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Student name:	CHAK, Suet Ching	Student ID number:	2124403
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Visions for the Future

– Theoretical Perspectives on Management

Submitted to : Prof. Eddie Yu

Assignment:

An Analysis of Implementation of Innovation Strategy and Using
the 3H Framework for Managing Innovation in an Enterprise

Student name: CHAK, Suet Ching

Student number: 2124403

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An Analysis of Implementation of Innovation Strategy and Using the 3H Framework for Managing Innovation in an Enterprise

Suet Ching CHAK
Student no. 2124403, UWTSD and HKMA

Abstract

Using the information and communication technology (ICT) has become a basis for doing business today. This paper is a report after conducting a comprehensive study on innovation management and explaining use of technology in an enterprise. Innovation includes the form of organizational, process, marketing, and customer innovation. Managers can select either buy the ready-made computer systems or build an in-house R&D department. The selection criteria depend on the financial ability and employee's willingness to change. Innovation and R&D involves technological skills, under these circumstances, Head dimension (H2), decision to innovate, and Hand (H3), operating technological systems, seem to be the most related dimensions. Hence, an enterprise also needs functional managers who provide appropriate leadership and motivation (Head H1) to make the knowledgeable workers work efficiently to achieve explicit and implicit rewards.

Keywords: Innovation, R&D, technological solution, buy or self-develop, 3H

Introduction

The purpose of this article is to discuss different approaches to achieve the mission of innovation and the related management issues during the innovation process.

Innovation has become an important mission of the private sector and national governments and is achieved by research and development activities (R&D). Therefore, innovation needs managers who manage people, equipment and other input to complete research tasks. Leadership, organizational structure and competence of research staff will affect the outcome of R&D activity.

There are various types of innovation, namely product innovation, process innovation, organizational innovation and marketing innovation, etc. An enterprise can consider one or more types. More important, the entrepreneur should think about whether they need to setup an in-house R&D department or buy the technological solutions from outside consultants or suppliers. Hence, the progress of organizational innovation also depends on the employee ability to change.

This paper also studies using the 3H approach in management of innovation. The 3H approach, namely Head (H1), Heart (H2) and Hand (H3) emphasizes taking a comprehensive approach on management that emphasizes on the quality of management. This article also adds budgetary control to supplement the management task. A budgetary control system provides proactive control rather than reactive. It is behavioural orientation. Explicit measures provide important indicators for evaluation of human and economic performance of a project or a department.

Innovation

The most common concept of innovation includes new, change, and using technologies to turn an idea into practice. “Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or process, in order to advance and differentiate themselves successfully in their market place.” (Baregheh, 2009)

Henderson and Clark (1990) had linked innovation on technological improvement on products and divided innovation into four types based on the degree of creativity and improvement: radical, incremental, architectural, and modular innovation.

Edition, Ali, & Torkar (2014) suggested two different dimensions of innovation: degree of novelty and kind of innovation. (Edison, Ali, & Torkar 2014).

Anderson, Potocnik and Zhou (2014) suggested the following definition of workplace creativity and innovation:

“Creativity and innovation at work are the process, outcomes, and products of attempts to develop and introduce new and improved ways of doing things. The creativity state of this process refers to idea generation, and innovation to the subsequent stage of implementing ideas toward better procedures, practices, or products.”

The technological environment in the world

Let’s introduce the recent development in technology in the world. United Nation (UN) produces a world-wide investment reports every three years. According to the World Investment Report 2019, top 100 global companies invested more than US\$350 billions in R&D in 2018, this amount reached over one-third of global business-funded R&D. The key industries contributed to R&D included pharmaceutical, ICT (information and communication technology), and automotive. Table 1 shows that the top three R&D investors, all coming from technology and digital-related industries. Amazon.com and Google (Alphabet), two of the world’s most profitable companies, generate their profit from ongoing high investment in R&D.

The right column of Table 1 shows “R&D Intensity”, this figure is more indicative as it compared R&D expenditure to total revenue (i.e. R&D \$/Revenue \$) of the company. It seems the strategy of pharmaceutical companies, Roche, Novartis, Pfizer, make continuous investment in R&D. It may be due to the product life cycle of their medical products. The length of patent right of a medicine is limited and its price decreases year by year.

