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How can technology companies in Hong Kong enhance their business through the adoption of innovation?

Leverage the Efficiency-Centered, Innovation-Enabling Business Models



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1) Abstract

Our society witness the advent of rapid change driven by new technologies such as Industry 4.0, 5G, Artificial Intelligence, Digital Transformation and Digital Economy. More importantly, this scale of change is enormous and affecting not only technology companies but enterprises from all types of industries. The ability of companies and management to adopt technological innovation will determine not only the likelihood of business success but its ability to survive. As seen amid the recent Covid-19 saga, the adoption of technology and innovation has hastened significantly for many industries worldwide. Business ranging from food delivery, online payment, e-commerce, healthcare to online education are all embracing new technology to combat challenges arise due to social distancing.

Technology companies are at the forefront of this change since their competitive advantage rely on the use of technology. Hong Kong, ranked as one of the most innovative entity in Asia by World Intellectual Property Organization (Dutta, S.; Bruno Lanvin, B.; Wunsch, S.; 2019)[2], is a good example of how rapid changes in technologies may lead to small and medium enterprise business success or failure with its primarily outward looking economy.

Acknowledging the importance of technology innovation for Hong Kong small and medium enterprises, my research will investigate how local management in Hong Kong SMEs adopt innovation as a tool to enhance their business. However, instead of using a case study approach, my research will try to leverage ethnographic research because the adoption of innovation is similar to the adoption of new trend into a local group culture. By definition, company is a group of people and every group has its own dynamics and unique culture so ethnography is a more appropriate approach for studying innovation adoption within a group. Through ethnographic research, companies like Intel, Xerox and Lego were able to successfully create new solutions and new products by uncovering real customer requirements with detailed observations.

In their study, Loon and Chik [23] concluded that many Hong Kong small and medium enterprises (SME) sustain their business advantages by creating innovative solutions based on third party technologies. Fast changing technological landscape nowadays demands even faster pace of innovation adoption so understanding how to effectively recognize and deliver the adoption process is becoming a critical success factor of the company and its management. Since Loon and Chik have already done a case study to demonstrate the relationship between innovation and efficiency for small and medium enterprise in Hong Kong, their research has been selected to be my literature review to lay the foundation for conducting further study in my research topic.

As the current society is becoming more and more reliant on automation of our working and living processes, the use of ethnographic research will only increase to meet with the growing needs to study and understand how human and machine will interact so more effective human machine interfaces can be built. This has already been taking place in many leading companies in USA including Hewlett-Packard, Apple Computer, Intel, AT&T, Kodak, Xerox, and Microsoft. (Blomberg, J.; Burrell, M.; Guest, G. 2002:966)[17] Hence, by studying a group of high technology small and medium enterprises, I expect this research will help to develop a general dendrogram, its related hypothesis and a set of common but noticeable patterns. These generalized findings are expected to help Hong Kong technology companies to operate more efficiently through the adoption of new technologies.

In the next section, I will provide a comprehensive literature review of Loon and Chik's research on how a virtuous cycle can be built from efficiency and innovation. The final section will explain what approaches my research will employ to identify factors and patterns that can enhance such virtuous cycle of innovation adoption as suggested by Loon and Chik's

2) Evaluation of a Current Research Article

Loon, M; Roy Chik, R.; (2018) “Efficiency-centered, innovation-enabling business models of high tech SMEs: Evidence from Hong Kong” Published online: 6 February 2018 # Springer Science+Business Media, LLC, part of Springer Nature 2018. [online] Available at : <https://doi.org/10.1007/s10490-017-9558-4> [Accessed 26 Oct. 2020]

a) Introduction of Research Background

Loon and Chik carried out their study to examine in detail how environmental circumstances can influence the creation and modification of business models. In particular, they looked at how efficiency and innovation can work together to strength business models to create competitive advantages for companies. As its title suggested, it tried to prove that high technology small and medium company business models are enhanced by the virtuous cycle of innovation and efficiency, using companies in Hong Kong as a reference. Another aim of the research is to deepen the understanding of how multi-paradigms, in this case efficiency and innovation, can co-exist in a business context. In using a descriptive case study approach, this research drawn “on methods of document review, participant observation, and in-depth interviews to understand the experiences, perspectives, and worldviews of people in a particular set of circumstances.” and has included “very little effort to engage existing scholarship, either theoretical or empirical.” (Denzin, N.; Lincoln, Y. 2018:607)[6] Their research also investigate how a focused and complementary business model supported by integrated innovation and e-commerce can enhance product quality, increasing customer satisfaction and reduce time to market. Finally, this research also identified the importance of relationship between product innovation, customer relationships and government policy.

b) Justification of Location Selection

In ranking second (2019) and fifth (2020) in World Competitiveness Ranking by the International Institute for Management Development, (IMD 2020) [1] Hong Kong is one of the most efficient cities in the world. According to World Intellectual Property Organization, (Dutta, S.; Bruno Lanvin, B.; Wunsch, S.; 2019) [2] Hong Kong has similar innovative ranking as Korea, Japan and France, (Fig. 1) making it a unique location to conduct an innovation and efficiency related study in Asia. By choosing to carry out their study in Hong Kong Science and Technology Park, which is represented by its motto “Where Innovation Meets The Future”, Loon and Chik was able to access some of the most innovative small and medium sized technology companies in Hong Kong for its research analysis.

