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Module:	Approaches to Research and Academic Communication		
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Lecturer:	Dr. Luk Chung Leung	Internal Verifier:	
Assignment Title:	In-class Presentation	Time Allowed:	15 minutes
Submission deadline:	18 July 2020	Return date of provisional marks & written feedback:	7 September 2020
Submission method:	Each students needs to present to the class a summary of the research proposal within 10 minutes. The presentation is designed to gauge the student's ability to communicate and present information related to research and academic matters. A soft copy of the PowerPoint slides used for the presentation should also be submitted via Turnitin before the presentation.		
Academic honesty / referencing:	Academic honesty is required. In the main body of your submission you must give credit to authors on whose research and ideas your work is based. Append to your submission a reference list that indicates the books, articles, etc. that you have used, cited or quoted in order to complete this assessment.		



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Approaches to Research and Academic Communication

UWTSD DBA – HKBM 7000

Lecturer : Dr. Chung Leung LUK

Student ID 1916324

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18th July 2020

Provisional Title of Business Research Project Proposal

Examine the Relationships between Research and
Development Investment Factors and the Success and
Sustainability of High Technology Companies in Hong Kong

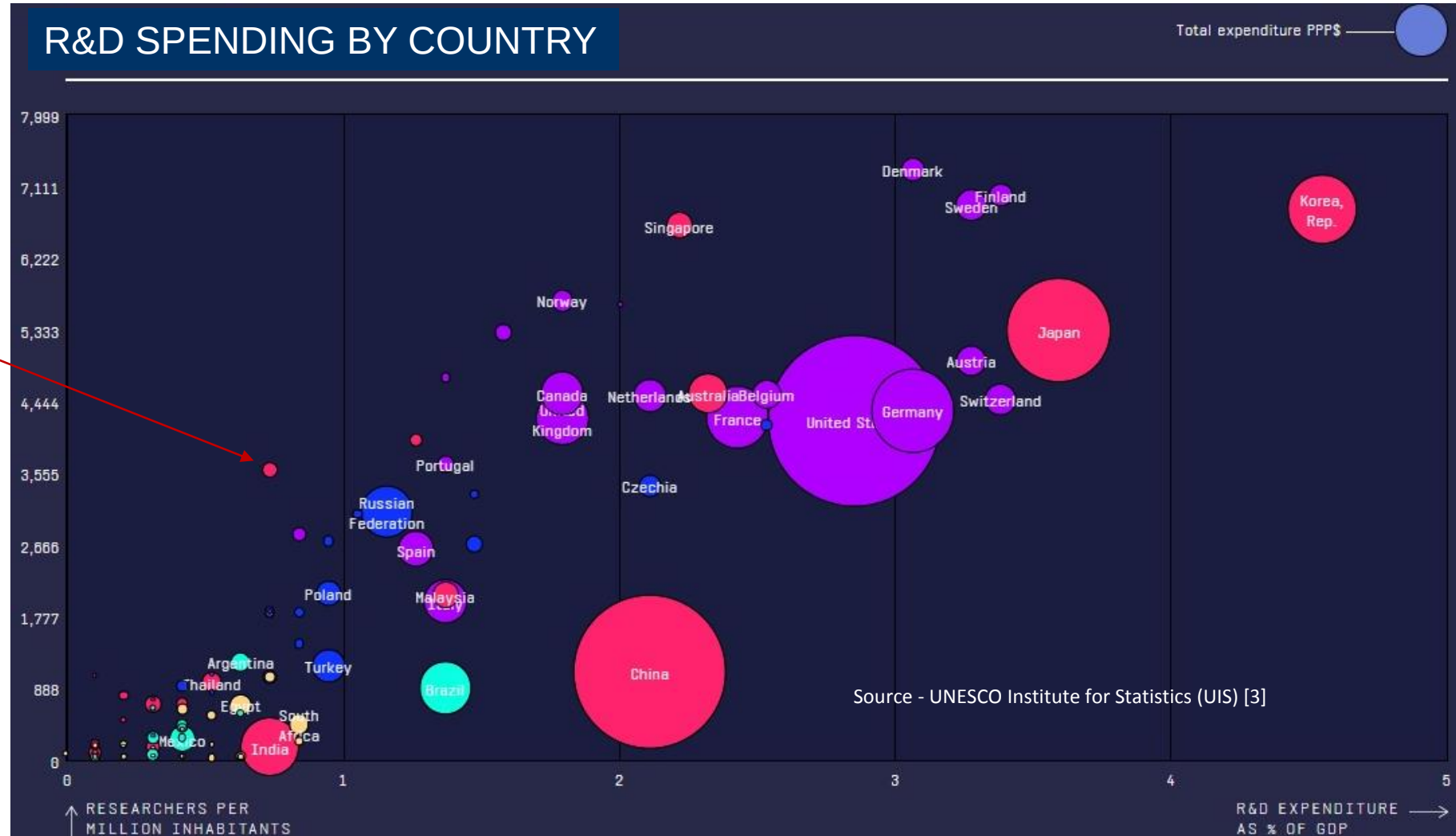


Background of Business Research

- A major problem facing Hong Kong High Tech Industries today is the minimal total of Research and Development (R&D) spending, only at 0.86% of Hong Kong total GDP at 24 Billion HKD in 2018. (HKSAR Government Dec 2019) [1]
- With such a low spending on R&D, it is important to understand what is the best way to allocate R&D resources to meet the challenges arise from the next stage of Industrialization (Industry 4.0 e.g. Smart City Application, Autonomous Factory/Driving, AI and Cloud Analysis)
