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A Localized Procedural Model for Cash-based Assistance to Livelihood and Health of Natural Disasters' Victims Based on Information Technology

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Abstract

Background: After the end of an emergency period and through setting up emergency settlement camps, humanitarian agents will take action to improve livelihood and health conditions of those suffering from the disaster through sending livelihood and health packages with standard contents and based on people's requirements. However, the problem is that the packages are prepared for normal people, and they would be no use for infants, children, and the elderly or patient family members. Cash-based Assistance (CBA) instead of in-kind donations would result in observing the human dignity of victims during the post-emergency period, as well as families and economic recovery of the affected region. There are many toolkits and process models provided by international humanitarian agencies, but because of special conditions of Iran (sanctions/economy) and a large number of natural disasters, we need a localized process model on CBA for victims of natural disasters based on Information Technology (IT), which would lead to speed, accuracy, and transparency.

Methods: The research was performed in two phases. Through a systematic review in the first phase, we studied international models/toolkits and proposed a process model for CBA in Iran. In the second phase, the localized model was customized using Delphi based on experts' opinions. The statistical population in the first phase was the international publications in addition to operational reports provided by local/international organizations/agencies from 2004 to 2019. In the second part, the statistical population included the executive managers of rescue and relief agencies and university professors in critical management from whom, 14 individuals were selected through targeted sampling and participated in Delphi rounds.

Results: In the first stage, by a systematic review, based on five well known international toolkits/models, researcher experiences, and experts, a process model was developed with five steps and 27 processes. In the first round of Delphi, four processes were rejected, and four new processes were added by experts. In the second and third rounds, the experts agreed with all of the items. The calculated Kendall's Coefficient of Concordance (KCC) value of 0.724 evidenced a good expert agreement on the obtained localized CBA model.

Conclusions: The localized process model on CBA for victims of natural disasters based on IT included 27 processes in five steps: (1) preparedness, (2) assessment, (3) response analysis, (4) implementation, and (5) monitoring, evaluation, and exit. These are localized processes agreed on by the Delphi panel expert, emphasizing hardware for e-transactions; victims, retailers, and wholesalers training in the fourth step; and program quality assurance and report to donors in the fifth step. The achieved theoretical process model would be a fundamental model to develop a process-based software application system for use in the future in Iran.

Keywords: Cash-based Assistance, Information Technology, Victim, Natural Disasters

1. Background

In recent years, the number of people, who are affected by disasters or man-made crises is increasing. In 2017, 445 million people were affected by disasters throughout the world (1). According to the reports of UNHCR, in 2018, there were 68.5 million Forcibly Displaced Persons (FDP) in the world, of whom 58%, 37%, and 5% were Internally Displaced Persons (IDP), refugees, and asylum seekers, respectively.

Considering the number of victims, it seems necessary to speed up and make the aid more effective. In Iran, the Red Crescent Relief and Rescue Organization, as the crisis management operations authority, after the end of the emergency phase and according to the Sphere Handbook (2), provides victims with the in-kind donations in the form

of 24-hour, 72-hour, and one-month livelihood and health packages. The content of these packages is the same for everyone, and therefore, there are problems for certain groups such as infants, children, the elderly, and the sick. Some of these problems include "non-compliance of packages with the needs of the affected household", "waste of packages and consequently food and health items", "providing some victims with packages more than they need", "non-coordination of aid organizations to distribute packages", "non-transparency in the extent of distributed and received aids", "lack of documented reports on distribution results and the rate of effectiveness", and "long-term regional consequences from an economic and social perspective".

In recent years, the cash transfer has been offered increasingly in humanitarian responses, as an alternative or supplement to in-kind aids. Given the growth of technological infrastructure and the impact and expansion of mobile phones in countries, humanitarian organizations have invested their resources to expand digital financial systems worldwide to deliver cash through bank cards and mobile money to people affected by crisis or disasters. Compared to cash payment, there are several potential advantages for digital cash delivery, including increased security for recipients, reduced costs, and improved traceability and transparency (3). Moreover, digital cash delivery can provide opportunities for customers to connect with extended financial services, such as savings, credit, and insurance. The High Council for International Development of Cash Payments, in the case of humanitarian aid, recommended that, if possible, cash transfers be made digitally, which would provide more financial services (4).