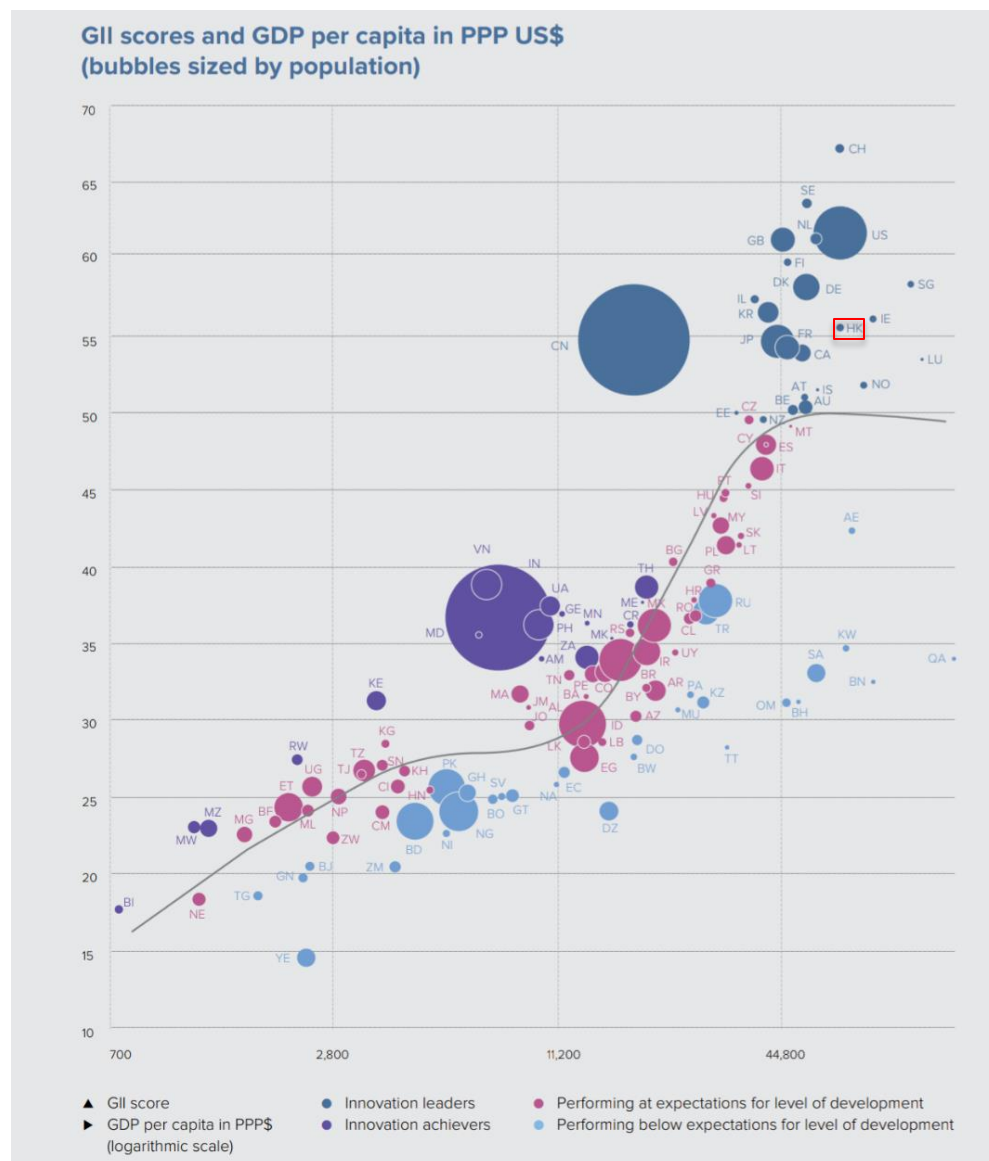


Fig 1 Global Innovation Index scores and GDP per capita in PPP US\$ (bubbles sized by population) [1:16]

c) Societal Relevance of the Research

This study is very relevant to the SME segment of Hong Kong as these enterprises have been heavily relying on its ability to reduce cost by innovating in the area of manufacturing, such as relocating to China, and marketing process rather than the use of technology. As Hong Kong government policy is now prioritizing the use of technology, innovation and branding to enhance the capabilities of companies in Hong Kong, Loon and Chik attempted to use this research to examine the role of technology and innovation plays in the design of business models of high technology oriented small and medium enterprises in Hong Kong. According to Loon and Chik, long lasting business models must be both efficient and cost effective so the use of sophisticated technology is an important way to increase the efficiency of business operations and this applies to both moderate and radical business models to enhance the ability to succeed.

d) Why Adopting a Case Study Approach

A case study approach was used to conduct their research because business world is very complex so the researchers need to be focused on collecting the in-depth insight of management thinking. A separate business model study even concluded that business models are complex and can have characteristics shared with “a complex system where a large number of parts characterized by nonlinear interdependencies.” (Massa, L.; Viscusi, G.; Tucci, C.; 2018:60)[3] With the case study approach, the research then tried to collect the information by focusing only on four firms within the Hong Kong Science and Technology Park which corresponds to a multi- site design. Hence, this case study was a bounded approach and offer comparison and contrast by using four cases. The use of multiple case study approach allows emerging theory to be identified, replicated and extended to enable the generation of more generalized theory from a business model perspective compared with a single case study approach.

e) Data Collection Methodology

Sampling of data was based on the criterion strategy as qualifying firm must be in business for at least three years to allow its business model to be fairly established. The research also used purposive sampling and the recruitment of the four firms were based upon the response from a set of pre-defined criteria that is relevant to the research questions posed. Invitation was first sent via email or over the phone and details of research were sent to those senior executives who accepted to participate in the research.

The returned survey was then used by the researcher to create a bespoke interview protocol for the interview. A mixed method approach was used where a semi-structured interview was carried out with key executives in a customized manner, complemented by the use of survey questionnaires for other staff members to validate the feedback obtained from the interview. Finally, company documentation was examined to confirm the level of technology and innovation deployment in their process to complete the information collection activities for the firm studied. In addition to traditional case study approach which “relies on interviewing, observing and document analysis”, (Denzin, N.; Lincoln, Y. 2018:59) [6] Loon and Chik constructively included the use of questionnaires in their study to complement and strengthen the quality of their data to support their findings.

The data collection carried out by this case study was well planned as the structured interview is constructed around the survey feedback so those being interviewed will not be taken by surprise. By cross validating interview responses with staff questionnaires and company documentations, multiple check points was introduced to strengthen the validity of the findings and enable the overall evaluation

process to identify discrepancies in early stages. However, certain information, such as company revenue and detailed strategy, shared during the interview may not be fully accurate due to business sensitivity.

f) Data Analysis Methodology

The interview text collected was first condensed and summarized into a brief format while survey and documentation data were used to develop a “thick description” to enable re-iterative analysis to examine the correlation between various data. “Thick description is a written record of cultural interpretation” (Fetterman, D. 2010:114)[4] so it is an useful approach to analyze company business model and adding this ethnographical aspect has enriched the breadth of the study. In establishing a common model emerging from different firms in their study through thick description, the researchers skillfully supported their observation of correlation discovery and gather readers’ consensus because thick description “enables readers to transfer information to other settings and to determine whether the findings can be transferred because of shared characteristics” (Creswell, J; Poth, C. 2018:343)[5]

Coding of data segments was the second step taken by Loon and Chik to categorize the data collected to identify any pattern or themes that exist in the data itself. Finally, the researchers also tried to develop a model or theory based on the output of the text data processed and cross checking them through triangulation against the four cases to improve their findings. The use of qualitative research techniques such as coding and triangulation has strengthened the credibility and increased the societal relevance of their research findings

g) Description of the Case Study Results

Although the research was able to identify the reliance on third party technologies by all four firms, it failed to determine the details and extent of impact external technologies have on two of the four firms, possibly due to the sensitivity involved as part of the surveyed firms’ trade secret. This is one of the limitations of case study approach which is bounded by the number of sites involved. With its smaller case study site count, the ability to generate certain theory or parameter could also be limited if some of the firms refused to share in-depth information. Nevertheless, the data analytic strategies taken by the researchers were proven to be effective for establishing high level themes as the research has successfully identified all four firms being opened to technology acquisition and willing to utilize new technologies to enhance their ability to innovate. The ability to sustain innovation by creating new differentiations to meet with customer requirements under time constraints were also found to be a key in the researchers’ data analysis in all cases.