- "The Government is committed to promoting innovation and technology (I&T) development in Hong Kong. Over the past 2 ½ years, the Government has committed over HK\$100 billion to build & enhance the local I&T ecosystem along the 8 major areas set out by the Chief Executive in her 2017 Policy Address." (HKSAR Government Dec 2019) [2]
- Identification of **relationships** and **contributions** from and between different R&D investment factors that may lead to successful/sustainable business outcome in High Tech Industries can be used as references and be duplicated to expedite the growth of local R&D in HK.

Problem to be Researched :

How can Hong Kong move to Industry 4.0 with its own local high tech industry with a low level of R&D spending : 0.86% GDP in 2018^[3]



Hong Kong still have a reasonable researcher ratio comparable to US and Europe



Local High Tech in Hong Kong may still be viable

Capabilities Critical for Successful R&D Investment^[9]



E&Y Relationship models for different factors that interact to affect R&D investment outcome.^[9]

In an EY study (2016)^[9], they found it is **difficult** to form simple correlation between R&D investment and output

“While there may be increased levels of R&D spending across businesses, those investments aren’t always productive. In fact, a study involving over 10,000 analyses of R&D spending across the 1,000 largest R&D spenders found no statistical correlation between R&D spend and sales growth, gross profit growth, operating profit growth, operating margin, net profit growth, net margin, market cap growth or total shareholder return”

“A key question at many companies is “How can we better leverage our resources around the globe to maximize efficiency and deliver improved R&D outcomes?” **This question can’t be answered without a unified way of tracking employees’ skill sets and project staffing”**

