Teaching Case

A Case for Calculating Innovation Score: Comparison between Apple, Inc. and Microsoft, Corp.

Ehi E. Aimiuwu
ehi.aimiuwu@morgan.edu
Information Sciences & Systems
Morgan State University
Baltimore, MD 21239, USA

Abstract

This case study is about measuring the innovation score of a firm and comparing it against a competitor within a particular industry nationally. It is meant to motivate students who are interested in how business intelligence dashboards can be used to measure innovation of firms. The case study is for students who are taking a class in business innovation, measuring business productivity, and business intelligence. Students should have studied the importance of innovation in business performance, as well as the strategies, tools, and roles of business intelligence before reading this case.

Keywords: business intelligence, innovation, innovation scorecard, Microsoft Corp., Apple Inc.

1. CASE SUMMARY

John has successfully presented a paper which he co-authored with his academic adviser, Dr. Zuba, as the main author at the Americas Conference on Information Systems (AMCIS). He is determined to turn the paper into a refereed journal publication by the end of the fall semester. John has completed the paper and is ready to submit it, but Dr. Zuba feels that despite the fact that he co-authored the initial paper for AMCIS, he will not co-author this upgraded paper. This is because Dr. Zuba does not agree with the innovation scores between Apple Inc. and Microsoft Corp. Dr. Zuba feels the more innovative company got the lower innovation score, which will be unacceptable to most professionals. Should John go ahead and submit this paper to a journal since his calculations are based on the exact measurements of innovation outlined in the AMCIS paper?

2. CASE

John got a standing ovation at the AMCIS conference because of the enthusiasm in which he presented his paper. Unlike many presentations at the conference, where members of the audience move in and out, John's audience sat down attentively throughout his 20-minute presentation. During the presentation, not a soul walked out. They asked questions with interest, and even the presentation coordinator suggested that his work should be submitted to a refereed journal. The initial work had a model, factors of innovation, and how the factors should be measured with Business Intelligence dashboards. It also explained the need to derive an innovation score for a firm within a country, but innovation scores for the firms mentioned were not calculated. John was determined to use the measures of the innovation factors in his AMCIS paper to calculate the innovation score for Apple Inc. and

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Microsoft Corp., as well as compare which of them was more innovative in 2010.

The Student

John Brown is a Ph.D. candidate in a mid-sized university in Arizona. He was determined to have at least one journal publication annually. He just began his second year as an Information Systems student in the School of Business and is determined to turn his AMCIS paper on innovation scores into a refereed journal publication. John believes that publications are more important than getting all "As" before graduation and that conference presentations are not as highly rated by (university) employers as publications in refereed Information System journals. Also, he is on a fellowship that requires that he works with a faculty member for 20 hours weekly as a research assistant and he must submit annual progress reports to the School of Graduate Studies, which must be approved by the
faculty to which he is assigned. John is in his mid-30s, is married, has a child, has written lots of articles in many newspapers, and has five years experience working as a business analyst in a communications company in Arizona.

The Professor

Dr. Zuba is a tenured faculty member in the university and has been a professor for 15 years. He taught at a different university before moving to Arizona seven years ago to help shape the new Information Systems department in the School of Business. His focus is business intelligence, information analysis and modeling, e-commerce, as well as data retrieval and analytics. Some of his publications have appeared in Decision Sciences, Decision Support Systems, and many others information systems journals. Dr. Zuba is also the graduate coordinator for the Ph.D. students in Information Systems. He is 52, married, has three children, and admires Steve Jobs and Apple, Inc.

The AMCIS Research Paper

The AMCIS paper that John presented was based on a model explained in Table 1 (all tables in appendix), which he designed to derive an innovation score for each firm within a country. The four factors and their various sub-factors were used to generate an innovation score. The multiple factors that help to determine how innovative a firm are listed in Table 1, along with the research done to show how they influence innovation. The measurement in Table 2 is utilized to calculate the innovation score for each firm within a country.
According to John, "Based on research, there are four factors that could be used to measure the innovation score of a firm within a particular country. These include: intrinsic motivation, resources, organizational characteristics, and the firm industrial code. The intrinsic motivation of employees can be assessed on the basis of challenge, freedom, supervisory encouragement, and organizational support. The resources are financial and human capital. The sub-factors of organizational characteristics are organizational size, market power, as well as organizational structure and networks. The firm industry code is the numerical value for the largest possible innovative difference between a large and small firm within a particular industry."

Updated Paper for Submission

John then decided to make the **Innovation Score (IS) = 2(A + B + C + D) + E + 2(F) + 2(G) + 2(H) + 2(I) + J**, based on the disaster preparedness score formula from Simpson (2008), explained in Table 3. Before comparing innovation scores of Apple Inc. and Microsoft Corp., John assumed that the two firms would score above 80% (a B grade by U.S. standards) in their employees' surveys, as seen in Table 3.