More importantly, the research has discovered all firms relied on working closely with customers and understand their need before performing product upgrade and innovation. All firms surveyed indicated their strategies focused on making small incremental innovations to mitigate risk and investment involved to ensure they could achieve maximum return on their innovation regardless it is based on extracting internal or third party technology. By tightly integrating its value creation business with the corresponding support components, a virtuous innovation cycle was created where new business drove further efficiency in existing components through technology innovation.

h) Case Assertion

One major research output from this study was to show how elements of business can reinforce each other to create an efficiency centered and innovation enabling business model as shown in Figure 2. Loon and Chik also cited how the successful growth model of early Japanese electronic industries through incremental innovation is adopted by Hong Kong SME today as part of their business model.

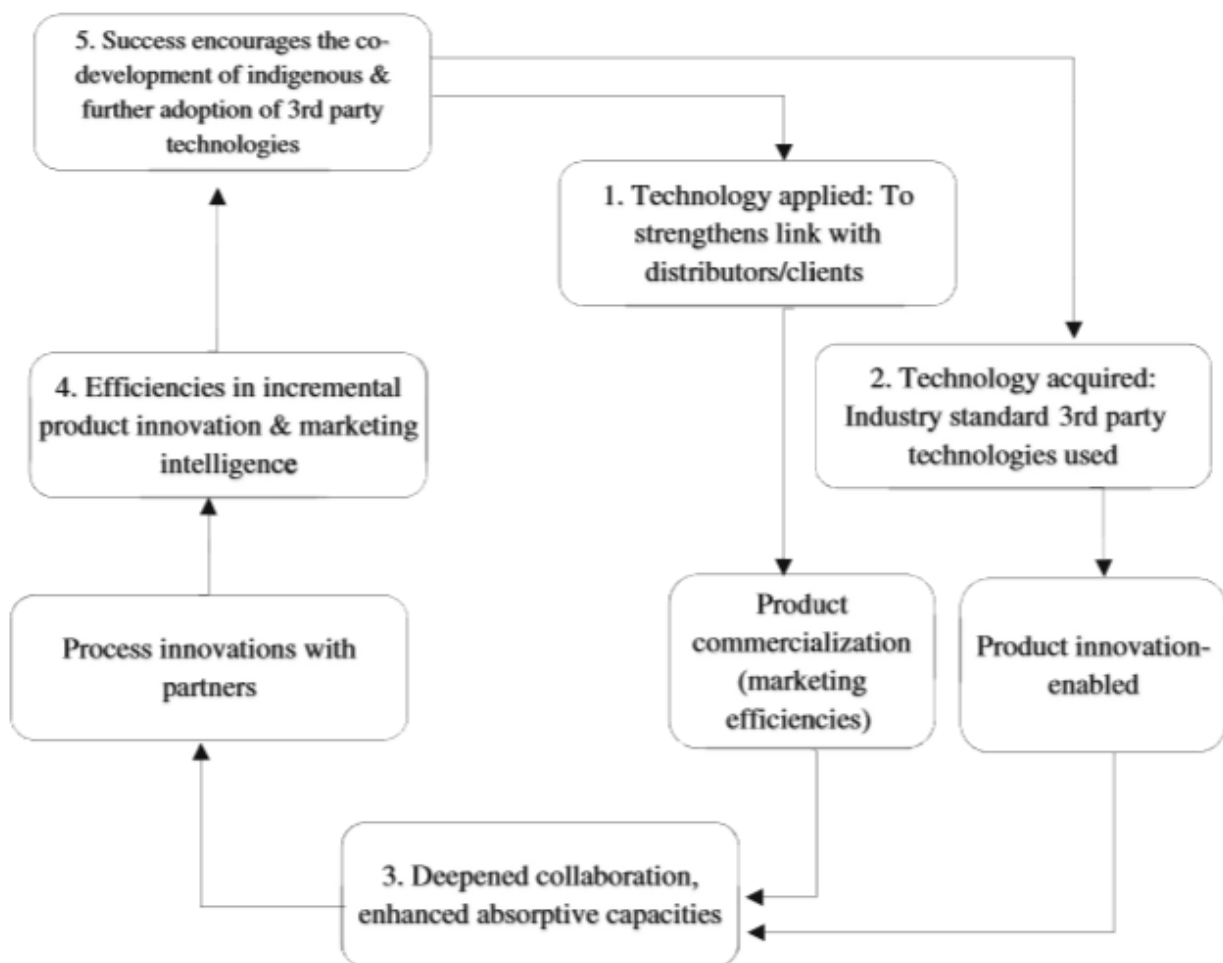


Fig. 2 Virtuous circle efficiency-centered, innovation-enabling business models

In analyzing the four firms, this study was also able to identify the subtle difference in the level of innovation and technology orientation existed in their respective business models which is represented by Figure 3. In expanding the categories of business models, this research could enable other researchers to fit their study into one of these categories respectively. The existence of variation implied further study can be carried out to explore the factors that may contribute to the uniqueness of business model formulation instead of a one size fit all approach.

Scope of innovation activity	Broad	Integrated innovation	e-commerce-supported
	Narrow	Focused	Complementary
		Internal-oriented	External-oriented
Internal/external orientation of technologies			

Fig. 3 Efficiency-centered, innovation-enabling business model typologies

Finally, the authors have concluded that most business models are evolutionary since changes in business model is risky and could be disruptive to the organization itself. However, companies need to be proactive in adapting to adjustment in business model changes to stay aligned with the evolution of its own industry to remain relevant. Although radical business model changes could be brought about by external interference, the evolution process through internal changes normally need to draw upon the resources and experiences from within the company itself.

