

Blog: Quantitative Research

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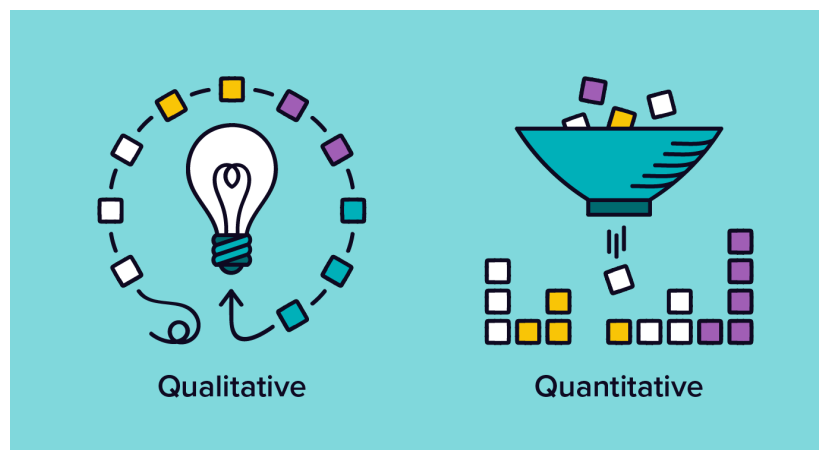
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Blog 1: Present and Future

(Word:293)

This module is about quantitative analysis, and I have never been exposed to this research method before. As a result, before the lesson began, I prepared necessary knowledge. Through this course, I expect to have a better understanding and application of quantitative analysis.

During the first week, I focused mostly on determining whether quantitative research methods are appropriate for my study. So that I can effectively solve any challenges that may arise during my investigation. In quantitative analysis, we also need to be able to comprehend first-hand data.



(source: David Renwick)¹

I comprehend the distinction between qualitative and quantitative analysis by the conclusion of the first week of the course. This is critical since both types of analysis will be employed in my future study. I'm guessing I cannot tell the difference right now. After then, the work will become more difficult.

¹ David Renwick. 2019. *A beginner's guide to qualitative and quantitative research*. [online] Available at: <https://blog.optimalworkshop.com/a-beginners-guide-to-qualitative-and-quantitative-research/> [Accessed 6 November 2021].

In my opinion, the quantitative analysis is very difficult, particularly when using questionnaires and SPSS software for data processing. A lot of thought goes into how to construct a decent research topic for a questionnaire. Every experiment designed to test a novel concept generates a slew of new questions. As a result, the process of discovery is endless. You must be continually inquiring in order to design the finest queries.² This was not a part of my previous understanding. I have always believed that the questionnaire questions should only be relevant to the research topic. However, after a week of studying the course, I realised that the preceding concept was far too simplistic.

My expectation for this course is to be able to construct the questionnaire on my own in accordance with the study and complete it using SPSS software. In addition, I wish to improve my understanding and use of quantitative analysis.

² Durbin, J. (2004) How to come up with a good research question: framing the hypothesis. *Respiratory care*. 49 (10), 1195–1198.

Blog 2: The biggest challenge

(Word: 514)

Through the study of the course and my earlier findings when writing the paper. I think, the biggest challenges of using quantitative research method are how to ensure reliability and validity of my own research. There is an example: an adult diet and exercise for a month. His clothes became too big for him, and his friends said he had lost weight. If the scale is showing a weight loss of ten pounds. This indicates that the data are reliable. If, on the other hand, the scale reads more 10 pounds. We believe there is a problem with the scale. As a result, when assessing a measurement method, researchers usually look at two factors: reliability and validity (Chiang, Jhangiani, and Price, 2013). However, the reliability and validity are different in test and research.

The term "reliability" refers to the consistency of measurement results (Stephanie 2016). For example, an adult is generally the same height from year to year. Heale and Twycross (2015) define is reliability relates to the consistency of a measure. The findings revealed that participants should have gotten about the same response each time they took the test. Although it is impossible to provide a 100% accurate answer, several tactics and methods can be used to assist in the collection of reliable data.

