Innovation and Knowledge Management Role in IoT industries of Thailand transformation: A case of Things on Net Thailand

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Abstract

This article was established to define the Innovation and Knowledge-based organization implementation for micro sme and startup IoT companies with rapid progression and growth of Thailand in order to enable its individuals to archive standard multinational innovative IoT mindset and skill. Knowledge is not the content feeds or text books, but it plays a critical role in making overseas and national investors believe in small-sized IoT sustainability and fast-moving organization in order to catch the global trends. This reflection also makes the talented individuals feel engaged to corporation and generates more innovations and initiatives in 0G and 5G technologies and tools to move forward solutions to enhance global standards in local region. Using **Things on Net** (**TON**) as a case study with the qualitative approach, field study, with observation and 4 times interviews techniques it is a leading micro-SME IoT company of Thailand. It is an interesting case study for Thailand. Implementing Innovation and Knowledge-based organization of **TON** is not only benefits **TON** performance and customer's values. It also sustains business in long run and trustworthiness in a highly competitive industry including modernity, technology and capital at global standard

Keywords: SMEs – Startups, Innovation, Knowledge Management, IoT, Things on Net

Introduction

Innovation and Knowledge-based organization (Shammari, 2014) is the concept of large standard multinational company used for company growth and sustainability by Global leading companies all over the worlds. With the New-Normal Era, IoT has disrupted several industries since 2020 since there are opportunities for IoT and AI-based companies to emerge as a solution provider based on 0G or 5G technologies.

In Thailand case, since 2019, **Things on Net** has emerged as a micro-SME company in IoT industry (Bouhnik et al., 2018; Zia, 2020) with the European standards while maintaining local Thai customization to expand all of its One-Stop Solutions in every IoT supply chain to apply Thailand to 0G era regardless the size of investment of the client, while elevating the standard of Thai government in many aspects such as social charity.

The critical factors whether a micro-SME company of IoT industry will be successful or not depend on the innovation and knowledge-based culture to attract the talented individuals, global class partnerships and customers. Additionally, promoting information transfer also contributes companies' technology to suit the new era.

With well-theoretical knowledge of management and innovation mixed with local South East Asia and Thailand geography, it could make micro-SME companies of IoT industry (Baporikar, 2014) grown into large corporations in a short period of time. Moreover, Thai micro-SMEs can initiate their own innovation without adopting or buying foreign technology that lack compatibility with Thailand's settings.

2. Contents

2.1 Why innovation and knowledge-based organization is important for micro-SMEs IoT and Startup?

Most people tend to think of training and knowledge development as an individual task; however, for global innovative companies such as Fortune Listed companies associated with AI, IoT, knowledge and innovation, technology or commerce changes every day in global scale. In order to survive in this industry relying on self-development which can apply to every sme companies of Thai technology infrastructures, **TON** has implemented infrastructure based on the Knowledge Management concept of **Cultivating organizational innovative culture.**

In order to embed Innovation and Knowledge-based with an organization, the companies might consider the Global standard level rather than traditional training and knowledge sharing practices (Rangnekar, 2010) i.e. Tata Motor, China Petroleum & Chemical Corporation (Sinopec Corp.), CLP Power Hong Kong Limited, Petroleum Development Oman LLC Dubai Municipality (MENA) Guodian Dadu River Hydropower Development Co., Ltd. (China) (MIKE.org, 2020) relies on 8 factors according to Assessment Guidelines for Preparing the Successful KM Stories. Retrieved from Global MIKE Award framework (2020) which are 1) Empowering knowledgeable workers for innovation, 2) Strategizing, visioning and transformative leadership, 3) Creating client and user expectations, needs, and experiences, 4) Developing internal & external networks and connectivity, 5) Cultivating organizational innovation culture, 6) Investing and delivering knowledge-based products, services, and solutions, 7) Enforcing knowledge practices and systems for knowledge creation, 8) Implementing creative and virtual space to create stakeholder value (Hong Kong MIKE Award, 2020; MIKE.org, 2020). Benefits of developing knowledge management and innovation into the high technology organization like Wipro) (Hong Kong MIKE Award, 2020) as an emerging micro-SME company that plays the role of industry leader. The size of the business and old-world capital investment is not as important as laying a good foundation for SMEs and Micro-SME companies in the industry Kragulj (2020), as they can still attract good amount of consumers and keep going with good reputation and credential equivalent to international standard and global companies perform its business worldwide, this culture is also included international culture to encourage Thai individuals to get into a learning organization and innovation Chinowsky & Carrillo (2007) in a highly competitive industry including modernity,

technology and capital, there is still a process to make minor companies stay consistent in the industry as procurement and shortage of experts are still issues.