As this research offered a new vision into the virtuous cycle in business model development between innovation and technology adaption, it is crucial for the study to highlight the level of acceptance by surveyed companies to accept such business model evolution. Low level of evolution acceptance could possibly scuffle any willingness to accept innovation but this study did not provide any solid findings in this important area as part of its case study research. Instead, it only indicated most companies preferred taking an incremental approach in business model changes.

i) Conclusion

In justifying the use of technology as a major component of innovation management, Loon and Chik argued technology is now a resource, which will create competitive advantages for enterprises including small and medium enterprise, instead of just being an output. Hence, the acquisition and management of technology as a resource in an innovative manner will enable companies, especially SMEs, to gain significant competitive advantages since all resources can be utilized efficiently and effectively. More importantly, Loon and Chik highlighted that innovation process and business model adjustment can be a virtuous cycle when technology is involved and managed properly. This is particularly relevant to SMEs as they seek to maximize their potential from both product and market perspective through the discovery, adoption and application of technology.

In addition to their case study findings, Loon and Chik, through referencing more than 120 articles, has established a self-explanatory but reasonably convincing business process model which outline how innovation and technology can live and thrive together. The study also demonstrated how the surveyed firms' ability of acquiring, adopting and applying technology to enable innovation, which in turn enhance efficiency, has helped SMEs to maintain their innovative edge and drive the adoption of more technology in a virtuous and recursive circle where collaboration is a critical component.

As this is a Hong Kong based study, it also contribute to the enhancement of understanding of business dynamics in Hong Kong for overseas researchers. By using a case study methods, Loon and Chik was able to "probe deeply and intensively to gain insight and understandings of phenomena", in this case business model used by technology based small and medium enterprises in Hong Kong, "that are new, not-understood, or unexamined." (Travers, M. 2001)[7]

This case study also opened up further research opportunities in multiple area. For instance, the variation of typologies listed in Figure 3 implied there are other factors that may be affecting the business models so further study may help to clarify and discover new elements that is not yet reported. In addition, the degree of evolution that companies are willing to accept are not clearly stated in the research report and this could before a separate study itself.

With its solid analysis effort, the findings were subsequently shared with governments from Taiwan, Korea and Singapore as enhancement suggestions to their existing government policies to foster further success in their respective high technology focused small and medium enterprises. Nevertheless, like any case study approach, this research has its limitation in generalizing to more high technology SMEs which may be from a different field of those four firms surveyed. The researchers acknowledged this limitation and proposed the inclusion of quantitative researches in future studies.

3) Research Proposal – Using Ethnography to Study Innovation Adoption in Technology Companies

a) Introduction of Research Proposal Background

For any company to be successful, having a good business model is just the beginning. To continue the investigation carried out by Loon and Chik, it is natural to extend their study and focus on innovation itself as a new research topic. One approach is to study how innovation is adopted by the management of Hong Kong based and technology focused SMEs and what roles innovation can contribute to the formation of the virtuous cycle. In their study, Loon and Chik [23] concluded that many Hong Kong small and medium enterprises (SME) sustain their business advantages by creating innovative solutions based on third party technologies. Fast changing technological landscape is pushing management to achieve faster pace of innovation adoption. My research will focus on how management can effectively realize and deliver the innovation adoption process to expand the application of Loon and Chik's findings.

b) Research Approach Selection

An ethnographic approach will be the core of our research since the innovation adoption process consists of a high level of social interaction both within and with the external context of the company. The advent of new technologies such as internet, mobile devices, laptop and social media are creating new opportunities and challenges for innovation as well as its adoption because they are changing the dynamics of social behavior. New user behavior and culture are emerging and will require adjustment in thinking especially in the management of work culture, product planning and customer expectation. Successful companies will be those that can uncover these new emerging paradigms as users and customers requirement changes. As an ethnographic researcher in this study, I will "set out to show how social action in one world makes sense from the point of view of another." (Agar, M. 1986:12)[30] This is particularly important for technology companies as they all exhibited similar requirement of innovating quickly due to the fast changing nature of their business against other competitions.

Intel, Xerox and Leggo have all encountered the impact of technological change in customer expectation successfully during the recent years through their use of ethnographic research. As ethnography focuses on developing an understanding of a problem, their use of ethnographic research approach enabled new market ideas and new products to be created through customer feedback and observation. Their success has proven the possibility of discovering how target customers may interact with innovation through ethnographic research. In the case of Intel, "Ethnography has proved so valuable at Intel that the company now employs two dozen anthropologists and other trained ethnographers, probably the biggest such corporate staff in the world." (Anderson, K. 2009)[9] This was because ethnography can be "helping firms in every industry truly understand customers and adapt to fast-changing markets." For Lego, it was on the brink of corporate failure in 2003 as "Sales were down 30% year-on-year and it was \$800m in debt. An internal report revealed it hadn't added anything of value to its portfolio for a decade" but was able to reinvent itself through conducting "the largest ethnographic

study of children in the world.” (Davis, J. 2017)[11] Xerox has gone even further to apply ethnography as part of its design consideration in dynamic parking systems in Los Angeles by complementing their big data analysis with observation of him behavior and reaction to congestion related experience. (Kerschberg, B. 2012)[12]

A more recent study by Arthur and Owen (Arthur, K.; Owen, R. 2019)[13] in “a small-to-medium-sized company developing disruptive, technology-related platforms and services in the banking and retail sectors based on big data and associated analytic” has shown the adoption of ethnographic research can even be applied in the modern era dominated by new economy. This is indeed an encouraging sign for any modern researchers looking at ways to correlate the research of technology and innovation as part of their socially oriented qualitative research. In fact, even back in 2012, Xerox Chief Innovation Office Ken Mihalyov believed “Ethnography is a strong counterpart to looking at the data a certain way and drawing conclusions from it. We can confirm that we’re working on the right problem, that we haven’t missed something and that our interpretations are correct. Ethnography helps us confirm those factors and that we’re seeing the bigger picture that includes human interaction.” (Kerschberg, B. 2012)[12]. For the digital era, ethnographic research can also be used to determine if the right user experience has been created by assessing customer reaction under certain configuration in real time.

c) Scoping the Study

My research will also be developed by referencing to the ethnographic research model given by Newbold in Figure 4 (Newbold, C. 2018)[19] and follow the milestones it has captured in a sequential fashion when my ethnographic study is conducted.

