**DSBA 6100-U01 – Spring 2016**

**Big Data Analytics for Competitive Advantage**

**Group Project – Part 3**

**Managerial Report**

**Team 5**

**Team Members:**

Kerri Easterbrook

Xiazhi (Sherri) Fang

Madlen Ivanova

Diana Kinney

Mahalakshmi Vishnampettai Raghuraman

Aravindharaj Rajendran

Divya Ravi

**1. Objective**

To gain insights into the relationships between Fortune 500 company performance, social responsibility, analytics, innovation, patent development, and current political climate in order to make valuable predictions.

**2. Fortune 500 Company Insights**

Even though statistical significance was found in over 95% of the relationships between all variables, scatter plots revealed most relationships were not practically significant. After splitting the data based upon Specialty, strong practically significant relationships appeared between the variables Revenue, US Patent count, and Research & Development (R&D) Expense (innovation) most strongly for the specialty Oil and Gas Equipment Services. The relationships indicate that for every 1 patent granted, the Oil and Gas Equipment Services industry spends $1.2 million in R&D (p<0.01, R2= 0.85) and earns $43 million in Revenue (p<0.01, R2= 0.58). Research reveals that companies within this specialty rely on their patents to generate revenue when oil prices decline by licensing their patents or suing competitors over patent infringement. Market segmentation based upon corporate social responsibility (CSR) ratings revealed that companies which do not participate in any primary CSR activities (environment, diversity, corporate governance, community, and product) earn much less revenue and are granted less patents, on average, than companies that do participate in CSR, specifically, high diversity support ratings, like Walmart and IBM.

**3. Walmart Insights**

Walmart would rate a “5” on the Davenport and Harris analytical competitor spectrum due to its use of predictive analytics models to discover the sales patterns, most profitable products, profitable store locations, consistently improving their supply chain costs, and its investments in open source technology, data analytics, mobile marketing and cloud infrastructure. This allows them to reduce costs and provide their customers with convenient low-cost shopping experience, which has made them the top revenue earing company for the last 10 years, having significantly higher revenues and net income compared to its competitors - Target, Sears (K-mart), and Costco.

Team 5 recommends that Walmart pursue the Omni channel strategy to streamline user shopping experience with Polaris search engine since Polaris provides users with a more tailored search experience. Walmart is already making heavy investments in mobile analytics, but only has 22 million active app users out of Walmart’s 260 million customers per week. Walmart could increase customer awareness via a zero-cost reminder at checkout to download the app. Mobile Marketing has the potential enhance customer experience and thereby build stronger brand loyalty. Another recommendation is to leverage Walmart’s network of stores and experienced logistics team to offer free and faster product delivery than their competitors.

**4. IBM Insights**

Topic modeling on the last 3 years of annual reports (2013, 2014, 2015) revealed that IBM’s annual reports focused on more on analytical terms compared to its competitors (HP, Microsoft, and Apple). This makes sense since IBM's four core capabilities are: Hadoop-based analytics, stream computing, data warehousing, and information integration & governance, ranking IBM a “5” on the Davenport and Harris analytical competitor spectrum. Over the last 10 years, IBM has more than doubled the number of patents granted compared to its competitors, yet, looking at our data, we observed a decrease in IBM’s revenue in the recent years along with a decrease in the number of IBM’s employees and the overall index of CSR. Team 5 recommends that IBM stop to lying off qualified employees as they may not be able to recoup experienced analytics professionals. IBM’s reputation has also declined in recent years due to IBM’s reduced quality and under-delivering on its commitments. As a result many large clients discontinued using IBM’s services. IBM should improve its product quality, be retaining qualified employees, to keep its large clients satisfied. Also, IBM should create an App Store that provides application developers a way to interact with customers.

**5. Election Impacts on Fortune 500 Companies**

After examining the relationship between presidential party on each variable independently, no single variable appeared to be significantly impacted by the which party was in office. Running a multiple linear regression, looking at the impact of party in office, number of employees, and current year on the an industry’s revenue revealed that the following industry experienced higher revenues when a Democrat is president: Hotels, Casinos, Resorts; and the following industries experienced higher revenues when a Republican was in office: Aerospace and Defense, Chemicals, Commercial Banks, Electronics, Electrical Equip., Energy, General Merchandisers, Mail, Package, and Freight Delivery, Medical Products and Equipment, Metals, Motor Vehicles and Parts, Packaging, Containers, Telecommunications, Railroads, Utilities: Gas and Electric.

**6. Limitations and Assumptions**

The above findings may not generalize to companies of different sizes and globally since data used was collected for only Fortune 500 companies – the US’s top performing companies. Even though most data was collected for the last 60 years, CSR and Patent data was only available for the most recent 10 years, preventing in-depth analysis due to the limited time frame. Factors such as the economy, global conflicts, inflation, other political office holders, campaign contribution data, and even company marketing and publicity factors were not taken into account for this analysis. In addition, the multiple linear regressions revealed some curvilinear relationships that a linear model could not appropriately measure. Future research should address these limitations.

