



T Level Technical Qualification in Digital Business Services

Occupational specialism assessment (OSA)

Data Technician

Task 1 - Distinction

Guide standard exemplification materials

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Task 1

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Introduction

The material within this document relates to the Data Technician occupational specialism sample assessment. These exemplification materials are designed to give providers and students an indication of what would be expected for the lowest level of attainment required to achieve a pass or distinction grade.

The examiner commentary is provided to detail the judgements examiners will undertake when examining the student work. This is not intended to replace the information within the qualification specification and providers must refer to this for the content.

In task 1, part A, the student must research the smart-home market using valid sources of information. They must produce a written proposal to include their findings in response to the client's requirements. In part B, the student must select the most appropriate datasets and produce a written proposal explaining why they are appropriate to the needs of the client. In part C, the student must explain which parts of the data are affected by law or regulations and explain what security measures they would use when handling this data.

After each live assessment series, authentic student evidence will be published with examiner commentary across the range of achievement.

Scenario

Many businesses use data analytics to plan and organise a marketing strategy. Marketing agencies have access to a large amount of data that can be used to help these businesses plan future activities and strategies.

Work like this within a marketing agency is usually carried out by small teams, each with a team leader, who usually has a high level of experience across the agency. Tasks can include analysing existing data provided by the client and bringing this together with publicly available data from social media and demographic sources. This data and initial insights from the team are then sent on to marketing consultants who create a strategy from this information.

About you and your employer

You are a junior data technician in a marketing agency called Dynamic Marketing, which specialises in strategic advice with several high value clients in the clothing and technology sector. You work in a small team of 4 people led by your team leader, Tony Slater.

Jessica McDonald is a corporate manager at Dynamic Marketing and is responsible for monitoring the progress of projects. She does this by having regular meetings with Tony, and occasionally requesting progress reports, which contain basic information and insight to keep her updated. She will get this directly from you, or Tony from time to time.

About Dynamic Marketing's client

Your client is in the technology sector and is the manufacturer and distributor of smart home Internet of Things (IOT) appliances, with a focus on the consumer market. The IOT are devices that are embedded with sensors, software and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet.

The client's vision statement is: 'To connect the world through innovative and exciting technology'.

Their objectives for the coming year are:

1. Open 2 new smart-home appliance shops, one for their budget range and one for their high-end range
2. Increase sales of their 8 recently launched products
3. Increase sound system sales
4. Efficiently stock their security-based products

The brief

The client has selected Dynamic Marketing to help determine suitable locations to open new stores. They have a range of products which have been proven to appeal to different audiences.

As a data technician, you will provide the client with information to help them succeed in meeting their business objectives. This is done by sourcing and selecting the most appropriate data available, including some research into the current smart-home market and IOT devices, with a focus on devices for the consumer market, along with some selected datasets.

The client is keen to see a proposal before commencing with the project. They are concerned about data sharing, especially as they have offices around the world including Europe, USA and India. They particularly want to maintain a competitive edge and want to avoid information falling into competitors' hands.

They require insight and a set of recommendations to help them decide their approach, based on research.

The client has told you the following things about their business:

- their products are not very popular with people over 55 years of age
- their sound systems are more popular with the under 30's
- customers with larger houses usually buy more products

The client has provided you with a list of their products. Use this list of products, the business objectives and what the client has told you about their business to justify your decisions throughout the project.

Your role

This project requires you to collect and classify data from various sources and of varying types, identify the useful data, and bring together selected data into combined datasets in line with the client's business objectives and their target market for this particular project. Often the original datasets are not structured correctly or contain errors and will require correcting (cleaning) before they can be used by you for the client's purposes.

You must keep in mind all the client's business objectives, even though not all of them will be relevant to every task. This will ensure the work you produce is useful to the client in helping them make these important strategic decisions for the success of their future business.

A large part of your role is to identify patterns and trends in the data supplied, using statistics and logical queries, while checking for errors. Once this is complete, the results can be presented in a summarised dashboard form.

Throughout this process you must keep a log of decisions that you have made, such as when you have had to format different data types, what security measures you had to consider (in line with current relevant legislation), and your chosen methods for verifying and validating your data. The reasons behind your insights and recommendations will be important for the client to help them understand the rationale that sits behind these decisions, which should be data driven.

Task 1:

Time limit and marks available

Maximum time allowed = 5 hours (you can use this time how you want during each session, but task 1 must be completed within this time limit).