International humanitarian organizations such as UNHCR, IFRC, ICRC, UNICEF, and FAO have longtime experiences in Cash Transfer Programs or Cash-based Interventions. They use cash payments for IDP/FDP's reunion, food security, education, health and nutrition, and resource mobilization and reintegration programs, although these are not exclusive and complete.

Cash Learning Partnership (CaLP), as a global partnership of humanitarian actors, is responsible for improving the quality of cash and coupon payment programs in emergencies for the humanitarian aid sector, by supporting capacity building, research, and information sharing. The program intends to use cash payments and coupons as a continuous, auditable mechanism by all operational departments involved in preparing for humanitarian responses.

2. Objectives

Due to the frequency of natural disasters in Iran and subsequently the high rate of affected people, the main purpose of this study was to provide a process model on CBA for victims of disasters using IT in Iran.

3. Methods

According to a literature review, the proposed process model, presented in Figure 1, is based on the principles of toolkits and the aforementioned models in the background section. Considering the studies conducted and the reviews of the specialized literature, as well as the recent process for cash donations to the victims of natural disasters by Iran Crisis Management Organization and Iranian Red Crescent Society under the supervision of the Ministry of Interior, the proposed process model was examined through the Delphi technique in three interviewing stages to take advantages of research experts. The Delphi method was selected due to the nature of the model and the lack of a specific model in Iran. In this study, the rules of the Delphi method were determined based on the opinions of a research panel. Appropriate parametric or nonparametric statistics were used to identify the key processes and the level of consensus or agreement based on the collected data distribution. To this end, the parametric statistical index of frequency distribution and the nonparametric statistic of KCC were used for normal and abnormal data, respectively. The condition for stopping the Delphi method in this study was: (1) considering all research criteria or important questions, (2) not providing a new criterion by experts, and (3) reaching a consensus or agreement on the questions or factors.

By identifying the processes, they were included in a seven-point Likert scale questionnaire and distributed to the experts. Then, the collected data were analyzed. While designing the questionnaire, we tried to identify important processes by studying the research literature and related articles. The designed questionnaire was primarily screened by the experts' viewpoints, and processes were approved by panel members. An initial survey of the questionnaire in this way indicated the validity of the questionnaire structure. Cronbach's alpha was used to assess the reliability of the questionnaire, which was 0.721 for the first round. As it was more than 0.7, the reliability of the research questionnaire was confirmed. The statistical value for Skewness and Kurtosis did not include all the questions in the domain (-2 and 2), indicating the abnormality of the data. Also, the significance level in the Shapiro-Wilk and Kolmogorov-Smirnov tests is less than 0.05 for some research questions, and thus, the null hypothesis consider-