According to the (2010) Apple report, Apple Inc. had revenues of $65.23 billion and profits of $14.01 billion, an outstanding issued stock share of $899.8 million, and total assets amounting to $75.18 billion. The operating cost for Apple Inc should be $51.22 billion, which is the difference between revenue and profits. According to ifoApplestore.com, a site dedicated to news and information about Apple Inc's retail stores, the retail segment contributed the most to Apple Inc's revenue at $9.08 billion in the fiscal year ending September 2010. Also, the (2010) Apple report shows that total revenue in 2009 for Apple Inc. was $42.91 billion, the profit was $8.24 billion, and Apple Inc's 2010 fiscal year ended on September 25, 2010. This means that the total cost to Apple Inc. for 2009 was $34.67 billion. So the cost margin for Apple Inc. from 2009 to 2010 will be the difference between the two annual costs.

Microsoft Corporation's (2010) Annual Report shows that its fiscal year ended on June 30, 2010 with a revenue of $62.4 billion, operating

expense of $38.4 billion ($38.1 for 2009), profit of $24.1 billion, total assets of $86.1 billion, and an outstanding issued stock share of $8.9 billion. The business division made the most revenue - $18.9 billion.

John observes, "In this innovation calculation, I made price-cost margin of market power a revenue-cost margin, which is equivalent to (revenue – (new year cost - last year cost)) / revenue). For human capital, I made (capital / sales) equivalent to (total assets / revenue). The financial capital is (stock value / total assets). I used Yahoo Finance to calculate the stock value by multiplying the outstanding issued stock share by the average stock price for the entire fiscal year."

In Yahoo Finance (YF), John used the monthly option for both companies and queried from July 1, 2009 to June 30, 2010 for Microsoft Corp. and from September 27, 2009 to September 25, 2010 for Apple Inc. because its last fiscal year ended in September 26, 2009. Since Apple Inc's fiscal year was not a perfect month-ending date, YF gave 13 monthly readings of the closing stock price for the year instead of 12. Apple Inc. had an average closing stock price of $229.10, Microsoft Corp. had $26.18, and John multiplied their average stock price with the average value of their diluted and outstanding stock shares shown in their respective financial reports.

In utilizing the Standard industrial Classification Code in Acs & Audretsch (1987), John had to depend on the large-to-small firm innovation rates created by the United States Small Business Administration in 1982. They decided to come up with a balanced innovative measure for large and small firms in the same industry. The purpose was to define a numerical value for the largest possible innovative difference between a large and small firm in a particular industry. The four measures include: the large firm innovation rate (LIE) and small firm innovation rate (SIE), which are both based on employee numbers, as well as innovation standardized by sales (DIS) and innovation standardized by employee number (DIE), which are both based on number of innovations. LIE is for firms with employees over 500, SIE is for firms below 500 employees, DIS is for sales that were made regardless of employee size, and DIE is for industries where employee size does not affect innovation.

Since this paper is dealing with innovation in firms where employee size matters and both are large firms, John felt that the LIE would be more applicable in deriving the innovation scores for Microsoft Corp. and Apple Inc. For the electronic computing equipment industry, which includes the two companies under focus, the LIE innovation difference was 0.9570, SIE was 8.2246, DIS was – 7.2676, and the DIE was – 8.3290.

So John utilized 0.9570 for the firm's industry. Companies in different industries can be compared and you can use any of the SIC classification differences to get the firm industry score depending on the availability of information provided by each company. You may want to use DIS if you are working with sales. John concluded in Table 5:

Innovation Score (IS) for Apple Inc. = 2(1 + 1 + 1 + 1) + 1(0.5) + 2(0.13) + 2(1.5) + 2(2.3) + 2(5.42) + 0.96 = **18.81**

Innovation Score (IS) for Microsoft Corp. = 2(1 + 1 + 1 + 1) + 1(0.5) + 2(0.3) + 2(1) + 2(1.38) + 2(5.42) + 0.96 = 19.94

The Disagreement

After reviewing the updated paper for submission, the day after Steve Jobs, co-founder of Apple Inc., died, Dr. Zuba felt that the paper was unsuitable for publication. This was because of how the results might affect Steve Jobs' sympathizers, how many in the technology field, including himself, believed that Apple Inc. is more innovative than Microsoft Corp., and because he disagreed with the use of a calculation used in a disaster preparedness paper (i.e., to calculate innovation score for firms).

Dr. Zuba insisted, "I do not know why you will use a formula for calculating disaster preparedness score for innovation, which is based on a linear combination of separate variables with various assigned values. When it comes to innovation factors, many executives would be concerned with issues such as pipeline of new products in development, number of innovative products being created, and comparing the current sales of new products to old ones. Many in the business community would even laugh at the fact that Microsoft Corp. is more innovative than Apple Inc. because the latter created innovations that shook up many industries."

John replied jokingly, "Sir, please do not allow your love for Apple Inc, the death of Steve Jobs, and your worship of Macintosh computers to prevent you from working with me to make this AMCIS paper become a refereed journal publication. I also know that you believe that IBM stands for "I Buy Mac". It was Dr. Moon, who teaches the PhD seminar in Internet Securities that suggested that any published formula from any field could be utilized to calculate any score as long as the adopted formula was replicated with adequate explanations. I believe that researched documentation always beats conversation, beliefs, or what we think. Numbers do not lie, and from my calculations based on financial data of the two firms, as well as researches from other notable scholars on the facts of innovation, Microsoft Corp. as of the end of 2010 was more innovative than Apple Inc."

