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An Empirical Analysis of Company Culture: Using Glassdoor Data to Measure the Impact of Culture and Employee Satisfaction on Performance

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Abstract

This paper examines the impact of culture and employee satisfaction on company performance; it considers which elements of culture are most important in specific industries: manufacturing, technology, and finance. Additionally, it explores whether these elements of productive cultures are also associated with employee satisfaction. It uses data from the MIT Sloan Management Review/Glassdoor *Culture 500* database, which applied machine learning to analyze 1.2 million Glassdoor reviews. This data quantitatively measures nine dimensions of culture: agility, collaboration, customer focus, diversity, execution, innovation, integrity performance, and respect—assigning each company a score for every cultural dimension. Two dependent variables are used to measure company performance, stock growth and ROA. The Glassdoor Company Employee Company Satisfaction Rating was used to as the dependent variable for employee satisfaction rating was used as a dependent variable for satisfaction. When industries are combined, it is concluded that customer focus, innovation, performance rewards, and integrity all increase company stock performance, whereas collaboration decreases stock performance. However, when regressions are run individually for individual industries, culture has different marginal effects. Collaboration was found to be positively linked to performance in the manufacturing industry, but was associated with lower performance outcomes in the technology industry. For both technology and manufacturing, customer focus and respect were most positively associated with performance. Additionally, employee satisfaction is highly correlated with company performance. Specifically, similar cultural variables (innovation, respect, customer focus, and performance rewards) that are significant for company performance are also positively associated with overall employee satisfaction. The paper concludes that further research should be conducted on a larger, more diverse dataset. This data set should include more observations for every industry and control for job titles to see if these findings hold when controlling more accurately for industry-related effects.

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I. Introduction

Companies are rapidly redefining what the workplace looks like. In some ways, the line between work and life for employees is blurring. For instance, at Facebook they have created incentives to never leave work. Their "campuses" are complete with amenities such as: ice cream shops, gyms, arcades, barbers, and restaurants. In many modern-day companies, like Facebook, employees' lives orbit around their work. They are bussed back and forth on company buses, eat three daily meals at work, and live in corporate housing complexes. Compared to the cubicle-based structures of the past, these investments in workplace culture pose a radical shift in practice. [1] Are these large profitable tech giants onto something? Is there really such a thing as a "free lunch", or is there an underlying economic incentive that is causing companies to invest in different cultural benefits? In order to understand this, my thesis explores three underlying questions related to performance. First, how do different elements of company culture[1] impact overall firm performance? If so, how does culture impact performance within specific industries? Lastly, do the same elements of culture that drive employee satisfaction also drive performance?

Over the last hundred years, the relationship between culture and performance has fundamentally evolved with the changing workplace. Traditional efficiency theories (e.g. Taylor, 1919), focused on reducing costs by eliminating all the complex elements of the

[1] While culture has many definitions, when I refer to culture, I am referencing a combination of 9 quantifiable dimensions used in the SMR MIT/Glassdoor Culture 500 dataset. These dimensions of culture include agility, collaboration, customer focus, diversity, execution, innovation, integrity, performance rewards, and respect (SMR MIT, 2019).

workday. Through this development of monotonous processes, productivity and firm profits increased at the cost of worker satisfaction. These practices were widely adopted by firms at the time. The original Ford assembly line draws from elements of this early research (Hayes et. al, 1988)**.** Efficiency theory applied well to firms in Ford's time because they were capital-intensive manufacturing companies with an unskilled workforce. Thus, it was easy to motivate workers by paying them relative to their output. However nowadays, work has become increasingly complex, and it is difficult to quantify output and create aligned incentives, a phenomenon known as the "agency problem" (Ritter, Taylor, 1997). Due to this agency problem, firms today are using cultural benefits as an intangible asset, outside of traditional efficiency wages, to motivate employees.

There are two major changes that have impacted the way companies think about culture: an increase in work complexity combined with labor turnover and mobility. As work grows more complex, due to technological advances, the value of human capital increases relative to physical capital (Edmans, 2011). Some economists have coined this new wave of technology as the "Fourth Industrial Revolution" (Schwab, 2019). This revolution requires that firms retain workers with specialized technical abilities. In order to compete, firms are investing more resources in training and spending longer onboarding their employees (Bersin, 2019).

Even though firms have increased resources devoted to on-the-job training, firms are having issues retaining employees. There was a period from World War II through the 1970s, where "corporations filled roughly 90% of their vacancies through promotions and lateral assignments" (Capelli, 2019). Now this figure hovers at roughly less than one

third. Additionally, the adoption of online job boards, combined with increased connectivity via online social networks, like Facebook and LinkedIn, has made it is easier for workers to discover new opportunities that might not have been as traditionally accessible. In 2018, the average length of employment in the US was 4.15 years (BLS, 2018). This labor turnover is costly. When an employee switches jobs, firms do not receive the full economic benefits of their initial investment in onboarding and on-the-job training. Additionally, they will have to incur additional recruitment, screening, and onboarding costs of hiring a replacement employee. A 2018 Gallup study estimated that millennial turnover costs the U.S. economy $30.5 billion annually (Gallup, 2018). Firms can bring down training and onboarding costs by offering completive salary and cultural benefits to attract highly-skilled workers (Edmans, 2011).

Due to these major trends, there is clearly a link between retention, recruitment of human capital, employee motivation and culture. Furthermore, workplace culture affects how employees interact with each, how they collaborate, how they share information, and their overall satisfaction. All of these factors can impact performance.

Crowdsourcing review platforms such as Glassdoor have reduced labor market asymmetry, by allowing employees to anonymously report on their salary and firm's culture. Before these internet platforms, it was more difficult to judge the relative cultures of companies at scale. For years, researchers have struggled to pin down a concrete method of measuring or even defining company culture.

My research will be one of the first cultural research studies that quantitatively examines the impact of culture in relation to performance at scale. In the past, research

has been limited to qualitative surveys, relying on a select pool of companies to self-report. For instance, one of the most extensive studies surrounding corporate culture, Kotter and Heskett (1992), measures culture by analyzing mail-in surveys for 218 firms. One limitation of this research is that it only surveys six "top officers" at every firm. By contrast, my dataset uses more than 1.2 million Glassdoor reviews to empirically measure culture, allowing all employees of companies to have an equal opportunity to report on their company's culture. Using Glassdoor's data**,** researchers at Massachusetts Institute of Technology Sloan Management Review (MIT SMR) have developed a machine learning-based model that analyzes Glassdoor reviews and quantitatively measures firm culture. This dataset is called the MIT/Glassdoor Culture 500. It measures culture on the following dimensions: agility, collaboration, customer focus, diversity, execution, innovation, integrity, respect, and performance rewards.

Through this paper, I will use econometric techniques to analyze how much culture impacts company performance. Furthermore, I will examine which cultural variables are associated with employee satisfaction, to see if cultural elements related to employee satisfaction also increase performance. In order to research this topic, I will first discuss the literature that surrounds this topic. Next, I provide an overview of the data that I have collected. After a summary of the data, I bring forth my regression analysis of the three dependent variables (Stock Growth, ROA, and Employee Satisfaction) to show that cultural variables and employee satisfaction have a positive effect on firm performance. Following this, I end with a discussion of the results and suggestions for future research on the topic.

II. Literature Review

Past researchers have used a wide array of approaches to define and measure culture in relation to firm performance. For instance, organizational culture has been defined as a collection of shared meanings (Louis, 1985), central organizational values (Barney, 1986), and shared beliefs (Borsch, 1985). With varied definitions of culture, researchers have used different approaches to measure it. One of the most extensive cultural studies is by Kotter and Heskett (1992). The researchers survey 207 firms and ask the top six officers at each firm to complete a short mailed questionnaire about the company's culture. With this data, they measure cultural buy-in, the degree to which employees accept the stated values of the company, in relation to the respective firm's EBIT performance. Sorenson (2002) examines cultural flexibility, the degree to which a firm is able to adapt to environmental change, by reanalyzing the Kotter and Heskett (1992) dataset. Sorenson (2002) finds a positive correlation between cultural flexibility on performance outcomes, Return on Invested Capital and Operating Income.

