTANCE OF THE EARLY WARNING SYSTEM

The average level of acceptance of the early warning system in the Palcacocha lagoon is explained by a capacity of 37% which refers to the acceptance capacity of the SAT micro-entrepreneurs and low knowledge of the SAT and a very low attitude to this alert system, the purpose of which is to warn the authorities and the population of the proximity of danger, through alerts and alarms in order to implement preparedness and response measures.

Citation Information: Ramirez-Asis, E.H., Vilchez-Carcamo, J.E., Maguiña-Palma, M.E., Huerta-Soto, R.M., Guerra-Muñoz, M.E., & Zarzosa-Marquez, E.D. (2022). Perception of alluvial risk and acceptance of the Palcacocha early warning system among micro-entrepreneurs of Huaraz –Peru. *Academy of Strategic Management Journal, 21*(S4), 1-12.

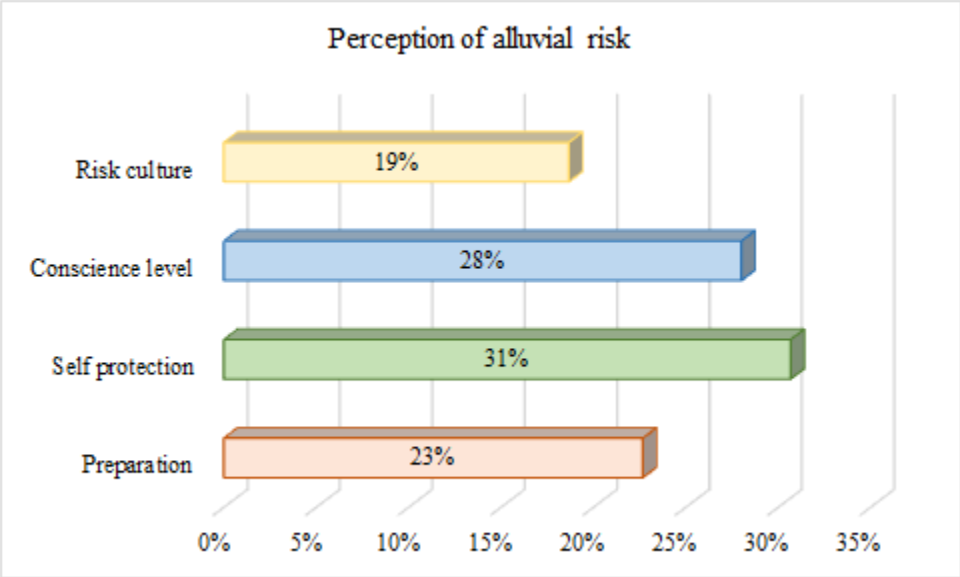


FIGURE 5
PERCEPTION OF ALLUVIAL RISK

The average level of alluvial risk perception is explained by a 31% self-protection that refers to the need to protect oneself and a low level of risk awareness and a poor culture of risk, this means that micro-entrepreneurs prefer to avoid facing threatening situations, which cause distress, through defence mechanisms, which in the case study would correspond to the subcriteria of risk denial.

Table 1
HYPOTHESIS TEST

Correlations			**Perception of alluvial risk**	**Acceptance of the early warning system**
Rho de Spearman	Perception of alluvial risk	Correlation coefficient	1.000	,794**
		Sig. (bilateral)		.000
		N	386	386
	Acceptance of the early warning system	Correlation coefficient	,794**	1.000
		Sig. (bilateral)	.000	
		N	386	386
**. The correlation is significant at level 0.01 (2 queues).				

There is a direct and significant relationship between the perception of risk of alluvium and the acceptance of the early warning system in the Palcacocha lagoon among micro-entrepreneurs of the city of Huaraz.