Dr. Zuba inquired further, "Are you sure Microsoft did not promise you a paid internship position to come up with this conclusion? How on earth can Microsoft, Corp. be more innovative than Apples Inc.? What products have Microsoft got to show lately that even brings it close to Apple in terms of being innovative? Can you even compare Apples Inc.'s sales to that of Microsoft Corp.'s? How then can these bunches of numbers here justify to business professionals and researchers that Microsoft is more innovative? Even customers on the street know that Apple is more innovative by the quality of gadgets they bought from Apples Inc. or see in the news?"

John concludes, "Focusing on the definition of innovation make Apple Inc. appear to be more innovative because it has re-engineered and re-structured our lives through its invention more than Microsoft Corp. Also, Apple Inc. did create more revenue, but it failed to be more profitable than Microsoft in 2010 as well as in other financial data. The effects of new products or its sales are all covered in the financial data. The purpose of an innovation score is to provide numerical value for innovation based on reliable annual financial data from firms and their employee evaluations on motivation to innovate, rather than relying on mere numbers of inventions, patents, revenue, or profits. Sir, let us try to put sentiments aside because Microsoft Corp. beats Apple Inc. in every financial data aside from revenue, assuming they both have maximum employee evaluation points for motivation to innovate. Ultimately, Business Intelligence scoreboards can be utilized to calculate a firm's innovation score annually in each industry within a country based on this research."

Dr. Zuba refused to put his name on the paper yet permitted John to summit it if he wanted to. John is worried that Dr. Zuba may be offended if he goes ahead and submit the paper and the paper gets accepted without his name. He feels maybe it is better to just let it go because the journal reviewers may see the paper the way Dr. Zuba sees it. Therefore, an innovative score will be insignificant to professionals, the public, and the media. John then wonders about the relevance and appropriateness of his innovation score and model.

3. EPILOGUE

John went ahead and submitted the paper to a refereed Information Systems journal as the only author and is still awaiting a decision on the acceptance or rejection of his paper.

4. CONCLUSION AND LIMITATIONS

Many believe that Apple Inc. is more innovative than Microsoft Corp. This assumption is based on the fact that Apples Inc. introduced a lot of innovative and dynamic products that really changed and affected the lives of many positively, but this does not mean that it was more innovative as a firm. The most innovative firm in an industry within a country should not be judged solely on the basis of the number of products, innovations, patents, or revenue. Rather, it should be judged by its employee surveys to determine how motivated its employees are to innovate, and its financial data to compute its firm structure, market power, human capital, as well as its financial capital. The firm industry score is usually constant within that industry, except the firms being measured are in separate industries. There may be other factors that need to be included in calculating innovation scores for firms. Perhaps in the future, Apple Inc. will become more innovative or have a higher innovation score than Microsoft, Corp. based on this innovation formula. In order for this to become a reality, Apple Inc. will really need to work on its financial data aside from its revenue, which is higher than that of Microsoft Corp.

The major limitation in this case study is that no survey was given to the employees of the firms

to actually measure the four sub-factors of motivation scores. In order to get accurate intrinsic motivation score for each sub-factor, each survey given and received from each employee must be graded on a scale of 10 for each survey question. After all the survey responses have been added up and averaged, only firms with a score of 80% and above should be given one point for each subgroup of motivation that the survey was meant for. A point of 0.5 (half) should be given if they score between 50% to 79%, or a zero if they score below 50%. Since the innovation score difference between the two firms was 1.13, Microsoft Corp.'s not getting maximum points in two of the motivation surveys would have reduced its score by 2 to 4 points. This would have made Apple Inc. have a higher innovation score, but in this case, maximum points were awarded to both firms on employee motivation surveys.

*All names of individuals have been changed.

5. ENDNOTES

1) Stahl (2004) defines innovation as creating ways to do things simpler and better.

2) Kuczmarski (1996) defines innovation as "the appreciation of risk as well as a radical attitude and mindset that enables businesses to create a future vision."

3) Scherer (1965) sees innovation as measurement of input, such as Research and Development, while Mansfield (1968) states that innovation is a measurement of output, such as patents.

4) According to Tellis, Prabhu, & Chandy (2009), the analysis on patents reveals that patents are not a driver of radical innovation. Other studies have indicated that the number of patents is correlated with the size of the firm (Wallsten, 2000).

5) Kuczmarski (1996) insists that "innovation is not cutting cost, but rather, the engineering, structuring, organizing, and examining of ourselves to beat industry competitors, increase our profit margin, and enhance future earnings from various streams."

6) Business intelligence as a concept is new compared to other strategic software approaches (Negash & Gray, 2008).

7) Business Intelligence creates forecasts based on past data, old and current performance, and predicts future directions (Negash, 2004).

8) As a part of Business Intelligence, balance scorecards are used for motivating and measuring business unit performance, which consists of four perspectives – financial, customer, internal business processes, and learning and growth (Kaplan & Norton, 1996).

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