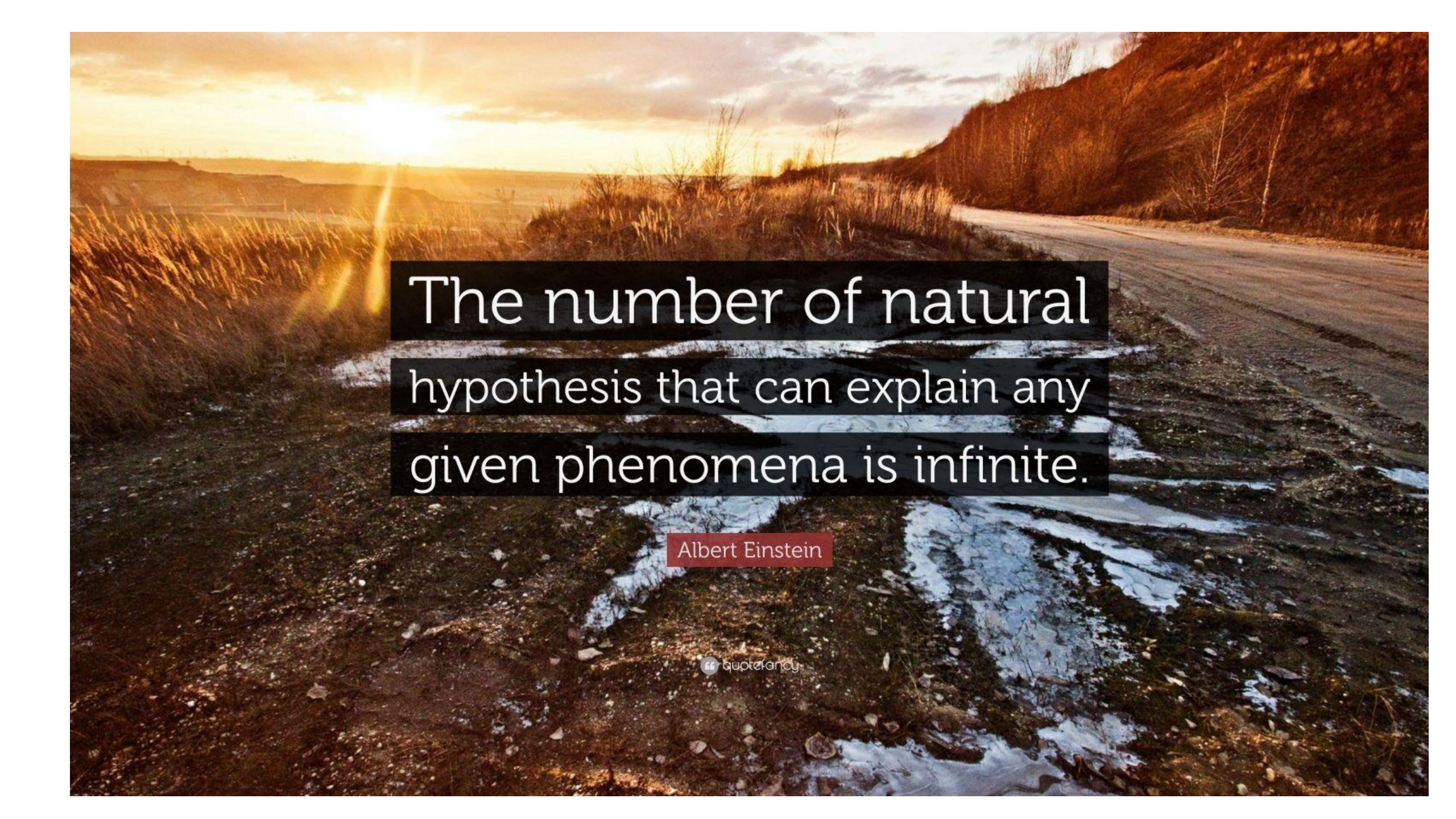
-Rose Martin
(Advisory, Performance Improvement) E&U LLP^[9]

Relationship between R&D Investment & Outcome needs further research especially for Hong Kong

Research Objectives

- To investigate if there are any significant relationships/pattern exist between R&D investment metrics collected and the success rate/sustainability of these companies
- Study should includes Start-ups, Small Medium Enterprise and Large local and Multi-National Companies
- Determine if there are common patterns that can enhance the rate of success/sustainability for different types of High Tech companies
- Conversely, investigate if each group of companies has its own set of characteristics that can improve chance of success/sustainability.
- Analysis should also include study of mediators and non parametric data, such as CEO and BoD industrial experience or relationships, participation of employee in skill enhancement program assisted by government funding and how they may influence the level of success or sustainability.



A scenic landscape at sunset or sunrise. The sun is low on the horizon, casting a warm, golden glow over the scene. In the foreground, there is a dirt road with patches of snow or ice. To the left, there is a field of tall, dry grass. To the right, there is a hillside with bare trees. The sky is filled with soft, orange and yellow clouds.

The number of natural
hypothesis that can explain any
given phenomena is infinite.

Albert Einstein

Hypotheses Development

- This is the **first** step of research design and execution.
- A number of hypotheses, which include extensions of previous studies for High Tech companies in Taiwan, Korea and China^{[4][5][6]}, will be developed in this stage so relevant metrics can be identified for the subsequent design of collection methodologies.
- Below are three hypotheses examples in our research proposal
 - Hypothesis A states that more R&D salary spending will automatically create more revenue for companies
 - Hypothesis B assumes more academically qualified employees will result in more successful products being launched.
 - Hypothesis C Top Management with more technically qualification will result in better company success
- Collection of data in a three year time interval will form the basis of study to align with R&D product cycle. Additional annualized data collected will be added if relevant.