Zerfass (2011) did the study on internal communication and innovation culture in order to develop a change framework " and it was found that the present study showed the emerging field of innovation communication of growing importance. Due to its possible contribution to business success, it is considered to be highly relevant while more studies are exploring on how optimization can be achieved. A study of Coffman (2016), "Building the Innovation Culture Some Notes on Adaptation and Change in Network-Centric Organizations1", while Hybrid (Top down & bottom up) approaches create a structure in the middle of the organization that encourages innovations from the bottom up. In addition, working to shape them into viable business ideas can be archived by encouraging a distributed network to form inside the organization which takes on the role of much of the innovation work.

The paper "Building the Knowledge- Based Organization: How Culture Drives Knowledge Behaviors" introduced by Long (1997), stated that building the knowledge-based culture was the process and mechanism not by lecturing a new content or event basis. The attitude building with the good culture leads to Knowledge- Oriented Behaviors (Zia (2020) listed as follow: 1) *Sharing and Teaching* , the norms and practices encouraged a variety of behaviors that influence the quality of interactions and, in the process, the creation, sharing, and use of knowledge. 2) *Dealing with mistakes*, One large international engineering and construction company trying to build a learning lesson database established from a result of large layoffs after a recent business downturn that engineers in the firm were reluctant to admit the mistakes. The implementation is not only the new technology side, but also the other people mechanism sides has to be initially set up since the business started Shammari (2014) such as Teamwork & Human Capital Management, Accessible Leadership, Diversity & Competent Workforce, Innovation & Continuous Learning, One Priority Professional Training, Collaborative & Creative Workplace, Multidisciplinary Knowledge, Empowering knowledge and ownership, Staff Innovation Incentive Scheme, Talent Management and Development.

Also, in the cultural aspect (Bouhnik et al. , 2018) building innovative and knowledge savvy culture "*The manager should consult with employees as to what they need most to complement the asynchronous sources; put more emphasize on measuring satisfaction from asynchronous sources to predict the value of these sources to the organization; and encourage and ensure the creation of an expert community of practice and support and maintain it thereafter"*. Educational Knowledge Nurturing, Result-Oriented KM Review, Collaborative Knowledge Carrillo & Chinowsky (2006) is crucial for Technology and Engineering sectors, IoT knowledge - Ecosystem Collaboration (Aslam et al. , 2020) and daily and weekly basis of and people sustainability internal & external networks and connectivity for Intellectual Capital Element are the unique practices of Innovation and AI and IoT industries to make micro-sme has competitiveness over the large scales companies. (Kragulj, 2020)

By implementing the systems and promoting Innovation Knowledge- Based Organization culture are assumed to be able to fix business sustainability in financial perspectives and investors, Because individuals always doubt how far micro-SMEs can grow, or will it collapse within 3-5 years since without any strong cash flow and new cutting-edge technology, it can rapidly make their solutions obsolete. Micro-SME awareness in customer

mindsets which are less engaged, but not in every circumstance. Some unique and innovative organizations with better comprehension and services get to the points with quicker and faster moving and transformation. These factors could be a key strength of the brand for customers who is passionate in technology and fast-pace progression.

2.2 A case of Things on Net (TON)'s Innovation and Knowledge-based system practices?

In the modern 0G and 5G society of Thailand, lots of micros sme and IoT start business could not be sustained since 2015, but there is a unique case study to demonstrate to be guideline for new emerging companies in Thailand like "**Things on Net**" (Things on Net, 2019) **TON** is the **Exclusive Sigfox Operator** (Sigfox, 2020) in Thailand that delivers low-power wireless networks or LPWAN for organizations globally in 72 countries. For the case study to simulate the practical ways of implementing Innovation and Knowledge-based organization, **Things on Net**, a small leading IoT company in Thailand's innovative IoT services, is an interesting case study for Thailand and CLMV in term of laying the foundation for human resource management and administration among the companies that have been launched for less than 3 years. In addition, various startups in the industry have had world class innovation and knowledge management systems; for example, projects and initiatives.