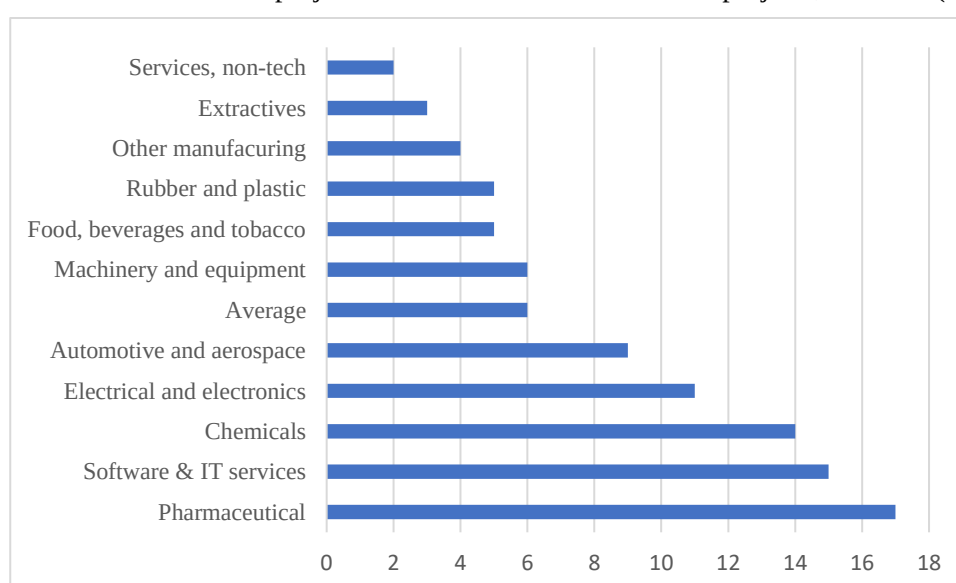
Table 1: Top 20 R&D investors from the top 100 MNEs (global), by expenditure, 2018

Ranking	Company	Country	Industry	R&D Expenditures (US\$ billion)	R&D Intensity (R&D/revenue)
1	Amazon.com	US	Tech	28.8	12.4%
2	Alphabet	US	Tech	21.4	15.7
3	Samsung	Korea S.	Tech	16.5	7.5
4	Huawei	China	Tech	15.3	14.1
5	Microsoft	US	Tech	14.7	13.3
6	Apple	US	Tech	14.2	5.4
7	Intel	US	Tech	13.5	19.1
8	Roche	Switzerland	Pharmaceuticals	12.3	20.3
9	Johnson & Johnson	US	Pharmaceuticals	10.8	13.2
10	Toyota	Japan	Automotive	10.0	3.6
11	Volkswagen	Germany	Automotive	9.6	3.4
12	Novartis	Switzerland	Pharmaceuticals	9.1	16.5
13	Robert Bosch	Germany	Automotive	8.7	9.2
14	Ford	US	Automotive	8.2	5.1
15	Pfizer	US	Pharmaceuticals	8.0	14.9
16	General Motors	US	Automotive	7.8	5.3
17	Daimler	Germany	Automotive	7.5	3.9
18	Honda	Japan	Automotive	7.3	5.1
19	Sanofi	France	Pharmaceuticals	6.7	16.0
20	Siemens	Germany	Industrial	6.4	6.7

Source: UN Investment Report 2019

In addition, the world investment report 2019 also provides an analysis of R&D expenditure on industrial base. Table 2 shows that pharmaceutical, software & IT services, Chemical are industries spent most in R&D. This analysis would help entrepreneurs know more about the future development trend in the world.

Table 2: R&D-related projects as a share of total announced projects, 2010-18 (Percent of projects)



Source: UN World Investment Report 2019, UNCTAD

Innovation achievement resulted from R&D expenditure

Table 3 shows the ratio of R&D to GDP 2020 of the top ten countries in the world. I observe that eight of the ten countries have a population of less than 100 million and therefore conclude that their governments encourage automation in their daily life to reduce the demand for labour work. In fact, automation in manufacturing has caused losing of job in the repetitive and codified operation. The labour-disruption trend is spreading to the service industries in recent years that will cause further unemployment in the labour-intensive sector.

Table 3: The top ten countries of ratio R&D / GDP 2020

	Country	R&D / GDP 2020 (%)	Population 2020 (million)
1	Israel	5.436%	9.22
2	South Korea	4.815	51.78
3	Sweden	3.527	10.35
4	Belgium	3.477	11.56
5	U.S.	3.450	329.50
6	Japan	3.275	124.84
7	Switzerland	3.147	8.64
8	Germany	3.144	83.24
9	Denmark	2.962	5.83
10	Finland	2.913	5.53
	OECD average	2.681	

Source: OECD

R&D in China

Innovation seems to be a political strategy implemented by the Chinese government when facing huge volume demand in public transportation, food, and electrical home appliance. The success of Apple phones, Google and Amazon also make the Chinese government participate in big data collection and national-wide telecommunication.

The All-China Federation of Industry and Commerce released a report reviewing China's innovation landscape of the top 1000 Chinese privately-owned enterprises that spent the most in R&D and owned the most patents right. The top three technological fields of R&D in China in 2021 was listed on Table 4.

Table 4: Top three technological fields of R&D in China 2021

1	Manufacture of computers, communication devices and electronic devices
2	The Internets and related service
3	Manufacture of machinery and equipment

Source: Website of China Intellectual Property

Table 4 shows that China's top R&D fields are slightly different from Table 2, UN World Report. R&D requires high return to cover the high expenditure. The above innovated products made in China are very popular in the global market. However, the pharmaceutical products made in China have limited markets outside China. Drug requires compliance to strict regulation and get registration in individual countries.

