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Single Window Solution for Integrated Emergency Communication and Response System

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Abstract

Integrated Emergency Communication and Response System (IECRS) should be implemented as a mandatory service worldwide as it plays significant role while providing emergency services to public without delay of single second. However, in context of Nepal, there are eight three digits and seventeen four digits short code numbers being used by different agencies which work independently with their own infrastructure and human resources. This situation creates confusion during the time of distress and hinders prompt, coordinated and effective emergency services to citizens. In this regard this paper explores possibility of establishing a single number system for emergency services in Nepal. The survey was conducted from different Telecommunication Service Providers, Regulatory bodies, Government officers, NGOs, Internet Service Providers. This research adopts explorative in research design and a content analysis (thematic analysis) was conducted on data collected from primary sources (interview questionnaires) and secondary sources (literature survey). The best model for an IECRS is proposed based on the analysis and outcome of the research. The validity of best recommended model was supported by the data collection through major three Emergency Response Organizations (EROs) (Nepal Police, Fire Brigade and Nepal Ambulance Service), also by the references taken from international trends and practices and from average response time of call taking by the EROs call operators. It is expected that emergency response services provided by several agencies would be enhanced and coordinated through the IECRS mechanism from single window. In this regard this research can be recommendation for the implementation of IECRS in Nepal and can be a reference for future research work.

Keywords: *Emergency Number, Emergency Service, Control Room, EROs, IECRS*

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1. Introduction:

In Nepal different emergency numbers are being used for different emergency services. Currently 100 is used for Police service, 101 is used for Fire Brigade and 102 is used for Nepal Ambulance Service as can be seen in Figure 1. Other three digits short numbers are being used by different organizations. For example 103 for Traffic Police, 104 for missing children, 105 for Nepal Army, 106 for Military Police, and 107 for CIAA. Seventeen four digits short code numbers are being used by different agencies including 1130 for Red Cross and 1144 for Tourist Police. Nepal is one of the many countries in the world where people need to call different numbers for emergency services operated by different Emergency Response Organizations (EROs). As a result multiple emergency numbers causes confusion in situation of distress.

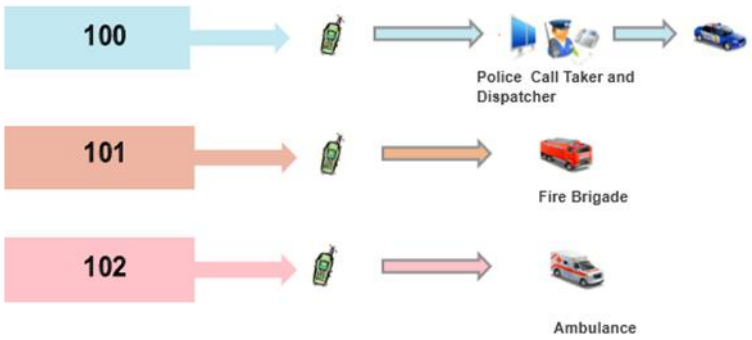


Figure 1. Current model of emergency response system in Nepal.

The research work is also concerned with providing recommendations for the implementation of an Integrated Emergency Communication and Response System (IECRS) in Nepal. IECRS is an integrated system which uses single number to provide emergency services (Police, Ambulance and Fire brigade) and it establishes a single interface for citizen to connect with emergency responders for any kind of emergency help they shall require.

According to International practices, the United Kingdom was the first country in the world to introduce 999 as a single emergency number in 1935. With the expansion of telephone network across the globe many countries started to provide different telephone numbers for emergency services.Most developed nations have already used national emergency number 112 (European Union) or 911 (United States of America) managed by the nation.However, in context of Nepal 100 as single integrated number could be more relevant as it is well known among public and most commonly used during the situation of emergency. Other numbers are less known to public and less used by them.The proposed model of IECRS will follow the international practices of Emergency number, will reduces the emergency response time, provide better coordination with other emergency partners from single window.

2. Method and Data Analysis:

The conceptual framework of this thesis can be shown in major three steps as in Figure 2. In the conceptual framework, the first step is identifying the current situation and issues related with multiple numbers by taking interview with emergency services facilitator. The emergency service facilitator includes Emergency Service Organizations and experts from various regulatory bodies, ministries, Telecom Service Providers. In the next step, the feasibility study will be identified with literature survey of national and international context as well as taking interview with the experts. Lastly, with the research we finally propose an IECRS model best suited in context of Nepal.