In Reliability, three test methods are commonly used to obtain data Reliability: Across items (internal consistency). Stability is tested using test -- retest and parallel or alternate-form reliability testing. Across different researchers is assessed through inter-rater reliability. (Heale, & Twycross, 2015; Chiang, Jhangiani, and Price, 2013.)

The amount to which a notion is accurately measured in a quantitative investigation is known as validity (Heale, & Twycross, 2015). In other words, validity refers to how close an experiment or test's end result is to the expected outcome (Stephanie 2016). Valid results usually indicate that the data are reliable. For example, adult height (which is

almost the same over time). However, the validity of dependable data results is not always guaranteed (Scribbr, 2019.). So, how can we make the most effective decision? Effectiveness can include the previously mentioned reliability. The experiment is still a failure if the data is demonstrated to be reliable but not valid. For example, an indoor thermometer is a reliable indicator of indoor temperature, but it is ineffective for outdoor temperature. As a result, data collection and analysis validity and reliability are critical (Chiang, Jhangiani, and Price, 2013). When it comes to validity, there are many different "categories" of debate. There are three main forms of validity that are evaluated since there are too many "categories" to consider: content validity、Construct validity/ face validity、 criterion validity (Heale, & Twycross, 2015; Chiang, Jhangiani, and Price, 2013)。

I noticed that appropriate preparation should be done ahead of time to ensure the study data's reliability and validity, using the aforementioned academic analysis. It's also important to make sure that the instruments utilised do not deviate from the experimental results. Finally, when analysing data, it is vital to maintain objectivity so that the experimental data can get the better value.

References

- Chiang, I., Jhangiani, R. and Price, P., 2013. Reliability and Validity of Measurement. [online] Opentextbc.ca. Available at: <https://opentextbc.ca/researchmethods/chapter/reliability-and-validity-of-measurement/> [Accessed 1 November 2021].
- Heale, R. & Twycross, A. (2015) Validity and reliability in quantitative studies. Evidence-based nursing. [Online] 18 (3), 66–67.

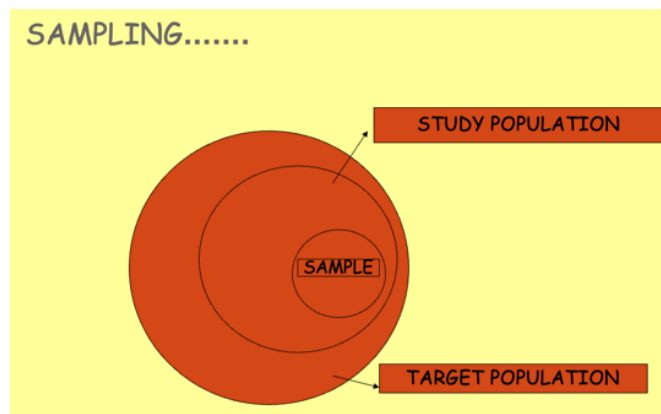
Stephanie 2016. Reliability and Validity in Research: Definitions, Examples. [online]
Available at: <https://www.statisticshowto.com/reliability-validity-definitions-examples/>
[Accessed 1 November 2021].

Scribbr, 2019. Reliability vs validity: what's the difference? [online] Available at:
<https://www.scribbr.com/methodology/reliability-vs-validity/> [Accessed 24 November
2021].

Blog 3: Why sampling is fundamental?

