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RESEARCH ARTICLE

IMPLEMENTATION OF HEALTH INFORMATICS IN DEVELOPING ECONOMIES: A LITERATURE REVIEW OF ORGANISATIONAL, SOCIO-CULTURAL AND ECONOMIC ASPECTS.

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Abstract

Health Informatics has a critical impact on the betterment of health services by enabling the physicians and hospital staff to cater an efficient and accurate service to patients while also reducing time consumption and helps documentation management of medical practitioners. In developed economic settings, health informatics systems have widely come into usage. Meanwhile, developing economies are still at the primary stages of implementation. In this paper, the authors have discussed the positive and negative effects of developing country's Organisational, Social-Cultural and Economical impact towards the success of health informatics implementation via a literature review. The study has been conducted by reviewing journal articles, and government published reports. Furthermore, the review has been conducted to reflect the possibilities and barriers of the implementation in developing economies.

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Introduction:-

Health Informatics is a discipline that combines ICT and medical process for the betterment of medical treatments, and it is procedures [1]. This may vary from electronic health records management to artificial intelligence based diagnostic analysis [2]. It can also be characterised as the transformation of current systems (often paper based) to digital formats [3].

Health informatics has been existing for over four decades [4] [1]. It has come a long way since the development of ICT, parallel to the advancement of medicine, and it has been an evolutionary process [1]. Nevertheless, the implementation of these systems has been a complicated factor in developing economies compared to developed economies [5]. The reasons vary in regards to numerous factors such as organisational, socio-cultural and economical.

Previously compiled literature can be found to address the issues of health informatics implementation in many regions. Nevertheless, South Asian focused literature has a significant shortage. Therefore the paper was compiled with a sense of a South Asian context. This paper discusses the issues of how a developing nation's Organisational, Socio-Cultural and Economic aspects affect the success of the implementation both positively and negatively. Subsequently, the reviewed literature findings have been reflected, respectively, in a positive and negative perspective.

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Methods:-

The literature has been obtained from journal articles over multiple disciplines, namely: "Information Systems, Organisational Behaviour, Economics and Sociology. These articles were categorised for subsections as "ICT implementation in developing economies", "Health Informatics Implementation" and "ICT acceptance".

Journal articles have been carefully chosen to get the crème de la crème outcome for the final analysis. Finally, published literature has been chosen on successful implementation from a developing economical setting (Sri Lanka).

The chosen literature has been reflected in three selected aspects: Organisational, Social-Cultural and economical, with regards to its advantages and disadvantages. The possibilities and barriers of system implementation have been widely discussed in every section, respectively.

Results:-

A total of 16 journal articles and a government publication have been used for the literature review. Information from the above mentioned three sections has been extracted, respectively. Reflection of the South Asian scenario has been conducted by thoroughly referring to a published journal article in the context of Sri Lankan health informatics implementation success. The findings were taken from the following subject areas:

1. Information Systems
2. Organisational Behaviour
3. Economics
4. Sociology

Discussion:-**Organisational Aspects**

In the implementation phase of Health Informatics, it is commonly believed that the organisational aspect primarily determines the success and failure, moreover to technical aspects. Long term organisational aspects affect the organisational change, which is characterised as a continuous learning process [6].

ICT usage has a positive impact on better health care. Nevertheless, successful implementation and winning over user acceptance is a challenging task. It takes expert levels skills on implementation and training, especially in transforming an existing manual system to an e-system [7].

Strong leadership of an organisation will benefit the implementation rapidly [8]. It can effectively motivate the employees (physicians, nurses and staff member) to adopt into the system quickly and efficiently [9]. Proficient project management, standardised terminology and continuous staff training will directly relate to betterment of user experience in HIS [9] [5].

As the frontier user group, physicians possess a higher impact on the success of Health Informatics systems [10]. According to Boonstra, the barriers are preventing physicians from adapting to HIS.

As a prominent barrier, [11] says that physicians always report, "they do not have access to technical support. Even when they could get a person, they do not have enough confidence that the person would have enough knowledge about a clinical setting".

Positive attitudes of governments and legislators are required for health care ICT success as many legal aspects are underlying with electronic medical records storing, processing and transportation. Also, it is vital to maintain clear strategies and goals to achieve the required targets [12] [8].

Before the implementation of the Health Informatics system in Dompe base hospital in 2010 (Sri Lanka), it was a disorganised, ordinary hospital with unnecessary delays [13]. According to Kulathilaka, the management of the Dompe base hospital had a positive attitude towards the implementation. Therefore they were able to maintain team spirit and achieve the optimal abilities of the staff while the implementation process [13].

