

# The Influences of the Triple Bottom Line within the Athletic Footwear Industry

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## Acknowledgements

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## ABSTRACT

The Triple Bottom Line (TBL) is an accounting framework which encompasses three dimensions of work ethics: the social, the environmental, and the financial; it is also known as the three P's: People, Planet, and Profit. In traditional accounting, the "bottom line" refers to the financial profit or loss a company sustains. The purpose of this study is to comprehend whether or not adopting environmental and social sustainable objectives would have affected the "bottom line" generated for companies within the athletic footwear industry. The companies selected for this study include: Puma SE; Adidas AG; Nike, Inc.; ASICS. These companies were selected because they represent strong orientations towards developing and instilling practices of social, environmental, and financial sustainability. They were also selected because they have a history of successfully publicizing their sustainable and social objectives through Corporate Social Responsibility (CSR) reports. Preliminary analysis indicates that for Adidas and Nike, relatively constant investments in their Planet and People orientations do not appear to affect their Profit dimension. Puma's Profit decreased with increased Planet and People investments.

## KEYWORDS

*Sustainability, Triple Bottom Line, Corporate Social Responsibility, Athletic Footwear, Profitability, Environmental Impact, Sustainable Reporting*

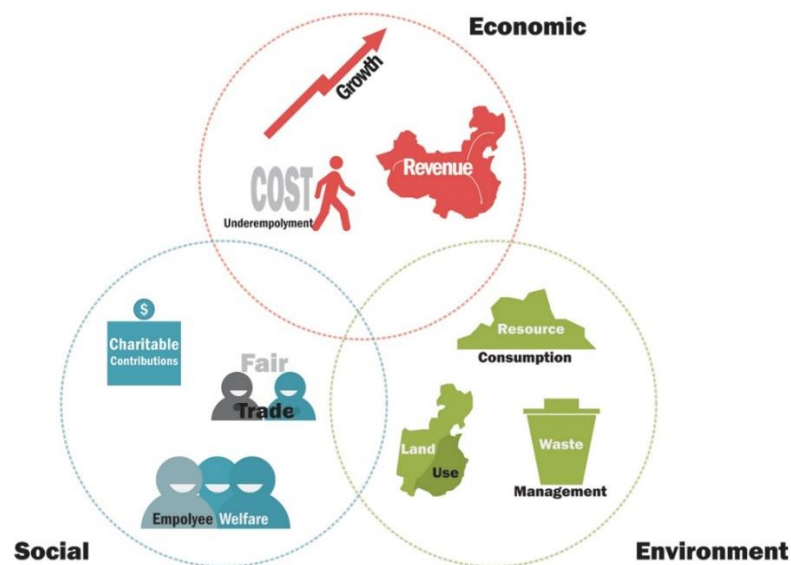
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# 1. INTRODUCTION

## 1.1 The Triple Bottom Line

In a journal published in 1994, John Elkington indicates how businesses should be actively involved in shaping and implementing sustainably conscious initiatives. “In contrast, to the anti-industry, anti-profit, and anti-growth orientation of much early environmentalism, it has become increasingly clear that business must play a central role in achieving the goals of sustainable development strategies.”<sup>1</sup> This accountability, also known as the Triple Bottom Line (TBL), goes “beyond the traditional measures of profits, return on investment, and shareholder value to include environmental and social dimensions.”<sup>2</sup> (Figure 1.1). The TBL is an institutionalized culture and accounting framework that encompasses three dimensions of work ethics: the social, the environmental, and the financial. Foran *et al.* defines it as a “way in which firms can realize broader societal objectives in addition to increasing shareholder value.”<sup>3</sup> It provides disclosure of important social, environmental, and economic factors which society may use to better understand how a company operates.



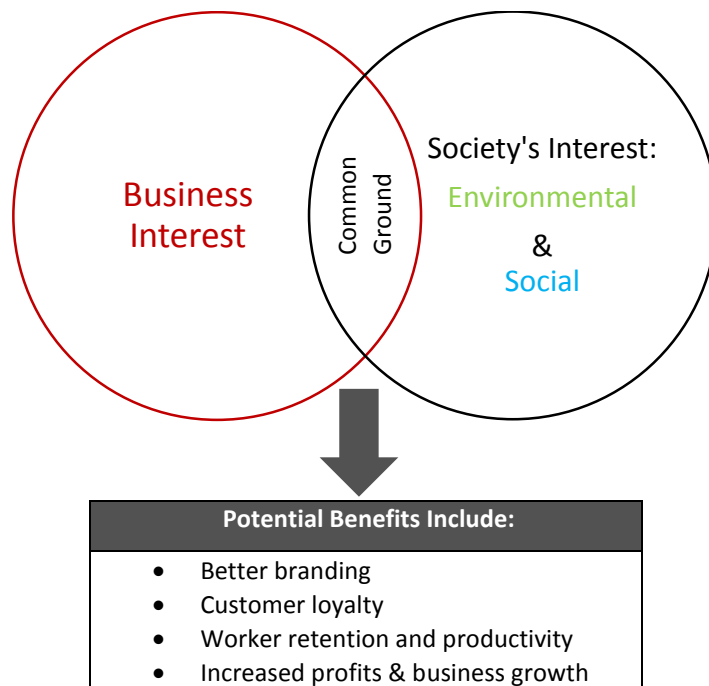
**Figure 1.1.1** – The Triple Bottom Line is an accounting framework providing equal importance to three dimensions: social, environmental, and economic.<sup>4</sup>

The “Profit” dimension of the TBL is the most well-known of the three P’s for most businesses. It represents the financial health of the company, its financial successes and downfalls, and most importantly, it determines if the company’s products and services are viable in today’s market. The “Planet” dimension reminds companies to not damage the ecosystem and/or take natural resources that is more than necessary; it is an intentional effort to restore the environment where harm has been done. These environmental sustainability initiatives include, but are not

limited to reducing: energy consumption, water consumption, material consumption, waste production, and carbon footprint. The “People” dimension reflects intentional efforts for companies to adhere to good business ethics for the benefit of its employees and their communities. The incorporation of these three dimensions within certain companies were assessed for the purpose of this study.

## 1.2 Background

The reason for an organization to implement the dimensions of the TBL is to effectively develop a common ground where the endeavor for profit blends with the endeavors of the common good. Endeavors of the common good may include both environmental and social benefits for all of the company’s stakeholders and the communities in which it operates.<sup>5</sup> Figure 1.2.1 shows a diagram of where the interests of both business and society are able to find a common ground to achieve significant gains.



**Figure 1.2.1** – A common ground may be established through the interest of business and society to achieve significant financial benefits.<sup>5</sup>

Bob Willard, author of *The New Sustainability Advantage: Seven Business Case Benefits of a Triple Bottom Line* and a leading expert in corporate sustainability, suggests that tackling environmental and social issues would theoretically give companies a competitive and substantial advantage over others<sup>5</sup> – a presumption that this study investigates. Addressing these issues

provides opportunities to also focus on institutionalizing objectives within the company that are not directly associated with sustainable measures. This includes, but is not limited to: reducing hiring and retention costs, improving productivity, reducing expenses in manufacturing, and increasing profit. The sooner a company realizes that these benefits are quantifiable, the sooner they would have a competitive edge in the market. Overall, it could be a success for the company and its shareholders, a success for the environment, and a success for the communities directly associated with the company.

According to a study by Ellison *et al.*<sup>6</sup> which focused on the social dimension of the TBL, gender diversity may increase productivity within a company since “having a more diverse set of employees means you have a more diverse set of skills” which “could result in an office that functions better.” Ellison *et al.* also explains that “more homogenous offices have a high level of social capital” but “higher levels of social capital are not important enough to cause those offices to perform better. The employee might be happier, they might be more comfortable, and these might be cooperative places, but they seem to perform less well.” Similarly, there are supplementary studies that also focus on the “people” aspect of the TBL. These social dimensions include political, ethnic and ethical diversity, as well as the age range of employees.<sup>7</sup> Variables like these were included for the purpose of this study in order to distinguish if there is a correlation with profitability.

### 1.3 Purpose

The purpose of this study was to examine how the implementation of the TBL can affect a company’s profitability, and how profitability reflects the magnitude of their orientation on other dimensions of the TBL. The TBL encompasses the capability of a particular organization to focus on its people, the planet, and its profits; its practice is a gauge of the organization’s core values. This study is conducted to assess whether the practice of implementing the TBL can cause variations of profitability within similar organizations in the same industry.

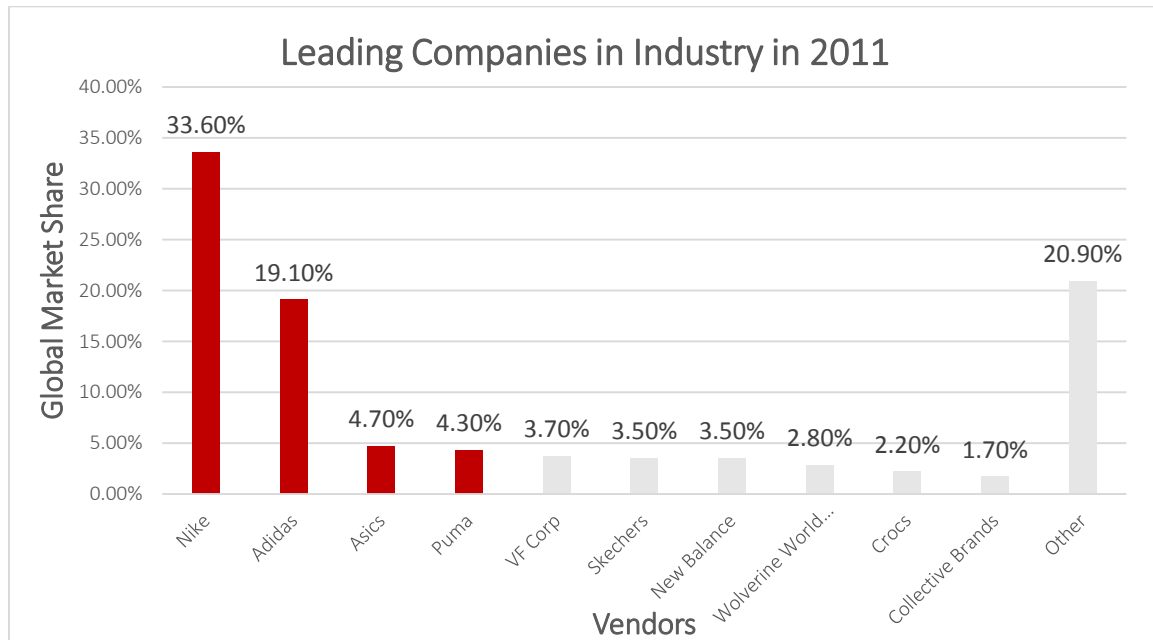
## 2. METHODS

### 2.1 General Design of Experiment

The athletic footwear industry was chosen for this study because companies within this industry provide a narrow range of consumer products. This is essential because it lessens the variables affecting these companies’ profits and how much revenue is generated from their athletic footwear. This industry was also chosen because certain companies within it have already

developed a history of CSR reporting. For example, Nike's first CSR report was published in 2001 and Puma's first CSR report was published in 2000.

