



### BUSINESS INTELLIGENCE (BI): RAW DATA INTO ACTIONABLE INSIGHTS

Koushal Sanjay Modi

Prabhavati Padamshi Soni International Junior College  
koushalmodi1@gmail.com

#### Abstract

An electronic system that comprises of computers, machines, tools and processes is being widely used across businesses globally to speed up and improve the accuracy of business decision making and at the same time benefitting from the flexibility that it provides. In order to provide crucial information to the companies and organizations, this intelligence system uses modern softwares and manpower together to automatically extract, convert and transform raw data into actionable insights. This paper provides a thorough insight on business intelligence (BI), its importance and how the data is generated, transferred and which employee uses for what purpose and in which department.

**Keywords:** *Business Intelligence (BI), Traditional and Modern BI, Key Performance Indicators, Functional Departments: Human Resources, Marketing, Operations and Finance*

#### INTRODUCTION

Business Intelligence is the practice of turning raw unstructured data from all functional departments, that is, human resource, marketing, finance and operations into actionable and valuable insights by using modern tools and processes. It suggests what is happening now and what has happened in the past in detail.

Business Intelligence is used to understand the capabilities available in the firm; the state of the art, trends, and future directions in the markets, the technologies, and the regulatory environment in which the firm competes; and the actions of competitors and the implications of these actions.

The data engineer, data analyst and visualization expert can then be used to provide a coherent and well-structured data to the business manager. The study of historical data can offer key insights into future trends, and help a company anticipate and calculate risk. The aim of this paper is to indicate how firms operate with the use of BI and the real world examples of businesses who have equipped the use of BI. The purpose of this paper is to indicate how, with the help of BI and the data available them to previously, a company can anticipate risk and make better decisions.

Objectives of this paper include how Business Intelligence assists managers of every functional department to make better informed decisions.



### Theory

Traditional BI platforms have provided companies with insights, but only through hands-on work by the data team. This took time, saddled data professionals with tedious tasks, and limited employees' autonomy. Modern business intelligence services empower everyone to be their own data scientist. [1]

### Traditional BI team roles and responsibilities

#### Data Engineers

Data preparers are the first role to begin with BI. They are involved in sourcing data and are involved in decisions about data storage. Moreover, they have the responsibility to create data warehouses which inculcates storing all business data which is then optimized for analysis by the next job person in the BI process. Furthermore, they must have a profound knowledge on data systems, that is, they must be able to classify between structured and unstructured data.

#### Data Analyst

Bearing in mind the need for constructing metrics is essential to the BI system, the data analyst performs the role of extracting, transforming and loading. This means that the data analyst has to select, amend and combine data from tables, variables, columns from the business's databases and then transform the sourced data into presentable and appropriate structures. Lastly, for this primary function to be completed, the data analyst loads the data into models. Other quintessential task data analysts perform is to calculate metrics. This when they write formulae to calculate business performance such as cost of customer acquisition, net promoter score, qualified leads per month, customer loyalty and retention and even qualitative data such as employee happiness. Tools for analysis include Power Pivot, Tableau and many more.

#### Data Visualization

This particular job plays a great role for the results to be understood by the readers. Therfore, they convert data into visuals to highlight key data and communicate results. Besides combing multiple visuals, data visualization experts keep a track on Key Performance Indicators (KPIs') such as revenue and profit margin.

Their role is to assist in identifying areas where the business is doing well and where some more attention might be needed. These can be presented via the use of box and whiskers plot, heat maps, tree diagrams, tornados and many more. The data can be made more understandable for audience with less business knowledge.

#### Business Managers

This the action taking body of the business where decisions are taken after utmost caution and confidence. Business managers have the role to ask questions to the specialists presenting the results, which when being transparent upon increases motivation of the employees within the BI system and ensures their loyalty and a guaranteed commitment to the business.

As the data of previous years is available, the managers can compare the trend growth and gauge what measures and steps can be taken, to convert the data into Actionable Insights.



### Modern BI

The efficient use of advanced and up-to-date tools and processes worldwide to enhance decision making by Managers at companies and organizations is commendable. Thus, businesses can gain a competitive advantage as BI offers flexibility to generate reports and the results can be used to assist decision making.

Modern BI is used by businesses that have four key departments namely: Human Resource, Marketing, Operations and Finance. BI is evidently seen used by huge multinational businesses and large organizations since they have the ability to purchase the expensive tools which gives them an edge over small businesses which have few employees.

