Internet of Things (IoTs) Effects and Building Effective Management Information System (MIS) in Vietnam Enterprises and Human-Computer Interaction Issues in Industry 4.0

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Abstract

In recent years there is a rising need in Vietnam enterprises to build an effective management information system in order to deliver better information for management levels to make a proper decision.

This paper mainly use qualitative analysis with statistics, synthesis and inductive methods, combine with dialectical materialism methods.

Research results indicate that in industry 4.0 under Internet of Things (IoTs) effects, Vietnam enterprises such as hospitals and renewable energy companies or manufacturing firms can use advanced cloud technology to store and process big data of clients to serve for a better MIS system or risk MIS system. IoTs together with Big Data and cloud technology also prove better solutions to accounting and human resources of businesses.

Last but not least, this study also propose some solutions to deal with challenges in constructing risk information system in Vietnam enterprises during covid 19 impacts. For instance, we need to invest more on technology infrastructure and take advantage of IoTs effects to build effective MIS for companies to make sound decisions.

Keywords

MIS, IoTs, Enterprises, Vietnam, Challenges.

Introduction

In recent years esp. in industry 4.0 there are many Vietnam enterprises including technology firms such s FPT group to manufacturing and banking sectors, who recognized the important of IoTs and AI and their applications in building better management and services system to serve more clients and gain more satisfaction.

Human-computer interaction has been increasing in Vietnam enterprises during their applications of ERP system into business process managing. Inventory management and Material purchasing process also can be done via computer support. Production process also can be managed with IT support.

In the mean time, we also realize that Internet of things (IoTs) have certain influence on building MIS system effectively for enterprises in emerging markets including Vietnam.

For instance, energy, electric and water companies can take advantage of IoTs and internet and could technology to manage better wastes energy and water, testing, and controlling quality of energy sources and produce better process of energy preservation.

Hence, businesses in Vietnam need to prepare well for EFVTA integration with building stronger MIS and Risk MIS with IT support and by identifying challenges.

Le Trung Hieu, Dinh Tran Ngoc Huy, Nguyen Thi Phuong Thanh et al (2021) mentioned that We can realize there are some popular applications of IoTs such as: nowadays, there are range of applications and uses of IoTs such as bluetooth, wifi, memory stick and microprocessors which helped us to keep information, data and behaviors. Cheap price of wearable devices, just < 50USD may generate problems to recognize gestures.

This study organized with introduction, literature review, methodology, main results, discussion and conclusion.

Research Questions

Question 1: What are impacts of IoTs and analysis of IoTs in building better MIS system for businesses in Vietnam and emerging markets?
Question 2: What are IoTs effects in hospitals and manufacturing companies?
Question 3: Is there any risk prevention solutions for IoTs impacts?

Literature Review

Ryu and Hur (2016) found out IoTs applied in electric and home applications devices such as washing machines, etc., with many terminal IoT devices used for controlling familime criminals, controlling gas and temperature, etc.

Beside, Pawar and Vital (2019) said that managing energy to avoid wastes with IoTs can be among concerns in many nations. We can restrict consumption of energy and electric during rush hours and reduce costs of consuming energy and saving more energy for the public.

Then, Nguyen Thi Bich Ngoc et al (2020) stated that New-generation FTAs have brought to Vietnam opportunities to sell its agricultural, especially traditional products to the world.

Long et al (2015) showed that Service Based Routing is inherited from the model of Content Based Routing - CBR that manages and classifies many of network services. In order making nodes to communicate quickly and stably, it requires applying some methodologies to reduce overhead and delay as well as power consumption.

Li et al (2018) found out proper solutions and concepts for smart home applications by using IoTs for saving energy and electric and avoid energy wastes.

Next, Sheela and Jilna (2020) mentioned that effective management can be done via many computer and electric devices that connect to a host computer at centre place. And this is for better management of energy system because there is rising consumption of energy and rising demand in recent years.

Practices in Vietnam show that risk management information system (RMIS) is still somewhat less developed in Vietnam enterprises.

This results in low labor productivity and low competitiveness of businesses in particular for the whole economy in general.

Last but not least, we see related studies in the below figure:

Authors	Year	Content, result
Kumar et al	2018	IoTs has presented in many sides of smart house, cities, transportation and pollution control with hi-tech styles.
Sheik	2018	IoTs has various applications which usufe for our life and based on IoTs, people can read many data from remote areas or locations
Khanna and Kaur	2020	IoTs has been considered in a few years ago and it is considered under many aspects including challengers, applications and tech.
Ghost et al	2020	Concentrates on applications and uses of IoTs for construction and building (smart objects)
Ahmad et al	2021	As IoT is in fast-growing stage and demand of smart devices also increasing so the manufactures oversight the security aspects and delivering the vulnerable devices in the market attackers easily targeting the devices using these vulnerabilities and performing a large number of DDoS and other types of Attacks to steal user personal information and data from IoT Devices.