The leading athletic footwear companies by market share were chosen for this study. As shown in Figure 2.2.1, these companies include Puma SE; Adidas AG; Nike, Inc.; and ASICS.

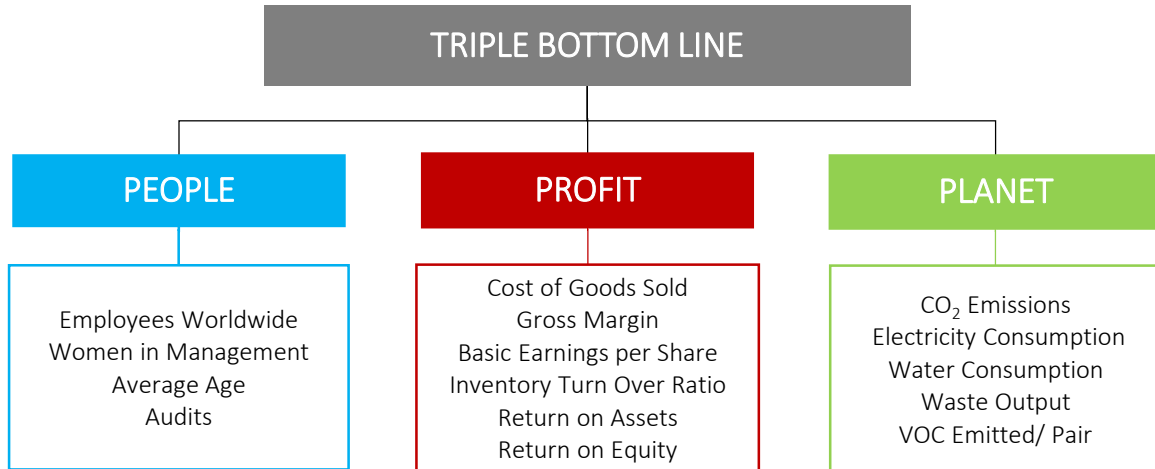


**Figure 2.1.1** – Leading athletic footwear companies in industry in 2011 by market share<sup>8</sup>

Companies emphasizing their environmental consciousness were evaluated as to how they pursued this objective; likewise, companies which focus on social sustainability were evaluated for what kinds of social dimensions they pursue and how that has affected their profitability. Environmental variables, which represent measurement of natural resources and solutions to achieve environmental sustainability, were measured with respect to variables such as electricity consumption, water consumption, carbon footprint, and solid waste emissions. “Ideally,” according to Hall *et al.*, “having long-range trends available for each of the environmental variables would help organizations identify the impacts a project or policy would have on the area.”<sup>2</sup> Social variables were measured by means of diversity (age and gender), audits performed, and number of factories that passed audits. The longer a company has been reporting its sustainable objectives, the easier it would be to extract information and evaluate its overall impact on its TBL. Likewise, it would be more difficult to assess companies with a short history of sustainable reporting because they have yet to develop trends that would genuinely reflect their overall growth. Profitability was determined by gross margin, earnings per share, and return on assets.

Information regarding these companies' efforts in TBL reporting were extracted from their respective Corporate Social Responsibility (CSR) and annual reports. CSR reports contain

information on the company's environmental and social sustainability objectives. Annual reports, on the other hand, are publications intended for shareholders that describe a company's operations and financial conditions for the preceding fiscal year. Figure 2.1.2 shows the variables that were extracted from each report.



**Figure 2.1.2** – Information to be extracted and evaluated from Corporate Social Responsibility reports.

The process obtaining and processing data was divided into four stages:

*Stage I*

Discover when these companies started institutionalizing sustainable practices and publicly reporting results.

*Stage II*

Find fiscal years for which all four companies reported on CSR and financial performance. Doing so established a common time frame for data extraction and analysis.

*Stage III*

Using information published within these companies' CSR reports, commonalities within reported social and environmental sustainability objectives were discovered. These commonalities became the variables within this study. These variables are listed in Table I.

*Stage IV*

Data was extracted within the time frame in which all companies reported on CSR and financial performance. Tables similar to Table I (see Appendix A) were used to organize and compare results. SI units were used whenever possible for environmental variables, and profitability variables were converted to U.S. dollars (USD).



**Table I** – Variables to be extracted from CSR and Annual Reports (FY indicates fiscal year).

COMPANY				
	FY '10	FY '11	FY '12	FY '13
PEOPLE				
Employees Worldwide (#)				
Women Employees				
Women in Management (%)				
Average Age(#)				
# of Factories Audited				
# of Factories Passed Audits				
# of Factories				
Factories Audited (%)				
Audited Factories that Passed Audits (%)				
Factories Passed Audits Overall (%)				
PLANET				
CO2 Emissions (tonnes)				
Energy Consumption (MWh)				
Water Consumption (m <sup>3</sup> )				
Waste Output(tonnes)				
VOC/ pair (g/pair)				
PROFIT				
Revenue (USD mil)				
Cost of Goods Sold (USD mil)				
Gross Margin (%)				
Basic Earning per Share (USD)				
Inventory Turn Over Ratio				
Return on Assets				
Return on Equity				

## 2.2 Analytical Methods

Because each dimension of the TBL in this study contains different variables, they were weighted using a modified version of Saaty's Analytical Hierarchy Process (AHP). The AHP "is a theory of measurement through pairwise comparisons and relies on the judgement of experts to derive priority scales."<sup>9</sup> It allows for the comparison of intangible entities relative to entities of the same kind and relates them to one another by making comparisons. Using the AHP method, each variable within a dimension of the TBL was assigned a weight. When assigning the weights, a scale of numbers (1—9) is used to indicate how many more times important one variable is in comparison to another. For example, the 'number of employees worldwide' and the 'percent of women in management' were assigned weights of 1 and 4, respectively in comparison to each other, within the People dimension (see Table II). This means that 'women in management' is considered to be 4 times more important than 'employees worldwide'.

**Table II** – Weighted Pair Wise Comparison Table of People Variables

Pair Wise Comparison Table							Sensitivity Analysis	
	Employees Worldwide (#)	Women in Management (%)	Average Age	% Factories Audited	% of Factories Passed Audits	W.P.I Average	4% Decrease	4% Increase
Employees Worldwide (#)	1.000	0.250	0.250	0.143	0.125	0.354	0.357	0.350
Women in Management (%)	4.000	1.000	3.000	0.200	0.167	1.673	1.690	1.657
Average Age	4.000	0.333	1.000	0.143	0.125	1.120	1.131	1.109
% Factories Audited	7.000	5.000	7.000	1.000	3.000	4.600	4.646	4.554
% of Factories Passed Audits	8.000	6.000	8.000	0.333	1.000	4.667	4.480	4.853
Total	24.00	12.58	19.25	1.82	4.42	12.414	12.305	12.523

After all the variables within a dimension have been assigned a weight, the sum of the weights with respect to a given variable is then normalized to 1 (Table III). The ‘Total’ row at the bottom of Table III shows how the sum of weights with respect to a given variable is 1. For example, the sum of the values within the column ‘Employees Worldwide’ is 1. Then the ‘Pair Wise Average’ with respect to a variable is calculated. For example, each entry in the ‘Pair Wise Average’ column in Table III is the average of the values of the variables in its row.

**Table III** – Normalized Pair Wise Comparison Table of People Variables

Normalized Pair Wise Comparison Table						Sensitivity Analysis		
	Employees Worldwide (#)	Women in Management (%)	Average Age	% Factories Audited	% of Factories Passed Audits	Pair Wise Average	4% Decrease	4% Increase
Employees Worldwide (#)	0.04	0.02	0.01	0.08	0.03	0.04	0.046	0.026
Women in Management (%)	0.17	0.08	0.16	0.11	0.04	0.11	0.120	0.100
Average Age	0.17	0.03	0.05	0.08	0.03	0.07	0.080	0.060
% Factories Audited	0.29	0.40	0.36	0.55	0.68	0.46	0.416	0.496
% of Factories Passed Audits	0.33	0.48	0.42	0.18	0.23	0.33	0.337	0.317
Total	1.00	1.00	1.00	1.00	1.00	1.000	1.000	1.000

The weighted pair wise indices (WPI, also known as  $\gamma$ ) for the People dimension are shown in Table IV in green. For each company between FY10 – FY13, raw data was gathered for each variable and each data value is normalized ( $\beta$ ). For some variables such as the number of employees worldwide, data normalization is achieved by dividing each data point by the maximum value of the variable achieved during FY10 – FY13 by the company. For other variables such as CO<sub>2</sub> emissions (see Appendix C), data normalization is achieved by inverting the data value and multiplying by the minimum value of the variable achieved during FY10 – FY13 by the company. The WPI is the sum of the product of  $\beta$  and the pair wise average of a given variable. The WPI values for each dimension of company will be reported in the Results section of this report.