DISCUSSION

This study showed that there is a direct and significant link between the acceptance of the early warning system in the Palcacocha lagoon and the risk perception of micro-entrepreneurs, *i.e.*, greater acceptance of the SAT will have better perception of risk, which is currently rated as an

Citation Information: Ramirez-Asis, E.H., Vilchez-Carcamo, J.E., Maguiña-Palma, M.E., Huerta-Soto, R.M., Guerra-Muñoz, M.E., & Zarzosa-Marquez, E.D. (2022). Perception of alluvial risk and acceptance of the Palcacocha early warning system among micro-entrepreneurs of Huaraz –Peru. *Academy of Strategic Management Journal, 21*(S4), 1-12.

average level, This outcome complements previous results that indicate estimates of gross glacial recoil and that the resultant change in lagoon geometry has dramatically increased the likelihood of flash flooding (Stuart-Smith, Roe, Li & Allen, 2021). Therefore, it provides very strong support to continue to study the perception of the risk of alluvial use as a mechanism to reduce adverse effects caused by natural events and is largely consistent with the existing literature on flood risk perceptions (Burns & Slovic, 2012; Count, 2020; Siegrist et al., 2006). With regard to the level of acceptance of the early warning system in the Palcacocha lagoon, it has been identified as medium, this show a bit of rejection on the part of the micro-entrepreneurs surveyed because there is a notorious concern for the continuity of their business and possible relocation of the entire sector. This result is similar to those identified in places where measures are implemented early, the population agrees, but in the micro-entrepreneurs of the area a certain level of rejection is identified (Kuroiwa, 2019).

On the other hand, with regard to the perception of risk of micro-entrepreneurs has been identified as a means, this due to the low concern in the alleged flood scenario, would be explained by the low preparation of the authorities so that micro-entrepreneurs can be alert to these events and the low level of risk culture because the belief of thinking about the future persists and only live day by day, Although the impact of experience on perceived risk are partial and indirect, these findings are close to what is shown by (Wachinger et al., 2013), The perception of risk was affected by the emotions associated with previous experience and it is assumed that living in a natural disaster neighborhood will bring an affective and emotional reaction, leading to a greater perception of the risk of alluviality (Brown et al., 2018).

CONCLUSION

According to the data analysis and the results, it has been shown that there is a direct and significant relationship between the perception of risk of alluvium and the acceptance of the early warning system in the Palcacocha lagoon among micro-entrepreneurs, Huaraz. In addition, the level of acceptance of the alert system in the Palcacocha lagoon is medium and the perception of alluvial risk on the part of the micro-entrepreneurs in the affected area is medium. Further, research is finally suggested considering the surrounding population and later with the youth population to identify whether the perception of the risk of alluvium decreases or increases in this age group.

REFERENCES

Bodoque, J.M., Díez-Herrero, A., Amérigo, M., García, J.A., & Olcina, J. (2019). Enhancing flash flood risk perception and awareness of mitigation actions through risk communication: A pre-post survey design. *Journal of hydrology, 568*, 769-779.

Brown, P., Daigneault, A., Tjernström, E., & Zou, W. (2018). Natural disasters, social protection, and risk perceptions. *World Development, 104*, 310–325.

Burns, W.J., & Slovic, P. (2012). Risk perception and behaviors: Anticipating and responding to crises. *Risk Analysis, 32*(4), 579– 582.

Conde, A.E. (2020). Disaster risk reduction management of university of Rizal system: Perspectives for strategic action. *PalArch's Journal of Archaeology of Egypt/Egyptology, 17*(1), 279-290.

Daene, M., Somos–Valenzuela, M. Chisolm, R., & Rivas, D. (2014). Map of potential flood hazards in Huaraz, Peru. The University of Texas at Austin.

Douglas, M., & Bestard, J. (1996). *Acceptability of risk according to the socialsciences*. Barcelona, Paidós.

Garcia-Acosta, V. (2005). *Riskas social construction and social riskconstruction, 19,* 11-24. Contempt of the Center for Research and Higher Studies in Social Anthropology. Mexico.

Gotham, K.F., Campanella, R., Lauve-Moon, K., & Powers, B. (2018). Hazard experience, geophysical vulnerability, and flood risk perceptions in a post disaster city, the case of New Orleans. *Risk analysis, 38*(2), 345-356.