Teamwork & Human Capital Management

- This is a top priority at company. **TON** strives to build a sustainable knowledge workplace, staffed by talented employees and driven by enthusiastic and collaborative work ethics, which identifies and provides opportunities for the employees to be independently creative in developing and sharing knowledge, initiative, and solutions.

Accessible Leadershipp

- TON's Chief Executive Officer acts as head coach, who is joined by among others, channel management and solutions sales directors and task managers in a coaching role. In every flow of work, **TON** monitors the process and provides guidance, while utilizing incentive and reward schemes to sustain a vibrant, conversant environment.

Diversity & Competent Workforce

- The company has Professional Technology and AI team include business workforce and support 13 Bachelor's Degree holders, 2 with Master's Degree and 2 Doctorate Degree, they are formerly mid-career professionals from multi-national companies with world-class knowledge in different fields, namely business management, Big Data, Artificial Intelligence (AI) and Internet of Things (IoT), sales, marketing, finance as well as deployment. Owing to the team's accumulated experience, they together create a seamless flow of work every day, at every level and function, thus making the company a cohesive, competitive and impactful enterprise.

Innovation & Continuous Learning

- The company has done well to foster a genuine learning workplace that has a strong focus on nurturing young talents and retaining veterans. **TON** prioritizes the sharing of knowledge over individuality and has devised due process to monitor, assess and augment knowledge expertise sustainably. The quality of the company's knowledge is of global standard aligning with Sigfox's industry leading benchmark.

One Priority Professional Training

Professional Training area is industrial IoT solutions skill enhancement, courtesy of **TON**'s global business partner, Sigfox. **TON** has Quarterly Innovative Solutions Collaborative training with Global IoT and advanced partners, chiefly Microsoft, Huawei, AWS, HP, Samsung, DELL and Cisco. Typically, workers spend on average two hours/day assimilating knowledge, thanks to a set of casual and formal networking, namely morning staff coffee, corporate/project LINE, while keeping abreast of local/global industry news and innovations via Sigfox Global.

Collaborative & Creative Workplace

- The knowledge gained has demonstratively enabled them to design and execute the work collaboratively and creatively.

-Closer to home, its staff find themselves in an ideal position to learn and develop.

Multidisciplinary Knowledge through working with itsecosystem partners.

- **TON** uses every opportunity to gain new knowledge critical to the workers' specific task. This is done through be-spoke talent acquisition & management, hiring external consultant, supplemented by both internal and external training.

Empowering knowledge and ownership

- **TON** broadly empowers employees to deliver their performance based on new trend and tools and technology expression and provide advisory services to customer by project base and offers them a flexibility to choose and perform their tasks to suit their task and time. Approximately 80% of the workforce can develop own working hours/solutions/work methods provided they can deliver as per their commitments.

Staff Innovation Incentive Scheme

- For Innovation and Knowledge-based incentives is critical to foster a vibrant and evolving knowledge environment. **TON** recognizes and rewards idea generation and innovation. Staff participate in the Point-based ***'I-Things Award'*** which is held every month to recognize an outstanding staff who collects the highest points from colleagues based on his input at the daily sharing of knowledge, experience and innovation session via Microsoft Team.

Talent Management and Development

- **TON** spends between 3-5% of total employee expenses annually on team building, inspirational activities, training courses, personal coaching, Key Opinion Leader program, certified training, licence service.

- **TON** extensively makes use of several knowledge database of employees' skills and competencies, namely:

Product Knowledge by **TON** has SharePoint of use cases, technical specifications, white papers, product catalogs. Perusing deeper, staff has access to Sigfox Global Library.

Sensor Technological Implementation by **TON** offers real-time dashboard to project managers working on-site.