Figure 1 Related studies

Methodology

This study mainly uses qualitative methods, statistics, with synthesis, analytical and inductive methods, combined with dialectical materialism analysis.

We also use many case and experiences from Vietnam enterprises.

Main Results

1) Building MIS in Human Resources and Accounting Firms in Vietnam

Many Vietnam companies use ERP, Fast software and Misa accounting software for more effective accounting processes and for finance functions.

Without IT support Vietnam enterprises can not have better and more effective financial accounting activities.

We can not deny that there are so many Vietnam businesses are applying IT to financial management in general and accounting in particular. For these enterprises, accounting work, in addition to providing sufficient information for financial accountants, is also more focused on providing information for management accountants. Therefore, the accounting organization of these enterprises is more closely organized.

Higher development of the application of IT in management in general and accounting in particular are some of the businesses that have gradually overcome difficulties in the

combination of financial accounting and management accounting, reducing the reports to do from excel.

In reality, IT software can help many Vietnam enterprises to calculate better employee salary effectively and concisely.

Payment accounting, general accounting and inventory accounting are also much supported by ICT and IoTs in big and SMEs firms.

Therefore the linkage between IoTs effects and financial accounting processed need to be evaluated clearly and look at the prospects not only the present state.

With support of IoTs and internet, human resources activities in Vietnam firms also can be done more effectively and to manage employee data better than traditional methods.

2) Constructing Effective MIS in Vietnam Hospitals under IoTs Effects

Under effects from Internet of things (IoTs), hospitals can take advantage of Big Data and cloud technology to store and process data of clients.

With benefits such as cheap cost sensoring applications, IoTs has helped enterprises such as hospitals and create more creative way to connect everything in business operation as well as hospitals operation and activities.

IoTs also create a better environment in which information of clients and medical equipment can be managed effectively and from long distance.

IoTs and internet and ICT also helped hospitals and doctors to reduce more errors in taking care patients and treatment process.

With IoT support, nowadays hospitals can better manage their assets by using web-based and wireless and cloud technology to deliver asset management solutions such as controlling asset information, asset cycles, camera, monitoring asset from long distance, etc. By connecting many information through internet.

The use of IoT has also given a positive impetus to healthcare analytics. With connected apps in wearables, healthcare professionals can access huge amounts of data which helps in healthcare trend analysis and also in impact measurement. of a particular drug or a particular health condition.

Because main features of IoTs is helping to connect everything through devices and internet to serve for human purposes, so hospitals and healthcare industry can get benefits.

Last but not least, IoTs can prove suitable data to allow doctors and hospitals to have warning of situation of health of clients and patients to serve them better.

3) Building MIS in other Vietnam Enterprises under IoTs Effects

Under effects from Internet of things (IoTs), Vietnam manufacturing firms, for example, renewable energy companies, can organize a system of IoT include: Service level - Application level - Network level. All information are connected with a IT device with the support from IT cloud technology which can store a Big data volumn. Then, all data were centralized at centre point and used for management with data analytical tools.

In renewable energy production activities, we can take advantage of IoTs to build better MIS system and figure out the optimal energy solutions for clients.

For example, to calculate the energy optimal solution for oil using clients, our technicians can go to customer factories to help to build the IoT system.

There will be many processes in Vietnam enterprises than can be managed and operated smoothly with the support of ERP system. They include but not limit to purchasing process, warehouse and storing, production, sale, finance and customer service process, etc.

For example, an enterprise that manufactures goods and distributes products through a system of sales agents throughout the provinces/cities/districts nationwide with the number of hundreds or thousands of agents at a time. This enterprise has established a procedure to manage records for opening / closing sales agents, a process that includes many business steps to process and approve records. This enterprise has implemented and is operating the ERP system relatively well. However, the ERP system does not support the operation management of the aforementioned process. Therefore, this process is still managed in the traditional way. Sales agent opening/closing applications are quite numerous, each taking one to two weeks to complete. The status of dossiers being delayed and backlog is quite large, even many records are omitted and forgotten without being detected until the business receives complaint information from a partner.

Moreover, in Education Sector for Instance, in Universities, Colleges, Schools Library

Internet of things (IoT) also allows libraries to provide availability status of reading rooms, discussion rooms, printers, scanners, computers... by displaying their peak and peak hours of usage. on the library's website, or users can check out using their library's mobile app.

IoT also support to manage devices in the library.

IoT can help libraries and their users better manage available devices and thereby save on energy costs. IoT can help extend device control not only to librarians but also to users. For example, a user after entering a library can use a cabinet or find a desk to read a document with an IoT-enabled mobile phone, then they can adjust the lighting, air conditioning, wifi, etc.