He also mentioned, "The Out Patient Department (OPD) has become methodical, efficient and trouble free after the implementation of the IT solution". According to Kulathilaka, Dompe base hospital had two main issues in the implementation phase. With regards to organisational aspects, one of them is "complexity of the health sector" [13]. It is clear that a complex system must be appropriately analysed and converted into simplified versions for electronic use.

Socio-Cultural aspects

According to Kaye, cultural barriers make one of the most significant impacts on the implementation failures in HIS. "Medical practitioners see EHR as a time-consuming matter, and they are too busy to deal with it. They commonly miss what is in there for them [8].

The language barrier is a significant issue in Socio-Cultural aspects of the implementation of ICT systems in developing economies. The majority of developing economies does not use English as their primary language, yet the majority of the software and technical content is available in English [14].

The localisation of software is imperative to overcome language barriers and to improve user acceptance. Users feel competent with the system when it has presented in their native language [14]. The user-interface quality and user-friendliness of the system has a positive effect on technology acceptance [9].

Sri Lanka's computer literacy rate was 27.1% by 2015 [15]. Maintaining an adequate level of computer literacy in a developing economy makes it feasible for ICT implementation [16]. According to Dompe hospital (Sri Lanka), it is clear that the computer literacy rate has a direct impact on successful HIS implementations. Therefore continuous training has been conducted for the hospital staff [13].

Kulathilaka states that "poor knowledge and attitudes towards IT" are one of the two main challenges Dompe base hospital had in the implementation stage of its HIS. 'Outbound training, best worker program', such activities have been conducted in the attitude changing process.

Kulathilaka has also mentioned that physicians, nurses, staff members were satisfying after the implementation of its ICT system due to the less work stress. Moreover, the patients had the opportunity to experience less waiting time and accurate diagnosis history retrievals [13].

Economical aspects

The cost factor has a significant impact on implementation. High initial implementation and maintenance cost, the uncertainty of return on investment, lack of financial resources is a significant drawback to successful implementations [10].

Lack of clarity in financial return on HIS implementation has a powerful impact on the economic aspect. It is not clear to many stakeholders such as investors, physicians and patients [8]. Physicians are reluctant to explore the system in office hours due to the reduction of revenue generation and increasing patient waiting time. Therefore it takes much time for them to get familiarised with the platforms (software) [11].

Financial funding is not only crucial for ICT equipment but also vital for continuous training and further development of HIS (maintenance). Relying entirely on funding based success is treating for project continuity as once the funding goes off, the sustainability of the project will get affected [17] [12].

The funding has a significant role in successful implementations. Kulathilaka has mentioned that forty-one computers were provided for the Dompe hospital (Sri Lanka) project by the Information and Communication Technology Agency of Sri Lanka which include thirty-one desktop computers and ten laptop computers, the initial financial support has a severe impact in the success [13]. According to Blya, many organisations are willing to fund pilot projects, and donor-funding is also commonly seen [7].

Conclusion:-

According to the literature reviewed, all three aspects mentioned in the paper have the advantages and disadvantages of their own. Nevertheless, it is visible that all three of them have to go parallel and simultaneously to overcome HIS implementation barriers. The socio-cultural aspects have an impact on the legislation and general attitude towards an

electronics system, while cultural aspects affect the ideology and behavioural attitudes towards ICT usage. Economic aspects have to be taken into consideration critically as they are vital for software/ hardware purchases as well as staff training

Strong leadership of an organisation positively affects the rapid system adaptation for the clinical staff. Physician's positive attitude towards using EMR in a clinical environment has a demanding advantage towards the success of HIS implementations [8]. Physicians are essential coachmen to other staff members, such as nurses [10].

Seldom, physicians tend to believe EMR and health informatics is time-consuming to practice in their clinical environments [8]. This is mainly due to the lack of practice in computer usage in a clinical environment and not seeing the bigger picture of advantages in HIS usage. Governments and legislators have a great responsibility in standardising HIS systems to make a positive attitude on physicians towards the EMR/HIS.

Economic factors such as significantly higher implementation and maintenance cost, uncertainties of return on investment are holding HIS implementation backwards in developing economies. In order to overcome these barriers, solid funding bases such as governmental organisations should be endorsed, while donor-based funding should be optimised [7].

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