Using Innovative Blockchain Technologies in Emergency Management and Disaster Response

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Purposes & Objectives

Purpose
With the complex nature of emergency management, utilizing new technologies to improve response logistics and reduce cost is crucial. Blockchain is a secure, distributed, and immutable digital ledger that records transactions across a business network. Using blockchain in emergency management can provide interoperability between many parties involved in response and provide transparency. Looking to new technologies would help reduce the 80% of humanitarian relief that is spent on logistics and speed recovery claims that take months (Wassenhove, 2006). The purpose of this review is to explore blockchain as a cost effective, innovative tool for improving emergency management systems and response programs.

Objectives
1) Be able to define basic principles of blockchain
2) Be able to discuss the benefits of blockchain in emergency management
3) Be able to discuss how blockchain can improve individual emergency management fields

Methods & Results

Methods
We performed a comparative literature analysis of thirty-five scholarly articles and white papers reviewing the applicability of blockchain in emergency management challenges such as improving logistic chains, recovery benefit claims, interagency communication, and transparency. Literature searches were conducted using keywords such as systems analysis, blockchain, disaster response, and disaster technology.

Results
Overall, blockchain technologies have shown proven success in reducing logistical and administrative costs across several industries. In addition, reviews suggested that the implementation is complex and cooperation of parties in needed, but it is effective in application.

Conclusion & References

Conclusions
Emergency management and disaster response can be significantly enhanced with the implementation of blockchain technologies. Blockchain has had particular success in the financial and shipping industries reducing cost and increasing timeliness of services. These two aspects are especially important in the logistics, recovery, and response capabilities of emergency management agencies such as disaster benefit claims. Hurricane Harvey alone had 91,000 National Flood Insurance Program claims (FEMA, 2018).

Blockchain would significantly reduce the cost of claims, digital connectivity would make the claims process easier, and victims would receive benefits expeditiously. Implementing blockchain in emergency management and response systems could greatly reduce costs (allowing for greater resources), unify efforts, and speed response efforts. Blockchain, although complex sometimes to understand, can be easy to integrate and low cost with the right use case.

References

Figure 1. What is blockchain? (Molesky & Trautman, 2019)

Figure 2. Supply Chain Improvement (Schulz, 2008)

Figure 3. Blockchain Industry Success Cases (Chang et al., 2019)

Figure 4. Emergency Management Blockchain Summary

Blockchain

- Shared Access to Information
- Decentralized Information & Access
- Automated Processes
- Trust (Smart Contracts & Transparency)

BBVA Bank
- WavePilot
- Document transactions reduced from 10 days to <2.5hrs

Maersk
- TradeLens
- 20% reduction in shipping-logistics costs (paper reduction & increased accuracy)
- 40% reduction in packaged materials shipping time

IBM-Walmart
- 2.2 sec trace back on produce with blockchain from customer to farmer

References
The youth are the future of the United States as they mature and enter their respective professions. As time passes and the programs are modified with each new generation, creation of common knowledge, similar to the "stop, drop, and roll" mantra, increases societal awareness of emergency response standards. This in turn reduces damages and improves health outcomes in times of emergency.

Future Implications
- Better outcomes for the target population that extends to the community as well as faster recovery times due to increased preparedness of individuals
- Inspiring the younger generation to pursue careers in the emergency management field and become involved
- Creation of common knowledge which will lead to a culture of preparedness
- This may also lead to the creation of collaborative relationships across organizations as the younger generations enter the workforce

References
Equitable Disaster Relief Can be Hindered by Appearance

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Purpose & Objectives.

Purpose

When responding in an emergency situation, first responders tend to operate instinctively due to the fast-paced nature of the disaster. Because of this, there is often a subconscious level of *implicit bias* that can drive the way first responders react within different populations. Based on a first responders’ perception of the population or community that they are serving, it can either disproportionately benefit or harm the disaster mitigation outcomes.

Objectives

1. Be able to define and identify implicit bias.
2. Be able to identify implicit biases in appearance that can arise in an emergency situation.
3. Be able to understand how to avoid implicit bias.

Methods.

Methods

We compiled a literature review based on both surveys and interviews which targeted the first-hand account of events from a first responder perspective. We researched various catastrophic events—notably Hurricane Andrew—and the measures or trainings that were in place to make sure the whole population was receiving proper delivery of care.

Results, Conclusion & References.

Results & Conclusion

The outcomes show direct correlations between implicit bias being present in emergency situations and the populations that are being responded to in these situations. It is important to understand that implicit bias exists, and each person will approach a situation differently based on the mental models that they perceive to be the norm. Although eliminating all bias may not be possible, through education, first responders can be made aware of bias that they bring and make a conscious effort to provide an equitable level of care to those they serve.

Additional Research


References

3. Edgoose, Quiogue, & Sidhar (2019). Acronym to remember in order to reduce Implicit Bias: Introspection Mindfulness Perspective-Taking Learn to Slow Down Thinking Individuation Check your Messaging Institutionalize Fairness Take Two

Figure 1 (Blair, Steiner, & Havranek, 2011)

Figure 2 (The Kirwan Institute for the Study of Race and Ethnicity, 2015)

Figure 3 shows the social vulnerability index (SVI) in Miami-Dade County in reference to Hurricane Andrew indicating the many social differences in the county which leads to differences in appearance (CDC, 2000)

Factors that determine the social vulnerability index calculation that also determine what goes into a person’s appearance:

- Race
- Ethnicity
- Culture
- Age
- Gender
- Employment
- Education
- Social dependency and social needs

Figure 3

Figure 4 shows the psychological impact of Hurricane Andrew on a large component of appearance—ethnicity. These results show a correlation of how implicit bias can affect relief efforts with minority groups compared to the majority (Penilla, Norris, & Lavizzo, 2002)

Figure 4

Interestingly, these also make up some of the first aspects we see regarding one’s appearance—another determinant of implicit bias.