Table 5 shows the most popular field engaged by the top high-tech enterprises is Internet and related service. As there is no figure of R&D expenditures 2021 available today, the figures of 2018 can be used as reference as shown in Table 6. It is no doubt that Huawei become the top leader in China as its huge amount spending on R&D.

Table 5: The top 10 private-sector enterprises of high R&D spendings 2021

	Company Name	Technological Fields
1	Huawei	Manufacture of computers, communication devices, electronic device
2	Alibaba	Internet and related service
3	Tencent	Internet and related service
4	Geely	Automobile
5	Baidu	Internet and related service
6	Jingdong	Internet and related service
7	Meituen	Internet and related service
8	NetEase	Internet and related service
9	Midea	Manufacture of electrical machinery and equipment
10	Lenovo	Manufacture of computer, communication devices, electronic devices

Source: chinamagazine.com/en/news-show.asp?id=12226

Table 6: Top R&D investors in China, by R&D Intensity 2018

	Company	Industry	R&D Expenditures (US\$ million)	R&D Intensity (R&D/revenue)
1	Huawei	Tech	15,300	14.1%
2	Tencent	Tech	3,465	7.3
3	China Mobile	Telecom	6,421	5.9
4	Midea Group	Industrial	1,218	3.1
5	Lenovo	Tech	1,274	2.8
6	Qingdao Haier	Industrial	739	2.7
7	China Communication Construction	Tech	1,457	2.0

Source: UN World Investment report 2019

China's innovation success

Technological development has become one of the top strategies initiated by the PRC government and has implemented for a number of years.

According to preliminary estimates, China's R&D investment in 2021 reached a record high of RMB2.7864 trillion, a 14% increase than its previous year 2020. However, China's 2020 R&D/GDP ratio of 2.41% was still lower than OECD's average of 2.68% that may have affected the ranking of innovation on Global Innovation Index (GII).

We would understand more the importance of innovation, taking China as an example, how R&D made China become one of the world's leaders in science and innovation (ec 2017). The following information was collected from the website of European Commission and by Internet Search.

- China was the most active investors in digital and ecosystems in the world, mainly active in big data, AI and fintech. Its mobile payments value 11 times that of the US because of its huge e-commerce.
- There are 1.02 billion Internet users in China in January 2022, with a penetration rate around 70%. China's e-commerce customers come from not only China but all over the world. China is the world's largest e-commerce market, account for around 50% of the global e-commerce transactions value starting from 2020.
- China accounts for over 30% of global ICT (Information and Communication Technology) goods exports.
- China has become a world leader in a number of high-tech industries, such as drones, robotics, aerospace equipment, auto devices and medical devices, etc.
- China has become competitor in fast growing high-tech sectors, like nuclear energy, new energy vehicles, wind and solar PV, Artificial Intelligence (AI) and some components of advanced equipment and robotic.
- Since 2016, China has had the most industrial robots in operation globally. Robots and drones supported with AI have been widely used, not only in manufacturing, but also agricultural, household electrical appliances, and movie/ video productions, etc.

China gains very success from R&D and innovation. The Chinese government plays an important role to encourage digitization of payment by mobile phones, big data analysis, fintech, electrical cars and green projects. The big digital power (BAT) (Baidu, Alibaba, and Tencent) plus Xiaomi provided huge venture capital to build the powerful digital China.

China, a fast mover in the innovation world

China was ranked as 12th on the Global Innovation Index (GII) 2021 while Switzerland was ranked the 1st one and the US the 3rd. GII is produced by World Intellectual Property Organization with its headquarter in Switzerland.

China is well-known by manufacturing technological products selling at acceptable prices. In fact, China was the second big spender in the world in R&D expenditure. China may not be the first mover but is a fast mover. For example, the unmanned aerial vehicle was developed by the US and Germany after the first world war and started to use during the second world war by military service. Nowadays, the aerial vehicle has been innovated into drones and widely used in the community.

China has become the world's biggest manufacturer in the sale of drone because of technological improvement and good price.

Table 7 Lists of top 5 countries in R&D spending 2019

Ranking	Country	R&D Spending (US billion)
1	US	612,714
2	China	514,798
3	Japan	172,614
4	India	158,691
5	Germany	131,932

Source: Wikipedia.org

Background of research

R&D is essential to development of an economy and a business. Today, innovation plays a growing important role. The commercialization of innovative products offered at a competitive price would be helpful in raising the living standard of a community and the political status of the country, therefore governments would like to encourage and even give subsidy to support innovation in the private sector and education institutions.

Globalization and new technologies give challenges for management. (Walicka and Prystrom, 2015) Innovation is a strategic that helps a firm to achieve its goals. The goals could be for survival or for growth determined by its owners or top managers. It is the management's decision whether it leads the market by means of innovation or acts a follower. Not only the ambitious enterprise spends money on innovation, the market follower or small business have to do something to catch up competitors and improve efficiency by means of innovation. The degree and method of innovation depends on the financial ability of the firm and employees' adaptation to change. T

Research Methodology

This paper aims to study the implementation of the strategy of innovation and try to explain the application of 3H in managing innovation in an enterprise. This is a descriptive study aim to give a comprehensive knowledge on innovation including selection of innovation type, buy technological solutions from outside suppliers or self-developed, and managing R&D activities. The sources of innovation information and data come from related IT and management books, academic journal, Internets, press releases, and credible reports issued by UN, EU, OECD, ISO, etc.