Citation Information: Ramirez-Asis, E.H., Vilchez-Carcamo, J.E., Maguiña-Palma, M.E., Huerta-Soto, R.M., Guerra-Muñoz, M.E., & Zarzosa-Marquez, E.D. (2022). Perception of alluvial risk and acceptance of the Palcacocha early warning system among micro-entrepreneurs of Huaraz –Peru. *Academy of Strategic Management Journal, 21*(S4), 1-12.

Fuster-Guillén, D., Ocaña-Fernández, Y., Salazar, D.E., & Ramirez, E.H. (2020). *Human development and family integration: Study from the comprehensive service of the elderly in Peru*, 25(90). 477–490. Venezuelan Management Magazine.

Ha, K.M. (2019). Examining a research boundary within natural disaster management: Qualitative case study. *International Journal of Business Continuity and Risk Management, 9*(4), 298-311.

INDECI. (2018). *Ministry of Defence: Guidance and training for a prepared country*. Lima – Peru.

Ittelson, W. (1978). Environmental perception & urban experience. *Environment & Behavior, 10*(2), 193-213.

Jiménez-Denis, O., Villalón-Legrá, G., & Evora-Larios, O. (2017). Education for disaster risk perception as a priority of the educational work in the schools of Cuba. *Educare electronic journal, 21*(3), 1-12.

Jongman, B. (2018). Effective adaptation to rising flood risk. *Nature communications, 9*(1), 1-3.

Kelman, I. (2017). Linking disaster risk reduction, climate change, and the sustainable development goals. *Disaster Prevention and Management, 26*(3), 254-258.

Kuroiwa, J. (2019). *Disaster risk management in the 21st Century*. Editora Peru, Peru.

Lechowska, E. (2018). What determines flood risk perception? A review of factors of flood risk perception and relations between its basic elements. *Natural Hazards, 94*(3), pp. 1341-1366.

Liu, D., Li, Y., Shen, X., Xie, Y., & Zhang, Y. (2018). Flood risk perception of rural households in western mountainous regions of Henan Province, China. *International journal of disaster risk reduction, 27*, 155-160.

López-García, J.D., Carvajal-Escobar, Y., & Enciso-Arango, A.M. (2017). *Early warning systems with participatory approach: A challenge for risk managementin Colombia, 44*, 231-246. Luna Azul Magazine.

Molina, F., Constanzo, J., & Inostroza, C. (2018). *Natural disasters and territoriality: The case of saavedra's lafkenche, 71*, 189-209. Magazine of Northern Geography Grande.

Nel-Quezada, L. (2019). *Research Methodology*, Editorial Macro, Peru.

O.E.A. (2010). *Manual for the design, installation, operation and maintenance of community flood warning systems*. Washington: Organization of American States.

Oecd. (2013). *OECD study on the national civil protection system in Mexico*. OECD Publishing.

Pidgeon, N., & Gregory, E. (2008). *Judgment, decision making, and public policy*. In: Koehler, Derek J., Harvey, Nigel, eds. Blackwell Handbook of Judgment and Decision Making. Oxford, UK, Blackwell Publishing, 604-623.

A.M. No. 173-2015-PCM. (2015). *Guidelines for the forming and operation of the national early warning network - RNAT and the conformation, operation and strengthening of early warning systems- SAT*. Ministerial Resolution.

Ramos, R. Olcina, J., & Molina, S. (2014). Analysis of the perception of natural risks at the University of Alicante. *Geographical Research, 10*(61), 147-157.

Raza, M., Wisetsri, W., Chansongpol, T., Somtawinpongsai, C., & Ramírez, E.H. (2020). Fostering workplace belongingness among employees. *Polish Journal of Management Studies, 22*(2). 428 – 442.

Riama, N.F., Sari, R.F., Rahmayanti, H., Sulistya, W., & Nurrahmat, M.H. (2021). The level of public acceptance to the development of a coastal flooding early warning system in Jakarta. *Sustainability, 13*(2), 1-25.

Roder, G., Hudson, P., & Tarolli, P. (2019). Flood risk perceptions and the willingness to pay for flood insurance in the Veneto region of Italy. *International Journal of Disaster Risk Reduction, 37*, 101172.