(Word: 469)

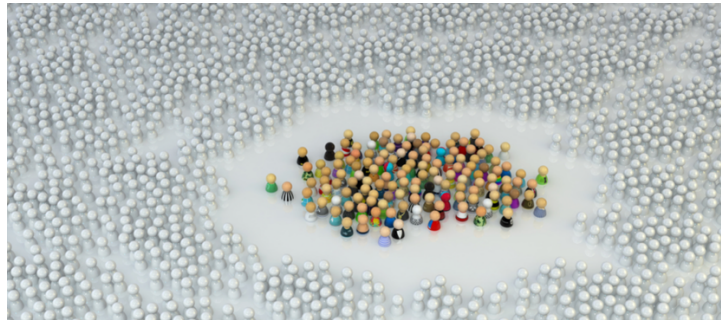
All quantitative analysis research is built on the foundation of dependability and validity data. Quantitative research is primarily concerned with numbers and measurements. It is all about gathering data and turning it into actionable information (David Renwick.2019). Data will provide you immediate answers because quantitative research is all about generating data that can be expressed numerically (Trint, 2021). On the other hand, researchers need prove research questions from all of the data obtained in order to be able to answer them. The issue is that the data is far too huge. As a result, sampling is commonly used by researchers to prove research questions (Hamed Taherdoost, 2016).



(Source: Chaturvedi, K. '*Sampling Methods*')³

³ Chaturvedi, K. '*Sampling Methods*', University of Pittsburgh. Available at: www.pitt.edu/~super7/43011-44001/43911.ppt (Accessed 8 Nov 2021).

Why do we think that sampling the population is important? Here is an example: we need to study the relationship between external influences on the body. That is, we need establish a link between external factors and our bodies and aim for the minimal risk of error, such as confusion, chance, and bias. However, it is impossible to do a whole experiment with such a large population. As a result, we need take a good sample and use sampling techniques to limit the possibility of error. A good sample should be representative of the population under study. As a result, each experimental participant in the sample should have the same chance of being chosen at random (Khalifa, 2020).



(Source: Khalifa, 2020)⁴

However, the subjects were as comprehensive as possible helped our final results. However, this necessitates a significant investment of resources and labour, which is clearly undesirable. For example, it is impossible to check that every slice of bread is up to standard, in a bakery. As a result, the purpose of sampling is to verify the reliability and validity of the overall data with relatively few data (Anon, 2019). Because no company can guarantee that all of its items are 100 percent qualified, there will be after-

⁴ Khalifa, M., 2020. *What are sampling methods and how do you choose the best one? - Students 4 Best Evidence*. [online] Students 4 Best Evidence. Available at: https://s4be.cochrane.org/blog/2020/11/18/what-are-sampling-methods-and-how-do-you-choose-the-best-one/?preview_id=16165 [Accessed 8 November 2021].

sales service. After performing sample surveys, it was discovered that they had built follow-up services to avert difficulties with specific products.

As a result, knowing how to sample is vital. To determine the population to be sampled, most researchers use a sampling framework. All of the subjects being tested must be represented in the sampling framework. It implies that they must share visible characteristics or qualities. However, it should be noted that the research background and environment are different, and the number of research objects will be different. As a result, we must understand the nature of the interaction between samples and all research objects in order to learn quantitative research (Gordon Lynch, 2021).

Reference:

Anon (2019) Systematic Sampling: Advantages and Disadvantages. New York: Newstex.

David Renwick. 2019. A beginner's guide to qualitative and quantitative research. [online] Available at: <https://blog.optimalworkshop.com/a-beginners-guide-to-qualitative-and-quantitative-research/> [Accessed 6 November 2021].

Gordon Lynch, 2021. [online] Available at: <https://www.kent.ac.uk/religionmethods/documents/Sampling.pdf> [Accessed 8 November 2021].

Hamed Taherdoost, 2016. (PDF) Sampling Methods in Research Methodology; How to Choose a Sampling Technique for Research. [online] Available at: https://www.researchgate.net/publication/319998246_Sampling_Methods_in_Research_Methodology_How_to_Choose_a_Sampling_Technique_for_Research [Accessed 6 November 2021].

Khalifa, M., 2020. What are sampling methods and how do you choose the best one? - Students 4 Best Evidence. [online] Students 4 Best Evidence. Available at: https://s4be.cochrane.org/blog/2020/11/18/what-are-sampling-methods-and-how-do-you-choose-the-best-one/?preview_id=16165 [Accessed 8 November 2021].