### Human Resource

Having studied the ways to achieve business objectives, Business Intelligence is used by HRM to analyze and forecast the number of workers and the skills of those workers that will be required. It is made possible by using reports to analyze newly recruited and turnover rates.

Moreover, in order to evaluate employees' skills and qualifications for recruitment and selection process, metrics such as experience, qualities and interviews are evidently subjective. To provide the HRM with the important data on the appropriate potential candidate, BI is very effective. Even further, the effectiveness of training can also be assessed which is necessary to ensure that needs of the business are aligned with those of employees.

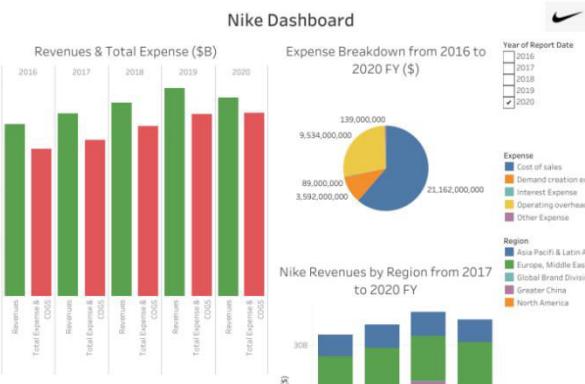
Additionally, the HRM can benefit by using business intelligence as using a BI tool to retain employees can save money on redundancy packages and benefits this is because BI will itself compare the behaviors of current employees with those in the past and indicate a precise estimate of the outcome that will arise during the current financial year. HRM will, as a result can justify their costs to the finance department from the quantifiable and reliable data obtained.

Applicant tracking system and performance management system are not combined, however, if the HRM wants to find out which recruit performed the best, BI enables the HRM to aggregate data. Most reporting consists of ad hoc reporting- different extracts are manually combined. Here, BI tools can facilitate data aggregation and enable automated reporting to assist the HR team.

Analyzing results against KPIs will accurately assess which employees meet the expected standard and identify who needs additional sales training. Keeping in mind that BI tools are much better at analyzing data than the average HR system. Power BI and SAS, such enable the HRM to statistically analyze large quantities of data. BI tools best known for the use by the HR department are Qlik, Visier, Tableau and Power BI.

[2]

Business intelligence can help to drive a culture of employee care by using data to identify needs and find solutions. This may be anything from analyzing the results of employee satisfaction surveys and comparing them with productivity levels to uncover areas of concern, or even analyzing exit interviews to pinpoint exactly where it all





went wrong in the process. In addition, BI can also be used to drive corporate social responsibility, a role that often falls on HR. This can be done by correlating employees' social interests, for example, dogs, with a local social project, or even looking at the wider impact of the company on the community, for instance by implementing youth mentorship projects with job shadowing. [3]

### Marketing

Business Intelligence provides a holistic view of a wide range of marketing activities: customer acquisition, forecasting trends on advertising and promotional budget, the frequency that a loyal customer shops, number of new customers, average number of items purchased per customer visit, market share, total sales, customer satisfaction and brand identity.

Clearly, BI lays out the most preferred product of a business which the marketing department can address the operations department to produce that particular good or service, enhancing the efficiency of the entire business. Having considered further, BI can be used to improve the action plan of a marketing department to achieve its marketing objective. Market segmentation is the process of identifying different segments within a market and targeting different products or services to them.

Apart from using BI to increase revenue via analyzing Customer Relationship Management tools, BI can be used to collect response rates of customers online can be analyzed with the help of click-through rates, downloaded content, ad impressions, conversion rate for each launched campaign and number of followers on social media websites such as Facebook, Instagram and Whatsapp. Many customers are targeted and they interact with companies on these websites and in order to collect such vast data and for marketing managers to make decisions based on it, BI is quintessential.

Demography is the study of population data and trends, and demographic factors- such as age, gender, income, interaction pattern, family size and ethnic background- a way to segment markets.BI is used by most marketing teams to gather this demographic data by getting into the shoes of the existing and potential customers to know their desire and segregate it into high definition streams which can then be used for constructing marketing strategies such as to improve marketing campaigns to cater to these elements of target customers. [4]

Marketing teams can benefit by the use of BI tools as external information can be obtained by using competitive intelligence and the business can compare their position with the rest of the market. Additionally, they will be better equipped for delivering extraordinary customer satisfaction because of pool of information that is now readily available in a comprehensive and easy to understand format.

