Honors Thesis: Comparing Technological Diffusion Between Levels of Economic Freedom

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Comparing Technological Diffusion Between Levels of Economic Freedom

"Value creation" is a central idea in the study of Entrepreneurship and how entrepreneurs operate within an economy. Believing an economically free society is more beneficial than an economy with less freedom, I wanted to test this hypothesis to determine which types of economies create the most value for all consumers.

"Value" is inherently a subjective measurement, which makes it very difficult to measure. Even though it would be easier to compare countries using an objective measurement such as Gross Domestic Product (GDP), it would be impossible to determine if consumers were actually better off than the year before. GDP does not measure improvements in a consumer's quality of life, but merely the difference between the imports and exports of a country (essentially measuring if an economy has grown or shrunk). The shortcomings of using GDP (or other objective standards) can be demonstrated with an example about wealth inequality. In a hypothetical scenario, it is completely possible for a country's GDP or overall wealth to increase, while at the same time having an increase in wealth inequality. This scenario can happen in one of two ways. In the first way, the wealth of one group can increase while the wealth of another group decreases. In a sense, "the rich get richer, and the poor get poorer". In the second way however, the wealth of all people can increase but at different rates. If one consumer's income increases by 50% while the remaining consumers' income only increases by 10%, there would technically be an increase in wealth inequality. For this reason, among others, I needed to use a metric which would accurately represent advancements in quality of life across a wide range of national economies. The metric selected was the adoption growth rate of truly innovative and life improving technologies within each selected country. By measuring the adoption rate of technology, it is possible to observe the increase in *consumption* (and subsequently quality of life) even though the numerical value of wealth inequality may have increased. For my research, the technology I selected as the unit of measurement for growth rate calculations was the smartphone. Compared to other technologies, there were several characteristics which make smartphones especially useful for my study. To begin, smartphones are an easily distinguishable technology that can provide a wide range of improvements in a consumer's life. Smartphones also belong to individuals whereas other technologies (such as a computer) could belong to a family or business. Since smartphones are more likely to be owned by an individual, the data would be more representative of a country's population. Finally, smartphones can be used as an example to differentiate between "wealth inequality" and quality of life differences. To better explain, there is a difference between not being able to afford the latest iPhone model and not being able to afford a smartphone at all.

To describe my research process, I think it is beneficial to begin with how I determined "economic freedom" for each selected country. Every year, The Heritage Foundation tracks and compiles a wide range of data to create their Index of Economic Freedom. This index grades 184 countries on a 100-point scale and evaluates several metrics. These metrics include property rights, judicial effectiveness, labor freedom, tax burdens, government spending and other

indicators of economic health. For context, most North American and European countries have a score in the seventies, while countries like Russia and China have scores in the fifties and forties.

For each of the countries I evaluated in my study, I first began by averaging their 1995 and 2022 economic freedom scores in order to create singular number to describe each country's economic freedom. From here, I was able to begin compiling data for yearly smartphone ownership in each country.

The main source of this data was the Statista database, which I had access to through the Edmon Low library. Once I found the data, I would begin the process of cleaning the data and transferring it to Excel. All the data I obtained needed to be formatted in terms of ownership percentage rather than the total number of smartphones for each year. This added to the tediousness of my research, but it ensured small countries would not be overshadowed by larger countries in my calculations. After finding what percent of each country's population owned a smartphone for a range of years, I was then able to calculate the growth rate between each year.

With a list of annual growth rates compiled for each country, I could begin calculating the average growth rate for each country. To help standardize the inputs of my analysis, I only averaged the years with growth rates between 12-16% and 80-85%. For example, if only 10% of a country's population owned a smartphone in 2010 and 13% owned a smartphone in 2011, I would exclude the 2010 data from the average calculation. By doing this, I was able to determine how quickly smartphones could be obtained by citizens once the adoption process had been started in a country. Now that my Excel list included the two main variables of my study (average growth rate of smartphone ownership and economic freedom scores), I was finally ready to run a simple linear regression analysis.

Unfortunately, after gathering and processing data, the results from the linear regression analysis were inconclusive. The R square value from the analysis was only 0.043, which was well below what is required to confidently state that there is any correlation between the variables. Even though the results are inconclusive, I do not believe this is due to my Excel model, but rather the lack of data. Many countries had little or no long-term data, and therefore had to be excluded from the analysis. If more countries could have been included, I believe the model would have been able to provide meaningful results.

There are also several considerations which I think are beneficial to mention about my study. These considerations include potential sources for error, the model's limitations, and ways my study could be improved now that I have the benefit of hindsight. If any errors were to occur in my research, the most likely place of origin would be in the raw data. Since I did not personally collect the data relating to smartphone ownership rates, there is no way I can verify the data's fidelity. The raw data could include impurities such as labeling "cellphone" ownership as "smartphone" ownership, and I would have no way to confirm the actual ownership rates needed for my study. I believe the most ideal way to solve this issue is by finding sales data from smartphone companies. Even though it would take significantly more time to acquire, this type of data would be much more accurate. As for limitations, I think it is important to note that my

Excel model would only demonstrate correlation between economic freedom and societal benefits rather than causation. While correlation does not prove cause and effect, a strong relationship between two variables can offer valuable insights. If I were to continue this study, it would be valuable to include several other variables within my regression analysis in order create a more holistic picture. When discussing my research with faculty, it was mentioned how other factors such as landline infrastructure could influence cell phone adoption rates. If a country had quality home phones, citizens may have been slower to adopt smartphones even if they had more economic freedom. By including other factors in my study, I would be able to determine how significant economic freedom to improving people's lives compared to other factors.

Overall, I thoroughly enjoyed the research process. It helped me gain a better understanding of entrepreneurial and economic theory while sharpening my analytical abilities. It also furthered my academic development and made me appreciate the current research being done in the field of entrepreneurship. I am very grateful for the help offered by Dr. Bylund and Dr. Trost, as well as the Spears School of Business and Honors College faculty who were involved in the research process.