The Culture 500 dataset defines culture in nine dimensions: agility, collaboration, customer focus, diversity, execution, innovation, integrity, performance and respect. The researchers identify these variables as key cultural values systematically. [2] In order to understand the dimensions of culture used in my analysis, I will briefly overview the

[2] The MIT researchers identify 60 values that the Culture 500 companies list most frequently in their company values statements. Then, they narrowed down these values to the 9 most cited variables.

prior research that has been done on these nine dimensions of culture. I will supplement this with the literature surrounding overall employee satisfaction.

In meta-analysis of culture, innovation has been discussed as one of the main drivers of company performance Vincent et al (2004). However, the direct impact of innovation is difficult to measure because it is connected to many other cultural elements. Inoeue and Liu (2015) analyze worker collaboration networks and determine that collaborative cultures mediate innovation. Minor (2017) analyzes data from idea management data 154 public companies and concludes that ideation rate was the key driving factor linked with increased innovation and performance. Ulsoy et al. (2011) find that innovation has a significant positive impact on firm performance.[3]Overall, these past research studies suggests that innovative culture can facilitate collaboration, along with continuous improvements of both business processes and product innovations —allowing the businesses to continuously adapt to the changing needs of the environment.

Diversity has been linked to innovation-driven business outcomes. Reeves et al. (2018), measure diversity within 1,700 companies around the world, finding a statistically significant relationship between diversity and innovation outcomes. In particular, Reeves et al. (2018) conclude that diversity has the highest impact on companies with an emphasis on digital innovation. Additionally, diversity has been

[3] Four dimensions measure firm innovation including: product innovation, process innovation, marketing innovation and organizational innovation, which aligns with the OECD Oslo Manual.

shown to bring down the phenomenon of groupthink[4], by increasing perspectives and group considerations (Riggio, 2017). Groupthink can potentially push teams to make consequential oversights when making key decisions (Riggio, 2017). Researchers posit that diversity can introduce more perspectives into the conversation and this can nudge the groups to be more innovative and to employ more thoughtful decision-making strategies.

Customer focus also can benefit the company from a marketing, innovation, and engagement perspective. Dunn et al. (1985) finds that there is a positive correlation between customer-oriented cultures and marketing performance. From a decision making perspective, it can empower employees to make data-driven decisions (Hughes et al., 2014). Additionally, it can help drive innovation by encouraging constant improvements based on customer painpoints. Lastly, customer focus improves alignment and engagement by building a common understanding of purpose throughout the company (Hughes et al., 2014).

Agility has been shown to have multiple organizational benefits including rapid innovation, an engaged workforce, and organizational stability (Baizagos, 2015). McGrath (2009) examines the agility of 2,300 large US-based companies, over the course

[4] Groupthink is when the members of a given group tend to develop similar lines of thought, agreeing with each other.

of ten years, and she states that the most agile companies increase their net income by at least 5 percent annually[5].

Rewarding employee performance can positively motivate employees. This is consistent efficiency wage theory, which posits that paying workers above the market average increases output increases productivity and performance. Ackerlof (1982) defines the labor market as a "Gift Exchange" where high quality labor, between the worker and the firm, depends on goodwill. By paying above market average levels, firms can motivate workers. Shapiro and Stieglitz (1986) assert that these high wages can decrease shirking. Under this theory, if a worker is caught shirking and is subsequently fired, they pay a penalty—having to work at a different firm that pays market standard wages. This fear can positively incentivize workers to be more productive. Recent research has added onto this theory, suggesting a more nuanced picture. Edmans (2011) suggests that high wages can help firms to attract higher quality labor that is inherently more productive. Salah (2016) argues that there are actually three types of channels through which companies can incentivize employees: extrinsic rewards[6], intrinsic rewards[7], and social rewards[8]. Salah (2016) finds a positive significant relationship between all these elements

[5] The study looks at company performance across the date range of 1999 to 2009.

[6] Extrinsic rewards are financial rewards: compensation, stock options, retirement benefits, etc.

[7] Intrinsic rewards are non-financial rewards: recognition, advancement, training, etc.

[8] Social rewards are related to environmental characteristics such as: a supportive environment, status symbols, etc.

of company rewards and company performance. The Culture 500 definition of performance combines the three channels in its measure of performance-related culture.

While I was unable to find relevant literature that define execution in the same dimensions as the Culture 500 dataset, one element within the definition of execution (see *Table 1*) had relevant literature. This was "effective project management". Dai and Wells (2004) find that strong project management practices are significantly correlated with project performance. This especially applies to companies that have many cross-functional teams working to produce products or services. Effective project management can help organizations to more efficiently allocate resources such as time, capital, and labor, while coordinating all the dependencies to optimize the project timeline.

Managerial integrity has been associated with positive organizational benefits. Davis and Rothstein (2006) conduct a meta-analysis of corporate integrity studies, and find that perceived behavioral integrity of managers' increases employee organizational commitment and job satisfaction[9]. Along with integrity, respect has been shown to be an important factor for employee satisfaction. A 2017 report from the Society for Human Resource Management, finds that respect was a highly influential factor relating to job satisfaction, with 65% employees citing is as an "important contributor to job satisfaction" (SHRM, 2017).

Overall employee satisfaction also has been linked to performance. Chamberlain (2015) examines the correlation between the Glassdoor "Best Places to Work" list and

[9] Finds a positive relationship overall (average $r=.48$, $p<.01$)

company stock performance. Chamberlain (2015) finds that the average daily stock return for the "Best Places To Work" list companies was 0.065 percent per day over the period, while the S&P 500's mean daily return was 0.030 percent per day ($p < .08$). The Glassdoor "Best Places to Work List" is one measure of employee satisfaction, suggesting that overall employee satisfaction is correlated with a positive stock performance.

There are several theories for why employee satisfaction is related to performance. Edmans (2011) suggests that positive employee satisfaction can be a valuable recruitment tool to attract more highly-skilled candidates. Murray (1999) concludes that job satisfaction is associated with lower levels of absenteeism. Other researchers, have tried to directly measure this causal relationship outside of the microeconomic analysis. In one lab-based experiment, Oswald et al. (2015) find that short-run happiness can directly affect productivity on tasks. By paying participants for their performance on a series of tasks, the researchers aim to replicate elements of the workplace[10]. Happiness was associated with a 10%–12% increase in performance. One important limitation of the Oswald et al. (2015) study, is that there are a lot of other factors that feed into employee satisfaction—pay, social interactions, position, etc. Overall employee happiness is more complex than a short-run shock. Past research does not comprehensively calculate how these individual cultural directly relate to satisfaction.

[10] The experimenters split 700 participants into two groups. In one condition, participants were either given free snack or watch a comedic movie—to induce happiness. In the another group, participants were questioned about recent family tragedies—to induce lower levels of happiness. Then, the participants were paid based on how many arithmetic problems they solved.

By measuring which specific cultural variables are associated both with satisfaction and performance, my research will be the first comprehensive study that examines this specific relationship.

III. Hypotheses

The literature suggests that there are there are performance-related benefits of agility (McGrath, 2019; Baizagos 2015), collaboration (Inoue, Liu, 2015), customer focus (Dunn et al., 1985; Hughes et al., 2014), diversity (Reeves et al. 2018), execution (Dai, Wells 2004), innovation (Vincent et al. 2004; Ulsoy et al. 2011, integrity (Rothstein 2006), performance (Edmans, 2011; Salah, 2016) and respect (SHRM 2017).

Hypothesis 1: *There will be a positive correlation between all of the cultural variables and company performance (stock growth and ROA) controlling for industry and firm related effects.*

Based on the literature discussed above, I posit that there will be positive cultural impacts of all variables for the manufacturing, technology, and financial industries. However, as a result of industry-related effects, I expect there to be different marginal effects of each cultural variable on each industry.