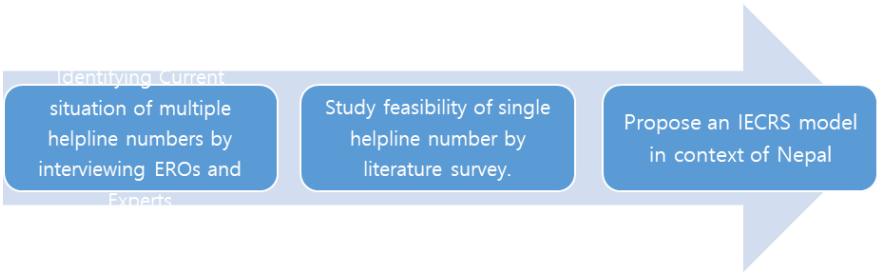


Figure 2. Conceptual framework of research procedure.

2.1 Comparative Analysis

Figure 3 depicts the comparative analysis of number of calls for Nepal Police, Fire Brigade and Nepal Ambulance Service during 9 months of period. As can be seen the number of calls of Nepal Police is in ten thousand, NAS is in thousand and Fire Brigade is in tens number. The maximum call received by NP is 53,990 in Bhadra and minimum is 28,468 in Chaitra. For FB, the maximum call received is 23 in Paush and minimum call is 12 in Magh. Similarly, NAS received maximum number of calls 529 in Falgun and minimum call is 381 in Magh.

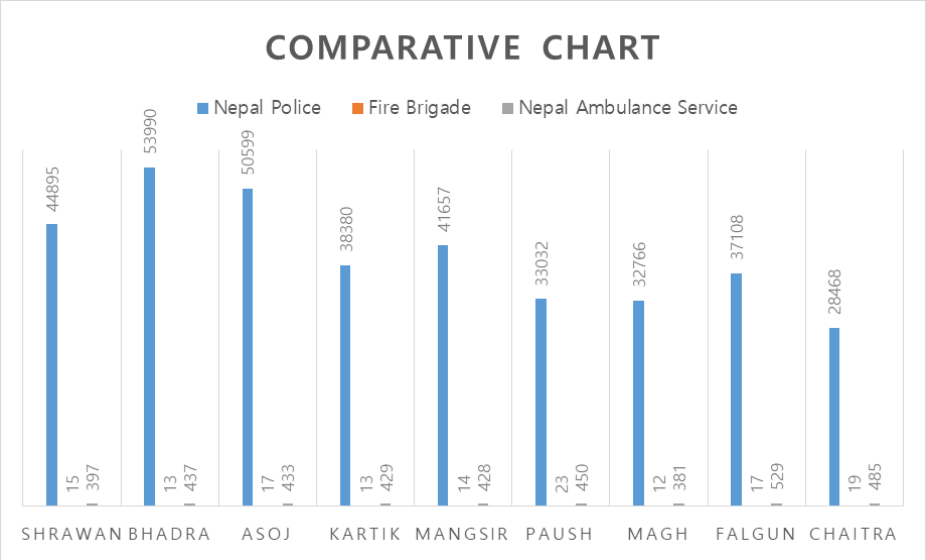


Figure 3. Comparative analysis of number of calls.

2.2 Issues and Challenges

Survey was carried out with sample population of 50 with three groups such as Expert, Operators and General public. From the survey data it has been found that, major issues and challenges faced during providing emergency service is lack of coordination which is about32%. Similarly, majority of people pointed the issue as lack of technology and not responding properly by 24% and 16% respectively. Lack of skill manpower holds for least percentage which is about 3%.

2.3 Demographic data supporting Single Number System

Experts from various regulatory bodies, government sectors, ministries, NGOs, Telecom Service Providers and Internet Service Providers and Stakeholders from major three EROs such as Nepal Police, Fire Brigade and Nepal Ambulance Service support is 100% and users respondents support is about 90% which is very high. Since

users, stakeholders and expert are considerable service takers and providers responsible for effectiveness of IERCS in Nepal.