**Table IV – Weighted Pair Wise Indices of the People Dimension**

People	W.P.I												Sensitivity Analysis		
	Employees Worldwide (#)		Women in Management (%)		Average Age		% Factories Audited		% of Factories Passed Audits		Gamma		Gamma -4%		Gamma +4%
	#	β	%	β	β	β	%	β	%	β	γ	γ	γ - 4%	γ + 4%	γ
PUMA '10	9313		0.70	36.00%	1.00	32.00	1.00	63.39%	0.83			0.59	0.58	0.59	
PUMA '11	10,043		0.75	36.00%	1.00	32.00	1.00	70.74%	0.93	58.89%	0.92	0.93	0.93	0.93	
PUMA '12	13,315		1.00	36.00%	1.00	32.00	1.00	76.00%	1.00	63.84%	1.00	1.00	1.00	1.00	
PUMA '13	12,966		0.97	34.00%	0.94	32.00	1.00	69.52%	0.91	60.00%	0.94	0.93	0.94	0.93	
ADIDAS '10	42,541		0.84	28.00%	1.00	33.00	1.00	58.00%	1.00	45.94%	0.95	0.98	0.98	0.98	
ADIDAS '11	44,824		0.88	27.00%	0.96	30.00	0.91	51.00%	0.88	48.31%	1.00	0.93	0.93	0.93	
ADIDAS '12	46,306		0.91	28.00%	1.00	31.00	0.94	51.00%	0.88	28.56%	0.59	0.80	0.80	0.80	
ADIDAS '13	50,728		1.00	28.00%	1.00	30.00	0.91	51.00%	0.88	29.58%	0.61	0.81	0.81	0.81	
NIKE '10	32,710		0.74	40.00%	0.98	31.00	0.97	72.13%	0.74	39.23%	0.56	0.72	0.72	0.72	
NIKE '11	37,515		0.85	40.40%	0.99	31.00	0.97	93.31%	0.95	50.00%	0.71	0.87	0.87	0.88	
NIKE '12	44,000		1.00	41.00%	1.00	32.00	1.00	97.03%	0.99	70.22%	1.00	1.00	1.00	1.00	
NIKE '13	43,700		0.99	41.00%	1.00	32.00	1.00	97.96%	1.00	68.28%	0.97	0.99	0.99	0.99	
ASICS '10	5,604		0.85					36.69%	0.66	27.88%	0.78	0.59	0.58	0.60	
ASICS '11	5,906		0.90					37.58%	0.68	28.94%	0.81	0.61	0.60	0.62	
ASICS '12	5,906		0.90					37.58%	0.68	28.94%	0.81	0.61	0.60	0.62	
ASICS '13	6,585		1.00					55.63%	1.00	35.60%	1.00	0.82	0.80	0.84	

Two sets of data were generated. For the first set, each variable within each TBL dimension were was weighted equally. For the second set, each variable was weighted using Saaty's comparison method. These values were then graphed and superimposed to reflect discrepancies within weighted and equally weighted trends.

### 3. RESULTS

All data were taken between fiscal years (FY) 2010 – 2013 because all four companies partook in CSR and financial reporting during this time frame. Combined data of all athletic footwear companies are shown in Appendix A.

#### 3.1 Financial Performance

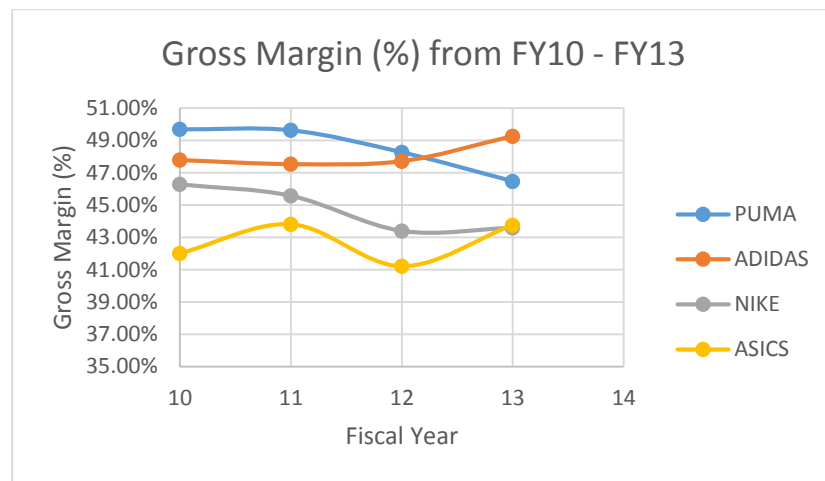
Financial performance is a term used to assess a company's overall financial health over a period of time. Instead of it having one common unit of measurement, multiple variables affect the financial performance of a company. It helps investors and researchers discern which companies have been the most profitable within a given time period. The financial performance of the footwear companies of interest were first analyzed to determine any distinguishing trends occurring between FY10 – FY 13. The years containing data that drastically deviate from trends were the most remarkable because it yielded points of interests to investigate.

### 3.1.1 Gross Margin

The gross margin represents the profitability of each sales dollar above the cost of goods sold. It reflects the business' ability to earn a profit from its merchandise.<sup>10</sup> Gross margin can be computed as follows:

$$\text{Gross Margin (\%)} = \frac{\text{Revenue} - \text{Cost of Goods Sold}}{\text{Revenue}} \times 100$$

The gross margin of each company is shown in Figure 3.2.1.

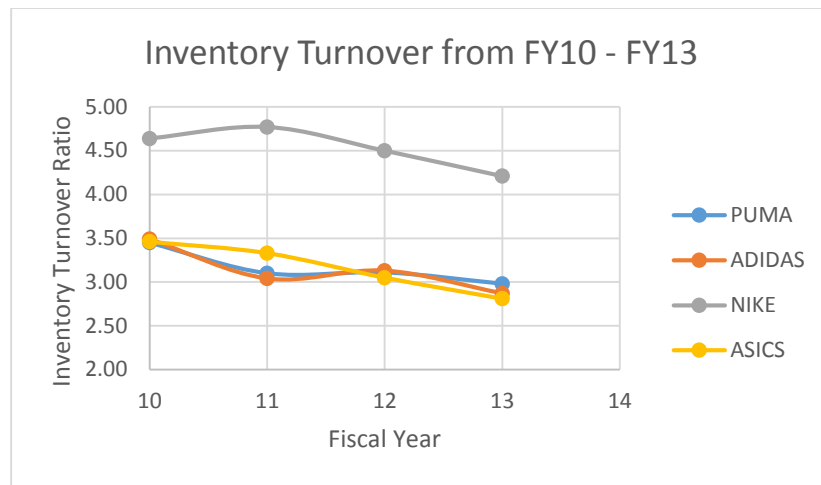


**Figure 3.2.1** – Gross margin (%) of footwear companies between FY10 – FY13

Puma and Nike had an overall decline in gross margin % between the years 2010 and 2013. Adidas showed a slight increase over time. ASICS drops to 41.21% in 2012 but increases to 43.76% the following year. The year 2012 appears interesting as it is the point when there is greatest deviation from the trends developed from prior fiscal years for Adidas and ASICS.

### 3.1.2 Inventory Turnover Ratio

The inventory turnover ratio reflects the number of times a company sells its average level of inventory during the year. A high rate of turnover indicates ease of selling merchandise while a low rate indicates difficulty. The inventory turnover of each company is shown in Figure 3.2.2.



**Figure 3.2.2** – Inventory turnover ratio of footwear companies between FY10 – FY13

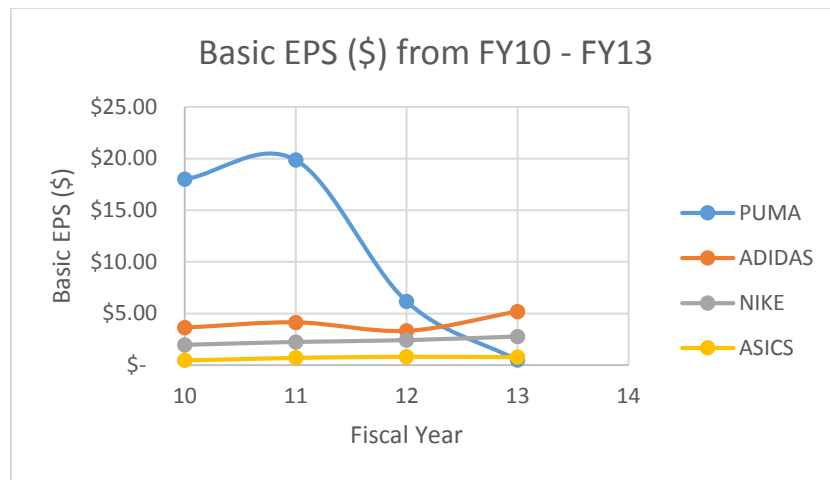
Nike shows the highest turnover ratio of the four athletic footwear companies. This means Nike sells its average level of merchandise faster than the other companies. Puma, Adidas, and ASICS were roughly the same between FY10 – FY13. Puma and Adidas experience similar fluctuation. Overall, all four companies experienced a decrease in inventory turnover within this time period.

### 3.1.3 Basic Earnings per Share

Basic earnings per share (EPS) is the amount of a company's net income for each share of its stocks outstanding. The EPS is generally considered to be the most important variable in determining the price of a share of a company's stock. It is calculated as:

$$EPS = \frac{\text{Net Income} - \text{Dividends on Preferred Stock}}{\text{Average Outstanding Shares}}$$

The basic EPS of each company is shown in Figure 3.2.3.



**Figure 3.2.3** – Basic earnings per share of footwear companies between FY10 – FY13

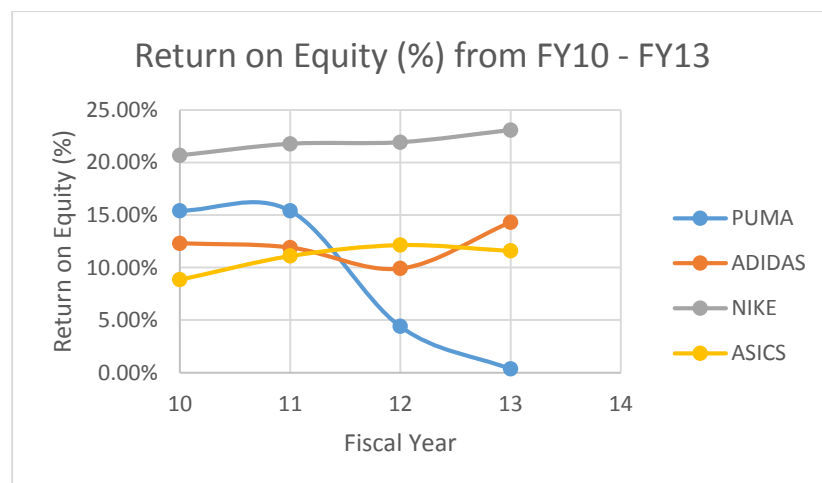
Puma had the highest EPS at the end of FY10, however by FY13, it has the lowest. Adidas, Nike and ASICS maintained relatively stable EPS throughout the four years.

### 3.1.4 Return on Equity

Return on equity (ROE) is the amount of net income returned as a percentage to shareholders equity. It measures a business' profitability by showing how much of a profit a company is able to generate with the money shareholders have invested.<sup>10</sup> It is calculated as:

$$ROE = \frac{\text{Net Income}}{\text{Shareholder's Equity}}$$

The ROE of each company is shown in Figure 3.2.4.