Research Questions:

1. Is it necessary to conduct in-house R&D to upgrade a business?
2. Is the 3H approach effective on managing innovation of an enterprise?

Literature review on innovation theory

i. Entrepreneurial Innovation

Entrepreneurs must have strategies that would support the mission of business growth and profitability. Innovation, therefore, is viewed as a major key to improve corporate performance. The ability of innovation to competition and satisfy customer demands are considered good competitive advantages. (Kiveu, Namusonge & Muathe, 2019).

Camison and Lopex (2010) observed the relationship between manufacturing flexibility and performance and concluded entrepreneurial innovation is they key when implementing innovation. The senior manager is the one who initiates the innovation and make decision on the important aspect of the event.

The resource-based view (RBV) theory (Penrose, 1959; Barney 1991) states that resources and capability are fundamental of a firm, Rumelt (1987) thinks that RBV is ahead of innovation and competition since it emphasises on turning a firm's resources into unique identity. A firm's corporate-level strategy is to make use resources that are valuable (V), difficult to copy (R), inimitable (I), and irreplaceable (N), to gain a competitive advantage and improve efficiency. (Bowman & Ambrosini, 2003) However, RBV is focused on internal resources and managerial abilities but neglect external elements. The RBV theory is also compatible to the Head (H2) dimension of 3H management approach.

ii. Marketing innovation

Muithya & muathe (2020) found from their study on Kenya that dynamic capabilities being the skills of a firm aware of the changing environment while developing innovative products to respond to the changing market conditions. Similarly, firms need to make its resources efficiently within a rapidly changing environment. Innovation is the critical capability to sustain adopted by small business. (Sok, O'Cass & Sok, 2013)

iii. Process innovation

Kiveu, Namusonge & Muathe (2019) stated that the manufacturing firms in Kenya must develop the process, marketing, and organizational innovation and concluded that product innovation was not significant, it could not really help their competitiveness. They argued that product innovation involves bringing new goods to the market that are unfamiliar to consumers. More important, the innovated high-quality products are sold at a higher price exceed the purchasing ability of the people in the emerging economy. Process innovation contributes significantly to improving the efficiency of a firm's operation when Rosli & Sidek (2013) studied the impact of innovation on the performance of SME in Malaysia. Process innovation affects performance positively as it improves the

competitive advantage. Oke, Burke and Myers (2007) get the same conclusion when they studied innovation types adopted by SME in the UK. Higher competition comes from improving internal process such as manufacturing technology, expertise, better planning in the plant, and quicker delivery to customers, all contribute to achieve higher customer satisfaction.

iv. Organizational innovation

Organizational innovation extends changes to the whole organization. It includes introducing new ways of internal operation, developing new method of communication by installation of the ICT system. Complex products with a separate brand identity need additional organizational support. (Lin, 2018) Lin conducted a case study of Lexus Motor and found that organizational support is essential to a branded product which needs not only high amount of R&D expenditure but also complement by promotion and marketing network. Cummings and O'Connell (1978) identified the two major reasons trigger the organizational innovation: (i) discrepancy between goals and performance, and (ii) opportunistic surveillance. Variables that affect innovation include goals, structures, organizational control and coordination process, leadership, organizational slash, and environment.

v. Product innovation

The information about a product, namely specification, ingredients, design, target markets, post-sale service, etc. is considered confidential. This is more important to the pharmaceutical, technological, electronic and branded products. Product differentiation and improvement in product quality would result in higher sales quantity and price.

v. Innovation support to small / medium firms (SME)