Trint, T., 2021. A beginner's guide to qualitative and quantitative research. [online] Blog.trint.com. Available at: <https://blog.trint.com/a-beginners-guide-to-qualitative-and-quantitative-research> [Accessed 6 November 2021].

Blog 4: Do we have privacy?

(Word: 484)



(source: Netflix. 2021)⁵

Netflix is a video-on-demand service based in the United States. It uses a subscription approach to provide a wide range of films and television series, as well as its own material and films. Netflix has evolved to become one of the world's most popular streaming services. In more than 190 countries, it has approximately 167 million paying subscribers.

⁶ Netflix is a subscription-based service that provides individualised advice. In order to provide users with movies and television programs that are relevant to their interests. Netflix has created a complicated system that uses big data and machine learning to enhance the click rate of its users (Netflix.2021). Because the privacy of users is a part of this data and machine learning. This technique is unethical from an ethical standpoint.

While Netflix claims to protect consumers' privacy by anonymising the data it collects, there's still the issue of privacy leaks. In 2007, researchers at the University of Austin

⁵ Netflix. 2021. *How Netflix's Recommendations System Works*. [online] Available at: <https://help.netflix.com/en/node/100639> [Accessed 9 November 2021].

⁶ Netflix, Inc. (2019) *Annual report 2019*. Available at: https://www.annualreports.com/HostedData/AnnualReports/PDF/NASDAQ_NFLX_2019.pdf (Accessed:9 November 2021).

finally found users in Netflix's anonymised dataset by matching their ratings on the Internet Movie Database. These types of data breaches occur without the users knowing the details. This violates on the user's right to know. However, Netflix claims that overall engagement has improved as a result of big data and algorithms. Users watch content based on suggestions 75% of the time. Furthermore, personalised recommendations can save Netflix more than \$1 billion every year (Chaithanya, 2020). Netflix keeps track on how its customers utilise the service. For instance, how long to watch, how many times to pause, whether to go backwards in time, and so on (Michael, 2019.). In fact, such behaviour makes individuals feel uneasy, and there is a sense of being watched. Ethical issues such as privacy are at issue.

The development of artificial intelligence has been a hot topic. There are ethical concerns, such as privacy. Many experts are concerned about whether humans will be superseded by artificial intelligence in the future. Artificial intelligence has ushered in a new era of "coercion." With the detection of big data, you will browse more things you do not need but you like. And that can lead to impulse buying because you like it. On Chinese Taobao's website, there is a section devoted to product recommendations, which the developers have a name for it: Guess you like. This area is a derivative of something you have viewed or purchased. After browsing, you'll be easy to buy them. Because these items all of you like or will be need. I also spend a lot of money in there.

We live in a transparent glass jar and are observed without reservation. It's simple to keep track of our actions. However, from the perspective of businesses, it is the collection of big data that enables them to better understand users' needs and make products that satisfy users. As a result, the broad adoption of big data or technologies is a proven truth. The balance between users' privacy and meeting their needs will be an important issue for companies in the future.

References:

Chaithanya Pramodh Kasula. 2020. *Netflix Recommender System—A Big Data Case Study*. [online] Available at: <https://towardsdatascience.com/netflix-recommender-system-a-big-data-case-study-19cfa6d56ff5> [Accessed 9 November 2021].

Michael Dixon, 2019. *How Netflix used big data and analytics to generate billions*. [online] Available at: <https://seleritysas.com/blog/2019/04/05/how-netflix-used-big-data-and-analytics-to-generate-billions/> [Accessed 10 November 2021].

Netflix. 2021. *How Netflix's Recommendations System Works*. [online] Available at: <https://help.netflix.com/en/node/100639> [Accessed 9 November 2021].