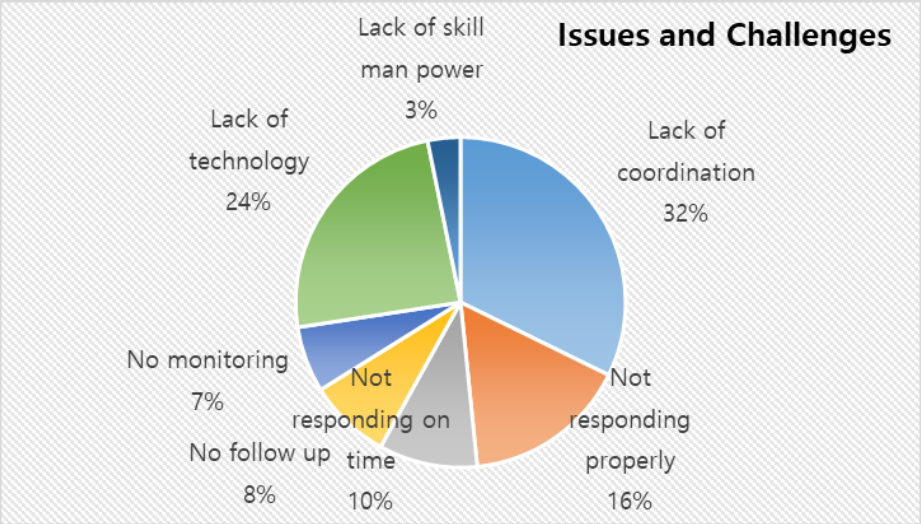


Figure 4. Issues and challenges in present emergency communication system.

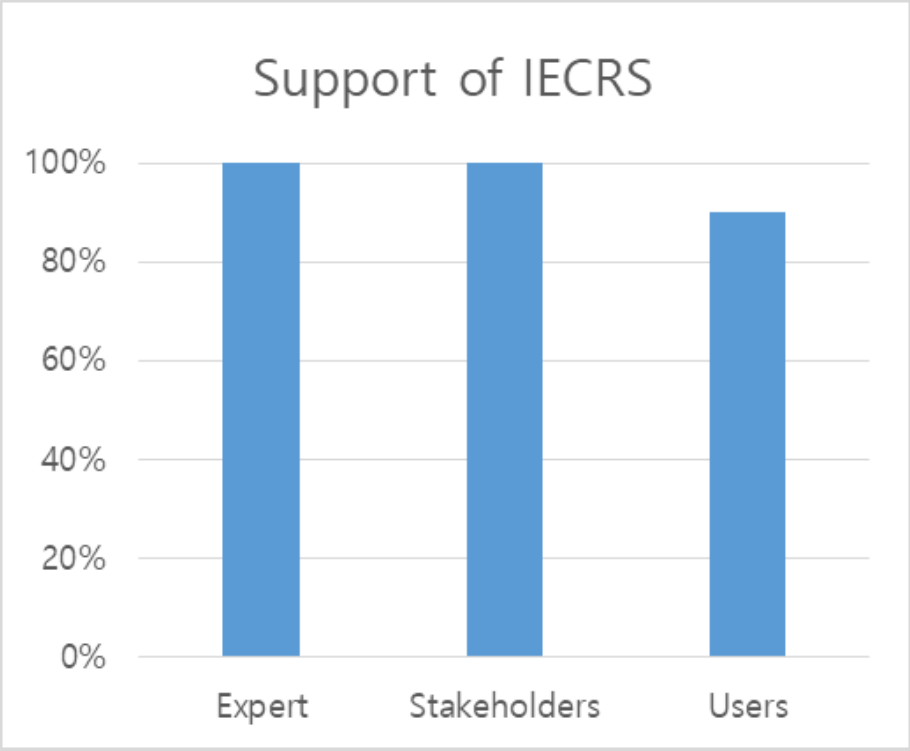


Figure 5. Support for single number system.

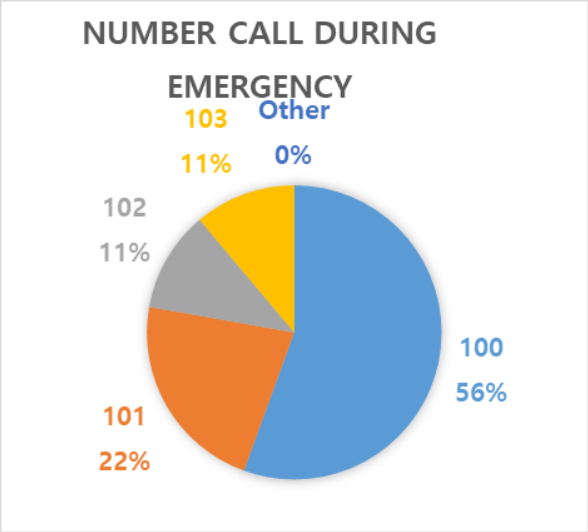


Figure 6. Number of calls during emergency.

2.4 Demographic data showing Number called by users in case of emergency

The highest percentage of dial number is 100 which is about 56%. Similarly, other number 101, 102, 103 and other has 22%, 11%, 11% and null for other numbers as can be shown in Figure 6.