**Figure 3.2.4** – Return on equity of footwear companies between FY10 – FY13

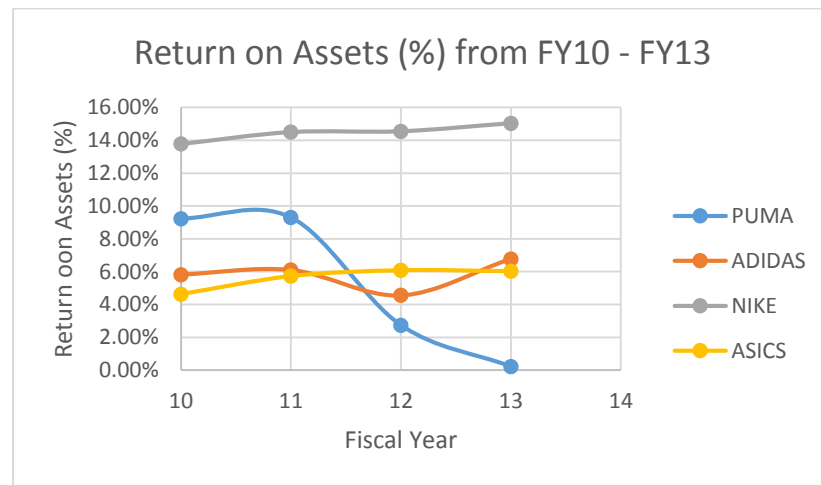
Puma has displayed the greatest decline in ROE, whereas Nike has the greatest overall ROE that is relatively constant over FY10 – FY 13. ASICS has a relatively constant ROE during FY10 – FY 13. Adidas drops slightly in ROE in FY12 but recovers the following year.

### 3.1.5 Return on Assets

The return on assets (ROA) indicates how profitable a company is relative to its total assets. It provides investors and researchers awareness of how efficient a company's management is using its assets to generate earnings. Hagel *et al.* says that “ROA explicitly takes into account the assets used to support business activities. It determines whether the company is able to generate an adequate return on these assets rather than simply showing a robust return on sales.”<sup>11</sup> It is calculated as:

$$ROA = \frac{\text{Net Income}}{\text{Total Assets}}$$

The ROA of each company is shown in Figure 3.2.5.



**Figure 3.2.5** – Return on assets of athletic footwear companies between FY10 – FY13

Similar to the ROE, Puma has displayed the greatest decline in ROA, whereas Nike has the greatest overall ROA that is relatively constant over FY10 – FY13. ASICS increases slightly from FY10 – FY13. Adidas drops slightly in FY12 but recovers the following year.

Both ROA and ROE have an interdependent relationship, not because they are functions of Net Income, but because total assets is a function of total equity (total assets = total liabilities + total equity). If a company sustains stable or increasing liabilities and equity, their assets are expected to increase. This results in similar trends between the ROA and ROE of companies examined within this study.

### 3.2 Saaty's Analytical Hierarch Process (AHP)

The AHP is a quantitative method involving the assignment of a weight to each variable used within each dimension of the TBL. The first step of the AHP is to model the goal of each dimension and develop a group of variables to define that goal. For example, if the goal is to measure environmental sustainability, it would be imperative to focus on variables such as reduction in CO<sub>2</sub> emission and energy consumption. Once the variables of the goal are established, a hierarchy is built by systematically evaluating the variables by comparing them with respect to another variable. For this portion of the AHP, qualitative data is used to establish which variable is more important than the other when pairs of variables are compared. The degree to which these variables were weighted was determined by scholarly research and judgement. Values from 1 to 9 were used to establish priorities (1 being equally important and 9 being extremely more important).<sup>12</sup> In the last stage of the process, quantitative values of each variable are used in conjunction with the priority weighting to produce a normalized weighted value. Complete comparison and normalization charts can be found in Appendices B, C, and D.

An analysis where each variable is weighted equally was also performed to determine if results were significantly affected through the comparison method. Each dimension also was given a sensitivity analysis to ensure normalization did not generate large variations in values. The degree of the sensitivity analysis is determined by one less the number of variables (n) being weighted:

$$\text{Sensitivity Analysis (\%)} = (n - 1)$$

Table V shows how the variables of the People dimension of the TBL were weighted. 'Employees worldwide' and 'average age' were weighted significantly less than other variables. 'Women in management' were weighted higher than employees worldwide but less than audits. The percentage of factories audits and the factories that passed audits were weighted the highest because they encompass ethical moral issues that the other variables do not possess as much.



**Table V** – Saaty’s Comparison Table of People Variables (W.P.I indicates weighted pairwise indices)

Pair Wise Comparison Table							Sensitivity Analysis	
	Employees Worldwide (#)	Women in Management (%)	Average Age	% Factories Audited	% of Factories Passed Audits	W.P.I Average	4% Decrease	4% Increase
Employees Worldwide (#)	1.000	0.250	0.250	0.143	0.125	0.354	0.357	0.350
Women in Management (%)	4.000	1.000	3.000	0.200	0.167	1.673	1.690	1.657
Average Age	4.000	0.333	1.000	0.143	0.125	1.120	1.131	1.109
% Factories Audited	7.000	5.000	7.000	1.000	3.000	4.600	4.646	4.554
% of Factories Passed Audits	8.000	6.000	8.000	0.333	1.000	4.667	4.480	4.853
Total	24.00	12.58	19.25	1.82	4.42	12.414	12.305	12.523

Table VI shows how the variables of the Planet dimension of the TBL were weighted. ‘Volatile organic compound (VOC)/pair’ was weighted significantly less than other variables, even though every company has made it an objective to decrease the amount of VOCs used in producing each pair of shoes. ‘CO<sub>2</sub> emissions’ and ‘energy consumption’ were weighted equally because of the interdependency of these two elements. They were also weighted the highest and equally amongst the Planet variables. Water consumption was weighted the most behind ‘CO<sub>2</sub> emissions’ and ‘energy consumption.’ ‘Waste output’ was weighted higher than ‘VOC/pair’ but less than the remaining three.

**Table VI** – Saaty’s Comparison Table of Planet Variables

Pair Wise Comparison Table							Sensitivity Analysis	
	VOC/pair (g)	CO <sub>2</sub> Emissions / COGS	Energy Consumption / COGS	Water Consumption / COGS	Waste Consumption / COGS	W.P.I Average	4% Decrease	4% Increase
VOC/ pair (g)	1.000	0.125	0.167	0.167	0.250	0.342	0.345	0.338
CO <sub>2</sub> Emissions / COGS (t/mil\$)	8.000	1.000	1.000	4.000	3.000	3.400	3.264	3.536
Energy Consumption / COGS (MWh/mil\$)	6.000	1.000	1.000	4.000	3.000	3.000	3.030	2.970
Water Consumption / COGS (m <sup>3</sup> /mil\$)	6.000	0.250	0.250	1.000	3.000	2.100	2.121	2.079
Waste Output/COGS(t/mil\$)	4.000	0.333	0.333	0.333	1.000	1.200	1.212	1.188
Total	25.00	2.71	2.75	9.50	10.25	10.042	9.972	10.111

Table VII shows how the variables of the profit dimension of the TBL were weighted. Inventory turnover ratio was weighted the least compared to other variables because its value does not completely reflect company management but rather the rate of which consumers purchase their products. ROA and ROE were weighted highest amongst the profit variables but equally amongst one another. An article by Hagel *et al.* indicates that ROE and ROA are the most prominent measures of profitability.<sup>11</sup> Even though Hagel *et al.* suggests that ROA is slightly better at measuring profitability than ROE, they were weighted equally because investors and researchers have indicated both ROA and ROE are most important when measuring profitability.

**Table VII** – Saaty’s Comparison Table of Profit Variables

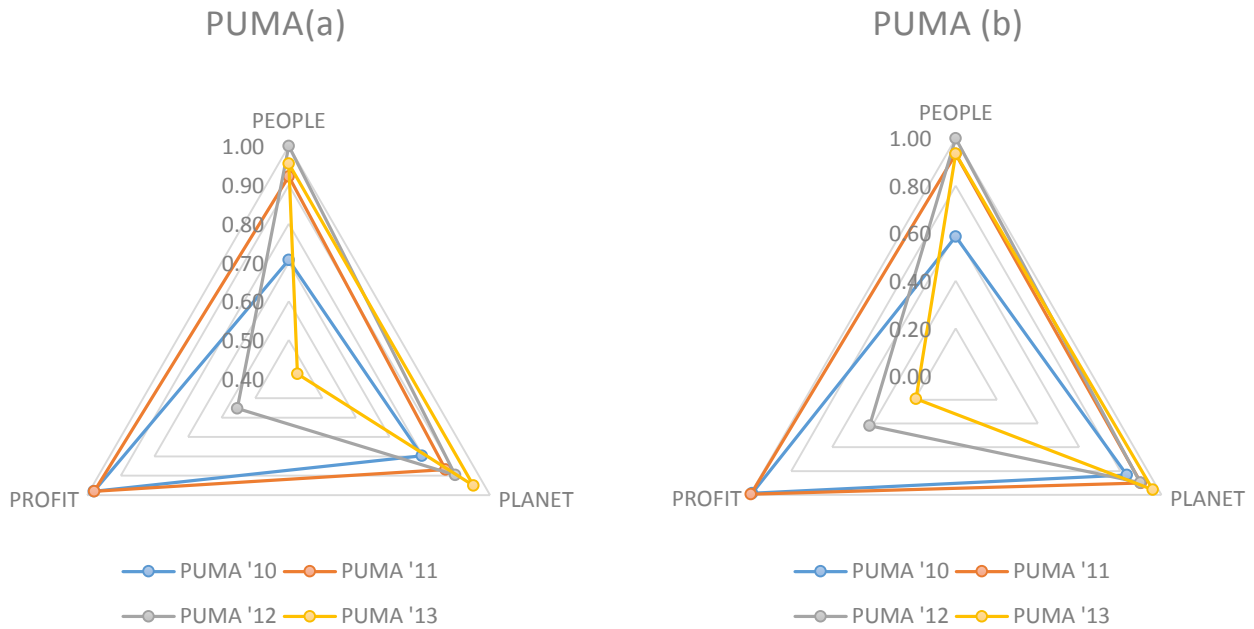
Pair Wise Comparison Table							Sensitivity Analysis	
	Gross Margin %	Basic Earnings Per Share (USD)	Inventory Turn Over Ratio	Return on Assets	Return on Equity	W.P.I Average	4% Decrease	4% Increase
Gross Margin %	1.000	2.000	3.000	0.333	0.333	1.333	1.347	1.320
Basic Earnings Per Share (USD)	0.500	1.000	3.000	0.250	0.250	1.000	0.960	1.040
Inventory Turn Over Ratio	0.333	0.333	1.000	0.167	0.167	0.400	0.404	0.396
Return on Assets	3.000	4.000	6.000	1.000	1.000	3.000	3.030	2.970
Return on Equity	3.000	4.000	6.000	1.000	1.000	3.000	3.030	2.970
Total	7.83	11.33	19.00	2.75	2.75	8.733	8.771	8.696