Blog 5: Find something rather than judge

(Word: 480)

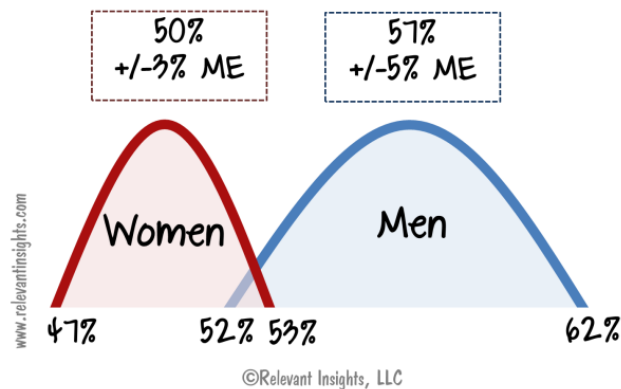
Through the words of Jordan Ellenberg's, let me reflect on what statistics are? What does it give us or help us gain? Redman stated that Statistical significance can assist researchers quantify results and determine whether they are due to chance or other reasons (HICX, 2017). When a study makes a significant discovery, it can only mean that you think it is true and that your sample selection was not lucky or unlucky (Phil, 2015). The probability that an observation will occur at any moment is referred to as statistical significance. This possibility is called "P" and by convention. It is generally considered that a value is significant when the P value is less than 5%. However, some researchers need the importance of numbers. Then the P value could be as low as 0.1% or even less (Jakob, 2004). For example, a data analyst at a shoe manufacturer. He needs to investigate the packaging of the shoe box. Statistical significance analysis is used as a result. The use of shoebox packing is convenient, according to the findings. If P is 0.02, it indicates that consumers think it convenient. In contrast, if the p value is 0.2, it means that the result is not important. Of course, other criteria may emerge. Consider the following examples: significant sales growth and low labor costs. In this case, the institute needs to follow up the experiment and pay closer attention to the entire procedure.

The examples show that the purpose of statistical significance analysis is not to persuade us to believe in something, but to provide us with guidance and help us understand what we should do. As a result, statistics clearly educate us to make decisions rather than just answer questions.

We frequently express our strong confidence in certain methods, such as I'm 95% confident. That means we need to do 100 experiments with this method. After that, we'll be correct 95 percent of the time and wrong only 5 percent of the time. This approach is known as confidence level. The range of error is within the "Confidence level". In other

words, we expect the results to be in the same range every time the experimental data is reproduced (Michaela, 2019).

Statistical significance?



(Source: Michaela, 2019)⁷

For example, the figure above shows a 1-3 percent (women) and 1-5 percent (men) margin of error. The data will be utterly worthless in terms of statistical significance if the error value is not examined. If we need more accurate data, that means we need to expand the sample size. This increases to the overall cost of the experiment. As a result, in some cases, we need to sacrifice the accuracy of the data to achieve overall balance.

Finally, as Redman points out, the results can only provide so much information. There is no problem in using statistics, but the final data results still need to be combined with various factors (HICX, 2017). When we use data, we should not only observe individual statistics, but also have a macro understanding of the integrity of statistics. In this way, we can have a more comprehensive understanding of the final analysis.

⁷ Michaela Mora, 2019. [online] Available at: <https://www.relevantinsights.com/articles/statistical-significance/> [Accessed 11 November 2021].

References:

HICX, 2017. *Has big data inspired a data revolution in large companies?* [online] Available at <https://www.hicx.com/data-big-data-vogue/> (Accessed:10 November 2021)

Jakob Nielsen, 2004. *Understanding Statistical Significance*. [online] Available at: <https://www.nngroup.com/articles/understanding-statistical-significance/> [Accessed 11 November 2021].

Michaela Mora, 2019. [online] Available at: <https://www.relevantinsights.com/articles/statistical-significance/> [Accessed 11 November 2021].

Phil Birnbaum, 2015. *Sabermetric Research: Two nice statistical analogies*. [online] Blog.philbirnbaum.com. Available at: <http://blog.philbirnbaum.com/2015/03/two-nice-statistical-analogies.html> [Accessed 11 November 2021].

Blog 6: What's the future of the urban?