3. Result and Discussion

3.1 Possible IECRS Models

In model 1 all the EROs are working in their own call centers equipped with their own resources. When a caller dials 100 the IVR (Interactive Voice Response) system gets activated and provides option to press 1, 2 or 3 for Police, Fire brigade and Ambulance service respectively.

Then corresponding EROs will receive the call and respond accordingly. As one ERO gets the call independently other EROs will not be aware of what is happening. They won't be able to help in the emergency situation. Therefore, a radio network having common emergency channel is proposed for better coordination among all EROs.

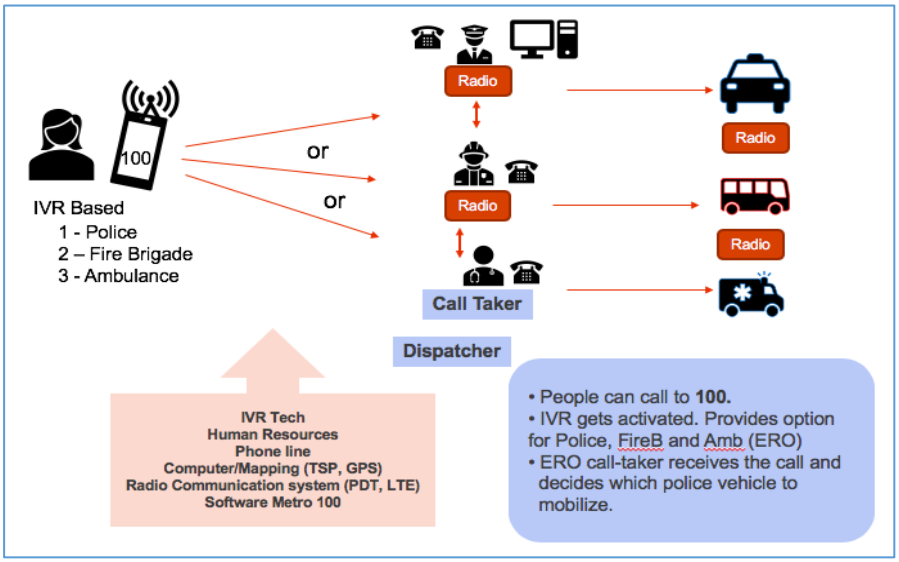


Figure 7. IVR based model.

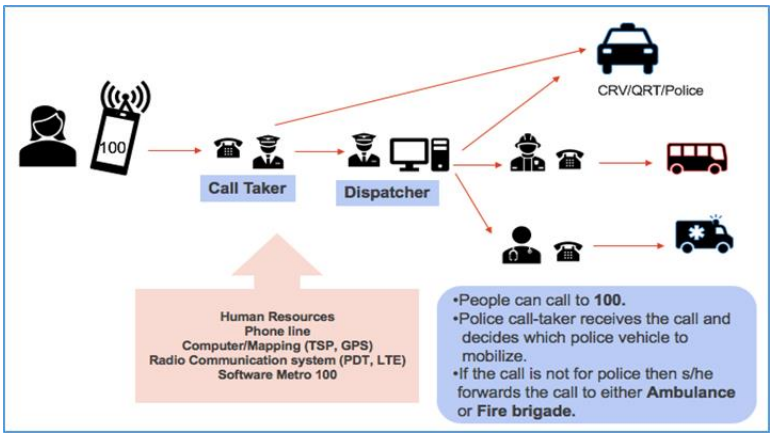


Figure 8. Call taker and dispatcher by same ERO.

3.2 Proposed IECRS Model (Model 3)

In model 3, there is only one call center which is manned by the Police as shown in Figure 9. When a caller dials 100 the call is received by the Police call taker who also records the call details. He or she directly mobilizes the resources of all the EROs and inform the respective EROs if the call belongs to them. The Dispatcher can monitor the response progress through computer information system. This model saves cost of human and other resources because of single call center.