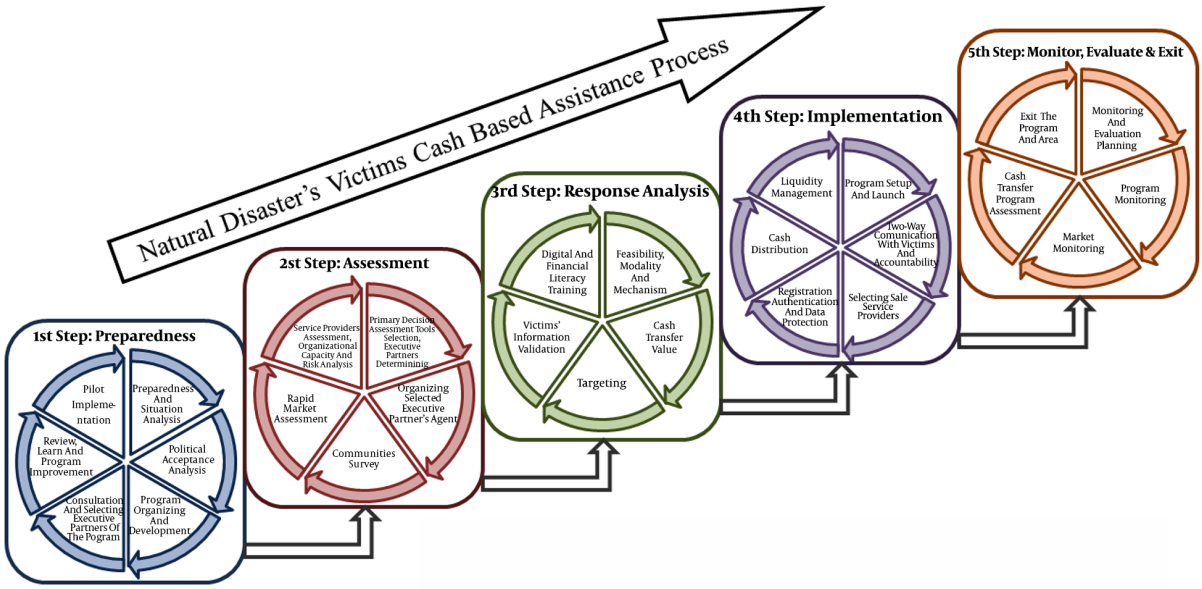

Figure 1. The theoretical framework of the proposed process model

ing the normality of data was rejected. Therefore, the normality of data distribution was not accepted. According to the data distribution, we used KCC to determine the level of consensus of experts.

Processes that were considered insignificant in the first round of Delphi were removed from the study. Meanwhile, the new processes proposed by experts in the first round were added to the questionnaire as new questions. In the next step, the designed questionnaire was presented to the experts, along with the results of the first round. After collecting the second-round questionnaire, the data were analyzed. The average expert opinion about all questions was higher than the threshold (3). However, because KCC was less than the standard (0.7), the Delphi's third round was implemented to achieve a better consensus.

4. Results

The results of the first round calculations of Delphi are presented in Table 1, and the results of KCC are presented in Table 2. As can be seen, the average numbers of expert opinions for the processes of "Organizing the Selected Executive Partner Agents ", "Victims' List Validation", "Digital and Financial Literacy Training", and "Selecting Sale Service Providers" were less than the threshold, which are highlighted in the table. Therefore, according to the experts' opinion, these processes were removed from the Delphi's first-round questionnaire. In addition, in the first round, the following four processes were proposed by experts as new processes:

• Hardware Distribution Process (Implementation Step)

- Providing mobile phones, SIM cards, or smart cards for affected people with no access to these devices previously. It may be anticipated and therefore be part of the available contracts with an executive program partner, or it may require further agreement after selecting and determining the number of affected people.

- It is better to distribute hardware/devices while registering victims.

• Victims, Wholesalers, and Retailers Training (Implementation Step)

- In cases where the victims do not already have a cell phone, it is necessary to train the basics of using a mobile phone and electronic cash and voucher.

- As part of electronic and mobile transactions, retailers and wholesalers must receive the necessary training.

- It may include retraining for those people who are already familiar with the technology.

• Quality assurance (Monitoring, Evaluation, and Exit Step)

- The quality of service that affected people receive based on the defined indicators in the first step should be carefully controlled.

• Reporting to donors (Monitoring, Evaluation, and Exit Step)

- Monitoring and tracking the donated cash should be possible based on the defined indicators in the first step in the form of online reports, from receiving cash to transfer to beneficiaries.

Because the conditions for stopping Delphi were not met, and it was necessary to survey the four new processes, the second round was implemented. The obtained results and KCC findings are presented in Tables 2 and 3, respectively. As can be seen, the average opinion of experts about all questions was higher than the threshold, and thus all research questions were significant, but KCC was less than standard (0.676). Therefore, the third round of Delphi was implemented to achieve a better consensus.