Hypothesis 2: *There will be a positive correlation between all of the cultural variables and company performance in the manufacturing, technology, and financial industries when controlling for subindustry and firm related effects.*

Chamberlain (2015) finds that highly rated work cultures positively relate to performance. Furthermore, research by (Oswald et.al 2015; Edmans, 2011) suggests that positive workplace conditions are associated with higher levels of employee productivity.

Hypothesis 3: *There will be a positive correlation between employee satisfaction and stock performance controlling for industry and firm related effects.*

IV Data.

I use the cultural dataset from the Glassdoor and SMR MIT "Culture 500" collaboration. Researchers at MIT used machine learning to systematically parse and analyze keywords from 1.2 million Glassdoor reviews, pulled from the dates of Jan 1st, 2014 to March 31st, 2019. The average Culture 500 Company has over 2,000 employee reviews. [11] The model empirically measures each company's culture in nine dimensions: innovation, collaboration, agility, diversity, performance, integrity, respect, execution, and customer focus.

Each company has three scores for each respective cultural variable: sentiment, frequency, and percentile.[12] Percentile combines the frequency and sentiment scores to express the overall strength and presence of a cultural variable. Given that percentile score is a more holistic measure, capturing sentiment and frequency in one metric, I use it to measure culture. In order to increase the interpretability of results and eliminate small variations in the model, I decile rank the percentile score converting it to a value on a scale of 10.

In addition to these measures of company culture, I supplement the Culture 500 data with a measure of Glassdoor Overall Company Satisfaction rating. [13] In order to

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[11] This is approximately the size of "three full-length books' worth of textual data" (SMR MIT, 2019).

[12] Sentiment is a measure of how positively employees talk about culture, in terms of standard deviations above or below the average. Frequency is how often employees discuss each cultural value in reviews, in terms of standard deviations above or below the average.

[13] This rating represents a cumulative value that Glassdoor assigns to each company based on a proprietary formula that assigns more weight to recent reviews.

increase the regression interpretability of these results, I convert the values for Glassdoor Overall Company Rating into a new scale[14].

A full list of cultural variables and how they were operationally defined by the SMR MIT and Glassdoor researchers is below in *Table 1*.

[14] The Glassdoor scale ranges from (0 to 5.0), whereas my data is scaled from (0 to 100).

Table 1. Cultural Variables Definitions

Variable	Scale	Definition*	Known As*
Overall Company Satisfaction Rating[15]	0 -100	0 - 30 Employees are "Very Dissatisfied" 30 - 50 Employees are "Dissatisfied" 50 - 70 Employees say it's "OK" 70 - 80 Employees are "Satisfied" 80 - 100 Employees are "Very Satisfied	Overall Company Satisfaction Rating
Agility	1-10	Employees can respond quickly and effectively to changes in the marketplace and seize new opportunities.	Flexibility, Nimble, Fast moving
Collaboration	1 - 10	Employees work well together within their team and across different parts of the organization.	Teamwork, One company, Join forces
Customer	1 - 10	Employees put customers at the center of everything they do, listening to them and prioritizing their needs.	Customer focus, Deliver for our clients, Customer-driven
Diversity	1 - 10	Company promotes a diverse and inclusive workplace where no one is disadvantaged because of their gender, race, ethnicity, sexual orientation, religion, or nationality	Inclusion, Everyone is welcome, Celebrate difference
Execution	1 - 10	Employees are empowered to act, have the resources they need, adhere to process discipline, and are held accountable for results.	Operational excellence, Projects managed well, Take ownership
Innovation	1 -10	Company pioneers novel products, services, technologies, or ways of working.	Cutting edge, Leading change, Advanced tech
Integrity	1 - 10	Employees consistently act in an honest and ethical manner.	Do the right thing, Be ethical, Play by the rules
Performance	1 - 10	Company rewards results through compensation, informal recognition, and promotions, and deals effectively with underperforming employees	Meritocratic, Recognize achievement, Results-driven
Respect	1 - 10	Employees demonstrate consideration and courtesy for others, and treat each other with dignity.	Treat with dignity, Courtesy, Appreciation for each other

[15] Company Satisfaction Rating from Glassdoor Website and represent the cumulative rating of the company over time. “Glassdoor calculates company ratings using a proprietary ratings algorithm, with an emphasis on recency of reviews. Generally, the more recent the review, the heavier its weight towards the overall rating on Glassdoor” (Glassdoor, 2019).

Stock Type	0 - 1	0= Stock Traded on NYSE 1= Stock Traded on Nasdaq	N/A

*Source: All variables and definitions (except company satisfaction rating) were from Culture 500 database, and company satisfaction rating was pulled directly from the Glassdoor platform database.

In order to analyze company performance, I use Return on Asset and Stock Growth data. Vincent et al. (2004) use ROA as one metric of performance in relation to culture. I used the Wharton Compustat database to pull quarterly Return on Assets (ROA) data for each company[16]. Then, I average the ROA data for each company across the timeline to create an overall measure of ROA for every company. Both Chamberlain (2015) and Edmans (2011), use stock growth as a metric of performance. In order to determine stock growth, I use Google Finance to pull company stock performance data for all companies that participated in the NASDAQ and NYSE stock exchange during the entire five year time range[17]. Using the starting stock price and final stock price, I calculate the growth of the stock price between the time range. In order to control for outlier values of stock performance and ROA, I winsorize both values at the five percent level[18].

Then, I add Industry-Related controls. I did this because different cultural elements are shown to be associated with certain industries. (Price et al., 2018). This is due to the inherent characteristics of employees attracted to each industry, historic

[16] I pull data for the date range of Jan 1, 2014 until May 31, 2019

[17] I pull data for the date range of Jan 1, 2014 until May 31, 2019

[18] Winsorizing data means to replace the extreme values of a data set with a certain percentile value from each end. This is different from trimming, which involves removing those extreme values. One limitation, is that winsorizing does not allow the model to account for the entire range of variation because it truncates the dependent variable range.

industry practices, and the varied nature of the work across industries. Another reason I control for industry related effects, is that certain industries, for example: technology, are high growth industries right now. Without industry controls, the model would overestimate the impact of cultural variation. To control for industry-related effects, I pull the Standard Industry Classification (SIC) codes, which are individual four digit codes that reflect the industry. However, there were not enough firms in each respective four-digit category to effectively control and group for every four-digit industry. In order to overcome this, I group the SIC codes based on the first two digits, and I form larger, more general, industry groupings. The Groupings made are based on the Standard Division of SIC Industries. After grouping, I divide the Industries into five groups based on commonly accepted divisions of SIC codes. I eliminate the Oil and Gas Industry along with the Transportation Industry because there were not enough companies within those industries to include them in the regressions. There are only three retail companies in my dataset: Amazon, Overstock.com, and Wayfair, and they are all internet-based retail companies, so I add them to the Technology group. Additionally, I create a new group for the insurance companies separate from their original finance SIC grouping because their summary statistics (*see Table 3*) were substantially different than the other financial firms.

I also add subindustry controls to account for variations in every industry. For instance, within the technology industry, there are different types of technology companies: Enterprise Technology, Consumer/Internet Technology, and IT Services/Hardware. In order to control for subindustries, I use the original subindustry

categorizations established by the Culture 500 dataset. Some companies within the dataset are associated with two subindustries. If a company was grouped into multiple subindustries, I use the 4-digit SIC code to group it with only one subindustry, matching it to the industry with most similar SIC codes. These control variables are only used for the industry specific regressions, meaning that only one industry is included in the regression. For industry specific regressions, I winsorize the data set by industry. Additionally, for industry-specific regressions, I remove companies that were part of subindustries with an ($n<5$) and could not be grouped into a different subindustry. See *Table 3* for the full list of subindustry controls and their summary statistics.