BI can be time saving since internal reporting and presentation of data into diagrams and charts.\_Primary research conducted has lead to the understanding that at PPSIJC, "Skolao" is a class management system which smoothens administrative activities allowing time savings. All the tools are easy to use and real time students' and staff attendance, leaves, fees collection can all be visualized graphically to make quick decisions. As a result, this ERP System is also used for employee management. An interesting point to note further is Skolaro facilitates in inventory management where all records of fixed and movable assets can be maintained and each item in inventory will have a vendor with vendor who has an evaluation report, attached.



As a result, BI can be used instead of manual work by employees, this benefit clearly allows employees to focus on other key areas, indicating that the business will benefit from increased productivity by the use of BI. BI generates its key KPIs according to the stance of the business and supplies the marketing team with relevant and realistic questions to ask.

Business intelligence together with business analytics can improve the results of predicting future sales by taking into account seasonal changes, start and end of promotional campaigns, price and income elasticity of demand. Furthermore, the finance department will use the sales forecasts of the marketing department to help construct cash-flow forecasts and operational budgets. In addition, they will have to ensure that the necessary capital is available to pay for the agreed marketing budget.

At the same time, the sales forecasts obtained by marketing team via BI will be used by human resources to help devise a workforce plan for all workers. It will be their key role to undertake recruitment and selection of appropriately qualified and experienced staff to make sure there are sufficient workers to produce and sell the sales planned for by the marketing department. The sales forecasts will be used by the operations department to plan for the capacity required, purchase of capital equipments like machines, robots and the stock of raw materials required for the forecasted output level. Business Intelligence for marketing help businesses adapt to customer needs and companies are investing heavily in the training of end-users on business intelligence tools, to encourage smooth and effective running of the BI process.

### Operations

Business Intelligence helps stock holders to identify the flow of inventory from their storage facility and it is crucial for the wholesalers and retailers to use BI to manage inventory in order to prevent lost sales and not hold idle production resources and at the same time procure enough inventory to not run out of it.

Recognizing the need to manage inventory better to save on costs like storage- insurance and refrigeration for example, risk of obsolescence or opportunity cost, BI backs up the operations team if they use the Just In Time process which requires holding inventories in warehouses by requiring supplies to arrive just as they are needed in production.

Bearing in mind the advantages that JIT brings to the business such as improved employee-employer relationship because of multiskilled and adaptable staff, substantial flexibility to match the desires and attitudes of customers in addition to those mentioned above, BI helps the operations team considerably.

Computer controlled machinery and robots under the vigilance of BI will give a rich view of real-time data of output levels and once they team knows which models and the quantity of them are present, then shipping efficiency and fulfillment of orders will greatly improve. For example, the most picked items ought to be placed near the exit section (door area) to not waste and increase time for delivery; this will increase customer satisfaction and gain a competitive advantage. Inventory control is vital step for supply chain management which ensures that both important aspects occur at the same time: lower costs and efficiency.

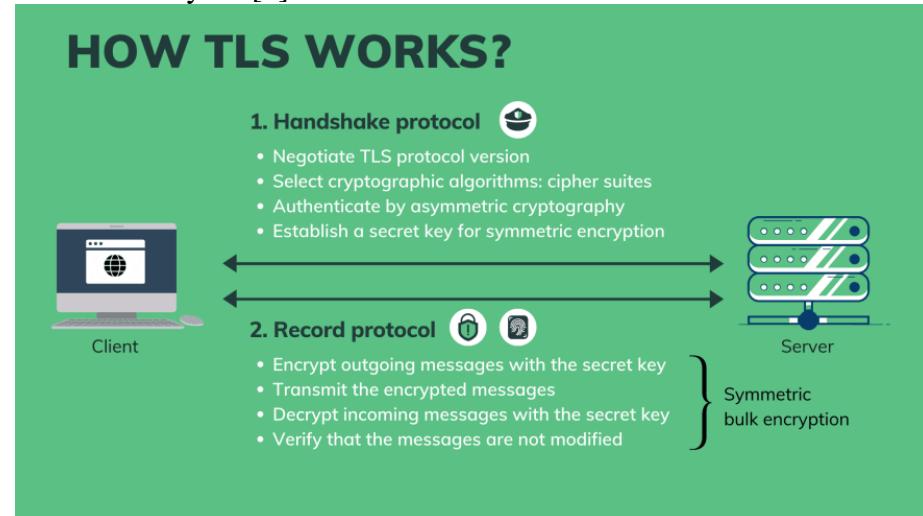
Location intelligence is a valuable component of business intelligence, it assists the Chief Operating Officer (COO) in deciding where to open the next production facility based on factors such as capital cost, transport cost, labour cost and sales revenue potentials. The COO also