The design of the third round questionnaire was done according to the results of the second round, and it was distributed to the experts. As can be seen in Tables 2 and 3, in the third round of Delphi, the average of all research questions was more than the threshold and the value of KCC was greater than 0.7. Thus, given that all the conditions for stopping the rounds were met, we practically reached the final stage of Delphi. Therefore, all processes related to the third round questionnaire were considered significant, with a reasonable concordance. The theoretical framework of the modified process model based on expert opinion is shown in Figure 2.

5. Discussion

During the interviews, the experts approved in practice the five steps of "preparedness", "assessment", "response analysis", "implementation", and "monitoring, evaluation, and exit" based on the institute's models (5), the International Red Cross/Crescent Movement (6, 7), nongovernmental organizations, Mercy Corps (8), UNHCR (9), and Oxfam (10). According to the average opinion of the experts, the six main processes proposed in the first step were approved, which indicated the adaptation with the mentioned studied models. The important point is the low consensus level in two processes "consultation and selecting executive partners of the program" and "pilot implementation" compared to other processes in this step, which reflected the views of experts in interviews who practically believed that the private sector in Iran is not an influential part of the aid process, and this issue arose with the involvement of the government and its subordinates as the moderator of the aid process. On the other hand, because of the domination of the state system over executive processes, most parts of any pilot implementation have converted to a superficial process and do not have the necessary effectiveness. However, in international models, due to their systematic views, both the role of the private sector in implementation and the need for operational maneuvers are highly emphasized (5, 7, 8).

In the "assessment" step, other than "primary decision, assessment tools selection, executive partners determining", subsequent processes showed good coordination between the experts. According to the experience of them, the primary decision is made mainly according to social and political conditions and is practically not subject to the results of pilot implementation and results of previous step processes. The assessment tools selection is good, but the uncertainty of assessment indicators does not lead to effective results. The role of executive partners is also clear because of their governmental nature that will be affected by the orders of government authorities, and perhaps this is the reason for less consensus of experts.

In the third step, "response analysis", there was agreement on all three processes although on the processes of "cash transfer value" and "targeting", there was less consensus on determining how much cash should be paid to whom in the region because some experts mainly emphasized that in these cases, there are inevitable social consequences during the crisis and they will be forced to divide the collected donated cash in the same proportion to the family head. Therefore, it is not possible to provide cash assistance only to some and in varying values in the affected region. The government's cash assistance to the victims of the Kermanshah province earthquake in 2017 and the Golestan, Khuzestan, and Lorestan provinces floods in 2019 has been mentioned as some examples, in which all families were paid a certain value equally. International toolkits, however, believe that these values would depend on affected family conditions (11).

In the fourth step, "implementation", the experts' agreement on the processes was interesting, possibly because of their operational and executive positions in organizations. In this step, after the "registration, authentication, and data protection" process, there was less agreement on the "hardware distribution" process because they believed that the cost of hardware increases the cost of aids due to sanctions against Iran and the fact that these are mainly imported goods. Therefore, experts did not reject this process because they had some histories about receiving such hardware as aids for program beneficiaries that international reports confirmed them (12, 13).

The fifth step included five processes: "monitoring and evaluation planning", "quality assurance", "program monitoring", "market monitoring", "cash transfer program evaluation", "report to donors", and finally, "exit from the program and region". There was little agreement on market surveillance due to the inability of supervisors to monitor and control the variables affecting the regional market. Although the process of reporting to donors during