(Word: 527)



(Source: Kaylene, 2021)⁸

More statistics show that the population of urban population has risen dramatically in the past decades. It is estimated that by 2050, 68% of the global population will live in cities (Un.org. 2018). This massive influx of people puts severe pressure on the city. For example, the use of infrastructure (hospital, police station, fire protection, municipal sewage plant, water source, wastewater treatment facilities, etc.) (World economic forum, 2017). And the city's planning department also faces challenges. They need to build safer and more convenient cities as the population explodes. As a result, one of their most significant tools for developing the city is data analysis (Kaylene, 2021). So how might data analytics help city planners in creating more livable cities?

⁸ Kaylene Dixon, 2021. *Data analytics in urban planning: What's the future of the industry?*. [online] Available at: <https://seleritysas.com/blog/2021/10/16/data-analytics-in-urban-planning-whats-the-future-of-the-industry/> [Accessed 15 November 2021].

Notable events	Year	Products or services launched
 First Apple iPhone released	2007	 amazonPrime
 First commercially available Android smartphone	2008	 Spotify
 Up to 50 Mbit/s broadband services launched		 amazonkindle
 First person to amass one million followers on Twitter (Ashton Kutcher)	2009	 WhatsApp
 First YouTube channel to reach one million subscribers ('Fred')		
 National launch of fibre-to-the-cabinet broadband	2010	 3D TV
 iPad goes on sale in the UK		 Instagram
	2011	 Snapchat
 4G mobile service launched in the UK by EE	2012	 NETFLIX
 Completion of digital switchover		 Cartoon Network
	2013	 chromecast
 Netflix begins streaming content in 4K (House of Cards and Breaking Bad)	2014	 amazon primevideo
 Apple's iWatch makes its debut		 amazon fireTV
 Samsung virtual reality headsets go on sale	2015	 f LIVE
 Friends Reunited, pioneer of social networking, closes	2016	 amazon echo
 Sonos One (with Amazon Alexa built in) is released	2017	 Google Home
 Share of digital radio listening exceeds 50%	2018	 Apple HomePod
 78% of adults have a smartphone		 YouTube Premium

(Source: Ofcom. 2018.)⁹

According to statistics, people's reliance on mobile phones has reached an obsessive level in the last decade (Ofcom. 2018). Mobile phones have become a "body organ" for people. The Internet of Things, which was created with the help of mobile phones, has become a part of daily life. For instance, express delivery, takeout distribution, public transport lines, traffic light system, etc. (Srivastava, 2005). And data analysis is the fundamental source of all of this. Researchers can use data analysis to better plan cities and create infrastructure.

Data analysis can even predict and simulate future cities and how urban development will affect residents' lives (Kaylene, 2021). First, the researchers were able to develop a transportation model of the city's infrastructure and virtual traffic conditions by studying

⁹ Ofcom. 2018. *A decade of digital dependency*. [online] Available at: <https://www.ofcom.org.uk/about-ofcom/latest/features-and-news/decade-of-digital-dependency> [Accessed 16 November 2021].

the projected data. Through such simulation, we can know whether the new planning will affect the operation of the whole city and help researchers to design more convenient solutions to reduce traffic congestion (Kaylene, 2021). Second, researchers may precisely comprehend how urban resources should be used effectively and without waste via data analysis. Reduce pollution emissions and improve the city's environment better (Tan, 2021). Finally, data analysis can help users and manufacturers better communicate. For example, the lifestyle of old people is different from that of young people. Therefore, there is a need to strengthen medical care around communities with high numbers of elderly people (GOV.UK. 2016). Recreational facilities may be required in areas where there are more young people.



(Source: Cib.barclays. 2020)¹⁰

Nowadays, many cities around the world are developing "smart". Using big data analysis, determine the demands of urban inhabitants and then turn those needs into services. Allow people to live more comfortably. This also makes the development of the city better. According to data analysis, 280 cities have been transformed into smart cities, with the number expected to rise in the next decade (Guest, 2019.)

¹⁰ Guest Contributor, 2019. Data analytics: The key to delivering smart cities, [online] Available at: <https://www.smart-energy.com/magazine-article/data-analytics-the-key-to-delivering-smart-cities/> [Accessed 16 November 2021].