Next, I add a few variables to control for firm-specific effects. First, I pull the Debt to Equity ratio from Compustat to control for each company's risk level. By doing so, I am controlling for the correlation between culture and stock performance that is explained by risk. Then, I add Compustat asset data for each respective company to control for company size. This control is important because differently sized companies tend to have different cultural speeds. For instance, a larger company might be less agile. If company size was not controlled for, the model could be overestimating the impact of agility and execution. To normalize asset data, I take the log of assets. Additionally, I control for company age relative to subindustry.[19] I based age relative to subindustry, rather than industry, because subindustry is more accurate way to measure variations in age. For instance, the median age for Enterprise Technology companies is 37 years old

[19] I base company age on the date the company was founded.

versus 20 years old for Consumer Technology. I control for age because as companies get older, the culture evolves. A few potential factors go into this: younger workers tend to be attracted to working at newer companies, there may be less hierarchal structures and processes in place, and oftentimes company culture is still being defined. To control for these effects, I create a dummy variable to denote whether the company is below the median subindustry age. Lastly, I controlled for the stock exchange that the company is traded in. The NASDAQ tends to be a place for growth oriented stocks, whereas the NYSE is seen as a stock market for "tried and true securities" (Desjardins, 2017). To control for the effects of the different markets, I create a dummy variable to control for stock market type. Lastly, I initially add R&D data for all the companies, but many companies did not have any data reported, so I remove this control[20]. Overall, my control variables are industry, subindustry, risk, size, stock type, and company age.

I initially begin with a sample size of 500 companies, which is the total number of companies present in the MIT dataset, and then I exclude companies based on the following criteria. Private firms or those who participated in markets outside of NYSE or NASDAQ are taken out. I remove subsidiaries. Although some subsidiaries have distinct cultural values, their financial performance cannot be separately measured. Additionally, I exclude companies that do not have data for the entire five-year time series. For instance, some companies went out of business, and some had an IPO after January 1, 2014. Additionally, companies that are missing multiple cultural data points were

[20] By removing this control, my model could potentially be overestimating the impacts of innovation, or other cultural elements associated with increased R&D spending.

excluded. These cultural data points are not initially included in the original MIT dataset. [21] They are excluded because they have high levels of frontline employees "who not adequately reflect values of agility, collaboration, innovation, and performance" (SMR MIT, 2019). In Glassdoor reviews, these employees tend to speak differently about "innovation" than an engineer or product manager might. Therefore, drawing comparisons is challenging. Lastly, I take out companies that are missing performance-related values from the Compustat company performance dataset. After this process, 188 companies are included in the dataset.

Table 2 outlines the summary statistics for companies included in my analysis. Whereas, *Table 3* details the summary statistics for the cultural variables, industries, and their subindustries.

[21] These include industries such as: apparel retail, fast food, general retail, grocery stores, hotels and leisure, home health care, and supply chain and logistics.

Table 2. Summary Statistics

Variable	Size (n)	Mean	Std. Dev.	Min	Max
Stock Growth	187	73.31	92.22	-57.21	293.56
ROA	188	.123	.076	.009	.276
Overall Company Satisfaction Rating	188	72.03	7.26	48	92
Age Relative to Industry	188	.50	.50	0	1
Ln(Assets)	188	10.23	1.78	4.22	14.74
Debt to Equity Ratio	188	3.944	4.29	.090	16.13
Stock Type	188	.292	.456	0	1
Insurance	17			0	1
Manufacturing	72			0	1
Technology	45			0	1
Financial Services	39			0	1
Media/ Telecommunications	15			0	1
Agility	188	5.54	2.86	1	10
Collaboration	188	5.39	2.89	1	10
Customer Focus	188	5.44	2.89	1	10
Diversity	188	5.61	2.87	1	10
Execution	188	5.85	2.89	1	10
Innovation	188	5.64	2.81	1	10
Integrity	188	5.50	2.83	1	10
Respect	188	5.42	2.87	1	10

* Values excluded for CEO with less than 200 ratings Note:

The first two variables: stock growth and ROA are the dependent variables for the regressions. Overall company satisfaction rating serves as a dependent variable and an independent variable.

Table 3. **Summary Statistics for Industries and Subindustries**

Industry	Size (n)*	Agility	Collab.	Custo. Focus	Diver -sity	Exec.	Innov	Inte.	Perfor- mance	Resp- ect	Satisfaction Rating	Stock Growth
Tech Overall	45	7.24	5.26	5.0	5.17	6.62	6.84	5.11	5.48	6.15	73.91	110.42
		(2.45)	(3.03)	(2.61)	(2.70)	(2.94)	(2.57)	(2.70)	(2.84)	(3.03)	(8.96)	(140.77)
Enterprise	13	5.84	4.76	5.0	6.38	7.0	7.38	6.46	6.54	7.62	78.61	118.80
		(2.76)	(2.83)	(2.83)	(2.39)	(2.35)	(1.83)	(2.10)	(2.87)	(2.36)	(7.08)	(116.41)
Internet/	15	8.0	5.22	4.33	5.24	6.139	6.62	3.30	6.54	5.23	73.28	125.28
Consumer		(2.01)	(3.32)	(2.71)	(2.54)	(3.41)	(3.31)	(2.65)	(2.40)	(3.60)	(11.09)	(198.69)
IT Services	14	7.29	5.57	5.50	3.28	7.42	6.28	5.35	3.78	5.85	70.01	92.03
		(2.30)	(3.0)	(2.44)	(2.15)	(2.87)	(2.62)	(2.93)	(2.66)	(2.35)	(6.65)	(99.71)
Finance Overall	38	5.34 (2.66)	5.5 (2.78)	6.05 (2.22)	6.44 (2.97)	4.31 (2.41)	4.28 (2.72)	5.34 (2.60)	5.23 (2.73)	4.78 (2.39)	70.57 (5.89)	51.64 (48.51)
Consumer Finance	12	6.51	3.22	5.8	5.7	4.8	5.8	5.0	5.44	4.92	70.8	85.52
		(2.32)	(2.25)	(2.32)	(3.59)	(2.524)	(2.52)	(2.35)	(1.96)	(1.97)	(8.543)	(78.83)
Diversified Financial Services	7	4.66	7.63	6.47	8.62	6.0	5.81	4.92	7.14	5.41	75.42	36.11
		(2.75)	(2.12)	(2.54)	(1.66)	(2.68)	(2.13)	(2.46)	(1.84)	(2.55)	(2.8)	(27.54)
Regional Banks	11	4.44	6.72	5.97	5.63	2.75	2.27	5.21	5.24	3.63	67.81	38.78
		(2.9)	(2.3)	(2.1)	(3.07)	(1.79)	(2.0)	(2.63)	(2.63)	(1.96)	(2.75)	(16.36)
Investment Services	8	5.54	5.0	6.42	5.75	4.0	4.12	6.42	5.0	6.33	70.51	36.71
		(2.36)	(2.94)	(2.78)	(2.12)	(2.07)	(2.93)	(2.75)	(3.65)	(2.77)	(5.92)	(26.8)
Manufactu- ring Overall	63	4.74 (3.01)	5.85 (2.83)	5.73 (3.43)	5.30 (2.93)	6.26 (2.65)	5.77 (2.72)	6.36 (2.81)	5.92 (2.86)	5.68 (2.90)	73.01 (6.35)	75.94 (78.90)
Aerospace & Defense	8	3.55	3.61	4.32	4.59	5.84	6.33	6.25	4.0	5.32	71.0	94.26
		(3.12)	(1.65)	(2.26)	(1.46)	(2.14)	(2.10)	(2.16)	(2.63)	(2.86)	(3.37)	(56.35)
Consumer Goods	7	2.41	7.74	7.14	8.28	7.04	3.73	8.91	5.72	8.40	77.71	33.17
		(1.94)	(2.05)	(3.53)	(2.15)	(3.26)	(3.32)	(1.74)	(1.86)	(2.64)	(4.01)	(64.4)
Food and Beverage	10	4.690	6.66	4.23	5.54	6.33	3.81	4.12	6.43	4.66	70.63	12.41
		(3.2)	(2.27)	(2.34)	(2.74)	(1.95)	(2.14)	(2.9)	(2.6)	(2.1)	(4.6)	(38.9)
Industrial Conglomerate	5	5.63	4.24	2.78	3.53	7.50	5.02	6.42	6.85	3.45	68.41	56.5297
		(3.83)	(3.83)	(3.43)	(3.85)	(2.39)	(2.75)	(2.67)	(3.10)	(2.94)	(5.53)	(48.73)
IT Hardware	5	8.01	6.01	3.22	5.85	7.22	4.62	4.84	5.84	5.24	67.67	-24.34
		(1.23)	(2.72)	(2.34)	(2.94)	(1.094)	(1.51)	(3.52)	(3.49)	(3.46)	(8.56)	(56.70)