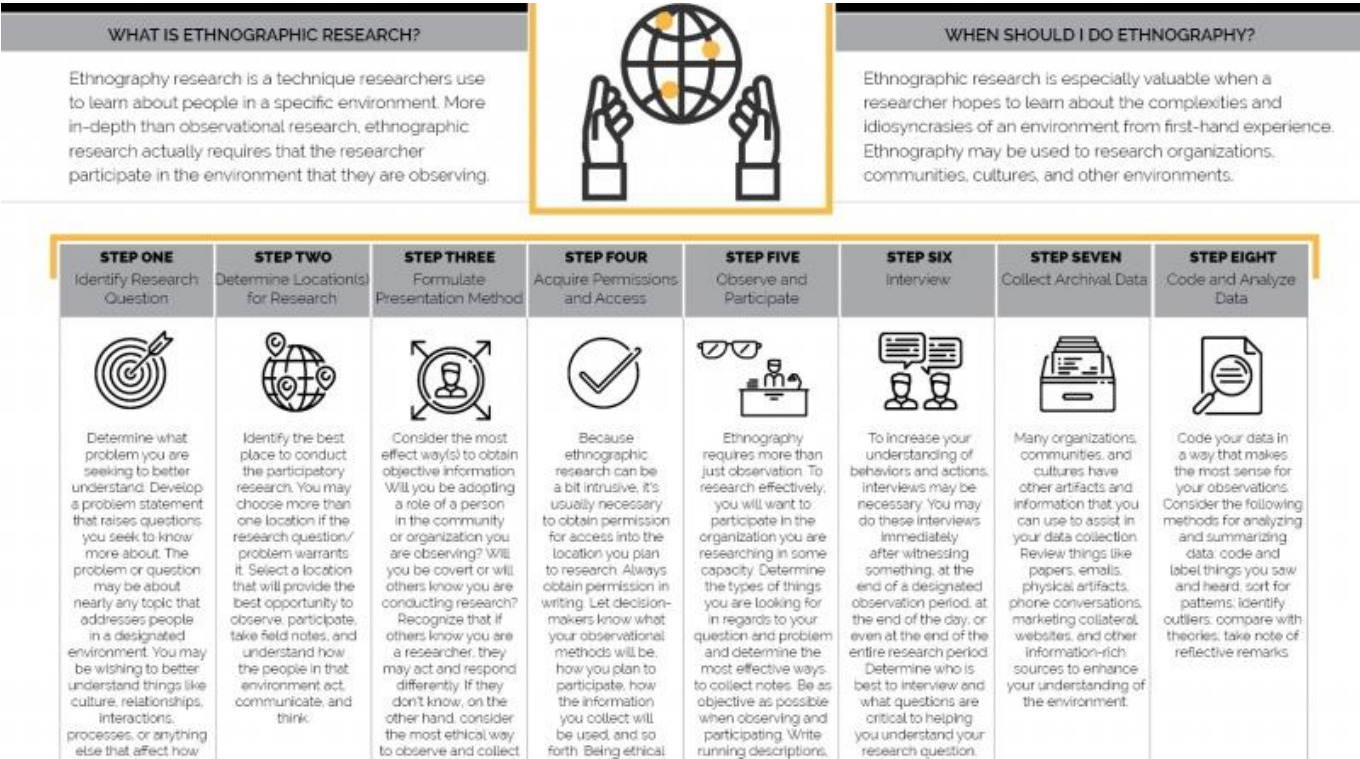


Figure 4 How to do ethnography by Curtis Newbold [19]

d) Research Question

My research will try to identify “How can technology companies in Hong Kong enhance their business through the adoption of innovation?” The expected research findings should be supported by observed patterns that occur in multiple companies that I will be interviewing or observing.

e) Research Location and Context Consideration

a. Location Selection for the Study

As Loon and Chik concluded, the companies inside Hong Kong Science and Technology Park offers a good collection of technology focused small and medium enterprises in Hong Kong. Hence, my research will continue to draw upon this pool of companies inside the Park as part of the investigation because of their ability to represent the innovation aspect of companies in Hong Kong.

b. Company and Organization as a Social group

Company is a collection of people and as a group, it will always develop and exhibit its unique social dynamic and culture that is reflected by its social behavior. Hence, management of the company needs to manage people within the company from a social group perspective, especially in the area of ideas, innovation and technologies adoption so it can be propagated smoothly within the organization.

c. Culture as a Determinant of Innovation Success

A recent study of service adoption and its relationship to national culture done in Denmark (Vejlgaard, H. 2018)[14] concluded that “if the service innovation is perceived as part of or connected to a service offering that is broadly founded in the culture, there may be a stronger causal relationship between the culture and the rate of adoption of the service innovation.” This could be an important consideration for management since according to the diffusion theory, (Rogers, E. 1983:35)[10] “An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. It matters little, so far as human behavior is concerned, whether or not an idea is "objectively" new as measured by the lapse of time since its first use or discovery.” Hence, how management introduces and incorporates new idea into the company as part of the underlying culture is critical because “The "newness" aspect of an innovation may be expressed in terms of knowledge, persuasion, or a decision to adopt”. In an individual level, management approach can create either synergy or destruction to the company through the adoption of innovation because “The perceived newness of the idea for the individual determines his or her reaction to it. Newness in an innovation need not just involve new knowledge. Someone may have known about an innovation for some time but not yet developed a favorable or unfavorable attitude toward it, nor have adopted or rejected it.”

f) Sampling Size and Company Selection

Before deciding on how the researcher should be presented, it is important for my research to choose the companies involved due to both physical and technological limitation on company site. Selection of companies could be based on company size such as office size in Hong Kong (e.g. those > 1000 sq. feet) and reputation of the company in their respective segment. Both of these information can be obtained from company and Hong Kong Science Park websites. This is to ensure only credible companies are selected in our research before seeking their approval to participate in my research.

Upon qualifying the relevant companies, my research needs to decide on the actual number of companies that will be sampled as part of our pool to strike a balance between resource availability and sample sizes. Bertaux (1981), for example, argues that an n of 15 is the smallest acceptable sample size in qualitative research, while Bernard (2000, p. 178) observes that most ethnographic studies are based on 30 to 60 interviews. Morse (1994, p. 225) outlines more detailed guidelines. She recommends at least six participants for phenomenological studies; approximately 30 to 50 participants for ethnographies. (Guest, G.; Namey, E.; Mitchell, M.; 2013:93) [8] As such, my research will aim at inviting 50 companies to allow room for invitation being declined and for information being discarding during post analysis due to poor data quality from participants.

g) Leveraging the Ethnographic Approach in Presenting Researchers and Data Collection Consideration

“Ethnography literally means to write about a group of people.” and “ethnographic approach is a holistic perspective, based on the premise that human behavior and culture are complicated phenomena and are composed of, and influenced by, a multitude of factors.” (Guest, G.; Namey, E.; Mitchell, M.; 2013:36)[8] In contrast to other approaches, holistic inquiry used by ethnographic research starts very broadly and then narrows down to the specific focus.

Through an ethnographic approach, which focuses on studying people and social interaction, researchers can carefully observe people in their natural environment or site to understand their challenges while living or operating within that context. The information gathered through interview or observation should lead the research to a deep level of understanding where cultural dynamics or meaning are embedded. By feeding the findings back to the management, managers can direct the design and development process of product to be more robust while enhancing the user or staff experience.