Leadership Knowledge & Team Member Reflection by **TON** comprises project planning courses pertaining to staff feedback, innovative thinking, business development, sales negotiation and daily experience sharing via daily conference calls.

Beyond the system, **building innovative and knowledge savvy culture** is also long term of non-toxic environment to IoT business. Owing to its all-encompassing business innovative culture, **TON** re-engages in some pro-bono activities to create social value and improve quality of life in our society. **TON** has reached out and invested heavily in establishing high-valued collaborative initiatives with prominent higher education institutions in Thailand, providing dedicated resources, industry standard equipment, be-spoke solutions and on-site training to co-deliver self-sustainable projects and achieve desirable outcomes, which can demonstrate the sample of micro-sme practice by **TON** as follows:

Educational Knowledge Nurturing

- In example, **TON** currently has on-going co-operations in various areas of education and training with: Sirindhorn International Institute of Technology, Sripatum University, KMUTT, Burapha University, to name just a few. Together **TON** aims to develop IoT studies at undergraduate level and enhance technical capabilities of IT professionals. This also includes an Internship Program available to suitable and interested students who could be considered to work with **TON** in the future.

Result-Oriented and Individual Knowledge Review

- Concurrently, **TON** pays attention to knowledge and lessons in carrying out the above initiatives. **TON** uses its KM expertise to review the outcome, identify potential areas of improvement so the institutions and individual students and project operators find them truly relevant and beneficial.

Collaborative Knowledge

- As the company is exploring opportunities beyond Thailand, **TON** examines how **TON** can leverage this local knowledge and experience in conjunction with Sigfox operators & **TON**'s partners et al to apply this collaborative knowledge in neighboring markets. **TON** did a tripartite webinar together with Malaysia and Singapore to enhance knowledge and innovation sharing in this region.

IoT knowledge - Ecosystem Collaboration

- Education and training are also taking place within the company's ecosystem and with relevant stakeholders. **TON** organizes webinar, consumer/channel events, online training courses in conjunction with key industry organizations, notably the Thai Programmer Association (TPA) and Thai IoT Association (TIoT).

Knowledge-Driven Organization

- **TON** endeavors to offer a balanced incentive-based staff appraisal system to acknowledge teamwork and knowledge creation in the workplace. Incentive scheme is critical to foster a vibrant and evolving knowledge environment and **TON** duly rewards idea generation and innovation.

Innovation and Initiatives based Performance Review

- As of March 2021, staff participates in the Point-based monthly **I-Things Award**, designed to recognize outstanding staff who collects the highest points from colleagues based on his/her input at the daily sharing of knowledge, experience and innovation session via Microsoft Team.

Team Communications Channels

- To recap, **TON** has the channels to collect new ideas from staff/workers. Crucial to the company's formal communications are namely SharePoint, Cloud, LINE Group subject to occasion and availability of staff. **TON** also has regular team meeting conducted in a personal and cordial manner, often with snacks and drinks. On a more serious note, there is a monthly workshop which hears ideas and inputs from everyone over the course of their work and interactions with various ecosystem parties, collects the ideas and lessons learned in a database which is conveniently accessible to staff via multiple digital static and mobile platforms.

-360-degree Conference

The majority of in-house or team meeting reflects an open, hand-on work approach so it is always noted for vivid and lively discussion/debate. In all the flow of work, **TON** monitors the process every step of the way, so can de-escalate potential issues of concerns to adhere to the solutions guidelines.

-Innovation Management

As an IoT startup, innovation/knowledge issues are typically a topic by design but a discussion of choice as well because its sales team are constantly exposed to new context and challenged to come up with new ideas to respond to new customer's demands or requirements. The channel management staff must be on the same page as well as resilient to react in one voice and deliver as a team. This is when the innovation and industry trends chat log proves indispensable in shortening the learning curb and allowing them to grasp the essence of the issue in hand prior to designing a customized solution.