Industry	Size (n)*	Agility	Collab.	Custo. Focus	Diver -sity	Exec.	Innov	Integri ty	Perfor- mance	Resp- ect	Satisfaction Rating	Stock Growth
Medical Devices	9	3.53 (2.01)	4.84 (2.74)	9.06 (1.55)	3.86 (2.72)	4.83 (2.8)	5.81 (2.67)	6.74 (2.54)	5.37 (3.23)	4.84 (1.91)	73.11 (5.75)	122.2 (59.17)
Pharma & BioTech	10	4.72 (3.12)	7.05 (2.44)	9.02 (1.95)	5.38 (3.26)	5.69 (3.16)	7.87 (2.32)	6.45 (2.72)	5.37 (2.51)	5.52 (3.22)	75.22 (5.95)	58.27 (66.15)
Semiconductors	9	6.72 (2.64)	6.16 (3.52)	3.77 (3.36)	5.63 (3.33)	7.85 (1.89)	8.28 (2.12)	7.40 (2.15)	8.16 (2.93)	7.63 (2.35)	76.94 (7.62)	315.6 (317.73)
Media & Communica- tion Overall	15	5.53 (2.47)	3.81 (2.70)	3.33 (2.74)	5.6 (3.06)	3.53 (2.47)	6.26 (3.36)	2.23 (1.47)	5.46 (3.25)	4.23 (2.20)	67.46 (8.67)	1.33 (69.66)
Insurance	16	5.38 (2.33)	4.68 (2.96)	5.25 (2.11)	5.81 (2.48)	3.81 (2.54)	4.63 (2.12)	5.13 (2.45)	5.25 (2.88)	3.87 (2.33)	68.63 (5.15)	103.42 (105.74)

*Note: A few subindustries were removed due to a small sample size, therefore the total values of subindustries don't add up to the total n of the industry.

V. Results

The main results are present in *Table 4*, and they show the overall impact of cultural values for all industries and companies. However, I go more in-depth to look at the impact of cultural values in specific industries. *Table 5* presents the industry-specific regression results. These three industry-specific regressions are run individually in order to account for variations between industries and account for subindustry effects. Next *Table 6*, shows the relationship between employee satisfaction and company performance. Lastly, *Table 7* examines the link between the elements of culture and overall company satisfaction.

The purpose of the regression on Table 4 is to see the effect of each cultural variable on firm performance. The model includes all Culture 500 variables except for respect[22]. Below is the formula for the regression present in *Table 4*.

$$Y_0=B_0 + B_1AG_x + B_2Cu_x + B_3Di_x + B_4Ex_x + B_5Ino_x + B_6Pe_x + B_6Int_x + B_7Co_x + B_8I_1 + B_9I_2 + B_{10}I_3 + B_{11}I_4 + B_{12}DE_x + B_{13}Ln(Assets)_x + B_{14}Age_x + B_{14}Sx$$

Where Y_0 = Stock Growth or ROA over 5 years, AG=Agility, Cu=Customer , Co= Collaboration, Focus, Di= Diversity, Ex=Execution, Ino= Innovation, Pe= Performance ,Int= I= Industry Dummy= I_x, Sx = stock type

[22] I remove respect because the correlation between integrity and respect is .62, which is above the .5 cutoff value.

Table 4. Overall Regression Results for Stock Performance Based on Culture 500 Variables

Variable	**Stock Growth**	**ROA**
Agility	-.701	-.0012
	(2.70)	(.0021)
Collaboration	-5.32***	-.0013
	(2.44)	(.0019)
Customer Focus	5.16 **	.0017
	(2.46)	(.0019)
Diversity	-1.72	.0001
	(2.41)	(.0018)
Execution	3.02	.0014
	(2.47)	(.0019)
Innovation	8.21***	.0049
	(2.55)	(.0019)
Integrity	4.82**	.0023
	(2.73)	(.0021)
Performance	4.57**	-.0026
	(2.40)	(.0017)
Respect	Eliminated due to correlation	Eliminated due to correlation
Debt to Equity	-.397*	.0001
	(.202)	(.0000)
Ln(Assets)	-1.44	-.0077*
	(4.45)	(.0034)
Stock Type	8.98*	.0249
	(14.96)	(.0116)
Age (Youth)	10.31	-.0145
	(13.33)	(.0103)
Insurance	56.03**	-.0784***
	(23.96)	(.0186)
Media	-38.08*	-.0049
	(26.35)	(.0205)

Finance	14.49	-.0716***
	(20.03)	(.0155)
Technology	24.00*	-.0517***
	(17.55)	(.0136)
Constant	-33.53	.2047*
	(50.42)	(.0391)
R^2	.28	.36
[Adjusted R^2]	[.22]	[0.30]
F-Stat	4.31***	6.10***
Sample Size	187	188

Note: I eliminate Respect because it is highly correlated with integrity and collaboration. I conduct a 1-Tailed T-test. Additionally, the *, **, *** indicate that the coefficients are significant at the 10%, 5%, and 1% probability levels respectively.

Overall many of the cultural variables were positively correlated with stock performance growth including: innovation, customer focus, integrity, and performance.

As expected, innovation is the largest OLS regression coefficient. For every ten percentile points in innovation, a firm's stock performance is associated with an 8.21% growth, over the course of 5 years ($p<.01$).[23] This positive relationship aligns with Vincent's et al. (2004) research surrounding innovation-driven performance outcomes.

Customer Focus is highly correlated to stock growth. For every ten percentile points in customer focus, a firm's stock performance is associated with a 5.16 percent increase in stock growth over the period of five years ($p<.05$). This finding is similar with past research that has indicates that high customer focus cultures are associated with increased marketing success (Dunn, 1985) and increased product innovation, and overall employee engagement (Hughes et al., 2014).

[23] Due to the decile ranking of cultural variables, every one point increase in the each cultural variable represents a 10 percentile increase.

Performance rewards were also found to be significant linked to stock performance ($p<.05$) which is consistent with Salah's (2016) finding linking company rewards to company performance. This suggests that when a company is meritocratic, results driven, and recognizes achievement, there is a measurable performance outcome. From this data, it is unclear whether or not performance directly influences employee motivation. One factor, outside of motivation, that could be contributing to this effect is that high wages and benefits could enable companies to attract more high quality candidates that are inherently more productive (Edmans, 2011).

Integrity is associated with positive stock growth ($p<.05$). As Davis and Rothstein (2006) propose, perceived integrity could increases employee organizational commitment and job satisfaction, resulting in an increase in employee productivity.

Collaboration is significant ($p<.05$), but is negatively correlated with stock performance. This finding contrasts Inoue and Liu's (2011) research. However it may be attributable to differences in industries. Technology seems to be the driver of this effect. I analyze this industry-specific in-depth in discussion of results in *Table 5*.

One limitation of the data in *Table 4* is the way the model groups all companies and industries. First, because the model combines all companies into one regression, it does not separate cultural directional differences for specific industries. For instance, if collaboration positively impacts one industry and negatively impacts another, it does not show these separate effects. Instead, it shows collaboration as being negatively correalated with performance. Similarly, another important factor that the model does not account for is variations within each defined industry. There are sub-industries that are

unaccounted for. For instance, IT Hardware and Enterprise Software are grouped together under the "Technology and Services" Industry grouping. It is possible that the model explains performance outcomes related to cultural tendencies of the sub industries and the respective performance trends of the sub-industry, rather than measuring the desired firm-related cultural differences.