30% of urban emissions could be cut by 2050 by making buildings more efficient.

(Source: Cib.barclays, 2020.)¹¹

The UK has just concluded the 26th United Nations Climate Change conference. At this meeting, the issue of "carbon emissions" is a key point (COP26, 2021). Many developed and developing countries already use data analytics in their plans to reduce carbon emissions. Data analysis will become more common in the urban environment in the future (Giest, 2017). As the urban population increases, effective urban planning is the key to ensuring the safety and sustainability of cities (Kaylene, 2021). Therefore, data analysis is of great importance in urban development.

References:

COP26, 2021. *COP26 Goals - UN Climate Change Conference (COP26) at the SEC – Glasgow 2021*. [online] Available at: <https://ukcop26.org/cop26-goals/> [Accessed 15 November 2021].

¹¹ Cib.barclays. 2020. *The future of Smart Cities*. [online] Available at: https://www.cib.barclays/our-insights/Rethinking-smart-cities-prioritising-infrastructure.html?cid=paidsearch-textads_google_google_themes_smart_cities_uk_research_general_phrase_300433502566&gclid=Cj0KCQIAkNiMBhCxARIsAIDDKNUZu7out4NIB8bO0lw5pe43wlLVHtizPEf_TWZvra5MImr663XKTacaAh7qEALw_wcB&gclsrc=aw.ds [Accessed 16 November 2021].

Giest, S. (2017) Big data analytics for mitigating carbon emissions in smart cities: opportunities and challenges. *European planning studies*. [Online] 25 (6), 941–957.

GOV.UK. 2016. *Future of an ageing population*. [online] Available at: <https://www.gov.uk/government/publications/future-of-an-ageing-population> [Accessed 16 November 2021].

Guest Contributor, 2019. Data analytics: The key to delivering smart cities, [online] Available at: <https://www.smart-energy.com/magazine-article/data-analytics-the-key-to-delivering-smart-cities/> [Accessed 16 November 2021].

Kaylene Dixon, 2021. *Data analytics in urban planning: What's the future of the industry?*. [online] Available at: <https://seleritysas.com/blog/2021/10/16/data-analytics-in-urban-planning-whats-the-future-of-the-industry/> [Accessed 15 November 2021].

Ofcom. 2018. *A decade of digital dependency*. [online] Available at: <https://www.ofcom.org.uk/about-ofcom/latest/features-and-news/decade-of-digital-dependency> [Accessed 16 November 2021].

Srivastava, L. (2005) Mobile phones and the evolution of social behaviour. *Behaviour & information technology*. [Online] 24 (2), 111–129.

Tan, L. et al. (2021) Mapping resource effectiveness across urban systems. [Online]

Un.org. 2018. *68% of the world population projected to live in urban areas by 2050, says UN* | UN DESA | United Nations Department of Economic and Social Affairs. [online] Available at: <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html> [Accessed 16 November 2021].

World economic forum, 2017. Migration and Its Impact on Cities – An Insight Report.

[online] Available at:

https://www3.weforum.org/docs/WEF_Migration_Report_Embargov.pdf

[Accessed 16 November 2021].

Blog 7: How about my future?

(Word: 182)

I got familiar with quantitative methods and the use of SPSS software through quantitative courses. After learning the course, I clearly realise that it is not easy to be a doctor. And I'm going to face more complicated problems.

As an old Chinese saying goes, " Learning from the sea is endless and painstaking." It means that knowledge, like the sea, has no boundary. Our determination to study hard will propel us to the edge of knowledge. In the future, my study will never stop. Quantitative analysis is not an easy research method. After studying the course and reading related literature after class, I only felt like I had a basic comprehension. In the future, I think I need to redouble my efforts to make a better improvement in the use of quantitative research. Including the use of SPSS, how to better design problems, data analysis, sample analysis.

Quantitative analysis is required for my own research. That means I cannot relax for the next three years. I need to strengthen my knowledge system so that I can eventually produce a better dissertation.