### 3.3 Triple Bottom Line Trends

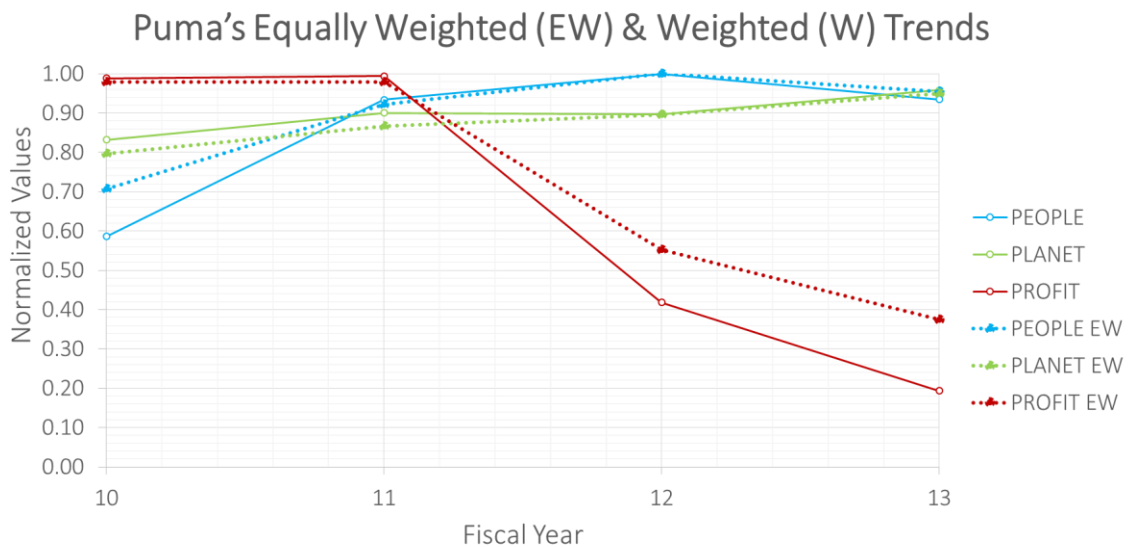
Once the variables of each dimension were weighted and normalized, the results were graphed. In conjunction, graphs containing the normalization of equally weighted variables were also produced. In doing so, normalization differences due to the AHP were made apparent. The radar charts consist of a sequence of equiangularly-spaced spokes, with each spoke representing a single dimension of the TBL (People, Planet, or Profit). Each colored triangle within the radar diagram represents a company’s fiscal year and their embodiment of the TBL by the end of that year. The distance between the center of the radar diagram and the vertex of a colored triangle depicts the magnitude for the variable relative to the maximum magnitude of the variable. The maximum value all for all variables is 1 and the lowest value is 0.

ASICS, within recent years, has only provided limited CSR reporting that was not useable for this portion of the study. Unfortunately, they have not provided sufficient data necessary to normalize and ultimately graphically depict their orientation towards the TBL. Values for each dimension for the other three companies can be found in Appendices B, C, and D.

Puma, as depicted in Figure 3.4.1, exhibits a large change in their Profit dimension over a four year period regardless of their weighting. However, they maintained a stability in their Planet and People dimensions. Looking at their equally weighted and weighted trends (Figure 3.4.2), regardless of how these variables are weighed, Puma witnesses a negative correlation in profitability despite large investments in their People and Planet orientation

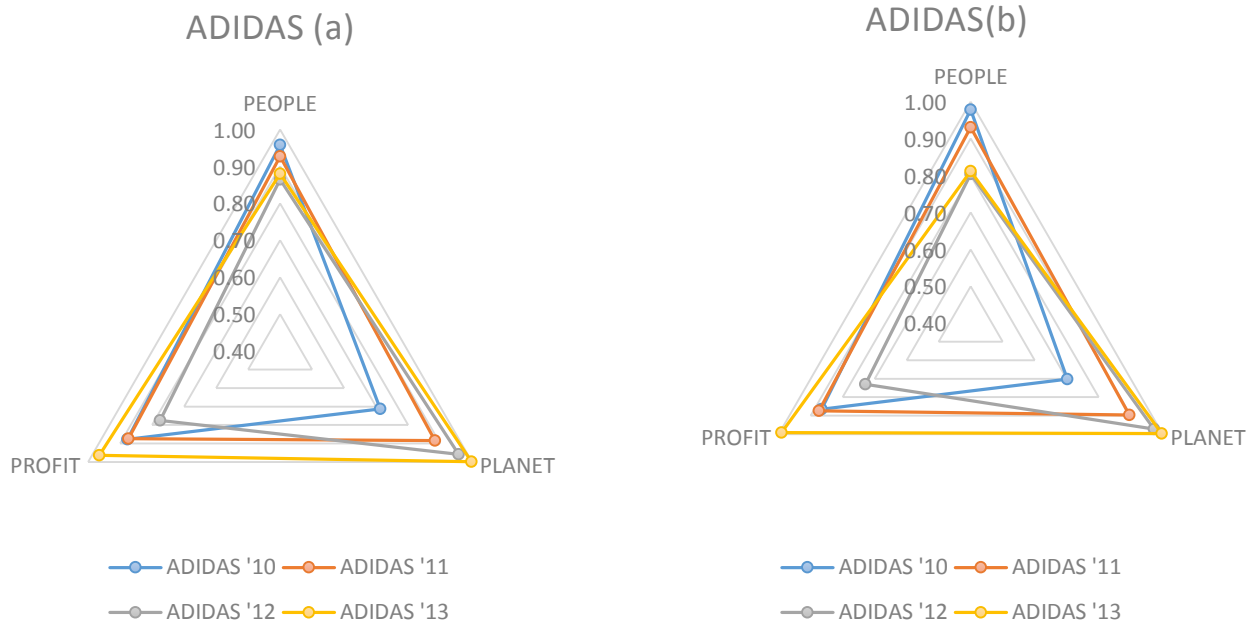


**Figure 3.4.1** – Radar graphs depicting Puma’s orientation to each dimension of the Triple Bottom Line. a) Equally weighted variables within each dimension, b) Differently weighted variables within each dimension

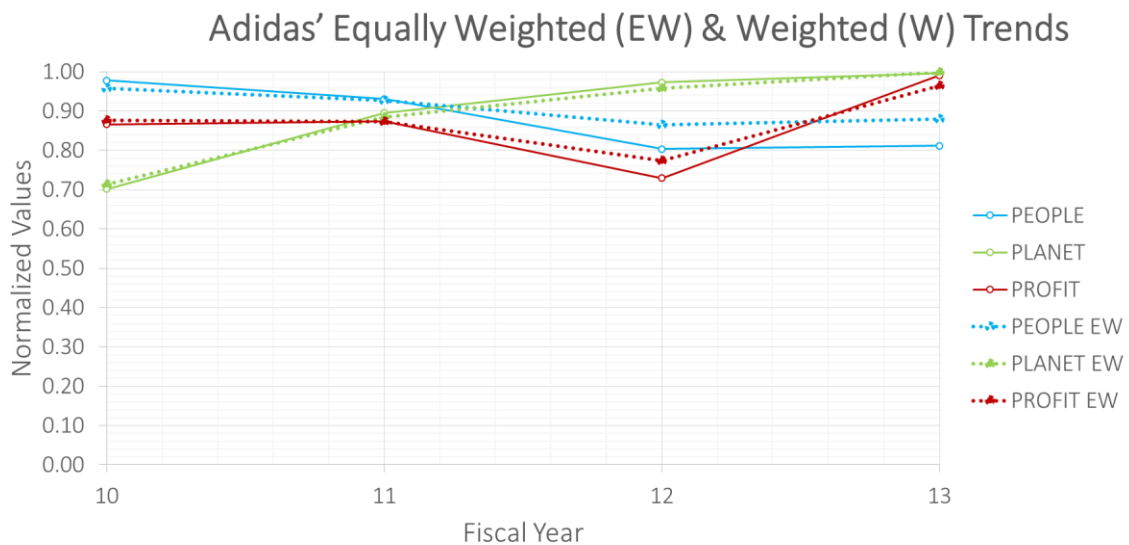


**Figure 3.4.2** – Puma’s equally weighted and differently weighted trends for each dimension of the TBL over a four year period.

Adidas, as depicted in Figure 3.4.3, exhibits a minor change in their Profit dimension compared to Puma. Looking at their equally weighted and weighted trends (Figure 3.4.4), regardless of how these variables are weighted, Adidas maintains a relatively constant Profit with a slight increase in their Planet dimension and a relatively constant People dimension.

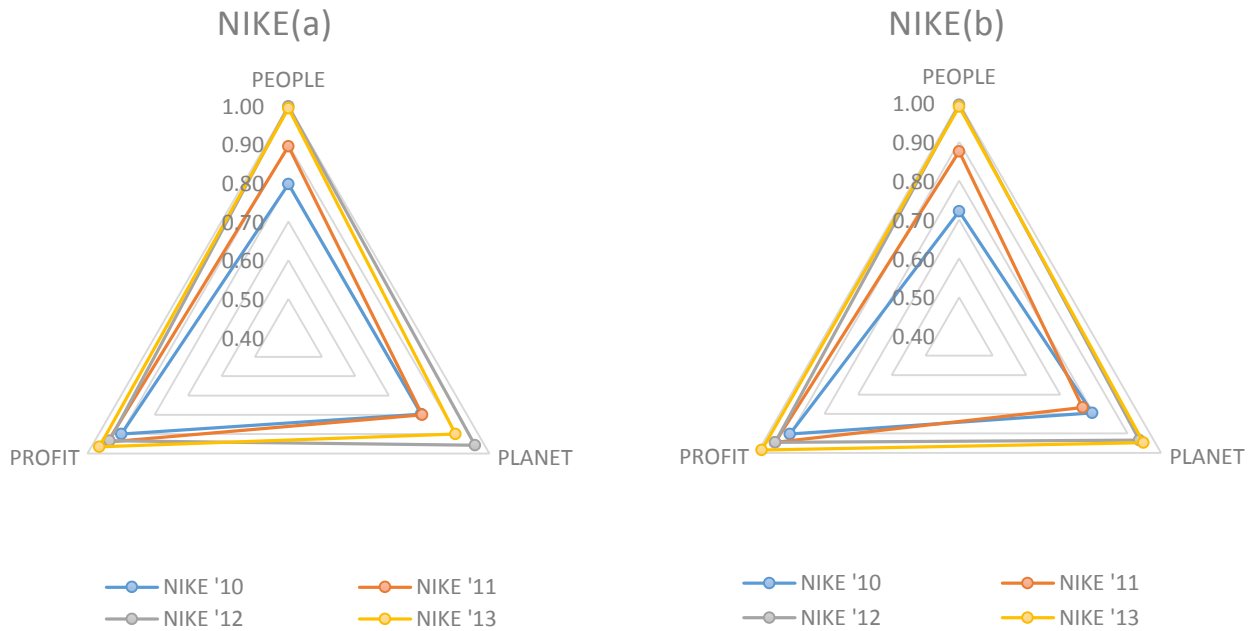


**Figure 3.4.3** – Radar graphs depicting Adidas’ orientation to each dimension of the Triple Bottom Line. a) Equally weighted variables within each dimension, b) Differently weighted variables within each dimension