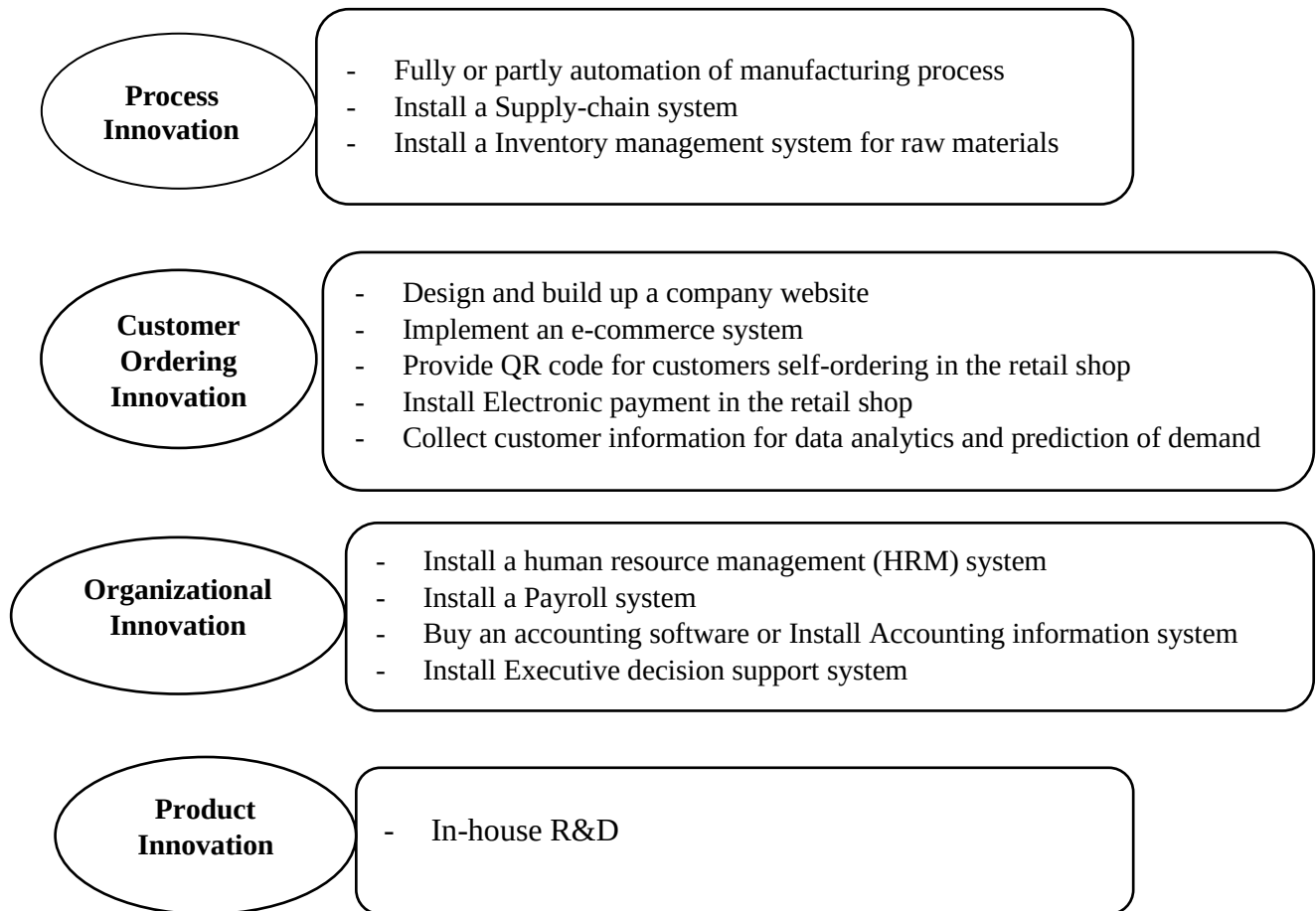
SMEs play a major role in most economies especially in developing economies. According to the statistics of World Bank (2019). Their contributions to the community are tremendous, around 40% of national income (GDP) in emerging economies and 90% employment worldwide. Therefore, the World Bank introduced innovation in SME finance such as e-lending platforms to support SME's upgrade of their business including e-invoicing, e-factoring and supply chain financing. Benchmarking seems to be the strategy of SME's product innovation.

Analysis of the Implementation of Innovation Strategy

a. Is it a must for private enterprises invest huge amount in R&D?

“Innovation activities need to address high degrees of variation and uncertainty, particularly during the early creative phases..... Innovation initiatives involve risk-taking and not all of these will result in innovation” (ISO56002, 2019)

Technology advancement makes lots of business systems available in the market today. I herewith introduce some examples of technological systems to help different functions of an enterprise as part of innovation. The manger can start computerization from buying one or two systems from the solution suppliers who will do adjustment to meet individual customer's requirements and provide maintenance. The firm still need to do data protection and customer privacy.



b. Buy or self-develop technological systems?

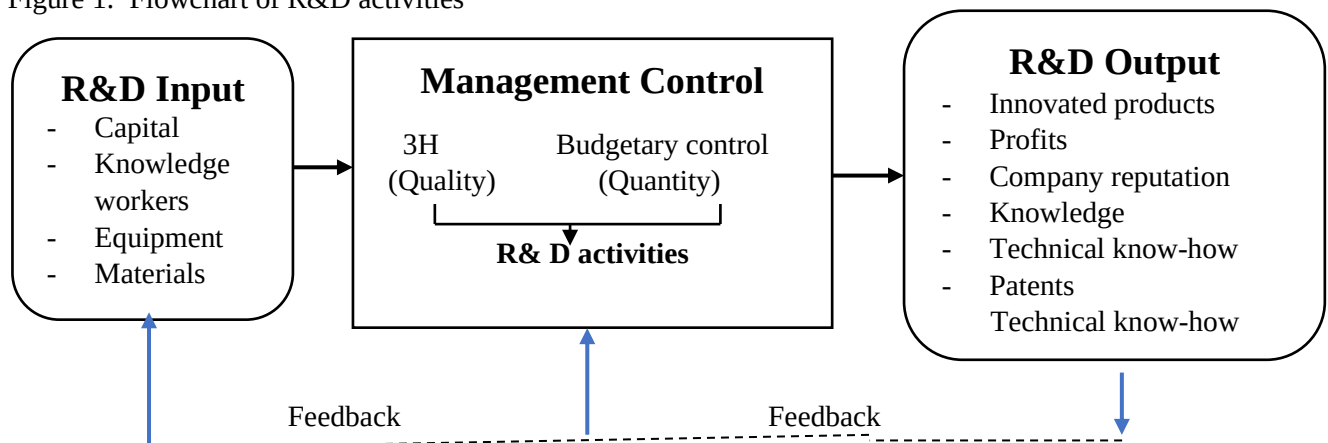
It would be very expensive to buy a whole ERP (Enterprise Resource Planning) from the solution suppliers or setup an IT team to self-develop all the computer systems. It is not necessary to do so especially for the small and medium firms who can select what they need. For examples, a restaurant can buy the customer ordering system from the IT supplier who can adjust the standard system following its menu; a small manufacturer can install some automatic equipment to handle the complicated or bulky operation and buy an inventory management system to handle various types of raw materials and merchandise. Similarly, there are a lot of accounting software available in the market that are designed to meet different industries of SME including manufacturing, retailing and service, etc. One advantage of the standard products is that they are ready to use and usually have less defects. The user can ask for support by paying maintenance fee, therefore SME can avoid to increase number of employee.