The Impact of Culture on Technology, Finance, and Manufacturing Firms Performance:

The regressions in *Table 5* were run separately for each industry address the industry and subindustry limitations of *Table 4*. While I could run five separate regressions to measure the impact of culture on all identified industries, I do not run regressions on the media and insurance industries due to their small sample size. The following regressions make up *Table 5:*

Technology Industry Regression:

$$Y_0 = B_0 * + B_1 AG_x + B_2 Cu_x + B_3 Di_x + B_4 Ex_x + B_5 Ino_x + B_6 Pe_x + B_7 Re_x + B_8 Co_x + B_9 DE_x + B_{10} Ln(Assets)_x + B_{11} Age_x + B_{12} SI_1 + B_{13} SI_2 + + B_{14} DE_x + B_{15} S_x$$

*Consumer/Internet Technology was set as the intercept value for the subindustry dummy variables because it had the largest sample size.

Finance Industry Regression:

$$Y_0 = B_0 * + B_1 AG_x + B_2 Cu_x + B_3 Di_x + B_4 Ex_x + B_5 Ino_x + B_6 Pe_x + B_7 Re_x + B_8 Co_x + B_9 Int + B_{10} DE_x + B_{11} Ln(Assets)_x + B_{12} Age_x + B_{13} SI_1 + B_{14} SI_2 + B_{15} SI_3 + B_{16} DE_x + B_{17} S_x$$

*Consumer Finance was set as the intercept value for the subindustry dummy variables because it had the largest sample size.

Manufacturing Industry Regression:

$$Y_0 = B_0 * + B_1 AG_x + B_2 Cu_x + B_3 Di_x + B_4 Ex_x + B_5 Ino_x + B_6 Pe_x + B_7 Co_x + B_8 Re_x + B_9 SI_1 + B_{10} SI_2 + B_{11} SI_3 + B_{12} SI_3 + B_{13} SI_4 + B_{14} SI_5 + B_{15} SI_2 + B_{16} DE_x + B_{17} Ln(Assets)_x + B_{18} S_x + B_{19} Age_x$$

*The Pharma and Biotech Industry was set as the intercept for the subindustry dummy variables because it had the largest sample size.

Where: Y_0 = Stock Growth over 5 years, AG=Agility, Cu=Customer Focus, Co= Collaboration, Di= Diversity, Ex=execution, Ino= Innovation, Pe= Performance, Re=Respect, Int= Integrity, SI= Sub-Industry Dummy, S= stock type

Table 5: Impact of Cultural Variables on Industry-Specific Stock Performance Controlling for Subindustries

Variable	**Technology**	**Finance**	**Manufacturing**
Agility	-.252	-4.66	1.43
	(8.33)	(4.22)	(3.58)
Collaboration	-9.68	2.52	1.04
	(6.82)	(6.16)	(3.40)
Customer Focus	14.48**	-1.95	4.35*
	(7.71)	(5.21)	(2.87)
Diversity	2.70	-4.85	-5.67**
	(8.63)	(3.81)	(3.07)
Execution	15.21**	4.38	-1.52
	(8.90)	(5.16)	(3.16)
Innovation	5.91	4.34	-1.04
	(8.56)	(4.11)	(3.64)
Integrity	*Eliminated	6.01	*Eliminated
		(4.32)	
Performance	11.32*	5.40	.183
	(7.49)	(4.08)	(3.18)
Respect	6.11*	-8.29	6.90**
	(6.43)	(5.59)	(3.58)
Debt to Equity	-.420	-8.25	-2.22
	(5.36)	(4.65)	(1.51)
Ln(Assets)	10.27	5.01	-1.67
	(12.08)	(9.97)	(9.16)
Stock Type	60.81	15.89	-72.15**
	(41.04)	(25.54)	(29.10)
Age (Youth)	-.443	-9.71	46.54**
	(33.71)	(17.48)	(18.39)
Sub Industry 1:	Enterprise: -26.96 (43.76)	Regional Banks: -20.76 (31.14)	Semiconductors: 169.44*** (41.70)

Variable	Technology	Finance	Manufacturing
Sub Industry 2:	IT Services: 14.87 (49.41)	Diversified Investing: 40.32 (44.63)	IT Hardware: -37.01 (36.18)
Sub Industry 3:	Consumer/Internet Tech: (Intercept)	Investment Banking: -13.89 (26.22)	Medical Devices: 67.83** (29.32)
Sub Industry 4:	N/A	Consumer Finance: (Intercept)	Industrial Conglomerates: 35.93 (36.34)
Sub Industry 5:	N/A	N/A	Food/Beverage: -6.71 (29.76)
Sub Industry 6:	N/A	N/A	Consumer Goods: .124 (32.81)
Sub Industry 7:	N/A	N/A	Aerospace & Defense: 44.69 (31.29)
Sub Industry 8:	N/A	N/A	Pharma & Biotech: (Intercept)
Constant	-285.91 (119.76)	61.01 (117.57)	27.51 (109.71)
R^2 [Adjusted R^2]	0.58 [0.39]	0.52 [0.15]	.72 [.59]
F-Stat [Prob]	3.05 [0.005]	1.43 [0.218]	5.73 [0.00]
Sample Size	45	38	62

Note: I conduct a 1-Tailed T-test. Additionally, the *, **, *** indicate that the coefficients are significant at the 10%, 5%, and 1% probability levels respectively.

Overall, for technology and manufacturing, similar variables seem to be associated with performance. For both, customer focus and respect were positively correlated with company performance.

For ten percentile points in customer focus, was associated with a 14 percent increase in stock performance in the Technology industry ($p<.05$) and a 4.35 percent

stock performance increase for the Manufacturing industry ($p<.1$) over the five year range. This user-focused outlook applies well to technology and manufacturing companies who need to specifically innovate and design products around their end user's needs.

Different from other industries, for technology, both performance and execution were also positively correlated to performance. For every ten percentile point increase in execution there is an associated 11.31 percent increase in stock performance over five years ($p<.05$). This consistent with research by Dai and Wells (2004), which finds that effective project management and operational process excellence is essential in technology companies because there are many dependencies due to the cross functional nature of work and teams. In order for teams to move fast, the timeline has to be orchestrated efficiently and effectively by good project management processes.

One result that stood out as surprising based on prior research. Collaboration is associated with a negative stock growth performance in the technology industry. Inoune and Liu (2011) suggested that collaboration can increase company performance by creating a more innovative and engaged work culture. One recent trend that has been widely adopted by technology companies is open-space offices—that are supposed to facilitate a more "collaborative" workplace. This trend might explain this stark contrast between collaboration outcomes in Tech relative to other industries. Recent research conducted by Harvard researchers has suggested that open space plans can inhibit performance. They tend to be more overcrowded because they take up more space. Additionally, these spaces can cause employees to feel a perceived of lack of privacy,

overcrowding, which in turn is has been shown to negatively affect job satisfaction and employee engagement (Węziak-Białowolska et al., 2018).

Contrary to results in *Table 4*, innovation was not significant for overall company performance when each industry is considered independently. There are a few factors that could be contributing to the insignificance of the innovation. First, the sample size of each industry-specific regression was smaller than the combined industries regression. Another factor, could be that differences in innovation can be explained by the subindustry.

Lastly, in the Finance Industry, no cultural variables were found to be significant. One factor could be that the intercept for the finance industry was the subindustry consumer finance, and this subindustry does not accurately represent the other financial firms. For instance, consumer finance has an average stock growth of 85% whereas the rest of the industry has an average growth of 37% over the course of five years (see *Table 3* for subindustry summary statistics). Another reason for insignificance, could be simply that these cultural values do not significantly impact overall firm performance for financial firms.

Employee Satisfaction and Impact on Performance

The next regression on *Table 6* details the impact of the overall employee satisfaction with company on company performance. The two separate dependent variable in this regression are stock growth and ROA, and I control for the same industry and firm related factors.