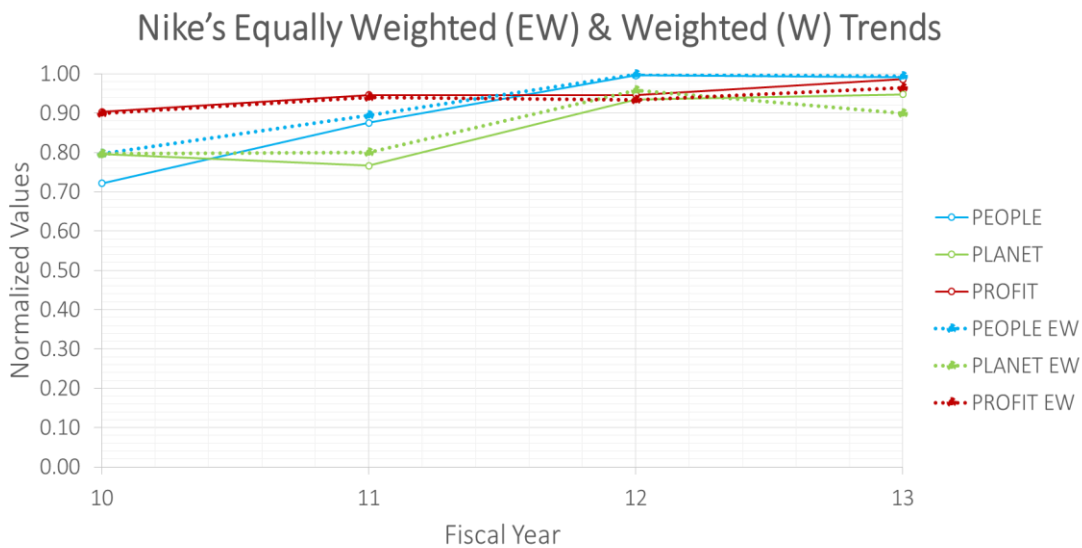


**Figure 3.4.4** – Adidas’ equally weighted and differently weighted trends for each dimension of the TBL over a four year period.

Nike, as depicted in Figure 3.4.5, exhibits a fairly constant Profit dimension over a four year period. They have also shown slight increases in their Planet and People dimensions. Looking at their equally weighted and weighted trends (Figure 3.4.6), similar to Adidas, Nike maintains a relatively constant Profit while maintaining constant to slight increases in their investments in their People and Planet dimensions.



**Figure 3.4.5** – Radar graphs depicting Nike’s orientation to each dimension of the Triple Bottom Line. a) Equally weighted variables within each dimension, b) Differently weighted variables within each dimension



**Figure 3.4.6** – Nike’s equally weighted and differently weighted trends for each dimension of the TBL over a four year period.

## 4. DISCUSSION

### 4.1 Analysis

#### 4.1.1 Importance of Corporate Social Responsibility and Reporting

In order to market a positive image as being in the forefront of sustainability, companies adopting the TBL framework must have a strong stance on their *Corporate*

*Social Responsibility (CSR)* – a code of conduct and action beyond what is required by laws, regulations, and trade rules. This can be along the lines of:

- i. Operating in clean and ecologically responsible ways,
- ii. Social and ethical educational programs for employees, and
- iii. Charitable endeavors and community involvement.

The public has witnessed a significant growth in CSR reporting within recent years, tripling from nearly 2,000 in 2007 to over 6,000 in 2011.<sup>13</sup> Organizations have taken on the obligation to generate these reports in order to inform their customers, clients and/or stakeholders about their Planet and People initiatives. With these reports, companies are expected to, according to Blanchard, “track the carbon footprint not only of their own manufacturing activities, but also their transportation, distribution, and procurement activities, while monitoring the related activities of their extended supply chain as well.”

<sup>14</sup> They are also expected to track social initiatives, such as diversity and welfare for their employees and community as a whole.

Positive side effects of investing in CSR may include increased brand recognition, worker retention, productivity, customer loyalty, and external interest in the company's stocks. Likewise, there are negative side effects. Some would argue that CSR is a distraction for companies – companies should only follow laws in addition to operating to maximize profits and shareholder value. Focusing company expenses on other objectives would be considered a distraction from a maximization of profits. However, since public awareness and concerns regarding environmental and social issues increasing, there is reasonable assurance that tackling these issues may impact a company's financial success. Nowadays, many companies that want to expand into sustainable markets invest in CSR by ensuring their operations are transparent to the public.

#### 4.1.2 Summary

In summary, three circumstances were witnessed within the four year period of which data was taken from. Firstly, Puma sustains a financial loss with substantial increase in People investment and slight increase in Planet investment. Interestingly, Puma's profitability shows a negative correlation with an increase in the other two dimensions of the TBL. Secondly, Adidas and Nike maintain a relatively constant Profit while maintaining relatively constant or slight increases in People and Planet investments. Despite Adidas' profitability slightly falling in 2012, it was able to recover the following year. Nike was the only company out of the four that displays stable profitability with a

slight increase in People and Planet orientations. Lastly, insufficient data was provided from ASICS' CSR reporting and trends could not be generated from the given information. From the three circumstances witnessed, sources of error can be drawn as to how they contribute to the variations observed in this study.

## 4.2 Errors and Variables

Since the beginning of this study, it was self-evident there is not a standard means of CSR reporting across all four companies. This is due to the fact that no oversight exists to manage what companies need to report regarding CSR. While the Securities and Exchange Commission (SEC) in the U.S. oversees financial reporting and protection of investors, there is not an analogous entity to facilitate CSR reporting. Without an existing organization to oversee CSR reporting, companies have the option to report whatever information and statistics regarding social and environmental sustainability they wish. Consequently, only variables that were common within these four companies' CSR reports were used. There may be other variables that profitability is dependent on, but for the purpose of this study, a common ground is necessary for valid comparison between companies.

Just as companies are able to choose what information to publish regarding social and environmental sustainability, they also have the option to choose which of their facilities to audit and which audit results to publish. For example, in 2013 Puma audited only 70% of their manufacturing facilities. The facilities that Puma had chosen to audit could have been selected to tailor desired results. This occurrence is actually quite common within most of the companies investigated in this study. With the exception of Nike, which managed to audit 98% of their facilities by the end of 2013, the remaining three companies failed to audit more than 80% of their manufacturing facilities every year for four consecutive years.

One of the biggest limitations of the TBL is that there is not a common unit of measurement to quantify all three dimensions since this framework includes both environmental and social measures. That being said, it is also difficult to establish a common unit for even a single dimension (with the exception of financial profits [USD]). For example, environmental impact can be measured by the electricity consumption, fossil fuel consumption, hazardous waste management, land use, and carbon footprint. Likewise, social measures can be measured via turnover rate, ratio of men to women in management, educational training, cultural diversity, age, health, and well-being. Therefore the exact degree to which an organization can be environmentally and socially impactful can be difficult to assess.

Lastly, ASICS' CSR reporting provided insufficient data necessary to draw conclusions like the other three companies. This is expected since ASICS was the latest to incorporate CSR reporting out of the sample set chosen for this study. In summary, a governing standard of sustainable reporting must be established in order to eliminate the impediments described above. Doing so would not only enhance clarity for the purpose of this study, but also for all the companies' stakeholders who choose to invest in a company because of its sustainability efforts.

## 5. CONCLUSION

Leaders in business with a superficial understanding of the TBL may treat it like a distraction from their main purpose of generating profit, and thus it is considered an imposition that is easily ignored. However, approaching the framework like such is a misunderstanding in itself. According to Andrew Savitz, a company that is truly focused on the TBL is one that "conducts its business so that benefits flow naturally to all stakeholders, including employees, customers, business partners, the communities in which it operates, and of course, shareholders."<sup>15</sup> The purpose of this study was to determine if a company's profitability is determined by how effectively it implements the orientations of the TBL. In the end, this analysis did not show strong evidence of how financial profitability within the athletic footwear industry is determined by how effectively the TBL was implemented. However, the Adidas and Nike cases show that it is possible to have some slight increase in Planet and/or People dimensions without significantly impacting Profit. Despite the different weighting given to each variable in the dimensions of the TBL, no significant differences were observed in equally weighted versus differently weighted trends. As a result, different Planet and People variables not considered in this specific study may also affect profitability. In conclusion, the theory of effectively implementing the TBL and seeing immediate results is overall easier said than done.



## 6. APPENDIX A - Raw Data (People, Planet, Profit) for Athletic Footwear Companies

		PUMA			
Fiscal Year		10	11	12	13
PEOPLE		PEOPLE			
Internal Operations	Employees Worldwide (#)	9,313	10,043	13,315	12,966
	Percentage Women Employees (%)	49%	48%	49%	49%
	Women in Management (%)	36%	36%	36%	34%
	Average Age ( #)	32	32	32	32
	# of Factories Audited (#)	310	382	380	365
	# of Factories that Passed Audits (#)		318	319	315
	# of Factories	489	540	500	525
	% Factories Audited (%)	63%	71%	76%	70%
	% of Audited Factories that Passed Audits		83%	84%	86%
	% Factories Passed Audits		59%	64%	60%
PLANET		PLANET			
Internal Operations	CO2 Emissions (t)	87,528	89,241	87,791	86,898
	Energy Consumption (MWh)	75,923	74,935	99,903	81,618
	Water Consumption (m^3)	116,532	113,366	121,043	124,106
	Waste Output (t)	6,458	6,246	5,071	4,719
	VOC / pair (g)	40.2	37.0	33.1	30.7
	CO2 Emissions / COGS (t/mil \$)	48.0	45.5	39.4	39.5
	Energy Consumption/COGS (MWh/ mil \$)	41.7	38.2	44.8	37.1
	Water Consumption/COGS (m^3/ mil \$)	64.0	57.8	54.3	56.4
	Waste Output/COGS (t/mil \$)	3.54	3.19	2.27	2.15
PROFIT		PROFIT			
Revenue (USD in millions)		\$ 3,622	\$ 3,892	\$ 4,311	\$ 4,110
Cost of Goods Sold (USD in millions)		\$ 1,822	\$ 1,960	\$ 2,230	\$ 2,200
Gross Profit (USD in millions)		\$ 1,800	\$ 1,932	\$ 2,081	\$ 1,910
Gross Margin %		49.70%	49.64%	48.27%	46.47%
Net Income after Taxes (USD in millions)		\$ 271	\$ 298	\$ 93	\$ 7
Net Income after Taxes (% difference)			9.96%	-68.79%	-92.47%
Basic Earnings Per Share (USD)		\$ 18.00	\$ 19.87	\$ 6.18	\$ 0.50
Inventory Turn Over Ratio		3.45	3.10	3.11	2.98
Days' Sales in Inventory		106	118	117	122
Return on Assets		9.23%	9.30%	2.74%	0.22%
Return on Equity		15.40%	15.39%	4.39%	0.35%