Work life quality in new normal

- Post Covid 19, **TON** encourages sensible work-life balance in new normal life style. Team interaction is neither restricted to a single physical or digital channel nor during normal office hours, though **TON** obviously does not encourage staff clocking excessive working hours. Ideas always prop up and need to be shared when it matters. During the lock down when WFH is the norm, **TON** stays connected and arouse one another every day to boost up energy level. A popular activity is the **"Wallpaper Theme Competition"** initiative – a daily competition to share favorite hobbies, movies, foods, sports, etc. An accompanied image shows **"The place TON staff wants to visit post-COVID"** competition in which everyone justifies their choices. Against the background of the pandemic, not only it enhances experience-sharing, but each staff can express themselves freely, increasing bonding and togetherness when working and interacting remotely.

2.3 The Business and people sustainability internal & external networks and connectivity for Intellectual Capital Element

To ensure the knowledge cycle is enlarged, **TON** promotes internal and external knowledge and IoT guru local wide and international wide.

- **Major Shareholders**– i.e. **TON**'s weekly meeting, held every Monday to inform the shareholders of and discuss operational and business updates with department heads, namely marketing & PR, Channel Management, Deployment and Sales.

- **High Mobility Office**– i.e. **TON** operates a virtual office to create innovative space for employees, but has a physical office in Bangkok to chat and chair by non IoT and IoT industries guru to up to date technology.

- **Decision-Makers Engagement**- The monthly Board of Directors meeting and the Annual General Meeting are held to inform them of the operational progress is also a chance and channels to promote new business challenges and technology. There is also the Quarterly Business Review to discuss business plans, marketing activities as well as operational results and all stakeholders' feedback.

- **New Normal Operation** - Practicing social distancing, physical travels and face-to-face meetings are replaced by online conference platforms, with the frequency increasing due to convenient set-up and availability of key regional stakeholders, who otherwise would be kept away by important schedules.

- **New Business Context Management**- Working on a client brief can be challenging as the workers find themselves outside the comfort zone. The challenge is mitigated and managed, thanks to the access to multidisciplinary networks of the chairman, CEO to directors and managers. Similarly, they are invaluable in tackling difficult and unfamiliar issues.

- **Out-of-the-Box-Knowledge** is often acquired by engaging external stakeholders regularly and with clear end-result in mind. These activities come in different shapes and forms, ranging from attendance at trade fair, university and professional association partnership, public speaking, social media and digital channels, Clubhouse or technical webinar with other IoT operators to a well-planned Key Opinion Leader (KOL) program to sourcing/retaining international experts to upskill our staff.

- **Customer Acclimatization**- Typically, the salesperson, the solution architecture team and the task manager are well-exposed to the customers both formally and informally as they are on site-visit to learn about the latter's business and requirements. This exposes them also to the customer's partners, distributors, suppliers etc.

- **Government Affairs** - A more formal setting and approaches **TON** pursues include liaison with key government agencies or influential industry bodies, leveraging **TON**'s strengths as a leading IoT operator to implement high-valued educational partnership, social giving program for vulnerable people, working with public hospitals to build long-term, cordial relationship on the basis of shared interests of working towards a smart society in Thailand and improving the quality of life through IoT application.

- **External Networking Building -** The CEO takes the lead in building and managing reputation by implementing a visible and impactful overarching marketing communications program, supplemented by PR as well as CSR. Leading from the front, he is prolific with the numbers of events he leads or participates to fly the flag of **TON**.

- **Social Giving (Schooling for the Disabled)** - **TON** also looks to give back to society where possible by implementing an impactful CSR program. A good, viable case is Srisangwan School for Special Children in Chiang Mai which receives IoT devices (Smart Button, Level Sensor Monitoring) to enable safe & accident-free mobility on the premises. The devices are bundled with product knowledge & training without any expenses.

- **Innovation Champion** - Determined to make IoT a universal innovation in Thailand, and a greater utilization across industries and sectors, the CEO is an informed guest speaker and had fielded numerous media interviews in less than three years. It is only fair to say that **TON** has contributed significantly to enhance and expand knowledge about IoT and Smart Technology in Thailand. This strong and increasing presence has consequently elevated the company's credibility and visibility, whilst also strengthening its brand in the market.

- **Occupational Training Engagements** - are done cooperatively with key stakeholders, namely the Digital Economy Promotion Agency (depa), Thai IoT Association (TIoT), Huawei and SAS.