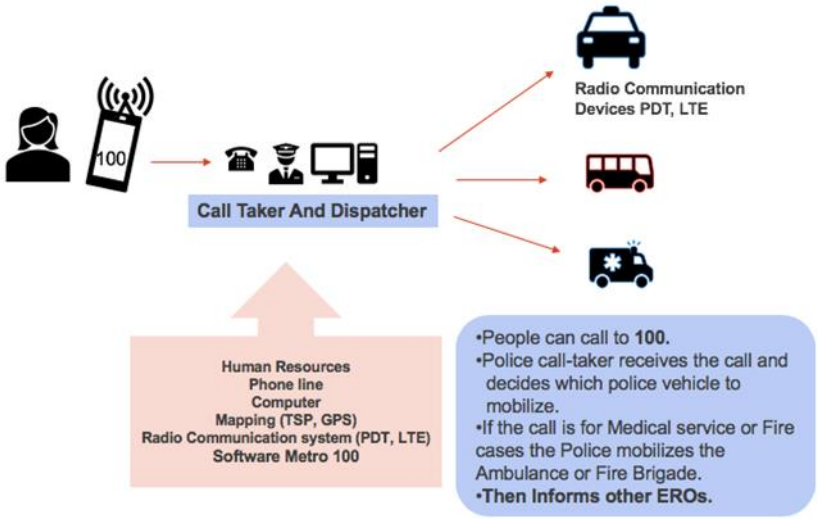


Figure 9. Single window approach.

In the context of Nepal single window approach that is model 3 where call taker and dispatcher will be under same roof of command has been proposed. The main advantage of single window approach is quick and effective response time highly coordinated EROs as well as cost reduction through resource sharing mechanism.

The detail functional model of integrated emergency communication response system (IECRS) has been shown in figure 10. The figure illustrates the functional architecture of IECRS. Here all the calls from the citizens are handled by public safety answering point (PSAP). A PSAP is a centralized authority responsible for call taking and dispatch of emergency services. In an IECRS, PSAP can be taken as the core component for communication, response, coordination and mobilization of emergency responders. The called number shall be single number e.g. 100, the call are then processed and then respective emergency control center are then informed and then response team shall be deployed.

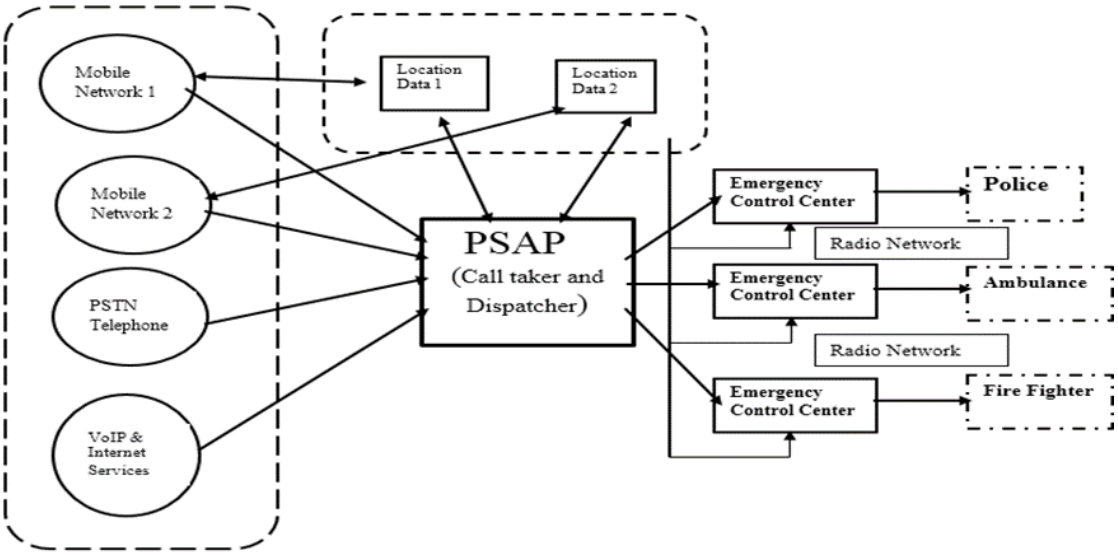


Figure 10. Functional model of integrated emergency communication system.

PSAP receives call from all the telecom operators and call from data communication also. When the call is received the location is identified with the location registry from the Telecom Service Providers (TSPs). After getting basic information about the caller, call will be forwarded to dispatcher. Dispatcher will confirm about the validation of incident and record detail information about the incident. Now the dispatcher will find the location of emergency mobilizing vehicles from AVLS (Automatic Vehicle Location System) and GPS tracking. The nearby CRV/QRT will be mobilized will and the incident updates are reported to the dispatcher via radio network by the emergency responders (CRV/QRT teams).

4. Conclusion

Based on the survey report and discussion with experts we proposed three possible models that can be feasible for Nepal. Among which Mode 3 is proposed for IECRS implementation for long run. With the single window approach for integrated emergency communication response system (IECRS), Nepal will not only will be able to provide effective, faster and coordinated emergency services in shortest response time with International standard and recommended practices, but also can save exchequers money. Most significantly, the implementation of this system will overcome coordination issue among EROs and during the time of emergency user can ask for any kind emergency services without remembering all the emergency numbers and without lapse of single second.

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