

**ANL201: Data Visualisation for Business**

Tutor-Marked Assignment

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**Question 1(a)**

Microsoft’s mission statement’s main theme is about empowerment, where everyone who uses their products will have confidence in their abilities to use it, they are able to accomplish their goals or objectives using Microsoft’s products and are able to oversee their work efficiently and effectively. Therefore, allowing everyone who uses their products to feel confident, capable, and in control and achieve more.

**Question 1(b)**

In my opinion, Microsoft’s vision for 2020 was for their partners to be independent with Microsoft, to not be so reliant on Microsoft and their products. Microsoft believes that the next big technology breakthrough will come from their customers and therefore are going to invest in large and growing markets and resources to help customers transform their digital arm (Microsoft, 2019). To do so, they have to innovate and invest significantly in resources to help with the growing process.

As seen from their acquisition of GitHub, a code hosting platform, they are looking to “build the most complete toolchain” for developers. At the same time, they want to build the world’s computer using Azure to help users with their workload and regulatory needs (Microsoft, 2019). For example, employees in Ford Motor Co. use GitHub as an ecosystem to develop and build cars of the future (Microsoft, 2019).

Artificial Intelligence (AI) is a widely discussed topic which is believed to be a part of every application in the future, even making plans to incorporate AI into Microsoft 365, a range of software services owned by Microsoft. Which is why, to be able to streamline this process for customers, Microsoft is planning to democratize their AI infrastructure, tools, and services so that developers can better design their applications (Microsoft, 2019).

Additionally, other than equipping customers to digitally transform, Microsoft aims to help customers bridge the physical and digital world together through a mixed-reality cloud. Finally, in the area of gaming, Microsoft is going to take the opportunity to transform the gaming experience in how they are distributed, played and viewed (Microsoft, 2019).

Therefore, Microsoft is committed to growing their customer’s success, focusing on helping them to build their own digital capabilities through innovations and investment in resources to help digitally transform them.

**Question 1(c)**

Under customer perspective, trust is one of the strategic themes of Microsoft. In relation to trust, Microsoft is focusing on privacy, which is about increasing customer’s trust in them as they believe that customers own their own data. Therefore, Microsoft is committed to ensuring transparency, providing meaningful privacy choices, and managing how data is stored and processed responsibly (Microsoft, 2019).

The second strategic theme under the customer perspective is corporate social responsibility (CSR) and environment. CSR initiatives include equipping minorities with digital skills, connecting 3 million people to broadband in rural areas by 2022, accelerating construction of more affordable housing by financing $500 million in loans and grants and accelerating non-profit organisation’s technology transformation through donations and discounts on software and services (Microsoft, 2019).

Under the internal process perspective, enhancing partners’ relationships is one of the strategic themes of Microsoft. As seen from their cybersecurity initiatives, Microsoft aims to improve the relationships among government agencies, technology companies and nongovernmental organisations to work collaboratively, to promote a safer and secured digital world (Microsoft, 2019). Additionally, Microsoft aims to improve the responsibility of building AI, taking caution to the unintended consequences of AI. Some of Microsoft’s AI initiatives include increasing efforts for users to address society’s issues using AI. One of them is using AI for Earth to help users generate valuable insights to understand our planet’s health (Microsoft, 2019).

The second strategic theme under internal process perspective is enhancing operations. As a part of their CSR initiatives, Microsoft aims to reduce carbon emissions by 75% by 2030. Additionally, they also aim to increase renewable energy usage of its datacentres, where in the next 4 years, they target to power its datacentres with 70% renewable energy (Microsoft, 2019).

Under the learning and growth perspective, enhancing employee well-being is one of their strategic themes where they provide great benefits to employees such as paid leave for welcoming a new child or taking care of a sick family member (Microsoft, 2019). Microsoft also aims to create a diverse and inclusive workplace, increasing career opportunities for minorities such as hiring more women for vice president positions. There is also an increase in representation on the board where 50% of the women are chairs the board committee (Microsoft, 2019).

The final theme identified is alignment of objectives with Microsoft’s overall strategy, where diversity and inclusion are a part of Microsoft’s annual performance and development program, such as through the global allyship program. Employees also give back to the community through donations and providing support to their local non-profits around the world.

**Question 1(d)**

In the first stage of the data visualisation process, which is data collection, one of the first challenges that may be faced is the protection of personal data. In Singapore, data cannot be collected, used, or disclosed without permission unless consent is given and only for legitimate and reasonable purposes (Personal Data Protection Commission, 2021). This is an issue of confidentiality where participants may feel that sensitive information about themselves are being shared and hence might feel uncomfortable (Rimando et al., 2010).

One other challenge could be cybersecurity, where if data is not stored properly, it could be subjected to data breach where hackers can steal data from companies (TrendMicro, 2018). Given that Microsoft is a huge technology company with many customers and partners, they will have a lot of data stored in the cloud in their datacentres, it is vital for them to ensure that their data is stored as securely as possible.

In the second stage of the data visualisation process, data pre-processing, one of the challenges is ensuring that the data we are measuring is the correct information we are trying to find out. GIGO (Garbage in, garbage out), is where incorrect or poor-quality input data produces nonsense or poor results (“GIGO”, n.d.). For example, what goes under general and administrative expenses have to be clearly marked out if not anything can go under this category of expenses, therefore inflating the actual amount of expenses.

The second challenge is having the right capabilities and knowledge to transform the data into meaningful insights. Mostly the process is highly math-intensive, requiring mathematical skills and the latest statistical methodologies to find useful data (McKinsey & Company, 2013). For example, someone lacking in accounting background would not understand what transition tax or goodwill, etc. is and therefore would not know what kind of data is needed to visualise such data.