Regression Formula:

Y_0=$B_0 * + B_1 R_x + B_2 I_1 + B_3 I_2 + B_4 I_3 + B_5 (I_1 * R_x) + B_6 (I_2 * R_x) + B_7 (I_3 * R_x) + B_8 DE_x + B_9 Ln(Assets)_x + B_{10} S_x + B_{11} Age_x$

Where Y_0 = Stock Growth over 5 years, $R_x = Glassdoor\ Employee\ Satisfaction\ Company\ Rating$, I= Industry Dummy, S= stock type. *Manufacturing was set as the intercept for the subindustry dummy variables because it had the largest sample size.

Table 6. Regression Results for Stock Performance Based on Employee Satisfaction Rating

Variable	**Stock Growth**	**ROA**
Overall Employee	5.63***	.0030***
Satisfaction Rating	(1.60)	(.0012)
Debt to Equity	-.374	.000069
	(.199)	(.000152)
Ln(Assets)	-5.84	-.0095***
	(4.36)	(.0032)
Stock Type	20.99*	N/A
	(14.10)	
Total Effect Insurance	-2.72**	-.0045*
	(4.41)	(.0037)
Total Effect Media	1.79*	-.0021
	(3.00)	(.0022)
Total Effect Finance	1.47*	-.0019
	(2.74)	(.0021)
Total Effect Tech	6.77	.0004
	(2.16)	(.0016)
Insurance	617.96**	.2376
	(306.65)	(.2345)
Media	226.36	.1428
	(209.04)	(.1595)
Finance	302.26**	.0578
	(196.44)	(.1503)
Technology	-70.44	-.0800
	(160.98)	(.1228)
Constant	-286.53 ***	.0428
	(124.16)	(.0946)

R^2	0.2602	0.3545
[Adjusted R^2]	[0.2092]	[.3141]
F-Stat	5.01	8.79
Prob.	0.0000	0.0000
Sample Size	187	188

Note: I conduct a 1-Tailed T-test. Additonally, the *, **, *** indicate that the coefficients are significant at the 10%, 5%, and 1% probability levels respectively.

Consistent with prior research on Glassdoor data (Chamberlain, 2015), it is clear to see that there a strong relationship between stock growth and employee satisfaction. Overall, a one percentile point increase in company satisfaction (out of 100) is associated with a 5.63 percent increase stock growth (p>.000) and a .003 increase in ROA (p>0.00) over the course of five years. The effect of employee satisfaction on performance varies across different industries as demonstrated by the total effects coefficients of each industry.

Relationship between Culture and Satisfaction

The next set of regressions examine the relationship between cultural values and employee satisfaction. I run these regressions to understand which cultural elements are associated with employee company satisfaction, in order to compare which elements of culture are associated with satisfaction and performance. I use the same controls as prior regressions with a few modifications. I add stock performance as a control, to account for employee satisfaction that could be related to stock performance. However, instead of winsorizing this variable, I decile rank it. This lowers the standard deviation that is present in the winsorized control variable, while controlling for different levels of stock growth. I also remove “stock type” as a control, because stock growth is not a dependent variable in the model. The rightmost regression, in *Table 7*, combines all companies into

one regression, controlling for industries. The other three regressions in *Table 7* represent separate regressions for each industry individually, controlling for subindustry effects. The formulas for the four regressions are detailed below.

Combined Industries Regression

$$Y_0=B_0 * +B_1AG_x + B_2Cu_x + B_3Di_x + B_4Ex_x + B_5Ino_x + B_6Pe_x + B_7Re_x + B_8Co_x + B_9Int_x + B_6I_1 + B_7I_2 + B_8I_3 + B_9I_4 + B_{10}DE_x + B_{11}Ln(Assets)_x + B_{17}SP_x$$

*Manufacturing was set as the intercept value for the industry dummy variables because it had the largest sample size

Technology Industry Regression:

$$Y_0= B_0 * +B_1AG_x + B_2Cu_x + B_3Di_x + B_4Ex_x + B_5Ino_x + B_6Pe_x + B_7Re_x + B_8Co_x + B_9DE_x + B_{10}Ln(Assets)_x + B_{11}Age_x + B_{12}SI_1 + B_{13}SI_2 + + B_{14}DE_x + B_{15}S_x + B_{16}SP_x$$

*Consumer/Internet Technology was set as the intercept value for the subindustry dummy variables because it had the largest sample size.

Finance Industry Regression:

$$Y_0= B_0 * +B_1AG_x + B_2Cu_x + B_3Di_x + B_4Ex_x + B_5Ino_x + B_6Pe_x + B_7Re_x + B_8Co_x + B_9DE_x + B_{10}Ln(Assets)_x + B_{11}Age_x + B_{12}SI_1 + B_{13}SI_2 + B_{14}SI_3 + B_{15}DE_x + B_{16}S_x + B_{17}SP_x$$

*Consumer Finance was set as the intercept value for the subindustry dummy variables because it had the largest sample size.

Manufacturing Industry Regression:

$$Y_0=B_0 * +B_1AG_x + B_2Cu_x + B_3Di_x + B_4Ex_x + B_5Ino_x + B_6Pe_x + B_7Co_x + B_8Re_x + B_9SI_1 + B_{10}SI_2 + B_{11}SI_3 + B_{12}SI_3 + B_{13}SI_4 + B_{14}SI_5 + B_{15}SI_2 + B_{16}DE_x + B_{17}Ln(Assets)_x + B_{18}S_x + B_{19}Age_x + B_{20}SP_x$$

*The Pharma and Biotech Industry was set as the intercept for the subindustry dummy variables because it had the largest sample size.

(Where Y_0 =Overall Glassdoor Rating, AG=Agility, Cu=Customer Focus, Di= Diversity, Ex=execution, Ino= Innovation, Pe= Performance, Re=Respect, Int= Integrity, SI= Sub-Industry Dummy, S= stock type, SP= Stock Performance)

Table 7: *Regression Results for Relationship between Cultural Values and Employee Satisfaction*

Variable	All Industries Combined	Technology	Finance	Manufacturing
Agility	-.03	.45*	-.45	-.064
	(.16)	(.31)	(.46)	(.29)
Collaboration	.44**	-.13	.12	.50**
	(.15)	(.26)	(.60)	(.29)
Customer Focus	.21*	.64**	1.20 **	.20
	(.14)	(.30)	(.44)	(.25)
Diversity	.37***	.44*	.08	.29
	(.14)	(.31)	(.39)	(.26)
Execution	-.04	.41*	-.61	.26
	(.14)	(.29)	(.48)	(.27)
Innovation	.26 **	-.36	.14	.13
	(.15)	(.32)	(.44)	(.31)
Integrity	.32** (.19)	*Eliminated	*Eliminated	*Eliminated
Performance	.02**	.06	.11	-.26
	(.14)	(.27)	(.41)	(.27)
Respect	.87***	1.70***	.76*	.87***
	(.18)	(.25)	(.52)	(.31)
Ln(Assets)	.83	2.13***	-.11	.21
	(.26)	(.46)	(.73)	(.73)
Stock Performance	.59	-.09	.24	.71**
(1-10)	(.14)	(.30)	(.32)	(.31)
Age (Youth)	1.13	2.58	-.74	3.17 **
	(.77)	(1.23)**	(1.9)	(1.51)
Subindustry:	Insurance : -3.02 *** (1.39)	IT Services: -3.10* (1.81)	Diversified : 3.2 (4.36)	Semi Cond.: -.99 (3.02)
Subindustry:	Media: -.91** (1.56)	Enterprise: .12 (1.60)	Investment: -2.41 (2.45)	IT Hardware: -2.93 (3.09)

Subindustry:	Finance: -2.03 (1.15)	Intercept: Consumer Tech	Regional Banks: -3.64 (3.30)	Medical Devices: -2.09 (2.51)
Subindustry:	Tech: 1.69* (1.03)	N/A	Intercept: Consumer Finance	Conglomerates: .14 (3.1)
Subindustry:	Intercept: Manufacturing	N/A	N/A	Food: -.32 (2.49)
Subindustry:	N/A	N/A	N/A	Consumer: .83 (2.74)
Subindustry:	N/A	N/A	N/A	Aerospace/Defense: -1.47 (2.69)
Subindustry:				Intercept: Pharma & Biotech
Constant	47.03***	35.81***	63.80***	55.57***
	(2.90)	(4.51)	(9.80)	(8.87)
R^2	0.61	0.88	0.60	0.69
[Adjusted R^2]	[0.58]	[0.83]	[0.36]	[0.56]
F-Stat	17.13	17.69	2.47	5.30*
[Prob]	[0.00]	[0.00]	[0.03]	[0.00]
Sample Size	187	45	38	62

Note: the scale for employee satisfaction " 0 - 30 Employees are 'Very Dissatisfied', 30 - 50 Employees are 'Dissatisfied, 50 - 70 Employees say it's 'OK', 70 - 80 Employees are 'Satisfied', 80 - 100 Employees are "Very Satisfied. I conduct a 1-Tailed T-test. Additonally, the *, **, *** indicate that the coefficients are significant at the 10%, 5%, and 1% probability levels respectively.