benefits by using BI's location intelligence because the tools will automatically take into account environmental concerns, infrastructure- port facilities and internet viability, public safety and future expansion chances into consideration. Expecting, operational efficiency will now upgrade. [5]

For instance, Toyota, uses JIT together with BI to maintain low amounts of raw materials at every stage of production and the marketing team co-ordinates with the operations team for forecasting of quantity of inventory of raw materials, work in progress and finished goods to be stored. In 2000 Toyota switched to business intelligence platform. The system included Hyperion's dashboard feature which allowed executives to visually see hot spots in their business units and investigate further to identify problems and their causes.

With the new TLS (cryptographic protocol that provides end-to-end security of data sent between applications over the Internet) system which uses colors meaningfully (red for danger) a business manager can see in real-time such as when delivery times are slowing and can immediately find the sources of the problems and even evaluate potential solutions by using 'what-if' analysis. [6]



[7]

Therefore, if a business wishes to stock warehouses and shops sufficiently with the correct type and quantity of inventory, BI will enable it to use real-time predictive needs of spare parts, preventing unnecessary wastage of resources.

Again, BI assists COOs for reacting quickly, making better decisions and optimizing warehouses, emphasizing that BI adds value to the Business since it helps in order fulfillments, low inventory costs, and higher profits.

### Finance

Business intelligence softwares are crucial to the finance department since they act as a platform to gauge the real-time financial performance and gives clear insights on investment opportunities and risks that underlie.

Noting with satisfaction, BI allows the finance manager to visualize the company's financial details by using dashboards and look out for risk associated places and to act accordingly by changing the course of action to prevent the risk from spreading any further, indicating that better informed decisions can now be made. BI also assists in deciding what



amount of money could be invested to earn a higher return on investment both within the business as well as outside the business.

Relevant and reliable information when collected together into a single warehouse is quintessential for the smooth functioning of the business. However, as some websites display incorrect information or have broken links. Using the faulty data in business decision making could lead to business's position in danger and eventually hamper the business's reputation in the eyes of the stakeholders. Viewing with appreciation, using Business Intelligence will aid the finance department manager as the data standards will not include overlapping or conflicting information which ensures that analysts are working with their exact requirements.

Therefore, BI based programmed softwares assist the finance department in reforming the cost and spending management which can finally be checked by auditing firms to make sure there is neither any fraudulent activity nor the performance of the business is flattered. Additionally, any inaccurate information during a company's external reporting could shatter the image of the company as a result BI will support the finance department to build a safe and secure environment (encrypted) since the user management access will be limited and pre-set by the manager.

Quantifiable measurements used to focus attention on the metrics most important to meet business goals. Key Financial Performance Indicators (KPIs) are also useful in helping a team understand how progress will be tracked and measured. Many ways to construct KPIs but they should all be measurable, practical, achievable, and provide direction.

The growing need to monitor working capital cycles, operating and net profit margins has lead to BI inventors to create tools that allow the finance manager to estimate the time at which cash will actually start coming into the business and at when will profits will start(notified by using BI tools) by using industry standard KPIs'. Time knowledge obtained will enable the finance department manager to communicate and co-ordinate with all other managers of functional departments and they can therefore plan their resources accordingly, thereby, benefitting the organization as a whole.

BI solutions collect financial and operational data, like NetSuiteAnalytics and produce dashboards timely to enable integrated analysis across multiple information sources and software suites which assists the CFOs to identify and forecast trends and decide on the allocation of resources.