As we enter the age of new technology such as Internet of Things and Artificial Intelligence, technology is becoming more relevant than ever before as many devices are now part of our daily life

and interface with human directly. The development of Xerox's parking systems, human computer interface developed (Blomberg, J.; Burrell, M.; Guest, G.; 2002:974)[17] as well as smart homes are all examples of the application that is changing the world on a daily basis and our ethnographic research can make significant contribution in the enhancement of these technologies through human machine interaction.

On the other hand, Markham gave a very good reminder on how to conduct and evolve ethnographic research in the digital era by "situate ethnography as a worldview, stance, or attitude, rather than a set of techniques or methods" (Denzin, N.; Lincoln, Y. 2018:1134)[6] The ability to broaden our research vision beyond physical presence and boundaries is becoming important as companies already start to leverage offsite staff to deliver their assigned tasks through new technologies like video conferencing, email and remote file sharing. If our researchers only limit their observation to those with physical or visual presence, important information or behavior may go undetected by the "primary and trained lens" of ethnography which may even lead to wrong conclusion in some circumstances. To combat the new digital element caused by the presence of internet, Markham proposed the use of "an ecological perspective can help scholars remain flexible and adaptive." where "ethnography in the digital era" as the study of cultural patterns and formations brought into view as we ask particular questions about the intersection of technology and people in the post internet age." [6]

h) Designing the Data Collection Process Using Interviews and Questions

By collecting the relevant information through ethnographic approach, my research can provide enough information so company management can create both long-term strategy and best productive practices for their organization and utilize them to enhance the adoption innovation to create new competitive advantages, such as outstanding products and services, to stay ahead of the competition. However, even though there are multiple ways to collect data and interview, questionnaire as well as observation are still the main strategies that will be used.

From a sample size perspective, we will plan on using Morse (1994, p. 225) recommendation of up-to 50 participant companies for ethnographic studies initially.[8] The aim is to overcome the limitation of Loon and Chik's case study which only covered four companies. In all cases, the data collection process should start with a small number of pilot companies so the process, researcher's techniques and actual questionnaires can all be optimized before launching for the rest of the bigger customer group. For the entire data collection program, my research will aim at contacting and interviewing up to 50 companies and the results must be documented from the native perspective of the interviewee to retain as much contextual information as possible for analysis later.

i) Structuring the Interview Context and Framework

Even though company staff under our research program may not have problem in communicating, our data collection process will mimic those in getting of feedback from clients with speech or hearing impairment as data is provided through the observation of interviewee responses instead of client sharing their ideas in a pro-active manner. Westby, C.; Burda, A and Mehta, Z. (2003)[20] gave a very detailed description of how speech-language pathologists and audiologists should conduct their ethnographic interview with clients and this will be utilized in our study. Our interview will be structured as a channel to ask open questions, allowing the participants to select the important information to share and the researcher can use the opportunity to gain a good understanding of the social situations surrounding the participants and their colleagues especially how they perceive and understand those situations.

The framework outlined below will be used to accomplish our information collection.

- i) Questions should not be direct but be descriptive and semi-structured to create an opportunity for interviewee to share their ideas rather than the researcher dictating the direction.
- ii) A comfortable and non-intrusive environment will be setup to minimize company staff feeling intimidated by the presence of the researcher.
- iii) The focus of the interview can be provided upfront by explaining the reason for the interview and the types of questions that will be asked to the participants clearly prior to the interview itself.

j) Questioning Techniques and Examples

My research question will pay particular attention to the following techniques.

- i) Since the purpose of ethnographic research is to collect cultural information for specific groups, researcher should adopt the “ask for use” approach that may lead to more specific information. According to Spradley, “Cultural meaning emerges from understanding how people use their ordinary language.” (Spradley, J. 2003:47)[21] For example, “Give me an example of what you are forgetting,” may lead to participant sharing more specific information regarding what he or she forgets and when he or she forgets that may be important in formulating innovation adoption strategies. Conversely, asking participant the meaning of their feedback through the use of “why” may sound judgmental and assuming the participant knows the reason behind will possibly make them more defensive and less likely to speak freely.
- ii) As innovation encourages people to execute out of their ordinary routine and activities, the researcher should use more open-ended questions rather than those that create a dichotomous

response. In fact, by encouraging participant to share and elaborate in an un-restricted manner, we may be able to gather more of their preference beyond what is available and lead to the creation of competitive advantages. An example would be “In what ways does the daily work load affect your participation in the product strategy workshops?”

- iii) Repeating and restating what the informant said in their exact words would help to build rapport with participant by showing researcher is listening and not making an interpretation of the collected feedback. In addition, repeating through summarizing their comment allows participant an opportunity to correct any mistake in data recording especially when there is a change in topic. All these strategies will encourage informant to speak more that may lead to information being made available to researcher.
- iv) Human processing capacity is limited so in order to obtain the most information and avoid overwhelming and confusing the informant, researcher should avoid multiple questions during interview. Singular questions such as, “Peter you mentioned you normally do not have time to finish all the tasks. Can you give me some examples of techniques you use to try to find time to do your tasks?” will enable the informant to focus on giving more depth in his/her response to the specific questions.
- v) Leading questions tend to orient participant to respond in a particular direction and researcher should steer clear of entering such scenario. By using leading questions, participants may be convinced that researchers have already formulate certain opinion, thereby becoming more retracted and less willing to share more details especially if he or she disagrees with such opinion. Instead, the researcher should ask more open questions such as “Tell me about your experiences with using WiFi technology” rather than “What do you like about WiFi for public premise?”

k) Alternate Sources of Data

Besides direct interview and observation, other sources of data collection could be conducted by searching company websites for such information as mission statement, annual reports and chairman statements, copies of internal and external documents that is related to companies as well as other narrative description about the companies. Previous focus groups discussions would be another valuable source of information. These are all excellent source of information about the company and can be complementary to what researchers can collect directly from management of the company.

I) Data Processing Procedures and Strategies

Research data is only relevant if they can be used for analysis after researchers spending substantial amount of required effort to collect them. To make the large amount of data useful, an effective way of data management and recording put in place through coding is important for research data processing and representation.

i. Importance of the Use of Coding

According to Saldana, “Coding is a heuristic--a method of discovery--to the meanings of individual sections of data. These codes function as a way of patterning, classifying, and later reorganizing each datum into emergent categories for further analysis.” (Saldaña, J.; 2011:104) [24] For the application of coding, Lincoln and Denzin suggested, “Coding labels segments of data with terms to summarize, categorize, and account for these segments. Coding means taking data apart and defining how they are constituted.” (Denzin,N.; Lincoln,Y.;2018:740) [16]

The code, which is represented by a word or short phrase, is often assigned to capture the essence or summative attribute of the verbal and visual data. “Just as a title represents and captures a book or film or poem’s primary content and essence, so does a code represent and capture a datum’s primary content and essence.” (Saldaña, J.; 2009:3)[25] However, variations of perspectives, analytic insights and subjective experience will certainly lead to variation in coding and documentation. Hence, review of interview results is very important especially after the completion of the small scale pilot interviews so researchers can adjust their standard with other researchers involved. Their coding approach based on the results they have collected should be used for calibration before conducting the bigger scale interview and survey.