Overall the same cultural variables that are related to performance are also related to overall employee company satisfaction. These cultural elements are collaboration,

customer focus, and innovation, which all significantly positively correlated with employee satisfaction and employee performance (*Table 4*).

Diversity which was not found to be a significant when measuring for company performance was found to be positively significant in this regression. This could suggest that while diversity may not significantly be linked with performance it can lead to more satisfied employees overall.

For the industry-specific regressions, respect is the strongest factor relating to employee satisfaction: technology ($p<.01$), finance ($p<.1$), and manufacturing ($p<.01$). This aligns with the SHRM (2017) report that cites respect as one of the "most important contributors to job satisfaction".

Customer focus is significant and positive for both technology and finance. Hughes et al. (2014) research that suggests that customer focus can increase employee satisfaction by engaging both decision makers and back-office workers. Additionally, customer-focused companies tend to be more mission-driven because they are more focused on helping their customers. Anderson (2018**)** finds that mission driven cultures are associated with positive employee engagement and satisfaction.

Diversity is found to be significant overall, but when evaluating each industry separately it is only significant for technology industry. For tech firms, every ten percentile points relating to diversity is associated with a .4 percent point increase employee satisfaction.

The age of the company significantly also impacts employee satisfaction. For manufacturing and technology firms, younger companies, relative to subindustry, are associated with a 2.5 percent increase in satisfaction in technology firms ($p<.05$) companies and 3.5 percent increase in satisfaction for manufacturing companies ($p<.05$). One limitation of this findings is that this positive relationship could be due to employee related effects that are not controlled. For instance, younger employees tend work at younger companies, and they potentially have a higher baseline levels of satisfaction than older employees.

VI. Limitations

It is important to recognize some limitations with the dataset and how I attempt to control and account for them. One limitation is the time range of the cultural variables. The Culture 500 dataset uses reviews collected over the course of five years. While this offers more observations, which can help to train the machine learning model, it does not take into account the variable nature of culture. For instance, the culture of a company could have greatly varied over this time period, and the model doesn't account for this. It just sums the average of the reviews. This could potentially be more of a problem for younger companies included in the model like Uber that are undergoing a lot of cultural changes as a result of quick growth, or companies that have structurally changed in general, unrelated to age.

Another limitation related to young companies is that they might also add a lot of variability in performance outcomes as their stocks could more easily increase from a lower starting list price. This five year time period can explain some of the large standard deviation for stock growth. The stock performance growth ranges from -97% to 1032% growth with a standard deviation of 130.94. In order to control for this, I winsorize the stock and ROA data.

Sampling bias related to the polarized nature of review data, could pose another limitation to the results. However, Schoenmueller et al. (2018) dispels this concern, showing that Glassdoor reviews are more normal distributed, compared to 21 internet-based review sites, like Yelp. Glassdoor is able to have a more normal distribution of reviews because of its content-related policies. Content on the site locks after a certain

amount of time. In order to access more pages on the site, users have to contribute a review. This facilitates more normal distribution of reviews, by increasing the demographic breakdown of reviewers. After these reviews are submitted they are passed through Glassdoor's system and verified for accuracy before they are added into the site. Another limitation, related to the demographics of employees, is that the model does not directly control for job title. The Culture 500 researchers posit that different types of employees speak differently about culture (MIT SMR, 2019), but they do not directly control for the different effects of position on cultural expression. This could potentially mean that certain perspectives, that are not indicative of the overall sentiment of the company, are overestimated.

The last issue with the dataset is how the machine learning model was calculated. There are obvious limitations to keyword parsing—one issue being the validity of measures. For instance one cultural variable could actually be measuring a different cultural variable, or a combination of multiple variables. The model depends on how the researchers define the parsing parameters. Additionally, it relies on employees to self-report certain dimensions of culture in their reviews. For instance, a few variables within the model had low instances of self-report. For instance, only four percent of reviews within the sample talked about diversity. Between companies, certain variables had stronger frequency of report in reviews. The model reported cultural variables as two

numbers: sentiment and frequency[24]. In order to compile these values, I use percentile data, an aggregate measure that combines the two terms. One limitation of this is that while it captures frequency and sentiment, it does not separate them. For instance, a company could have a low frequency of self-report on collaboration, but on average those reviews could express a positive sentiment surrounding collaboration. The combination of scores does have benefits. For instance, if collaboration isn't something that is discussed much in company reviews it is less likely to be a strong cultural value (MIT SMR, 2019). Another limitation related to percentile ranking is that it caps the true range of a variable. For instance, a company could be 500x more agile than another firm but it would only be rated in the 100th percentile. As a result, the impact of cultural variable could be potentially overestimated, because the model does not account for the full range of cultural variation.

[24] The researchers define sentiment as how positively employees talk about culture in terms of standard deviations above or below the average. They define frequency as how often employees discuss this value in reviews, in terms of standard deviations above or below the average

VII. Conclusion

The goal of this paper is to identify how much cultural variables and employee satisfaction have an impact on company performance. Through my econometric analysis, it is clear a few main cultural variables are associated with increases in company stock performance. Overall, firms with higher levels of customer focus, innovation, performance rewards, and respect are correlated with increased performance. These variables are also correlated with employee satisfaction. The link, between cultural performance and cultural satisfaction variables, suggests that companies should promote cultures of customer focus, innovation, and performance, to create a happier and more productive workplace.

My results have a few implications for companies and their evaluation. First, investors and evaluators should include measurements of culture as an intangible asset when measuring and predicting investment performance. For companies, this research helps to quantify which cultural variables drive performance and employee satisfaction. Thus, it could help firms make more informed decisions about culture, in order to more effectively motivate and retain employees. Using this data, companies can more efficiently allocate resources to develop certain programs that are tied more closely to performance outcomes. For instance, using this data, companies could justify allocating resources to diversity and inclusion programs by pointing to the increase in employee satisfaction. Additionally, this could also help companies make more informed hiring decisions in an effort to reshape their culture to optimize for performance.

Given the evidence, companies should implement processes that measure and improve cultural values and employee satisfaction. However, cultural change management should be done with caution. It is difficult to fundamentally reform an organization's culture. A McKinsey survey of 3,199 global executives found that only one cultural transformation in three succeeds (Dewar and Keller, 2009). Major cultural reformation takes more than an internal marketing campaign or one day of anti-bias training. However, if done properly, companies can potentially increase employee retention, satisfaction, motivation, productivity, and overall company performance.

Future research in this field should analyze a data set with a larger sample size for each respective industry. An analysis of that includes employee job position and would help to develop an understanding of the ways in which specific cultural variables affect different roles. Lastly, future research should examine the validity of all the cultural variables to see whether they measure the element of culture that they suggest to be measuring. Overall, this research is one of the first comprehensive analysis on culture, and it suggests that more work should be done to further examine the topic and control for the limitations.

VIII. References

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