Research Data Collection (1)

- 4 steps will be taken for data sample collection based on the hypotheses developed

Step One – Key Metrics/Information Specification

- Defining the relevant set of Independent Variable (IV) for data collection :
 - R&D spending on Capital (e.g. equipment)
 - R&D spending on Manpower (e.g. salary)
 - R&D operating expenses (e.g. travel and rental)
 - R&D staff vs Overall staff count (R&D Talent Ratio)
- Defining the relevant set of Dependent Variables (DV) for data collection :
 - Company Revenue per year
 - Number of Product launched per year
 - Number of Patents generated/applied (IP output)
 - Number of Spin-off achieved (if applicable)

Research Data Collection (2)

Step Two – Capturing of Confounding Variables/Mediators

- Factors such as CEO/BoD Members' background, experience and connection in High Tech industries and Employee's qualification upgrade frequency (either through sponsored training or formal certification) should be collected in the Questionnaire if possible.

Step Three - Creation of Questionnaire

- Make it Simple and Easy to follow for Respondent
- Start with a brief introduction, stating the purpose of the survey and who is the originator of the survey
- Re-assure respondent data will remain strictly confidential

Step Four – Identify the Number of Companies Needed to be Survey

- To achieve a confidence level of 95% - feedback from around 400 companies is needed (Dekking, F.M. 2005)^[8]

Questionnaire Design



A) Declare the Origin of Survey

Thank you for participating in this online survey for the characterizing R&D Investment and Sustainability of High Tech Company in Hong Kong

B) Introducing the Purpose

This questionnaire is to seek your views on the business environment of Hong Kong and your interests in expanding business in Hong Kong. The whole questionnaire can be completed in less than 5 minutes.

C) Set the Expectation of Survey Length

Please be assured that all data provided will be used solely for the purpose of the study and will be kept strictly confidential. Should you have any questions, please contact Mr. Patrick Lau at patlau@gmail.com. We thank you again for your time and contribution to the Study.

D) Re-Assure Respondent of Data Confidentiality

Name of respondent:

English ▼

E) Tri/Bilingual

Job title:

Company name:

Based on the description above, what is the appropriate size designation of your company?

☐ Large Company

☐ SME

☐ Start-up

F) Clarify Definitions

Definition of company size:

Large companies are companies with over 50 to 100 employees (over 100 employees for manufacturing enterprises)

SMEs are companies with fewer than 50 employees and at least 3 years of establishment

Start-ups are SMEs with under 3 years of establishment



Do you currently have any intention to expand your business to/in Hong Kong?

☐ Yes

☐ No

G) Simple Click to Register Response



H) Clear Indication of Page Strolling

What initiatives / facilities / equipment are essential for your business to thrive this year? (Please select all that apply)

☐ Cash subsidy per annum

☐ Co-working space support

☐ Rent subsidy for office

☐ Wet-lab facilities support

☐ Engineering-lab facilities support

☐ Office facilities support

☐ Accommodation support

☐ Incubation/ Investment Fund program

☐ Other business and technical support

☐ Others (please specify):

I) Multiple Choice Layout

You have reached the end of the survey! Thank you very much once again for your time and your responses.