A relevant example includes American Express. Business intelligence is instrumental in the finance industry. American Express has been using the technology to develop new payment service products and market offers to customers. The company's experiments in the Australian market have rendered it capable of identifying up to 24% of all Australian users who will close their accounts within four months. Using that information, American Express takes steps to retain customers. BI also helps the company accurately detect fraud and protect customers whose card data may be compromised. [8]

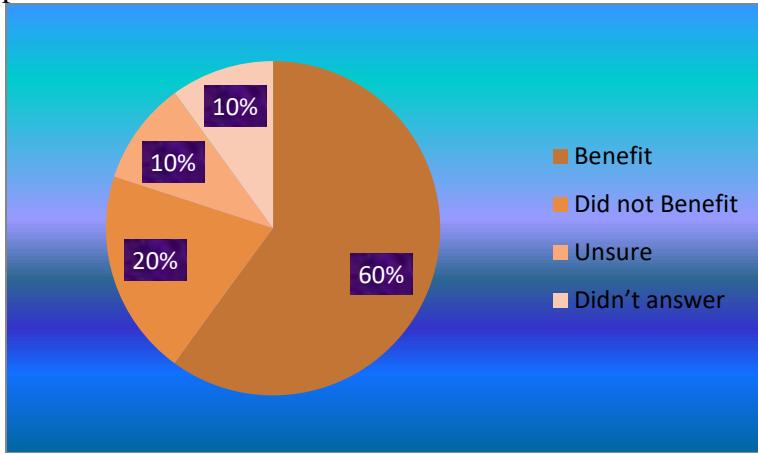
### Experimental

Having examined further, primary research was conducted as questionnaires were prepared and emails were sent to 10 businesses dealing in services, banking, finance, retailing, building industry ,oil and gas. Questions inculcated: rating BI from 1 to 10, explaining few benefits and limitations and what could be the future of BI in application to his business.

### RESULT

Primary research was conducted which lead to a leading property developer in Mumbai to highlight key areas. Benefits for included: BI assisting managers of operations to decide which location to choose by running its tools for comparing all the possible factors. Moreover, the company saved on time for reporting payments and receipts: GST, taxes, maintenance cost as well as sending across automated content and email to market the existing and potential customers. Limitations highlighted by the developer included high fixed cost and the need to frequently train employees on the usage and specifications of BI.

Results were up-to-date, realistic and relevant to the study conducted and therefore more useful than most secondary data. Effort was made to convince the respondents that the data provided would remain confidential. This led to the endeavor being time-consuming in comparison to the secondary data obtained from the Internet. Owing to the circumstances surrounding the pandemic it was difficult to find conclusive statistics due to downsizing of firms.



### CONCLUSION

Managers of any business have to have an understanding to analyze the data accurately to make strategized informed decision. Emphasizing the need to be able to match the business' position according to the dynamic environment based on the factors: competitive environment, technological changes, legal changes and environmental changes, managers make sure to use BI to convert raw and unstructured data into actionable insights.

BI facilitates to provide a holistic view of a company by displaying valuable information for each functional department within the organization, indicating, the top ranked managers take decisions which are backed up by facts and not assumptions. When certain criterias are predefined, business intelligence can be used to locate areas with problems where measures and actions can be necessary to avert them.

Business analytics goes hand in hand with the BI process. Since BI fulfils the requirement to gather the past data with trends, business analytics can then be used to predict future demand patterns, quantity of inventory, and source of finance to be chosen and how to produce a suitable marketing mix, that is: product, price, place and promotion. Additionally, identifying new markets for selling existing and new products is made possible by BI.



In order for managers to take tactical decisions, BI's tools and processes offer data 24\*7, unlike the traditional system where the employee can be asked about the data during office workers. This magnificent difference allows managers great flexibilities for reporting and looking over essential documents. Contemplating, managers within the business are required to give a higher return on investment, as a result, BI makes the process easy as decision making can be faster and time can be saved on wide range of calculations.

Along with the pros, the cons too have found their way into the new system of judgment and evaluation which are significant and are worth studying. One of the most pressing concerns with any data analysis system is the risk of leaks. If you use BI applications to handle sensitive information, an error in the process could expose it, harming your business, customers or employees.