Table 1. Results of the First Round of Delphi

Steps	Main Processes	Average	Result
Preparedness			
	Preparedness and Situation Analysis	5.07	√
	Political Acceptance Analysis	4.93	√
	Program Organizing and Development	6.21	√
	Consultation and Selecting Executive Partners of the Program	4.43	√
	Reviewing, Learning, and Program Improvement	5.93	√
	Pilot Implementation	4.36	√
Assessment			
	Primary Decision, Assessment Tools Selection, Executive Partners Determination	6.43	√
	Organizing the Selected Executive Partner Agents	3.43	×
	Community Survey	5.79	√
	Rapid Market Assessment	5.93	√
	Service Provider Assessment, Organizational Capacity, and Risk Analysis	6.29	√
Response analysis			
	Feasibility, Modality, and Mechanism	4.79	√
	Cash Transfer Value	4.21	√
	Targeting	5.00	√
	Victims' List Validation	3.21	×
	Digital and Financial Literacy Training	3.43	×
Implementation			
	Program Setup and Launch	6.29	√
	Two-way Communication with Victims and Accountability	6.43	√
	Selecting Sale Service Providers	3.36	×
	Registration, Authentication, and Data Protection	5.36	√
	Cash Transfer	4.57	√
	Liquidity Management	5.79	√
Monitoring, evaluation, and exit			
	Monitoring and Evaluation Planning	6.21	√
	Program Monitoring	6.64	√
	Market Monitoring	6.43	√
	Cash Transfer Program Evaluation	5.21	√
	Exit from the Program and Region	5.64	√

interviews was considered an important factor by experts, they did not consider it as operational as other processes due to the lack of effective documentation and the political/governmental actors' interventions. At the same time, most experts believed that an integrated software system that could document the whole process, from receiving cash donations to transfer them to the beneficiaries is the only way to provide a documented and reasonable report to donors. Indeed, the international approach to developing such a system is to make transparency and cost-effectiveness of cash donations (14).

5.1. Conclusion

The research showed that the process of organizing the selected agents of the executive partner was part of the duties of the executive partners to manage their agencies based on the agreed agenda according to the facilities and infrastructure that should be anticipated. In case of any complaint, they should communicate victims to solve the problem through the complaint mechanism process. The authentication process of victims, as well as training digital and financial literacy, was not accepted at this stage independently because the consensus was that both processes should be carried out at the time of registration, and doing so at this stage would lead to duplication. Experts believe that the Consultation and Selecting Executive Partners of the Program is part of the preparedness step. Based on experience in critical situations, there is no time practically for negotiation on how to deal with fare prices, and the cost will affect the effectiveness of the action. Also, as

Table 2. Results of the Second and Third Rounds of Delphi (Experts' Suggested Processes are Highlighted)

Steps	Main Processes	Second Round Avg.	Third Round Avg.
Preparedness			
	Preparedness and Situation Analysis	5.142857	5.14
	Political Acceptance Analysis	5.000000	5.00
	Program Organizing and Development	6.214286	6.21
	Consultation and Selecting Executive Partners of the Program	4.428571	4.21
	Reviewing, Learning, and Program Improvement	5.928571	5.93
	Pilot Implementation	4.357143	4.36
Assessment			
	Primary Decision, Assessment Tools Selection, Executive Partners Determination	4.357143	4.36
	Community Survey	5.785714	5.79
	Rapid Market Assessment	6.357143	6.36
	Service Providers Assessment, Organizational Capacity, and Risk Analysis	6.714286	6.71
Response analysis			
	Feasibility, Modality, and Mechanism	4.928571	4.93
	Cash Transfer Value	4.214286	4.21
	Targeting	4.214286	4.21
Implementation			
	Program Setup and Launch	6.285714	6.29
	Two-way Communication with Victims and Accountability	6.500000	6.50
	Registration, Authentication, and Data Protection	5.428571	5.43
	Hardware Distribution Process	4.571429	4.57
	Victims, Wholesalers, and Retailers Training	5.785714	5.79
	Cash Distribution	5.785714	5.79
	Liquidity Management	6.642857	6.64
Monitoring, evaluation, and exit			
	Monitoring and Evaluation Planning	6.785714	6.79
	Quality Assurance	5.642857	5.64
	Program Monitoring	5.642857	5.64
	Market Monitoring	4.214286	4.21
	Cash Transfer Program Evaluation	5.928571	4.21
	Report to Donors	4.214286	4.21
	Exit from the Program and Region	4.928571	4.21

Table 3. Kendall's Coefficient of Concordance for Three Rounds of Delphi

	First Round	Second Round	Third Round
N	14	14	14
Kendall's Wa	0.669	0.676	0.724
Chi-square	243.364	245.989	263.460
df	26	26	26
Asymp. sig.	0.000	0.000	0.000

one of the sub-processes of selecting an executive partner, it is possible to sign a contract with chain stores or wholesalers to reduce the total costs of the cash assistance program. In this way, the four processes were eliminated in the first step or merged into other processes.