The above are the transactional systems for operation and data analytics. There are various business intelligence systems available to managers for decision making but this needs tailor-made.

c. Building an in-house R&D department for product innovation

R&D makes the innovation dream comes true that aim to create new product distinct in the market. The big enterprise tends to make innovation by building an in-house R&D department. I herewith write a diagram to show the relationship between input, output and management process shown below

Figure 1: Flowchart of R&D activities



i. R&D Input

R&D activity (project) starts from inputs. The basic inputs for R&D activity includes capital funds, equipment, AI and robots, knowledgeable workers, raw material and other ingredients etc. As risk of most R&D projects are high and takes time to complete, cash planning and budgetary control are essential for management control. R&D expenditure is discretionary in nature, its amount depends on the financial ability of the enterprise. Lots of countries give tax incentives to R&D expenditures, tax saving may help attracting more venture capital to invest in cutting-edge R&D projects.

ii. R&D operating process and control

People control plus result control could be implemented on operation of the R&D department / project. People control means recruit the people having the required skill.

It seems impossible to control the work process of a research project, the senior manager will set a target for R&D team in the areas of expenditure and time completion. Most of the time, the highest ongoing expenditure of R&D activity is salary payable to the professional staff. Good leadership and motivation are essential (Heart) during the operating process.

iii. Expected output from R&D activities

R&D output can be physical or digital products, technological networks, information system, patents, etc. The managers of commercial firms wish to get handsome return from the innovated products.

From the viewpoint of scholars and government, it is important to build knowledge data base from the R&D process and result. Some professional staff or scholar will write papers to be published in the professional journals as knowledge sharing. The private-funded entity may try to protect their database highly confidential. In fact, the protection of intellectual property from hijack has become the priority job of top managers.

The R&D activity includes both operation process, documentation, data collection and analytics, information storage for future education and training. All these will contribute to the mission of innovation and sustainable growth,

How systemization of innovation and R&D activity help management?

Innovation ability is recognized an important factor in two aspects, it makes an enterprise achieving economic success and sustaining ethical and long-term growth. More important, it contributes to a society's development and raising living standards at acceptable cost.

ISO56002 (2019) indicates "The innovation capabilities of an organization include the ability to understand and respond to changing conditions of its context, to pursue new opportunities, and to leverage the knowledge and creativity of people within the organization, and in collaboration with external interested parties."

The ISO organization further states "An organization can innovate more effectively and efficiently if all necessary activities and other interrelated or interacting elements are managed as a system" This paragraph clearly states that innovation requires systematic management.

Nowadays, we would expect that a well-designed innovation system would likely bring benefits that helps the company meets ESG (economic, social and governance) and ethical expectations from the related stakeholders and public. I would like to analyse the benefits by referring to the four perspectives of balance scorecard.

i. Customer perspective

Innovation helps to provide hi-tech products that would likely to bring about better customers satisfaction and loyalty, increased competition advantages, compliance to regulations, and enhance company's reputation, etc. Inventory waste would reduce from better prediction of customer demand.

ii. Internal business process perspective

Manufacturing automation would increase productivity and efficiency, increase yield and decrease defect rates, and better scheduling of the supply-chain system. All this will help employee work

more efficiently. However, some employees are resistant to change. Technological advancement has caused job lost, so called innovative disruption.

iii. Organizational growth and employee satisfaction perspectives

The overall technological level of the organization will upgrade after innovation. In addition, the recruitment of high-skilled employee and training of existing employee would also cause higher employee satisfaction. However, some employees are resistant to change, therefore innovation would cause layoff. Reduction or replacement of existing employee would likely affect morale and company reputation in the short term.

iv. Financial perspective:

Any R&D or upgrade in facilities require cash outflow at the forefront. The outcome of certain research projects may be highly risky. R&D investors would expect innovation generating increase revenue from innovated products/ services, decrease cost and waste, increase company value and stock price, attract new partners and more investors, etc.