The Times reported that in 2014 contractors and employees of Cambridge Analytica, eager to sell psychological profiles of American voters to political campaigns, acquired the private Facebook data of tens of millions of users — the largest known leak in Facebook history. [9]

Many employees and departments may be reluctant to adopt to use BI, this could be the result of lack of IT knowledge. Trade unions may take the side of their members instead of taking this new initiative in a positive way. If some departments do not agree then the organization as a whole will not be as effective as it would otherwise be. [10]

Additionally, BI provides substantial power to centralized managers; however the power that information brings to central managers could be abused and could lead to a reduction in the authority and empowerment extended to work teams and middle managers. BI if used for central control in an oppressive way could reduce job enrichment and hence motivation levels. Managers should not allow it to change their style of leadership to a centralized or authoritarian based on using data to control all aspects of the organization. Sculley, according to wired.com, was a genius in lifestyle advertising when he was with Pepsi-Cola. Both he and Jobs ran Apple as co-CEOs. However, the pair had differences that they couldn't resolve. So, they brought their disagreements to the board, where they eventually sided with Sculley. Jobs reaction? Well, he quit. So, that explains September 16, 1985, when Steve Jobs quit Apple. [11]

More than 30% of surveyed businesses cited security issues as the biggest challenge facing BI. Even further, the business also has the legal right to follow the regularly updated rules laid down by the law.

Capital costs for using BI is considerable. Apart from paying redundancy cost to replace workers with machine, the business now planning to use BI will have to invest on training workers. Also, job security could be hampered if many are made redundant. Therefore, employees will have to undertake courses on BI and the justification of implementing BI in the business should be done with democratic style of leadership. In this digital age, you have more information at your disposal than ever, but this can prove to be problematic. A surplus of data can mean that a lot of what your BI tools analyze is irrelevant or unhelpful, muddying results and slowing down processes.



Business Intelligence requires a very different organizational structure to that of traditional BI methods. This change in decision making towards not accepting the time consuming and less secured version of raw data can be of great benefit to business. Efficient use of BI can help increase productivity and this can create added value for a business. Even further, the multiskilled and adaptable staff required to use BI may gain from improved motivation and the business is likely to meet its goals since there is greater flexibility that the BI system offers, leading to quicker response times to meet changes in consumer demand or tastes.

Therefore, managers can frequently obtain data from all departments and regional divisions quickly- aiding overall control. Recalling, BI accelerates the process of communicating decisions to those in the organization that need to be aware.

The best managers will use Business Intelligence to improve and speed up their decision-making. Good leadership, strong motivation in workers, effective BI system and clear communication are hallmarks of successful businesses.

### REFERENCES

1. <https://www.thoughtspot.com/product/major-differences/between-traditional-modern-bi-services#:~:text=Traditional%20BI%20platforms%20have%20provided,be%20their%20own%20data%20scientist>
2. <https://public.tableau.com/en-gb/search/all/%23nike>
3. <https://gethppy.com/employee-engagement/how-hr-can-benefit-from-business-intelligence>
4. <https://www.constructdigital.com/insight/the-importance-of-business-intelligence-in-marketing-today>
5. <https://360.here.com/2015/07/07/location-intelligence-is-business-intelligence/>
6. <http://bistudycase.blogspot.com/2012/02/toyota-from-excel-to-business.html>
7. [https://www.google.com/url?sa=i&url=https%3A%2F%2Fdev.to%2Ftechschoolguru%2Fa-complete-overview-of-ssl-tls-and-its-cryptographic-system-36pd&psig=AOvVaw31oNgi8ZvAjisUyhTe7ze5&ust=1625160514815000&source=images&cd=vfe&ved=0CAoQjRxqFwoTCLjG4u7wv\\_ECFQAAAAAdAAAAABAD](https://www.google.com/url?sa=i&url=https%3A%2F%2Fdev.to%2Ftechschoolguru%2Fa-complete-overview-of-ssl-tls-and-its-cryptographic-system-36pd&psig=AOvVaw31oNgi8ZvAjisUyhTe7ze5&ust=1625160514815000&source=images&cd=vfe&ved=0CAoQjRxqFwoTCLjG4u7wv_ECFQAAAAAdAAAAABAD)
8. <https://www.netsuite.com/portal/resource/articles/business-strategy/business-intelligence-examples.shtml>
9. <https://www.nytimes.com/2018/04/04/us/politics/cambridge-analytica-scandal-fallout.html>
10. <https://customerthink.com/8-ways-how-business-intelligence-can-benefit-the-finance-department/>
11. <https://codeinstitute.net/blog/september-16-steve-jobs-quits-becomes-ceo/>