Salvador-Ginez, O., Ortega, P., Rivera, S., & García-Mira, R. (2017). Validityand reliability of deslave's risk perception scale in Mexico City. *Psychological ResearchAct, 7*(1), 2618-2626.

Siegrist, M., & Árvai, J. (2020). Risk perception: Reflections on 40 years of research. *Risk Analysis, 40*(S1), 2191-2206.

Siegrist, M., & Gutscher, H. (2006). Flooding risks: A comparison of lay people's perceptions and expert's assessments in Switzerland. *Risk Analysis, 26*(4), 971–979.

Slovic, P. (1999). Trust, emotion, sex, politics and science: Surveying the risk-assessment battlefield. *Risk Analysis, 19*(4), 689-701.

Spielberger, G., Gorsuch, R., & Lushene, R. (1970). *Manual for the state-trait anxiety inventory*. Palo Alto, California, Consulting Psychologists Press.

Stuart-Smith, R., Roe, G.H., Li, S., & Allen, M. (2021). Increased outburst flood hazard from Lake Palcacocha due to human-induced glacier retreat. *Nature Geoscience, 14*(2), 85–90.

Supo, J., & Zacarias, H. (2020). *Methodology of scientific research: For health sciences and social sciences*. Sincie, Peru.

Trelles, I., Badia, A.T., Menéndez, M., & Donoso, F. (2019). Theoretical and practical principles of communication management in disaster risk prevention of natural origin. *Alcance, 8*(21), 53-68.

Vargas, H., Tobar, M., & Villanueva, J. (2016). The SAT (Early Warning Systems). *Scientific Journal, 26*, 21-28.

Vazquez, L.S., & Riofrío, M.B. (2017). Theoretical-methodological contributions for an Early Warning System of socio-environmental conflicts. Experiences around the Mirador Project. *Ecuador', Geographical Research, Bulletin of the Institute of Geography, 93*, 61-75.

Wachinger, G., Renn, O., Begg, C., & Kuhlicke, C. (2013). The risk perception paradox -Implications for governance and communication of natural hazards. *Risk Analysis, 33*(6), 1049–1065.

Citation Information: Ramirez-Asis, E.H., Vilchez-Carcamo, J.E., Maguiña-Palma, M.E., Huerta-Soto, R.M., Guerra-Muñoz, M.E., & Zarzosa-Marquez, E.D. (2022). Perception of alluvial risk and acceptance of the Palcacocha early warning system among micro-entrepreneurs of Huaraz –Peru. *Academy of Strategic Management Journal, 21*(S4), 1-12.

Weber, J.M., Hair J.F., & Fowler, C.R. (2000). Developing a measure of perceived environmental risk. *Journal of Environmental Education, 32*(1), 28-35.

Winsemius, H.C., Brenden, J., Veldkamp, T.I., Hallegatte, S., Bangalore, M., & Ward, P.J. (2018). Disaster risk, climate change, and poverty: Assessing the global exposure of poor people to floods and droughts. *Environ. Dev. Econ, 23*(S3), 328–348.

Xu, Y., Yang W., & Wang, J. (2017). Air quality early-warning system for cities in China. *Atmospheric Environment, 148*, 239-257.

Yabar, D.A. (2018). *Methodology for planning an early warning system (SAT) to floods for the Madre de Dios Region*, Peru. Crossref , Google scholar , Indexed at

Received: 21-Dec-2021, Manuscript No. ASMJ-21-10563; **Editor assigned:** 23-Dec-2021, PreQC No. ASMJ-21-10563(PQ); **Reviewed:** 03-Jan-2021, QC No. ASMJ-21-10563; **Revised:** 13-Jan-2022, Manuscript No. ASMJ-21-10563(R); **Published:** 21-Jan-2022

Citation Information: Ramirez-Asis, E.H., Vilchez-Carcamo, J.E., Maguiña-Palma, M.E., Huerta-Soto, R.M., Guerra-Muñoz, M.E., & Zarzosa-Marquez, E.D. (2022). Perception of alluvial risk and acceptance of the Palcacocha early warning system among micro-entrepreneurs of Huaraz –Peru. *Academy of Strategic Management Journal, 21*(S4), 1-12.