Research Data Analysis and Hypothesis Testing

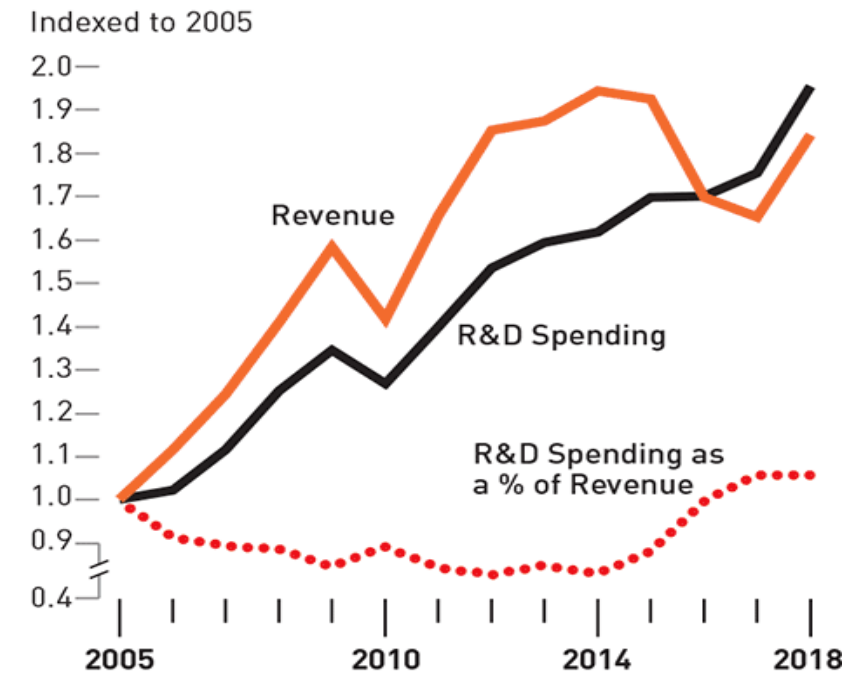
- Combination of both Qualitative and Quantitative Approaches
- Initial hypothesis testing will be done via Quantitative correlations
 - Effect on Company Revenue due to more R&D Salary Spending
 - Effect on Company Revenue due to More Academically Qualified Staff
 - Effect on Company Revenue due to more R&D Capital Spending on Equipment
- Confounding variables such as CEO background/qualifications will be used as part of the qualitative analysis to observe any variations of correlations between Independent and Dependent Variables.
- A small number of interviews will be carried out, [as pilot research](#), with CEOs, Country Managers and Division Heads to see if the hypotheses derived are reflective of their company growth strategies both in past, current or future.
- Hypotheses modification and retesting will be done if results from data analysis indicate there is significant deviation from original hypotheses

Expected Finding and Reporting (1)

- Previous study by Jaruzelski B; Robert Chwalik R; and Goehle B (October 2018)^[7] from PwC used data from 1,000 public companies and found “There is no long-term correlation between the amount of money a company spends on its innovation efforts and its overall financial performance. Instead, what matters is how companies use that money and other resources to create products and services that connect with their customers”.
- This clearly indicates there are other moderating factor(s) that affects company revenue besides R&D spending and our study hopefully will identify some of these moderating factors

R&D and Revenue

In 2018, both revenue and R&D spending among the Global Innovation 1000 continued to climb.



Source: Capital IQ data, Thomson Reuters Eikon data, Strategy& analysis

Jaruzelski B; Robert Chwalik R; and Goehle B (Oct 2018)^[7]

Expected Finding and Reporting (2)

- If we only correlate R&D dollar spending against company outputs, it is expected the findings for Hong Kong Tech companies will exhibit similar characteristics.
- However, when new independent variables and moderating/mediating factors, which were not included in any previous Hong Kong based studies, are now part of the consideration, they may play an important role in shaping the company performance.
- Results based on correlating different IV, DV, Mediators and Moderators will be tabulated and discussed against the proposed hypotheses in the Discussion section of the Report.



Discussion and Conclusions

- As many companies involved in this research are not public companies, the integrity of the data provided is based purely on management honesty and judgment.
 - This varies significantly among candidates which ranges from Startups or SME CEOs to Country Manager of MNCs. Hence, the study data will have some level of deviations due to “bias” by default.
- As our research will try to **adopt and modify** a number of approaches used by previous studies for Taiwan, Korea and Chinese High Tech companies,^{[4][5][6]} output from our research should be an **enhancement** of their findings.
- Use of data from **local** Hong Kong companies will make this study more relevant to Hong Kong High Tech business operations.
- Final data models/relationships derived by this research report will hopefully provide insightful information to improve the investment efficiency of High Tech companies in Hong Kong, especially those with limited R&D resources.
- Lessons learned from this research on the High Tech companies in Hong Kong could provide a **reference** for carrying out similar studies in other types of businesses such as e-finance and logistics for **further research**.

References

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Q & A

Thank You