**REFERENCES**

Businesses Will Feel Impact of US Presidential Campaign Throughout 2016. (n.d.). Retrieved February, 2016, from http://www.consultingsociety.com/news\_release\_12-1-15.html

DeZyre. (2015, May 23). How Big Data Analysis helped increase Walmart's Sales turnover? Retrieved March, 2016, from https://www.dezyre.com/article/how-big-data-analysis-helped-increase-walmart-s-sales-turnover/109

Dividend Monk. (2013, January 31). Dividend Growth Investor. Retrieved April, 2016, from http://www .dividendgrowthinvestor.com/2013/01/costco-dividend-stock-analysis-for-2013.html

Easley, J. (2013, December 23). Walmart Gets Busted Forcing Employees to Make Political Contributions to Republicans. Retrieved April, 2016, from http://www.politicususa.com/2013/12/23/walmart-busted-forcing-employees-political-contributions-republicans.html

European Patent Office. (n.d.). Patent Information Services for Experts: European Patent Applications and Specifications. Retrieved March, 2016, from https://data.epo.org/expert-services/index-2-2-5.html EU Patent data for 2005 - 2015

Federal Election Commission. (n.d.). 2016 Presidential Campaign Finance. Retrieved January, 2016, from http://www.fec.gov/disclosurep/pnational.do

Federal Election Commission. (n.d.). Disclosure Data Catalog. Retrieved March, 2016, from http://www.fec.gov/data/DataCatalog.do

Fernandez, B., Hobgood, J., & Slenkovich, K. (2016, March 3). United States: As Oil Prices Descend, Patent Enforcement Litigation Increases Within Energy Industry. Retrieved May, 2016, from http://www.mondaq.com/unitedstates/x/471250/Oil Gas Electricity/As Oil Prices Descend Patent Enforcement Litigation Increases Within Energy Industry

Godfrey, P. C., Merrill, C. B., & Hansen, J. M. (2009). The relationship between corporate social responsibility and shareholder value: An empirical test of the risk management hypothesis. *Strat. Mgmt. J. Strategic Management Journal,* *30*(4), 425-445. doi:10.1002/smj.750

Hansen, J. (2016, February). [Fortune 500 2015 firms (for group project analysis)]. Unpublished raw data.

Hansen, J. (2016, February). [Compustat Revenue etc Report for Fortune 500 ticker list]. Unpublished raw data. CompuStat

Hansen, J. (2016, February). [Compustat KLD Report for Fortune 500 ticker list]. Unpublished raw data. CompuStat

Historic Election Results. (n.d.). Retrieved January, 2016, from http://www.archives.gov/federal-register/electoral-college/map/historic.html

IBM. (n.d.). Political expenditures and public policy matters. Retrieved March, 2016, from http://www.ibm.com/investor/governance/public-policy-matters.html

*Japanese Patent Data (2005 - 2015)*. (n.d.). Retrieved March, 2016. Patent & Trademark Resource Center

Kostovetsky, L., & Di Giuli, A. (n.d.). Politics and Corporate Social Responsibility. Retrieved February, 2016, from https://corpgov.law.harvard.edu/2013/12/30/politics-and-corporate-social-responsibility/

Lee, S., Yoon, B., & Park, Y. (2009, June/July). An approach to discovering new technology opportunities: Keyword-based patent map approach. Technovation, Volume 29 (6). Retrieved February, 2016, from http://www.sciencedirect.com.librarylink.uncc.edu/science/article/pii/S0166497208001326

NAICS Codes by Industry. (n.d.). Retrieved March, 2016, from https://businessdatacodes.com/naics/

North American Industry Classification System. (n.d.). Retrieved February, 2016, from http://www.census.gov/cgi-bin/sssd/naics/naicsrch?chart=2012 Raw Data

Patent Troll (n.d.). Retrieved March, 2016, from https://en.wikipedia.org/wiki/Patent\_troll

Pettypiece, S. (2016, February 26). How Wal-Mart Explains the Difference Between Clinton and Sanders. Retrieved April, 2016, from http://www.bloomberg.com/politics/articles/2016-02-26/clinton-vs-sanders-in-one-word-wal-mart

Ruetschlin, C., & McElwee, S. (2014, December 3). How Walmart and Home Depot Are Buying Huge Political Influence. Retrieved April, 2016, from http://prospect.org/article/how-walmart-and-home-depot-are-buying-huge-political-influence

Tasini, J. (2011, May 25). Why Are Democrats Taking Money From Wal-Mart? Retrieved April, 2016, from http://www.huffingtonpost.com/jonathan-tasini/why-are-democrats-taking\_b\_116346.html

The Motley Fool. (n.d.). SWOT Analysis of International Business Machines Corp: Do IBM’s strengths and opportunities offset its weaknesses and threats? Retrieved March, 2016, from http://www.fool.com/investing/general/2015/05/07/swot-analysis-of-international-business-machines-c.aspx

The Motley Fool. (n.d.). Costco vs. Wal-Mart: Higher Wages Mean Superior Returns for Investors. Retrieved April, 2016, from http://www.fool.com/investing/general/2014/03/12/costco-vs-wal-mart-higher-wages-mean-superior-retu.aspx

TopForeignStocks.com. (n.d.). Historical Fortune 500 lists. Retrieved March, 2016, from http://topforeignstocks.com/downloads/

United States Patent Trademark Office. (n.d.). Patenting By NAICS Industry Classification. Retrieved March, 2016, from http://www.uspto.gov/web/offices/ac/ido/oeip/taf/naics/naics\_stc\_fg5/naics\_stc\_fg.htm

United States Patent Trademark Office. (n.d.). Patenting By Geographic Region (State and Country),Breakout By Organization. Retrieved February, 2016, from http://www.uspto.gov/web/offices/ac/ido/oeip/taf/stcasg/jpx\_stcorg.htm

Whiffleberry whiffleberry. (2016, February 4). Hillary is the Wal-Mart Candidate. Retrieved April, 2016, from http://www.dailykos.com/story/2016/2/4/1479959/-Hillary-is-the-Wal-Mart-Candidate

Zadrozny, W. (2016, January). [US Patent Data (2005 - 2015) from DSBA hadoop server]. Unpublished raw data. /projects/class/dsba-6100/patentData2000\_2015/patGrants2005\_2015h1\_ipgs