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## **Mediating Effect of ICT Impacts on ICT and Health Goals of MDGs: A Cross-national Panel Analysis**

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**Full Research Paper****Mediating Effect of ICT Impacts on ICT and Health Goals of MDGs:****A Cross-national Panel Analysis***Jing Fan<sup>1</sup>, Zishan Huang<sup>2</sup>, Mingxing Shao<sup>3\*</sup>, Hongquan Li<sup>4</sup>, Yan Wan<sup>5</sup>*<sup>1</sup>International Business School, Beijing Foreign Studies University, China<sup>2</sup> School of Economics and Management, Beijing University of Posts and Telecommunications, China

**Abstract:** This work contributes to the discussion on the relationship between ICT factors, ICT impact and national health outcomes. The method used is a cross-national study of 148 countries using secondary data from World Economic Forum, World Bank, the United Nations and other international organizations. This study applies a panel data set from 2012 to 2016 and structures a mediating effect model to explore dynamic relationships between all the constructs, among which ICT factors are independent variables, ICT impacts are mediating variables and health indicators selected from Goal 4 and Goal 5 of UN Millennium Development Goals (MDGs) are dependent variables. The results show that there are significant negative associations between all ICT factors and health indicators, while only some of the partial mediating effects are proved. Economic impact has a significant mediating effect on the association between ICT infrastructure and both of the two health indicators. Social impact only mediates the influence of ICT infrastructure on under-five mortality rate, and ICT skills on maternal mortality ratio as well.

Keywords: Information and communication technology (ICT), health outcomes, cross-national research, mediating effect

**1. INTRODUCTION**

Information and communications technology (ICT) is an inclusive term, covering all communication equipment or application software: for example, radio, television, mobile phone, computer, network hardware and software, satellite system, etc., as well as various services and application software related to it, such as video conference and distance learning. The importance of ICT is not the technology as such, but its enabling function in facilitating enhanced access to information and communication across large distances.

This study aims to explore two research questions: first, the association between ICT factors and health outcomes are the basis; second, ICT impacts are introduced as mediation variables. Answering these questions can help global policy makers to formulate health resource allocation and investment strategies, especially in the fields of health care and technology in developing countries, so as to achieve the best interests of people worldwide.

The method used is a cross-national study of 148 countries using data from World Economic Forum, World Bank, the United Nations and other relevant international organizations. This study applies a panel data set from 2012-2016 and structures a classic mediating effect model to explore dynamic relationships between all the constructs.

**2. RESULTS**

Our results indicate that overall ICT factors substantially facilitate national public health delivery. However, ICT factors have different acting mechanism on health outcomes. Some use economic impact as a mediation, some use social impact, and others seem to totally skip a mediating process. From the economic perspective, ICT infrastructure is the only ICT factor that shows mediation function. We can clearly see the necessity of ICT infrastructure in facilitating economic growth. Thus, the mediation of economic impact is inevitable.

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From the social perspective, only with ICT infrastructure and skills can social impact jointly influence the two health indicators respectively. NRI measures social impact by impact of ICTs on access to basic services, Internet access in schools, ICT use and government efficiency and E-Participation Index. It is quite obvious that social impact mainly emphasizes on a wider scope of a citizen's daily life, including access to education, government and Internet, etc. Thus, we can draw a possible path of ICT infrastructure laying a solid ground for the wide spreading of social applications including newborn care education, government support of childbirth, etc.

Likewise, given that ICT skills obviously highlight education level, it is connected even more tightly with social impact. A reasonable assumption is that maternal health requires higher concern than newborn health, especially in some developing countries where newborn is seen as more important than mothers and women may be treated as fertility machine in the birth giving process. Therefore, ICT skills, which is closely linked to education level, may influence maternal health through the channel of social impact.

Affordability and skills, on the other hand, fail to influence economic in our study. Affordability also fails in social case. Although not in line with our hypotheses, we can accept that the mediating effect is relatively weak in our research paradigm.

### 3. CONTRIBUTIONS

The contributions of this study can be categorized into theoretical and practical contributions.

Theoretically, Previous studies on ICT and health development are mostly conceptual, or remain micro level, focusing on the actual operation of technology. This study raises the theoretical altitude to a macro level, introducing a wider sample of countries from the United Nations when a large number of fellow studies only look at EU, other regional organizations or even just single countries. Second, on top of ICT factors, we bring in ICT impacts as mediations in our model, which is a huge innovation in the area. We hope it can serve as a good beginning for researchers to try other theoretical models and make it more and more sufficient and accurate. Finally, the study aims to review the realization of MDGs (2000-2015) and provide inspiration for SDGs (Sustainable Development Goals, 2015-2030).

Practically, this study aims to help global policy makers formulate health resource allocation and investment strategies, especially in the fields of healthcare and technology in developing countries. As we provide a new perspective to see how ICT factors associate with its impact, developing countries can use it as a guide to get financial assistance from or cooperate with other countries or organizations to improve health deliveries from their weakest areas with the most urgent needs according to their own conditions.

### REFERENCES

- [1] Raghupathi, W. Raghupathi. (2013). Exploring the relationship between ICTs and public health at country level: a health analytics approach, *Int. J. Health. Inf. Syst. Inf.*, 8(3): 1-22.
- [2] Tavares, A. I. (2018). eHealth, ICT and its relationship with self-reported health outcomes in the EU countries. *International Journal of Medical Informatics*, 112: 104-113.
- [3] Seddon, J. J. J. M., & Currie, W. L. (2017). Healthcare financialization and the digital divide in the European Union: Narrative and numbers. *Information & Management*, 54(8): 1084-1096.
- [4] Si, Y. , Su, M. , Dong, W. , Yang, Z. , & Chen, X. . (2018). Importance of medical information for health-care utilization in china: a cross-sectional study. *The Lancet*, 392, S49.
- [5] Dieleman, J. L. , Krycia, C. , Agyepong, I. A. , Sarah, A. , Bollyky, T. J. , & Bump, J. B. , et al. (2019). The g20 and development assistance for health: historical trends and crucial questions to inform a new era. *Lancet (London, England)*, 394(10193): 173-183.