IoT also can deliver e-book reading services for libraries to allow students and readers to assess to books from far distance easily.

4) Building Risk Management Information System with IT Support

First, many Vietnam enterprises do not pay attention much to build effective risk management information system (risk MIS system).
During Covid 19 time, there are changes in macro environment and changes in export-import policies and commerce, hence, there are external risks from macro conditions such as economic and technology factors, and Vietnam companies need to incorporate them into their MIS system.
Therefore, we realize the necessity of IT and computer in helping companies risk (MIS) information system.

Moreover we need to make assessment on effects of Internet of things on building efefctive MIS for firms in industry 4.0.

Discussion

According to the Global Standards Initiative on Internet of Things (IoT-GSI), IoT is a global infrastructure serving the information society, supporting intensive (computing) services through objects (both real and virtual) are interconnected through integrated existing information and communication technologies. To that end, a 'thing' is something in the real world (physical thing) or the information world (virtual thing), which can be identified and integrated into a communication network.

According to Wikipedia, IoT is an internetwork in which devices, vehicles (referred to as "connected devices" and "smart devices"), buildings, and other devices are embedded with Electronic components, software, sensors, actuators, and network connectivity enable these devices to collect and transmit data.

Internet of Things (IoTs) Effects on MIS System Construction

First, IoTs can present advantages for companies. For instance:

Nguyen Van thuy (2020) said that the 'perceived usefulness' factor has the greatest impact on user intention of smart devices with IoT with the same level of impact of 0.345 standard units. This is consistent with the situation in Vietnam, when all respondents said that smart technology products with highlevel well-functioning features from famous brands with the highest quality will be the first factor that attracts customers. Therefore, the policy implication is that technology firms want to influence customers using smart products to create advanced features, lead market trends, create a network with various smart devices and meet the needs of users. There is a need for in-depth research on useful features for each group of customers who use IoT smart devices.

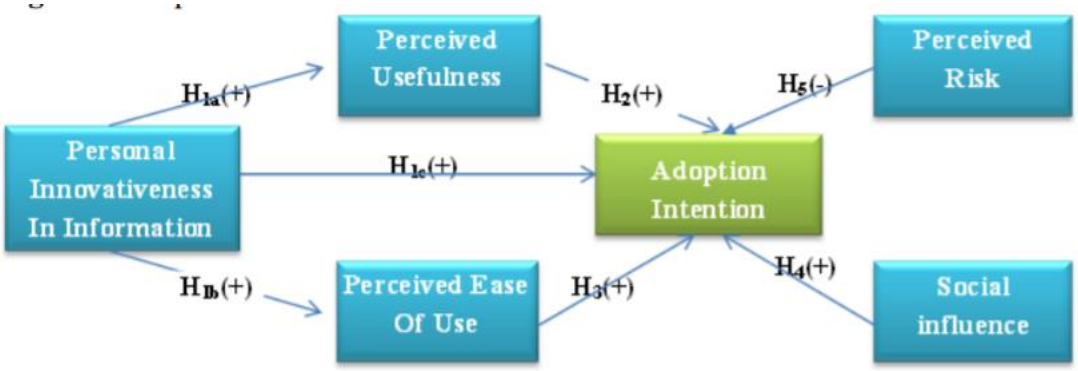

Figure 2 IoT model
(Source: Nguyen Van Thuy, 2020)

Conclusion

The application of information technology - software for business administration is becoming more and more popular. Although businesses have many software applications deployed, even businesses have ERP (Enterprise Resource Planning) implementations to serve for higher productivity.

Nguyen Van Thuy (2020) described the strong impact of many factors on accessing IoT technology through smart devices such as smart phones or smart TVs. For the adoption intention to use smart devices with IoT, there are 5 main factors directly affecting the user intention. The factor of 'perceived usefulness' has the strongest impact on the adoption intention to use smart devices with IoT. Factors of 'social influence' and 'perceived ease of use' are the second and third most influential factors to user intention. When developing smart devices towards IoT technology, it requires developers and suppliers to pay attention to the psychological factors of customers towards products with high usefulness, ease of use and many users. Research results are the basis for firms to develop and supply smart high-tech products on the basis of IoT technology with appropriate development policies to orient the design and development of the best customer-oriented products.

Beside We Also Pay Attention to Risk Management and Risk Prevention under IoTs Effects

We recognize that many benefits that IoT brings to libraries in the future, we also need to be more objective about the risks that this technology brings. Due to the vast nature of the IoT network, many sources face the issue of information security and access. Sharing data with third parties may pose risks of attack and information theft in the current system itself. Therefore, the issue of security always needs to be respected and realized as among 1st priorities.

Limitation of Research

This study can be expanded into more details for Artificial intelligence (AI) and Big Data and IoTs effects on MIS system for companies and for other merging markets.

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