Next, in the third stage of the data visualisation process is, graphics engine. One challenge could be that the infrastructure of the available technology and applications, software and hardware may not be compatible (McKinsey & Company, 2013). For example, if the computer lacks RAM space, the computer would likely be unable to run big files such as Excel files with a lot of formatting, etc. (Microsoft, n.d.). In addition, not having access to a specific type of software hinders the abilities of the analyst to plot out findings into graphics visualisations (Gatto, 2015).

One other challenge is to make a decision on the selection of colours or attribute coding for visualisation. Colours can mean differently to others and it is influenced through culture. For example, the association with the colour ‘blue’ as cold while ‘red’ as hot could mean differently for different cultures as these associations are developed not innate (Török & Török, 2019), this also means that colours associations are not universal. Another example is that the “$” sign can also mean differently for different countries, if not stated clearly, we would not know if it were in USD or SGD.

In the final stage of the data visualisation process, human visual and cognitive processing, one of the challenges is trying to understand the numbers and what the data is trying to show the readers (Ware, 2013). It is difficult to visualise textual and relational data when there is a lack of knowledge about data visualisation. For example, if the balance sheet does not indicate if the numbers are in millions or thousands, the readers will not know and read it at face value.

One other identified issue is the understanding of graphics and words across various cultures and groups. Words are arbitrary codes that are socially constructed where we put meaning onto objects and teach people on what it means (Ware, 2013). A “common” interpretation of an object could mean differently for someone else from a different culture or group. For example, anyone who is not from the U.S. would not know what IRS (Internal Revenue Service) is unless we are taught to understand what it means.

**Question 1(e)**

The first interesting point in Microsoft’s Annual Report is the Sales and Marketing operating expenses. From the summary of results of operations, revenue for 2017 is seen to be $96,571 million, 2018 is $110,360 million and 2019 is $125,843 million. Meanwhile the percentage change of revenue from 2017 to 2018 is an increase in 14% or $13.8 billion while the percentage change of revenue from 2018 to 2019 is also an increase in 14% or $15.5 billion. This indicates that Microsoft’s revenue is increasing steadily over the 3 years.

Key changes in sales and marketing expenses in 2018 increased by $2.0 billion or 13% mainly due to LinkedIn and commercial sales capacity while in 2019, expenses increased by $744 million or 4% driven by investment in commercial sales capacity, LinkedIn, and GitHub. Meanwhile in 2019, the expenses also included a favourable foreign currency impact of 2% (Microsoft, 2019). This means that expenses in 2019 could potentially have been much more, up to 6% increase if foreign currencies were unfavourable.

At first glance, the percentage change in 2019 versus 2018 and 2018 versus 2017 is very different which makes Sales and Marketing expenses an interesting point to look at. Another reason is also because it takes up the largest portion of operating expenses in total operating expenses for 3 years.

From the numbers we can see that there was substantially less money invested in Sales and Marketing in year 2019, about $18 billion, also given that the increase is only 4% and yet revenue still increased at the normal rate in 2019, at 14%. This indicates that Microsoft could save some costs in 2020 in Sales and Marketing, given that with the current amount of expenses in 2019, revenue is still able to increase at the same rate in 2018.

This point is good for the company as it can generally tell the company where they can save costs and where they could invest their money at. However, it is also bad as it does not tell exactly how much money is spent on specific products under Sales and Marketing, making it difficult to differentiate which product they may be spending too much money on. A recommendation would be to further break the data into its products to be able to see the breakdown numbers for each specific product. By doing so would allow for better interpretation of the data.

The second interesting point in Microsoft’s Annual Report is on LinkedIn, the world’s largest professional networking site, providing free services as well as paid options. LinkedIn was completely acquired on December 8, 2016 (Microsoft, 2019), and is bringing in substantial revenue for Microsoft, it would be interesting to see what financial impact it has made to Microsoft given that it has been in operation for about 3 years under Microsoft.

Key changes in expenses in 2018 due to LinkedIn are for Cost of Revenue, Sales and Marketing, Research and Development as well as General and Administrative while key changes in expenses for 2019 which included LinkedIn are for Research and Development, and Sales and Marketing. Operating expenses in 2018 for LinkedIn increased from $2.2 billion to $4.5 billion, a $2.3 billion difference, while in 2019, operating expenses for LinkedIn and including cloud engineering increased $806 million. This shows that more money and resources were invested into LinkedIn in 2018 but started to taper down in 2019.

In 2018, revenue from LinkedIn increased from $3.0 billion to $5.3 billion. This indicates that investing in LinkedIn helped to grow the revenue of the company in 2018. However, the increase in revenue, at $2.3 billion is equal to the increase in operating expenses for LinkedIn, also at $2.3 billion, which is not ideal for business as this could mean that the profit gained from investment in LinkedIn may not be huge. Additionally, there could be other costs that could be associated with LinkedIn that are not calculated or put into consideration which could affect the revenue.

Whereas in 2019, revenue from LinkedIn increased $1.5 billion and operating expenses increased by only 6% or $806 million. This increase in revenue is much more than the increase in operating expenses, which is good for Microsoft as they are earning more but spending less money on LinkedIn. It could also mean that the growth of LinkedIn is starting to become stable, where its return on investments is not growing any faster.

This point is good to the company as it tells the company on the progress of their investment in LinkedIn, to assess if the money and resources they invested into a product is bringing in profits for the company and if it is worth continuing to invest money in that area or start to focus on other areas.

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