According to the results of the operational and executive experience of experts in the field of crisis management, rescue, and relief management in disasters, which have been revealed in the final result, compliance with the process models of international aid organizations is largely evident. The main difference between this model and international models is the small role of private charities and organizations. In the international system, most of the executive processes are done by this group to motivate them to collect more aids while it seems that in Iran, executives in the relevant domain do not believe in taking advantage of this dynamic potential, and perhaps the lack of clear rules and regulations in this regard has prevented the consensus of experts in this case. However, during the interviews, the issue was discussed with them, and at least, it was an incentive to think effectively about the private sector's use of CBA for victims of natural disasters based on IT. Finally, almost all experts emphasized that the existence of feedback at each stage to other stages will cause contin-

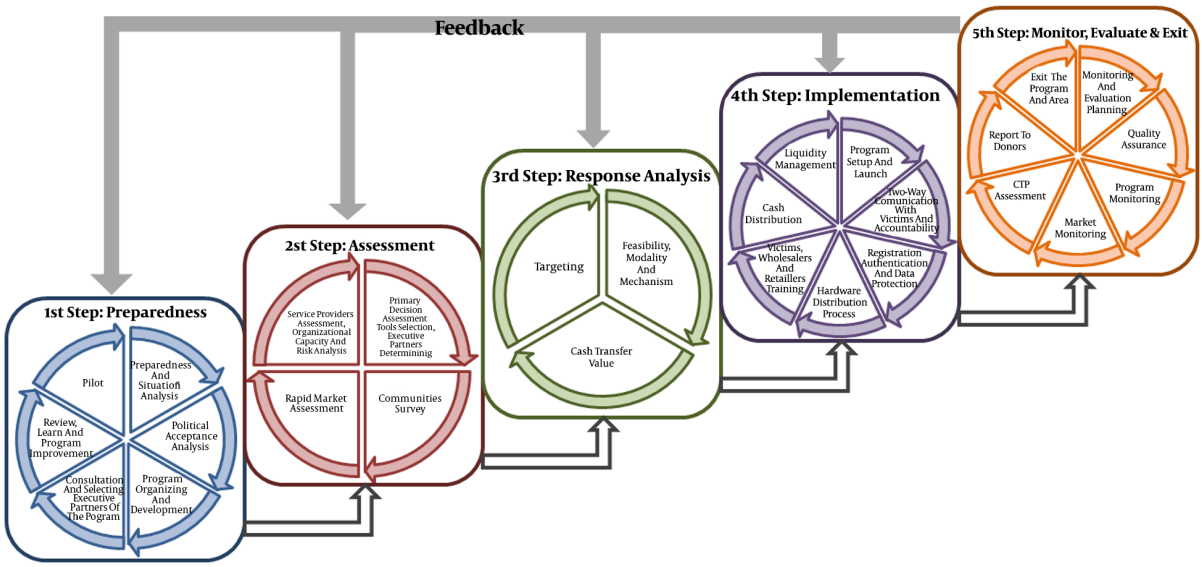

Figure 2. The theoretical framework of the modified process model based on expert opinion

uous improvement, which could maintain its dynamism, necessary revisions, and corrections among the steps and processes. Based on the modified process model for the future, developer teams could work on integrated software applications to apply all localized processes for Iran.

Footnotes

Authors' Contribution: Study concept and design: MT. T. and Y. Y.; data gathering and interviews: Y. Y.; analysis and interpretation of data: MT. T. and Y. Y.; drafting of the manuscript: Y. Y.; critical revision of the manuscript for important intellectual content: MT. T. and Y. Y.; statistical analysis: Y. Y.

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