With the advancement in technology, natural language processing (NLP) products may offer a solution for researchers to enhance their ability to analyze the collected data and discover pattern previous unknown in a convenient and more consistent manner. The effectiveness of using natural language processing solutions will also be investigated as part of the pilot result review since Leeson, Resnick and Alexander concluded in their research, “A combination of computer analytics and human insight produces optimal results, so perhaps the sweet spot in qualitative analysis is a combination of machine learning and human analysis, where we take advantage of NLP to speed analysis and cross-check open coding, yet continue to rely on humans to critically evaluate results. (Leeson, W.; Resnick, A.; Alexander, D.; 2019) [26] Nevertheless, data recording and coding consistencies remain the key in pattern discovery and we need to pay full attention to this area during our result analysis.

ii) Data Analytic Methods

Even completing all the hard work in data collection and organization, the success of the entire research project will still be determined by how competent researchers can analyze and present those data. Due to the rich context-dependent data generated during ethnographic fieldwork, researchers have to immerse themselves deep into the data to extract the most from the data available. Saldana [25] used the term "data intimacy" to describe such relationship because by fully indulging into the pool of information, researchers may be able to discover new innovation opportunities that was overlooked because the informants have made their "adjustment" subconsciously to accommodate the situation without raising any questions. The ability to immerse require in-depth involvement of the researchers in all aspects of the research process, starting from creating the interview questions, executing the interview and observation on site to making field notes, coding the information and performing the analysis itself. Only this level of involvement will help researchers to effectively and efficiently discover hidden information buried underneath the existing work protocol.

Pattern identification is probably the most obvious outcome from coding analysis if information was coded in a consistent manner. Abramson and Dohan [27] have even ingeniously proposed the use of graphic representation through arrays to enable ethnographic researchers to visualize their findings and we will try to utilize this approach in our research. By identifying how information interact and inter-relate through various methods, ranging from traditional field notes to computer analysis, researchers may be able to deduce other secondary information to support its conclusion either as a new theory or new concept. Since "Our minds can intricately connect multiple phenomena together, but only if the data and their analyses support the constructions" (Saldana, J.; 2011:92)[24], new discoveries and concepts may arise when information is categorized and grouped together in unique manner by tools which can make such categorization possible. Hence, by analyzing immersive experience collected during research with new data computing technologies such as artificial intelligence and pattern recognition, we should be able to obtain more fruitful discoveries in our research to support our grounded theory or concepts.

In addition, since ethnography is about people's decision, an ethnographic decision models (EDMs) has been proposed by Bernard as a way to predict the choices that people make under specific circumstances. (Bernard, H.; 2011:522) [29] The analysis results is a decision tree that can predict decisions with dichotomous outcomes and "EDMs get the prediction right 80%–90% of the time and that's as good as it gets in the social sciences." "So, when you stop getting new reasons or constraints from EDM interviews, try building a model that accounts for at least 80% of the decisions with the fewest number of rules. Then—and here's the important part—test your model against an entirely new group of

informants.” (Bernard, H.; 2011:523) [29] As part of the results analysis, we will also try to check if this is applicable to our research data.

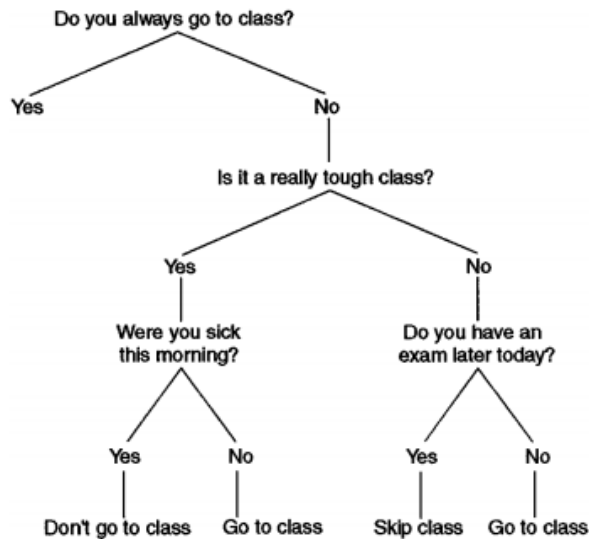


Figure 5 An ethnographic decision model after interviewing two informants (Alex and Sheila).

m) Selecting an Appropriate Presentation Method

No research is complete without sharing its findings with the audience and there are different ways how findings can be presented to make it persuasive and meaningful. However, the research must comply with all ethical requirements such as maintaining anonymity and using pseudonyms when referring to participants and locations in the report before it can be published. Nevertheless, "...the major task of writing [about our research] involves working out how to make contextually grounded theoretical points that are viewed as a contribution by the relevant professional community of readers." (Golden-Biddles, K.; Locke, K.; 2007)[28] Hence, the final structure of the research presentation should be based around the categories or themes that have emerged.

Since this research is about finding the relationship between innovation adoption and business enhancement rather than social injustice or corporate drama, the writing style will not likely to be critical or impressionistic. As the investigation is aimed at helping small and medium sized enterprises to improve, it is also unlikely to be confessionally written. On the other hand, since the research is attempting to propose ways to improve the adoption of innovation, it is unlikely to be purely descriptive and narrative. Hence, the research is likely to be presented in an interpretive manner since "Writing interpretively aims for higher or deeper levels of thought — the “big ideas” about the nature of what’s been investigated” or an analytically manner as it “presents the researcher’s systematic procedures and thinking of how the data come together to explain how things work.” (Saldaña, J.; 2011:148)[24]

4) Expected Research Finding

Benefits of ethnographic research approach include capturing the visual and emotional behavior of users through observation, detection of user's behavior in different contexts, and identifying discrepancies between what people say and what they do. All these may lead to the revelation of unarticulated needs especially when a personal relationship is built between the research participants and the researcher. The new discovery may identify new products that could be valuable to particular group(s). According to Intel, "Ethnography has proved so valuable at Intel that the company now employs two dozen anthropologists and other trained ethnographers, probably the biggest such corporate staff in the world. High-tech companies have to date employed the lion's share of corporate ethnographers." This is also acknowledged by Xerox which has also shown high profile presence of ethnographic researchers on their website.