Calendar
Considering recent theories surrounding AGW’s, there is a great
Healthcare
373
Journal of Coastal
Philosophical Transactions: Mathematical, Physical
Administration
Healthcare
By implementing the AGW systems, it is possible to measure the
Healthcare
Dean
Dougherty
Iveson
The tsunami that propagated in the Indian Ocean in December of
To explain the mechanism of a Resonant Triad interaction and why
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Student
Chris
Disaster response/relief can be significantly enhanced through the
Acoustic
To gain a better understanding, an extensive amount of reading
Describe the importance and benefits of using Acoustic
Until recently, very few mechanisms have been curated to mitigate
Jacob
Student
Mitigating Tsunami with Multiple Low Frequency
Acoustic Gravity Waves
Brian Iveson: Healthcare Administration Student
Chris Dougherty: Healthcare Administration Student
Chase Beecher: Healthcare Administration Student
Jacob Dean: Healthcare Administration Student

Purposes & Objectives

Purpose

• The tsunami that propagated in the Indian Ocean in December of 2004 killed more than 230,000 people.
• Until recently, very few mechanisms have been curatured to mitigate a tsunami and most of our focus has been on warning systems.

Introduction

• The size of impact from a tsunami is determined by the wavelength and amplitude of the wave.
• By forcing a wave to interact with resonating acoustic-gravity waves (AGW), its energy can be redistributed over a larger space.

Objectives

• Help people gain an understanding of how Acoustic-Gravity waves can be used to mitigate a tsunami.
• To explain the mechanism of a Resonant Triad interaction and why this is necessary for redistribution of energy.
• To ensure the audience understands the limitations to mitigation and how they can be overcome.
• Describe the importance and benefits of using Acoustic-Gravity Waves to forecast and recover from a tsunami.

Methods & Results

Methods

• The methods include a literature review where select qualitative research was gathered through scholarly journals used to understand the characteristics of tsunamis, AGW’s, and their relationship.
• To gain a better understanding, an extensive amount of reading was done through the sources of the primary sources and physics textbooks.
• Interviews with physics professors were conducted as well to help gain a deeper understanding.

Results

• By implementing the AGW systems, it is possible to measure the AGW’s of the tsunami wave. With that data multiple waves with the same amplitude and wavelength but a lower frequency can be sent out to redistribute the energy of the tsunami’s gravity waves. The waves will undergo a resonant triad interaction. The interaction involves two AGW’s sent toward the Acoustic-Gravity Wave of the tsunami. The first AGW will match the frequency and wavelength of the tsunami and the second will be of a smaller frequency and wavelength to disrupt the energy of the wave.

Conclusions & References

Conclusions

• Considering recent theories surrounding AGW’s, there is a great need for research in using them to mitigate tsunamis.
• There are still some limitations surrounding tide-tsunami interactions and constructive interference.
• This research is different from others because it focuses on mitigation of the tsunami and not just warning systems, which tend to create congestion upon evacuation.
• Practical use of this research would be to assist warning systems and utilize general relativity to lower the impact of a tsunami.
• Disaster response/relief can be significantly enhanced through the implementation of Acoustic-Gravity Waves. These efforts will proactively prevent the loss of life, property damages, and even environmental damages.

References

International Deployments Under the Siege of Symbols
Diego Otegui, University of Delaware

Purposes & Objectives
There is a need to know more about how post-disaster deployments come to exist, about the forces involved in its origination. Humanitarian deployments (and convergence) are inescapably influenced by the individual values, the boundaries defined by organizations, and societal forces that unconsciously determine the way humanitarian executives understand the reality in which they live. These three levels are nested within one another and intimately connected with their personal cognitive space.

The significance and intellectual merit of this research resides in the application of a unique theoretical framework that helps us understand how post-disaster operations are constructed with information from the three levels. It can help us know more about the distinct values and meaning that humanitarian interventions have in different areas of the world.

Methods & Results

Institutional Logics
- There are six distinct institutional orders: family, religion, state, market, profession, and corporation" (Friedland and Alford 2014).
- Each institutional order is composed of a series of ideas that encapsulate the “cultural symbols and material practices particular to that order” (Thornton, Ocasio and Lounsbury 2012 p.54). These are called institutional logics.
- Institutional logics allows us to study human behavior from the point of view of the relationships that exist between the individuals, their organizations, and the society at large (Thornton, Ocasio and Lounsbury 2012).

Research Question
Do Institutional Logics help understand international post-disaster convergence? If so, what is their effect?

Sampling
- 30 Open Ended Interviews
- Executives Involved in the Deployment of Personnel
- Humanitarian Organizations
- Trips to 4 countries

Analysis
- Content Analysis
- Three Coding Cycles (Inductive & Deductive)

Conclusion & References

Major Findings
The major findings were presented in two chapters. The first one focuses on how symbolic constructions influence the western humanitarian machine. It presents one critical finding for each of the three nested levels of analysis, the individual, the organization and society. The second expands the discussion and describes the implications for international humanitarian response, emphasizing its effects in the relationship between humanitarian actors and local stakeholders.

References