The concept of the 3H framework

Mr. Peter Drucker wrote: “Innovation is the specific function of entrepreneurship, whether in an existing business, a public service institution, or a new venture started by a lone individual in the family kitchen. It is the means by which the entrepreneur either creates new wealth-producing resource or endows existing resources with enhanced potential for creating wealth.”

a. What is a 3-H framework?

The 3H is combined of Heart (H1), Head (H2) and Hand (H3) that are linked to three aspects of an organization: people (H1), organizational structure (H2) and competence (H3). Suggested by Yu (1997), “the 3H is a mindset for managing people and organizational issues in a holistic way” . (Yu, 2020) The 3-H framework is a methodology for managing people and activities in a holistic way to ensure individual employee’s task aligned to the organizational goal efficiently and effectively. The relationship between the three elements is expressed as follows by Prof. Yu. (1997)

Organization Performance (OP) is the function of $f(H1 \cap H2 \cap H3)$

Where as :

H1: Heart (Organizational behavior, culture, communication)

H2: Head (Organizational design, structure, objective and strategy)

H3: Hand (Operational level function, employee competence, training, reward, recruit)

In short, the concept of holistic management approach includes effective leadership (H1), effective strategy (H2), and workforce competence (H3). The achievement of company goal requires setting the right direction by senior management, planning and control of tasks by middle managers, and providing resources to employee to complete the task within the time limit. Better leading and motivation would enhance the commitment and result in better performance.

b. Literature review of 3H

Each of the 3-H framework comes from well-established theoretical groundworks that have already been recognized by academic scholars and entrepreneurs.

H1 –The Heart-oriented dimension

Yu thinks “Heart” plays a central role to the 3-H approach. Heart-oriented means managers caring about motivation to employee to gain their commitment to complete the tasks through coaching, training, communication and building trust.

Janes Burns (1978) introduced two types of leadership: transactional leadership and transformational leadership. For innovation, transformational leadership seems more appropriate. Leader and followers make each other advance to a higher level of morality and motivation through the strength of their vision and personality. There are four components to transformational leadership: idealized influence, inspirational motivation, intellectual stimulation and individualized consideration. (Bass, 2010) Transformational leaders do one thing transactional leaders do not, which is going beyond self-actualization. “Head is the most challenging part among all three dimensions because dealing with people and changing their attitudes and behaviour is the most difficult job” (Yu, 2019). On the other hand, employee is encouraged by remuneration to work under transactional leadership. Extra effort is motivated by extra bonus. Other types of leadership, authentic leadership, leader-servant leadership, empower leadership, adaptive leadership and discursive leadership can also be used for R&D activity.

Motivation plays a key role of Heart domain. After the second world war, commercial activities resumed that made motivation concerned by managers and scholars. The early one is Maslow’s five hierarchy starting from physiological needs, then safety and securities needs, belonging and social needs, esteem and status needs and the top self-actualization and fulfilment needs. (Maslow, 1943). Maslow thinks people tend to seek a higher motivation step by step. His theory seems showing the general situation of common people. However, he neglected the aggressive people or artists who

give up routine jobs and pursue personal interest. Alderfer (1969) further developed Maslow's hierarchy of needs by restructure it into his ERG theory, the need for **E**xistence, **R**elatedness and **G**rowth. Alderfer made his ERG theory more flexible than Maslow's hierarchy of needs. Alderfer stated that when one person got frustrated when moving to another need, he or she will turn back. Vroom (1964) introduced three variables, valence (V), expectancy (E) and instrumentality (I), within his expectancy theory. An individual will behave or act in a certain way because he/she are motivated to select a specific behaviour for getting the expected outcome. The value of the outcome (valence) to the individual is subjective. Expectancy theory focuses on the mental processes regarding choice that an individual makes. We can interpret that the core of Expectancy theory is the cognitive process that different people are motivated by personal expected outcome.

To conclude, the outcomes of heart-driven leadership include high morale, good employee loyalty, low attrition rate, commitment to work etc. The ability of leaders is the determinant factor. We would expect the leader has a high interpersonal and communication skills to inspire, influence, and lead subordinates working at their best efforts to complete the task.

H2- The Head-oriented dimension

Head (H2) means the mind of an executive or a senior manager who are engaged in strategy formulation for achieving the company goal. It is a goal(s) in the right direction. The quality of the Head person include visionary, strategic thinking, analytical mind, planning, and organizing, etc.

One of the well-known theories is Michael Porter's industry analysis. Porter (1979) identified five forces that fall into two dimensions. The horizontal dimension includes the threat of substitute products or services, the threat of established rivals, and the threat of new entrants; the vertical dimension includes the [bargaining power](#) of suppliers and the bargaining power of customers, these are the upstream and downstream of the supply chain system. Porter developed his five forces framework in reaction to SWOT analysis, which he found too theoretical while his five forces reflect the reality in industrial organizational economics. SWOT analysis (or SWOT matrix) is a [strategic planning](#) and [strategic management](#) technique used to help to identify Strengths, Weaknesses, Opportunities, and Threats related to a company. This is also called situational assessment. This technique is designed for use in the preliminary stage of study a project of a business. The SWOT analysis guides researcher to look into the internal strength and weakness of an organization and compare itself to the external situation whether there is any opportunity or threat faced by the organization.