Reference <sup>16 17 18 19</sup>

		ADIDAS			
Fiscal Year		10	11	12	13
PEOPLE		PEOPLE			
Internal Operations	Employees Worldwide (#)	42,541	44,824	46,306	50,728
	Percentage Women Employees (%)	48%	50	50%	49%
	Women in Management (%)	28%	27%	28%	28%
	Average Age ( #)	33	30	31	30
	# of Factories Audited (#)	717	752	566	619
	# of Factories that Passed Audits (#)	568	595	317	359
	# of Factories	1,236	1,232	1,109	1,214
	% Factories Audited (%)	58%	61%	51%	51%
	% of Audited Factories that Passed Audits	79%	79%	56%	58%
	% Factories Passed Audits	46%	48%	29%	30%
PLANET		PLANET			
Internal Operations	CO2 Emissions (t)	78,800	61,997	63,472	61,611
	Energy Consumption (MWh)	227,100	198,943	204,447	203,624
	Water Consumption (m^3)	355,700	309,342	358,517	325,255
	Waste Output (t)	3,410	2,989	2,955	2,772
	VOC / pair (g)	25.0	22.0	20.0	18.8
	CO2 Emissions / COGS (t/mil \$)	9.4	6.8	6.2	6.1
	Energy Consumption/COGS (MWh/ mil \$)	27.1	22.0	19.9	20.1
	Water Consumption/COGS (m^3/ mil \$)	42.5	34.2	35.0	32.1
	Waste Output/COGS (t/mil \$)	0.41	0.33	0.29	0.27
PROFIT		PROFIT			
Revenue (USD in millions)		\$ 16,047	\$ 17,260	\$ 19,617	\$ 19,952
Cost of Goods Sold (USD in millions)		\$ 8,378	\$ 9,054	\$ 10,255	\$ 10,122
Gross Profit (USD in millions)		\$ 7,669	\$ 8,206	\$ 9,362	\$ 9,830
Gross Margin %		47.79%	47.54%	47.72%	49.27%
Net Income after Taxes (USD in millions)		\$ 753	\$ 868	\$ 692	\$ 1,088
Net Income after Taxes (% difference)			15.26%	-20.18%	57.05%
Basic Earnings Per Share (USD)		\$ 3.63	\$ 4.14	\$ 3.32	\$ 5.18
Inventory Turn Over Ratio		3.49	3.04	3.13	2.87
Days' Sales in Inventory		105	120	117	127
Return on Assets		5.82%	6.10%	4.56%	6.77%
Return on Equity		12.30%	11.90%	9.90%	14.30%

Reference <sup>20 21 22 23</sup>

		NIKE			
Fiscal Year		10	11	12	13
PEOPLE		PEOPLE			
Internal Operations	Employees Worldwide (#)	32,710	37,515	44,000	43,700
	Percentage Women Employees (%)	49%	49%	50%	48%
	Women in Management (%)	40%	40%	41%	41%
	Average Age ( #)	31	31	32	32
	# of Factories Audited (#)	730	823	883	769
	# of Factories that Passed Audits (#)	397	441	639	536
	# of Factories	1,012	882	910	785
	% Factories Audited (%)	72%	93%	97%	98%
	% of Audited Factories that Passed Audits	54%	54%	72%	70%
	% Factories Passed Audits	39%	50%	70%	68%
PLANET		PLANET			
Internal Operations	CO2 Emissions (t)	1,406,100	1,720,844	1,715,902	1,671,939
	Energy Consumption (MWh)	3,481,111	4,168,333	4,406,389	4,145,556
	Water Consumption (m^3)	6,624,468	6,624,468	5,080,020	5,080,020
	Waste Output (t)	24,350	24,350	24,350	48,350
	VOC / pair (g)	12.5	12.4	12.3	12.7
	CO2 Emissions / COGS (t/mil \$)	138	152	126	117
	Energy Consumption/COGS (MWh/ mil \$)	341	367	323	290
	Water Consumption/COGS (m^3/ mil \$)	649	583	372	356
	Waste Output/COGS (t/mil \$)	2.38	2.14	1.78	3.39
PROFIT		PROFIT			
Revenue (USD in millions)		\$ 19,014	\$ 20,862	\$ 24,128	\$ 25,313
Cost of Goods Sold (USD in millions)		\$ 10,214	\$ 11,354	\$ 13,657	\$ 14,279
Gross Profit (USD in millions)		\$ 8,800	\$ 9,508	\$ 10,471	\$ 11,034
Gross Margin %		46.28%	45.58%	43.40%	43.59%
Net Income after Taxes (USD in millions)		\$ 1,916	\$ 2,163	\$ 2,257	\$ 2,451
Net Income after Taxes (% difference)			12.89%	4.35%	8.60%
Basic Earnings Per Share (USD)		\$ 1.97	\$ 2.24	\$ 2.42	\$ 2.77
Inventory Turn Over Ratio		4.64	4.77	4.50	4.21
Days' Sales in Inventory		79	77	81	87
Return on Assets		13.78%	14.50%	14.55%	15.04%
Return on Equity		20.67%	21.77%	21.92%	23.08%

Reference <sup>24 25</sup>

		ASICS			
Fiscal Year		10	11	12	13
PEOPLE		PEOPLE			
Internal Operations	Employees Worldwide (#)	5,604	5,906	5,906	6,585
	Percentage Women Employees (%)				46%
	Women in Management (%)				32%
	Average Age ( #)				
	# of Factories Audited (#)	62	59	59	89
	# of Factories that Passed Audits (#)	47	45	45	57
	# of Factories	169	157	157	160
	% Factories Audited (%)	37%	38%	38%	56%
	% of Audited Factories that Passed Audits	76%	77%	77%	64%
	% Factories Passed Audits	28%	29%	29%	36%
PLANET		PLANET			
Internal Operations	CO2 Emissions (t)		16,632	16,632	16,758
	Energy Consumption (MWh)	3,282	3,013	3,013	
	Water Consumption (m^3)		110,134	110,134	
	Waste Output (t)	66	69	69	
	VOC / pair (g)				
	CO2 Emissions / COGS (t/mil \$)	0.00	5.85	5.51	10.78
	Energy Consumption/COGS (MWh/ mil \$)	2.36	1.89	1.76	0.00
	Water Consumption/COGS (m^3/ mil \$)	0	69	64	0
	Waste Output/COGS (t/mil \$)	0.05	0.04	0.04	0.00
PROFIT		PROFIT			
Revenue (USD in millions)		\$ 2,402	\$ 2,842	\$ 3,021	\$ 2,765
Cost of Goods Sold (USD in millions)		\$ 1,393	\$ 1,597	\$ 1,710	\$ 1,555
Gross Profit (USD in millions)		\$ 1,009	\$ 1,245	\$ 1,245	\$ 1,210
Gross Margin %		42.01%	43.81%	41.21%	43.76%
Net Income after Taxes (USD in millions)		\$ 89	\$ 133	\$ 154	\$ 146
Net Income after Taxes (% difference)			49.44%	15.79%	-5.19%
Basic Earnings Per Share (USD)		\$ 0.47	\$ 0.70	\$ 0.81	\$ 0.77
Inventory Turn Over Ratio		3.46	3.33	3.05	2.81
Days' Sales in Inventory		105	110	120	130
Return on Assets		4.63%	5.73%	6.09%	6.03%
Return on Equity		8.84%	11.09%	12.13%	11.58%

Reference <sup>26 27 28 29</sup>



## 7. APPENDIX B – Normalization of People Dimension

Pair Wise Comparison Table							Sensitivity Analysis	
	Employees Worldwide (#)	Women in Management (%)	Average Age	% Factories Audited	% of Factories Passed Audits	W.P.I Average	4% Decrease	4% Increase
Employees Worldwide (#)	1.000	0.250	0.250	0.143	0.125	0.354	0.357	0.350
Women in Management (%)	4.000	1.000	3.000	0.200	0.167	1.673	1.690	1.657
Average Age	4.000	0.333	1.000	0.143	0.125	1.120	1.131	1.109
% Factories Audited	7.000	5.000	7.000	1.000	3.000	4.600	4.646	4.554
% of Factories Passed Audits	8.000	6.000	8.000	0.333	1.000	4.667	4.480	4.853
Total	24.00	12.58	19.25	1.82	4.42	12.414	12.305	12.523

Normalized Pair Wise Comparison Table							Sensitivity Analysis	
	Employees Worldwide (#)	Women in Management (%)	Average Age	% Factories Audited	% of Factories Passed Audits	Pair Wise Average	4% Decrease	4% Increase
Employees Worldwide (#)	0.04	0.02	0.01	0.08	0.03	0.04	0.046	0.026
Women in Management (%)	0.17	0.08	0.16	0.11	0.04	0.11	0.120	0.100
Average Age	0.17	0.03	0.05	0.08	0.03	0.07	0.080	0.060
% Factories Audited	0.29	0.40	0.36	0.55	0.68	0.46	0.416	0.496
% of Factories Passed Audits	0.33	0.48	0.42	0.18	0.23	0.33	0.337	0.317
Total	1.00	1.00	1.00	1.00	1.00	1.000	1.000	1.000