Hence, by the end of this research, we expect the following will be achieved

- a) To establish a pattern that can be used to deduce how likely management of technology companies will be successful in adopting innovation to create efficiency improvement in company operation and increase the bottom-line
- b) To utilize ethnographic decision modeling technique a decision tree as part of the finding. One of the most compelling reasons to choose EDM methodology is the ability to create a highly informative dendrograms that can be adopted easily from a programmatic perspective as each decision point can also be considered as a potential intervention point. (Guest, G.; Namey, E.; Mitchell, M.; 2013:324)[8] An example of dendrogram is shown below in Figure 5.

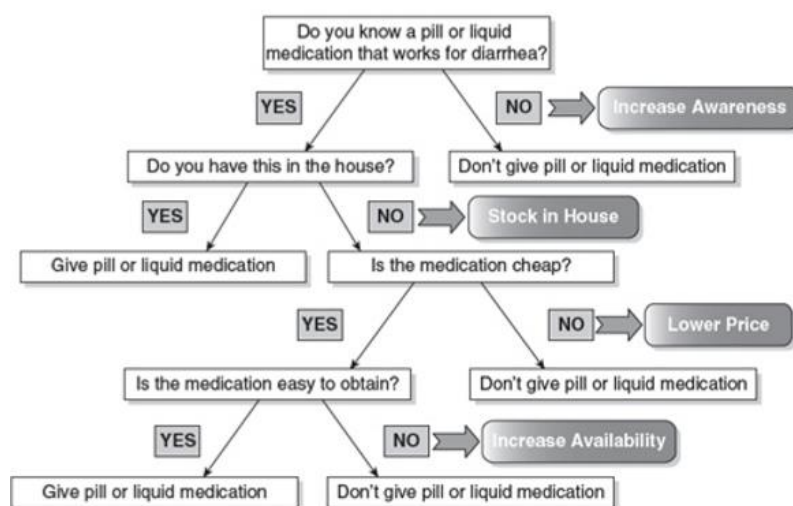


Figure 6 Partial Decision Tree—Mothers' Decision to Medicate Child With Diarrhea [8]

- c) My research should also include some hypotheses since ethnographic research is an inductive approach to understanding. As an open-ended and discovery-oriented approach, “ethnography allows knowledge to emerge rather than being forced into pre-determined categories” through observations because “Compared to other research methods, ethnography is most likely to result in completely new and unexpected learnings, by being open to what is really there, rather than being constrained by what is already known, or presumed to be relevant.” (Perry, B. 2003:2)[15]

5) Limitations

As many companies involved in this research are small and medium enterprises, the quality of data collection through observation on site in this research could vary, depending on such factors as staff attendance and shared space available for researcher which may limit the level of unease created during the survey period. More importantly, maintaining data consistency between observation and documentation is not an easy task and it could be time consuming, labor intensive and may even require a team of analysts. In fact, the limitations faced by researchers for this investigation is similar to those faced by scientists when they tried to create a new human computer interface. (Blomberg, J.; Burrell, M.; Guest, G.2002:969)[17]. “The limitation of human memory is another reason why interview data can differ from observations. When asking participants about past events, or recurring patterns of behavior, our memory may be selective and skew responses in any number of directions. In many cases, these tendencies occur in predictable patterns (Bernard, 1995). The complexity of social life is another reason individual accounts of an event may miss certain relevant details. The environments in which humans interact are extremely dynamic and complex-composed of social relationships, artifacts, and physical spaces-which can make it difficult for individuals to fully envision, let alone articulate, after the fact, what is going on.”

Another major limitation is the subjective bias and consistency of role taken by the researcher as an observer which relates directly to his or her level of integration into the events and environment. As Guest, G.; Namey, E.; Mitchell, M.; (2013:31)[8] stated “every part of any research process is influenced by, and filtered through, the researchers’ own cognitive predilections. Identifying and operationalizing the research question, data collection and analysis, and report writing are all subject to decisions a researcher or research team make.” Findings could then vary due to the emotional “attachment” that may occur especially if the role of a participant observer is taken up by the researcher. If multiple researchers are involved due to time or resources requirement, this could also create major issues in data consistency and needs to be clearly defined, perhaps through standard coding, prior to the commencement of the observation activities and after the collection activities as part of data review and analysis process.

Moreover, as documentation based on information provided by company may also contribute to the results of the research, the integrity of data provided, which is purely based on the honesty and

judgment of individual companies, will play an important role that may affect the final research outcome. Since interview participants may range from Startups or SME CEOs to Country Manager of MNCs, their personal attachment to the companies will also affect the quality and accuracy of data, especially for the more qualitative ones. “We tend to be prejudiced by our loyalties to family, friends, and country. We accord such loyalties disproportionate moral weight, he argues, out of mere habit and custom. If we were to reason properly, we would recognize the contingent character of our loyalties; but habit and custom blinds us.” (Sandel, A.A; 2014:36)[18] Hence, the collected data will always be subject to a certain level of bias which is influenced by various level of confirmation, reporting and judgmental biases.

Last but not least, as our research will mainly be conducted in Cantonese, the translation of English to and from Cantonese for both questions and results will result in some information being lost during our recording process. Further complication will occur when cultural and language differences in information collection and recording appear during the interviewing process. This will require all the skills researchers already possess or develop during pilot process to enable a certain level of compensation either during the interview or through the coding and analysis stages.

6) Conclusion

In the age which is driven by an accelerating technological evolution, the creation and adoption of innovation is becoming the key for the survival of any company regardless of the business nature. As human and technology are tightly intertwined when it comes to innovation, modification in one will certainly impact the other.

Although the operation and "expected behavior" of technological changes must be well documented as part of design, it is not necessarily the case for human reaction when technology evolve so the adoption of innovation will vary when it takes place in different context and different organizations. This is precisely when ethnographic approach becomes important as researchers will be observing for new and unexpected findings rather than trying to validate their own beliefs.

By continuing the investigation done by Loon and Chik for Hong Kong small and medium enterprise through an ethnographic study, we are looking more specific into the adoption of innovation as Loon and Chik has already identified innovation as an important factor in driving business efficiency. Fine tuning of interviewing questions and techniques will take place in the early stage of execution through small scale pilots in preparation for the broader pool of participants. Finally, by performing cross company analysis after the result which is unique to each company, is coded our research should hopefully be able to uncover some pattern which can be useful for improving the effectiveness of innovation adoption so Hong Kong technology companies can all be benefited by our research results.

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