Technology challenges to healthcare service innovation in aging Asia: Case of value co-creation in emergency medical support system

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ABSTRACT

The trend of the aging populations in Asia countries will increase at an average of 30% in 2050. Healthcare service innovation is an essential mechanism to support and increase the well-being of the elderly. The emergency medical support system is a critical process that challenge providers to implication healthcare innovation and technology for physical helps to life threatening cases. There is a need to provide flexible applications that enable the elderly to communicate their desires with others in emergency cases. This research is aimed at identifying the technological challenges that face healthcare services in terms of the emergency medical service system created to support elderly patients' demands. We conduct a statistical analysis based on secondary data from the World Health Organization (WHO) and use systematic reviews to identify the needs of healthcare technology related to aging based on the service system. The results show that value co-creation concept in emergency medical service system are positively significant system influencing healthcare service innovation for selected countries. This paper support E-health development and promote activities that co-created value between healthcare providers and patients through the preparation of alternative service systems.

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1. Introduction

The trend of the aging population in Asia is rising from 10% in 2009 to 30% in 2050. The increase in elderly people is caused from the unstable growth of population in many countries caused by developed healthcare quality, different life styles of people that are living alone, and have a decreased rate of fertility. The growth in the number of elderly people will have an effect on society, the economic, consumption, and healthcare services [1–2]. Many factors need to be prepared in order to support aging populations, including mobility, physical condition, and daily life. The main factors are related to health policy, promotion, and service infrastructure [3–5]. In the 21st century, technology and service innovation drives the economic and society through a variety of applications involving education, communication, entertainment, and healthcare. Many technologies and innovations are aimed at supporting the well being of the aging population for simple use with universal design, examples of which can be found in smart homes, smart cities and mobile applications [6–9].

Healthcare service is essential for the well-being of elderly people for personal care, nursing, life threatening illness, health consulting, and contingency help. Lack of a workforce in healthcare sectors and limited of funding are the main problems in developing countries. Technologies for healthcare services need to be designed and selected to support the requirements of the aging population on the basic of respective countries [10–13]. Many pieces of research are aimed at trying to develop and focus on possible technologies that can be applied to healthcare services, from basic needs in daily life to special help [14–19]. Emergency medical service is a critical healthcare service for aging people that needs to be prepared and provided for all possible cases, from physical condition help to life threatening cases on a 24 h basis. These services need to provide a flexible application that enables the elderly to communicate their desires with others in reasonable time. It is important to improve emergency medical system and services.

From the viewpoint of service-dominant logic (SDL), the co-creation concept is intended to capture the essential nature of

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value creation between participators; it involves the participation of beneficiaries through use, and integrated resources with partners [20,21]. It supports services exchanged through the interaction of service providers co-operating together with consumers who are active participants in the service system. The trend of aging populations has an effect on Asian societies, especially on healthcare services and the well-being of people. There is a need to improve the quality of emergency medical services by have a service perspective and developing new technologies. This research identifies the technological challenges that face healthcare services in terms of the emergency medical healthcare service system (EMSS) to support elderly patients' demands. We conducted a statistical analysis with the secondary data from the World Health Organization (WHO). We then perform systematic reviews to identify the need for aging healthcare technology based on the service system. Conceptual modeling is developed to represent a framework for EMSS for elderly people on the basic of the value co-creation concept.

2. Literature

2.1. Aging society and technology

Aging society refers to the population of elderly people in society who are 60 year olds and older. Their increase is caused from changes in lifestyle, a shirking birthrate, and the increasing quality of health over the last 20 year. The trends of aging society will incur economic and social cost through changing services and market demand. Governments and societies should prepare and plan to support the growth of these trends [2–4]. Technologies and communication systems in many countries developed in order to support the daily life of people for faster and easier living. Technology development is driven by many industries and changes the lifestyle of people into one of technology consumers [22–24]. A complementary perspective on the relationship between technology and aging focuses on elderly as active consumers and co-creator of the transformation of technological change and consumption. One piece of research focuses on technology and aging by using a new concept called "innosumer" for the aging market [25].

Healthcare is an industry that tries to use mobile technology and communication systems for elderly people, it supports well-being and life quality through security and confidence. Mobile phones in many countries are challenging tools to improving the quality of healthcare service for elderly. Applications and implications healthcare service through mobile phone satisfy the requirements of elderly and improve their quality of life [26–32]. It should be taken into healthcare development plans when defining future roles of mobile applications to support elderly in an aging society. One piece of research focused on the needs and expectations in using technology for elderly people separated by using the criteria in Table 1. For example, to contact with families, to link their health status of elderly adults to hospital, reminder daily plans with family, and communicate health providers to support their health problem in emergency case.

In modern societies, elderly people have access to technology and applications that support their health and social care. Technological applications are necessary in order to learn and share experience on services between providers, elderly and family. Aging healthcare services that provide through e-services are essential to life quality of patients and increase available of service on time in any place [33–35]. It can improve the effectiveness of health system by building up technologies that provide the general needs of aging people. Aging people require to support varies from individuals to social preferences. The individual preferences of elderly people differ depending on their ability to live at home through appropriate technology base on lifestyle, environment, and preference [36,37]. Moreover, technologies are also possible to improve the physical health and independence of seniors. For instance, mobile devices are possible to connect medical professionals with seniors to monitor and review their chronic conditions.

Today, information and communication technology development depends on the ability of the internet and the infrastructure of each country, It can support the demands of elderly people to communicate with their needs include family, caregivers, friends, or hospitals. The Internet based devices stand to integrate and co-operate the ways in which respite care services for family and caregivers communicate with elder members [38–40]. They can set the essential information on mobile and cloud memory that guides healthcare providers to secure quality care for their seniors, it can be achieved with a simple search from database system that done in minutes through the internet. Moreover, they can plan time with technology when providing healthcare to recipients for taking care, resting, monitoring and communicating. Implication communication technologies in healthcare service make efficient use of limited time and provide quality of life for both healthcare providers and recipients that will ultimately determine the "value" of technology in healthcare [41,42].

2.2. Emergency medical service system

An emergency medical service system (EMSS) can be defined as "a comprehensive system which provides the arrangements of personnel, facilities and equipment for the effective, coordinated and timely delivery of health and safety services to victims of sudden illness or injury" [43]. The aim of EMSS emphasizes providing timely care to victims of sudden and life-threatening injuries or emergencies in order to prevent needless mortality or long-term morbidity. The function of EMSS can be simplified into four main components: accessing emergency care, care in the community, care on transportation routes, and care upon arrival to receiving care at a health care facility [44]. EMSS can provide service that supports the needs of elderly people through integrated information and communication technology. Available of the EMSS will increase life confident in aging societies, and actors in EMSS need to prepare and active to support all possible cases in 24 h basis.

The impact of an aging society on the demand for EMSS must be addressed that prepare for the increased need of pre-hospital

Table 1
Expectation on technology of elderly [26].

Need and expectation	Note
Feeling safe and secure	Connected to the usability of the technology
Memory and daily life activity aids	Appointment reminder, alarm, address book, diary, medication reminder, and caller ID complemented
Communication device	Enables contacts with friends and family
Freedom of movement	Involves both self-determination and empowerment
Enjoyment, self-actualization, healthier independent life	Intrinsic motivations. Services that promote their physical and mental well-being