The focal point of head-oriented is to develop an organizational structure and dynamic culture for survival and growth in the ever-changing market. Nowadays, the challenges arise not only in the domestic market, but all over the world. The environmental protection, anti-discrimination, equally

opportunities rights, politics and trade wars, shortage of food, delay of international cargo, all these increase cost to commercial activities

H3 – The hand-oriented dimension

Hand herewith represents the operational-level functions, for examples, HR process, marketing, selling and distribution, accounting, IT, data collection and storage etc. Most of the operational works have been replaced by automation and technological systems. A company can make use the theory of product-life-cycle for pricing and prediction of sales volume during the stage of initial, growth, maturity and decline. The BCG matrix (1970) can help a business to evaluate its product or marketing status either situated at star, cash cow, dog or question marks. After understanding its own situation, the senior manager can decide the strategy for future, either build / increase, hold, harvest or divest investment.

Discuss application of 3H on an R&D department and technological system

I will classify the technological system and R&D department into three areas:

- i. Operation process system: a research project carried by the technical staff usually work on group basis.
- ii. Budgetary control system: expenditure controlled by accountants.
- iii. Communication and information system: Data collection and storage by IT staff.

Choosing the right research project or technological system is the first but most important step. This is the decision of senior managers who will consider the corporate mission, strategy, organizational strength and weakness, market opportunity and competition, and source of financing, such that the Head (H2) dimension. The operation task of R&D or the technological system are carried by technical staff, such that the Hand (H3) dimension. Management by exception could be adopted after the technical people understanding their task and making use the facilities. Leading and motivation are necessary to encourage the technical staff to work more efficiently and effectively. The transformational or empower leadership would be appropriate to motivate the knowledgeable workers achieve needs of recognition, growth and self-satisfaction. It would be better if the company can provide bonus if the R&D team completes the project in time and at cost lower than the budget. Monetary reward could be a valid motivator generally accepted by most people (Valence) at end of the task.

Key success factors of 3H integration

- i. Top management's genuine commitment to support the 3H driven innovation / R&D activities.
- ii. Delegate the R&D team carry out the research work in their own way, listen to their suggestion for building trust and confidence, and help them to solve problems.

- iii. A reward scheme is provided as recognition of the success outcome of R&D.
- iv. The interior design of the workplace shows culture of innovation, teamwork, open communication, taking into accounts employee's physiological needs.
- v. Leaders build a trust atmosphere between managers and employee.
- vi. The top manager raises innovated but feasible targets that inspire people.
- vii. The degree of interaction ($\cap$) of the three dimensions is situational depends on characteristics of employee, division of work and organizational structure.

Conclusion

Referring to the two research questions, the answer is yes. "Digital innovation and new business models are driving transformation, including of jobs and trade" (OECD, 2017).

With the support of automation and information systems, direct contact between people become less demanding that could reduce employee stress. Managers know more details and get online reports from the information system wherever the location of the workplace. The installation of smart office and surveillance camera can also reduce human supervision.

We still need quality management that the 3H could support and not be replaced by AI robotics and cutting-edge equipment.

Research limited and further study

This paper provides a framework of theoretical-base knowledge for entrepreneur upgrading their organization using the modern technology. However, it is lack of first-hand data which is usually conducted by interviews. For further study, we would like to see more research on specific areas of innovation and management. For examples, conducting empirical research to find out how different kinds of leadership and organizational mechanism encourage or hinder workplace creativity and innovation in a particular country. In addition, UN encourages internationalization of business R&D (Dachs & Zahradnik, 2022). However, political de-globalization of certain advanced countries in recent years threatens the benefit of sharing R&D. We would like to see more research on the innovation strategy of multinational enterprises building R&D centers in selected areas all over the world.

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STUDENT FEEDBACK FORM

This section details the *extent* to which the assessment criteria are demonstrated by you, which in turn determines your mark. The marks available for each category of skill are shown. Lecturers will use the space provided to comment on the achievement of the task(s), including those areas in which you have performed well and areas that would benefit from development/improvement.

Generic Assessment Criteria	Marks available	Marks awarded
1. Engagement with Literature Skills	20%	
2. Knowledge and Understanding Skills	20%	
3. Cognitive and Intellectual Skills	20%	
4. Practical Application Skills	15%	
5. Transferable Skills for Life and Professional Practice	25%	

Assessment Mark (Assessment marks are subject to ratification at the Exam Board. These comments and marks are to give feedback on module work and are for guidance only until they are confirmed.)	Late Submission Penalties (tick if appropriate)		%
	Up to 1 week late (50% Max)		
	Over 1 week late (0%)		