W.P.I											Sensitivity Analysis		
People	Employees Worldwide (#)		Women in Management (%)		Average Age		% Factories Audited		% of Factories Passed Audits		Gamma	Gamma -4%	Gamma +4%
	#	β	%	β		β	%	β	%	β			
PUMA '10	9313	0.70	36.00%	1.00	32.00	1.00	63.39%	0.83			0.59	0.58	0.59
PUMA '11	10,043	0.75	36.00%	1.00	32.00	1.00	70.74%	0.93	58.89%	0.92	0.93	0.93	0.93
PUMA '12	13,315	1.00	36.00%	1.00	32.00	1.00	76.00%	1.00	63.84%	1.00	1.00	1.00	1.00
PUMA '13	12,966	0.97	34.00%	0.94	32.00	1.00	69.52%	0.91	60.00%	0.94	0.93	0.94	0.93
ADIDAS '10	42,541	0.84	28.00%	1.00	33.00	1.00	58.00%	1.00	45.94%	0.95	0.98	0.98	0.98
ADIDAS '11	44,824	0.88	27.00%	0.96	30.00	0.91	51.00%	0.88	48.31%	1.00	0.93	0.93	0.93
ADIDAS '12	46,306	0.91	28.00%	1.00	31.00	0.94	51.00%	0.88	28.56%	0.59	0.80	0.80	0.80
ADIDAS '13	50,728	1.00	28.00%	1.00	30.00	0.91	51.00%	0.88	29.58%	0.61	0.81	0.81	0.81
NIKE '10	32,710	0.74	40.00%	0.98	31.00	0.97	72.13%	0.74	39.23%	0.56	0.72	0.72	0.72
NIKE '11	37,515	0.85	40.40%	0.99	31.00	0.97	93.31%	0.95	50.00%	0.71	0.87	0.87	0.88
NIKE '12	44,000	1.00	41.00%	1.00	32.00	1.00	97.03%	0.99	70.22%	1.00	1.00	1.00	1.00
NIKE '13	43,700	0.99	41.00%	1.00	32.00	1.00	97.96%	1.00	68.28%	0.97	0.99	0.99	0.99
ASICS '10	5,604	0.85					36.69%	0.66	27.88%	0.78	0.59	0.58	0.60
ASICS '11	5,906	0.90					37.58%	0.68	28.94%	0.81	0.61	0.60	0.62
ASICS '12	5,906	0.90					37.58%	0.68	28.94%	0.81	0.61	0.60	0.62
ASICS '13	6,585	1.00					55.63%	1.00	35.60%	1.00	0.82	0.80	0.84

## 8. APPENDIX C – Normalization of Planet Dimension

Pair Wise Comparison Table							Sensitivity Analysis	
	VOC/pair (g)	CO2 Emissions / COGS	Energy Consumption/ COGS	Water Consumption/ COGS	Waste Consumption/ COGS	W.P.I Average	4% Decrease	4% Increase
VOC/ pair (g)	1.000	0.125	0.167	0.167	0.250	0.342	0.345	0.338
CO2 Emissions / COGS (t/mil\$)	8.000	1.000	1.000	4.000	3.000	3.400	3.264	3.536
Energy Consumption/ COGS (MWh/mil\$)	6.000	1.000	1.000	4.000	3.000	3.000	3.030	2.970
Water Consumption / COGS (m <sup>3</sup> /mil\$)	6.000	0.250	0.250	1.000	3.000	2.100	2.121	2.079
Waste Output/COGS(t/mil\$)	4.000	0.333	0.333	0.333	1.000	1.200	1.212	1.188
Total	25.00	2.71	2.75	9.50	10.25	10.042	9.972	10.111

Normalized Pair Wise Comparison Table							Sensitivity Analysis	
	VOC/pair (g)	CO2 Emissions / COGS	Energy Consumption/ COGS	Water Consumption/ COGS	Waste Consumption/ COGS	Pair Wise Average	4% Decrease	4% Increase
VOC/ pair (g)	0.04	0.05	0.06	0.02	0.02	0.038	0.048	0.028
CO2 Emissions / COGS (t/mil\$)	0.32	0.37	0.36	0.42	0.29	0.353	0.313	0.393
Energy Consumption/ COGS (MWh/mil\$)	0.24	0.37	0.36	0.42	0.29	0.337	0.347	0.327
Water Consumption / COGS (m <sup>3</sup> /mil\$)	0.24	0.09	0.09	0.11	0.29	0.164	0.174	0.154
Waste Output/COGS(t/mil\$)	0.16	0.12	0.12	0.04	0.10	0.107	0.117	0.097
Total	1.00	1.00	1.00	1.00	1.00	1.000	1.000	1.000

Environmental Impact	W.P.I										Sensitivity Analysis		
	VOC/ pair (g)		CO2 Emissions / COGS (t/mil\$)		Energy Consumption/ COGS (MWh/mil\$)		Water Consumption / COGS (m <sup>3</sup> /mil\$)		Waste Output/COGS(t/mil\$)		Gamma	Gamma -4%	Gamma +4%
	g	β	t/mil\$	β	MWh/mil\$	β	m <sup>3</sup> /mil\$	β	t/mil\$	β	γ	γ	γ
PUMA '10	40.22	0.76	48.04	0.82	41.67	0.89	63.96	0.90	3.54	0.61	0.83	0.83	0.83
PUMA '11	37.02	0.83	45.53	0.86	38.23	0.97	57.84	1.00	3.19	0.67	0.90	0.90	0.90
PUMA '12	33.10	0.93	39.37	1.00	44.80	0.83	54.28	0.78	2.27	0.94	0.90	0.89	0.90
PUMA '13	30.70	1.00	39.50	1.00	37.10	1.00	56.41	0.75	2.15	1.00	0.96	0.96	0.96
ADIDAS '10	25.00	0.75	9.41	0.65	27.11	0.74	42.46	0.76	0.41	0.67	0.70	0.70	0.70
ADIDAS '11	22.00	0.85	6.85	0.89	21.97	0.91	34.17	0.94	0.33	0.83	0.90	0.90	0.90
ADIDAS '12	20.00	0.94	6.19	0.98	19.94	1.00	34.96	0.92	0.29	0.95	0.97	0.97	0.97
ADIDAS '13	18.80	1.00	6.09	1.00	20.12	0.99	32.13	1.00	0.27	1.00	1.00	1.00	1.00
NIKE '10	12.5	0.98	138	0.85	341	0.85	649	0.55	2.38	0.75	0.80	0.79	0.80
NIKE '11	12.4	0.99	152	0.77	367	0.79	583	0.61	2.14	0.83	0.77	0.77	0.77
NIKE '12	12.3	1.00	126	0.93	323	0.90	372	0.96	1.78	1.00	0.94	0.94	0.93
NIKE '13	12.7	0.97	117	1.00	290	1.00	356	1.00	3.39	0.53	0.95	0.94	0.95
ASICS '10	0		0.00		2.36		0		0.05				
ASICS '11	0		5.85		1.89		69		0.04				
ASICS '12	0		5.51		1.76		64		0.04				
ASICS '13	0		10.78		0.00		0		0.00				

## 9. APPENDIX D – Normalization of Profit Dimension

Pair Wise Comparison Table							Sensitivity Analysis	
	Gross Margin %	Basic Earnings Per Share (USD)	Inventory Turn Over Ratio	Return on Assets	Return on Equity	W.P.I Average	4% Decrease	4% Increase
Gross Margin %	1.000	2.000	3.000	0.333	0.333	1.333	1.347	1.320
Basic Earnings Per Share (USD)	0.500	1.000	3.000	0.250	0.250	1.000	0.960	1.040
Inventory Turn Over Ratio	0.333	0.333	1.000	0.167	0.167	0.400	0.404	0.396
Return on Assets	3.000	4.000	6.000	1.000	1.000	3.000	3.030	2.970
Return on Equity	3.000	4.000	6.000	1.000	1.000	3.000	3.030	2.970
Total	7.83	11.33	19.00	2.75	2.75	8.733	8.771	8.696

Normalized Pair Wise Comparison Table							Sensitivity Analysis	
	Gross Margin %	Basic Earnings Per Share (USD)	Inventory Turn Over Ratio	Return on Assets	Return on Equity	Pair Wise Average	4% Decrease	4% Increase
Gross Margin %	0.13	0.18	0.16	0.12	0.12	0.14	0.151	0.131
Basic Earnings Per Share (USD)	0.06	0.09	0.16	0.09	0.09	0.10	0.058	0.138
Inventory Turn Over Ratio	0.04	0.03	0.05	0.06	0.06	0.05	0.059	0.039
Return on Assets	0.38	0.35	0.32	0.36	0.36	0.36	0.366	0.346
Return on Equity	0.38	0.35	0.32	0.36	0.36	0.36	0.366	0.346
Total	1.00	1.00	1.00	1.00	1.00	1.000	1.000	1.000

Profitability	W.P.I										Sensitivity Analysis		
	Gross Margin %		Basic Earnings Per Share (USD)		Inventory Turn Over Ratio		Return on Assets		Return on Equity		Gamma	Gamma -4%	Gamma +4%
	%	β	USD	β		β	%	β	%	β	γ	γ	γ
PUMA '10	49.70%	1.00	\$18.00	0.91	3.45	1.00	9.23%	0.99	15.40%	1.00	0.99	0.99	0.98
PUMA '11	49.64%	1.00	\$19.87	1.00	3.10	0.90	9.30%	1.00	15.39%	1.00	0.99	0.99	1.00
PUMA '12	48.27%	0.97	\$6.18	0.31	3.11	0.90	2.74%	0.29	4.39%	0.29	0.42	0.43	0.41
PUMA '13	46.47%	0.94	\$0.50	0.03	2.98	0.86	0.22%	0.02	0.35%	0.02	0.19	0.21	0.18
ADIDAS '10	47.79%	0.96	\$3.63	0.70	3.49	1.00	5.82%	0.86	12.30%	0.86	0.87	0.87	0.86
ADIDAS '11	47.54%	0.96	\$4.14	0.80	3.04	0.87	6.10%	0.90	11.90%	0.83	0.87	0.88	0.87
ADIDAS '12	47.72%	0.97	\$3.32	0.64	3.13	0.90	4.56%	0.67	9.90%	0.69	0.73	0.74	0.72
ADIDAS '13	49.27%	1.00	\$5.18	1.00	2.87	0.82	6.77%	1.00	14.30%	1.00	0.99	0.99	0.99
NIKE '10	46.28%	1.00	\$1.97	0.71	4.64	0.97	13.78%	0.92	20.67%	0.90	0.90	0.91	0.89
NIKE '11	45.58%	0.98	\$2.24	0.81	4.77	1.00	14.50%	0.96	21.77%	0.94	0.95	0.95	0.94
NIKE '12	43.40%	0.94	\$2.42	0.87	4.50	0.94	14.55%	0.97	21.92%	0.95	0.95	0.95	0.94
NIKE '13	43.59%	0.94	\$2.77	1.00	4.21	0.88	15.04%	1.00	23.08%	1.00	0.99	0.98	0.99
ASICS '10	42.01%	0.96	\$0.47	0.58	3.46	1.00	4.63%	0.76	8.84%	0.76	0.78	0.80	0.77
ASICS '11	43.81%	1.00	\$0.70	0.87	3.33	0.96	5.73%	0.94	11.09%	0.96	0.95	0.95	0.95
ASICS '12	41.21%	0.94	\$0.81	1.00	3.05	0.88	6.09%	1.00	12.13%	1.05	1.00	1.00	1.00
ASICS '13	42.01%	0.96	\$0.77	0.95	2.81	0.81	6.03%	0.99	11.58%	1.00	0.98	0.98	0.98

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