- **Internal & External Networking - TON**'s senior team members, subject to the topic and their individual expertise, take turn to be guest speakers at many forums organized by both global and local private sector, professional associations and educational organizations, such

as Microsoft, Federation of Thai Industries, Thai Programmer Association, Sripatum University (SPU), King Mongkut's University of Technology Thonburi (KMUTT), Mahanakorn University of Technology (MUT), Sirindhorn International Institute of Technology (SIIT) etc.

2.4 The Global brand trustworthiness for Thai IoT company

The role of Knowledge Management in creating business sustainability Aldabaldetreku et al. (2016) has examined the corporate sustainability and found that most of companies have not really implemented Knowledge Management in practice, only basic training, by ignorance of this matters, later business operations potentially less adaptive to the change. The authentic Knowledge Management system is composed of system, infrastructure, technology support, contents, and lots of mechanism to make human capital effective. Even Thailand Stock Exchange also requires Knowledge-based organization is one of criteria of considering the small and medium sized companies to be able to reach listed companies standards of Stock Exchange of Thailand (Kantasuwan, 2018) composes of 3 dimensions which are this qualitative research revealed that (1) Strategic sustainability management has been initiated based on three dimensions: economy, society, and environment, while some companies have added corporate governance and risk management or even developed self -framework (2) Strategic sustainability communication has been focused on specific group of stakeholder by analyzing expectations in order to develop suitable content and tactics (3) Stakeholders-oriented and digital channel have been initiated as the outlook and tend of strategic sustainability communication.

Also, the study of Santoro et al. (2017) regarding The Internet of Things in Building a knowledge management system for open innovation and knowledge management capacity “the research employs structural equation modelling on a sample of 298 Italian firms from different sectors. The findings indicate that knowledge management systems help in creating an open and collaborative ecosystem, and in exploiting internal and external flows of knowledge through the development of internal knowledge management capabilities; which in turn increase innovation capacity. The research further draws on its findings to identify significant scholarly and managerial implications, and to prescribe future research directions” which confirm that Innovation and Knowledge Management make IoT companies sustainable and enlargeable.

In Conclusion, the micro sme and startup companies to build trustworthiness for Thai IoT company, the critical factors which are Knowledge Management system, A possession of IP and innovation, Developing internal & external networks and connectivity Intellectual Capital Element and knowledge networks engagement, Global standard in people and financial management, Global citizen standard and cultural skills development, Cutting edge technology updated with optimization. Successful implementation of the innovation and knowledge management creates trustworthiness for Thai IoT company toward every segments of customers as well as overseas investors and financial institution and Stock Exchange of Thailand (SET) to ensure the trend of growth and suitability.

Conclusion & Implication

From the mentioned ~~l~~ aspects of transforming **micro-SME company of IoT industry** toward global practices for business growth as pioneer of Thailand, there are managerial implications for young CEO groups of Thailand in order to learn and obtain managerial implication listed as follow: First, CEO of **micro-SME company of IoT industry** must design fundamental knowledge and innovation ecology for talent development since the business launch. Second, the received and delivered knowledge must be officially engaged with 360-degree partnerships to be able to equip total solutions and spectrum of IoT not solely focused on platform, telecommuting operators or network. Third, regular and daily knowledge and innovation culture building are critical factors of innovation success and competitive capability against large companies in telecommunication industry. Forth, international recredential and innovative leadership recognition are staff prides and engagement for long-run success. Correspondingly, knowledge management and innovation tools can contribute to an increasing brand awareness as the global brand trustworthiness for Thai IoT company is beyond local Thai companies rooted with long-term staff engagement and commitment. To finish, cross-knowledge collaboration between Thai IoT associations and foreign IoT partners within a community fabricates the sustainable growth of the emerging IoT and startup companies.

For theoretical implication, theoretical framework and models of **large-sized companies** and IoT and telecommunication operators are partially suitable to **micro-SME level** in practices since the large-scale companies can invest in digital database and events, outside guest speakers and consulting services with average cost per individual lower than the **micro-SME** companies. However, if bringing brand, public relations, and customer engagement models to thrust knowledge-based and innovation-based theories into practices, the astonished results would appear and speed up the company success in short run.

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