(40 marks)

Instructions for students

Part A

You are to research the current smart-home market, considering the demographics of the people that buy them, and how they use them, ensuring you use valid sources for this research.

You are required to create a written proposal to meet the client's requirements, which must include tables or charts which show relevant data related to your research on smart home demographics, such as:

- the forecast of the smart-home device market
- the internet of things (IOT) industry, with a focus on devices for the consumer market
- the popularity of smart-home devices by age
- the most popular smart-home devices

Part B

Tony Slater and the client have provided you with some data from various sources. Not all of it will be relevant to the project brief, and some may have errors or need cleaning in order to be useful and reflect the client's requirements.

You are required to:

- select the most appropriate datasets from this selection (which will be given to you by your provider from NCFE)
- discuss, in the form of a written proposal, your choice of datasets and why they are appropriate to the needs of the client and the agency including why you would, or would not use them

Part C

Tony has reminded you to consider relevant laws, regulations and security principles in relation to the client's data.

Explain, in a separate section of your proposal, which parts of the data are affected by GDPR and the Data Protection Act 2018.

You should also explain the key principles of data security and also explain what security measures you would put in place when handling this data.

Resources

You will have access to the following resources for all parts of the task, plus the original brief:

- the internet, for research purposes in part A
- task 1 data sets (provided by NCFE)
 - ages_sctr
 - ann
 - client_data_finance
 - client_data_personal
 - client_data_sales
 - client_product_list
 - homeC
 - number_of_bedrooms
 - number_of_rooms
 - population
 - raw data
 - REFIT_BUILDING_SURVEY
 - UK postcodes
- software applications to select and organise data (Microsoft or Google)
- word processing software (Microsoft or Google)

Evidence required for submission to NCFE

- selected datasets relevant to the project brief
- a single written proposal covering all 3 parts of task 1 (parts A, B and C) which includes the information described in the instructions

Note: you will have access to the internet during this task for the research elements you are required to undertake.

Student evidence

Part A

This section of this research relates to secondary data that has been gathered with regard to the market for smart home products. Our client wishes to expand their business and open 2 new locations. They are aiming to sell both premium and budget ranges and will aim at differing demographics. Their campaign will be aimed at groups under the age of 55 years old, with a specific focus on targeting stereo equipment at the under 30s.

In preparing this research, I have been unable to locate datasets available within the public domain that are relevant to the task. This means that the data in this report should either be attributed to the various sources from which they are drawn and may not be usable for commercial purpose without permission of the owner, or that the data should be linked/referenced to its original source.

The information used for this research has already been published and made available in the news media so the content is already readily available, suggesting that it may be citable and/or the owner has allowed it to be used.

Another issue with the data presented here is that there were no datasets that could be found. Only headline figures are shown here, and no comment can be made on how these figures were arrived at, which raises questions about validity and reliability. Without any indication of the methodology that is used to create a dataset, or the analysis used to pull a specific statistic from a dataset, it is harder to examine whether the method used is subject to bias and therefore is likely to be appropriate to the business objectives.

The data used here has been triangulated between multiple sources, meaning that there is some confidence that it is accurate, but this cannot be confirmed by validating the underpinning source material.

The data available shows that the sector is due to grow. All sources indicate that the popularity of smart devices and internet of things enabled resources will increase. Ofcom highlights a key trend in the growth of the segment from 13 million connected devices in 2016 to over 150 million by 2024, reflecting exponential growth. This is across both domestic and industrial users. The expectation of this report is growth in all sectors, but most significantly in the areas of:

- automotive
- consumer goods
- utilities

There are a number of different types of smart home device that are popular with the public. According to a YouGov survey in 2020, people who own one device often own other devices. For examples, someone who owns a smart speaker is quite likely to own a smart thermostat. Table 1 summarises the main points of the popularity of these devices.

Table 1	% of smart thermostat owners likely to own devices	% of smart light owners likely to own devices	% smart speaker owners likely to own devices	% smart meter owners likely to own devices	% smart security owners likely to own devices
Smart meter	41%	43%	28%	n/a	46%
Smart speaker	37%	53%	n/a	18%	37%
Smart thermostat	n/a	40%	19%	14%	28%

Smart light	31%	n/a	22%	11%	28%
Smart security	16%	20%	11%	9%	n/a

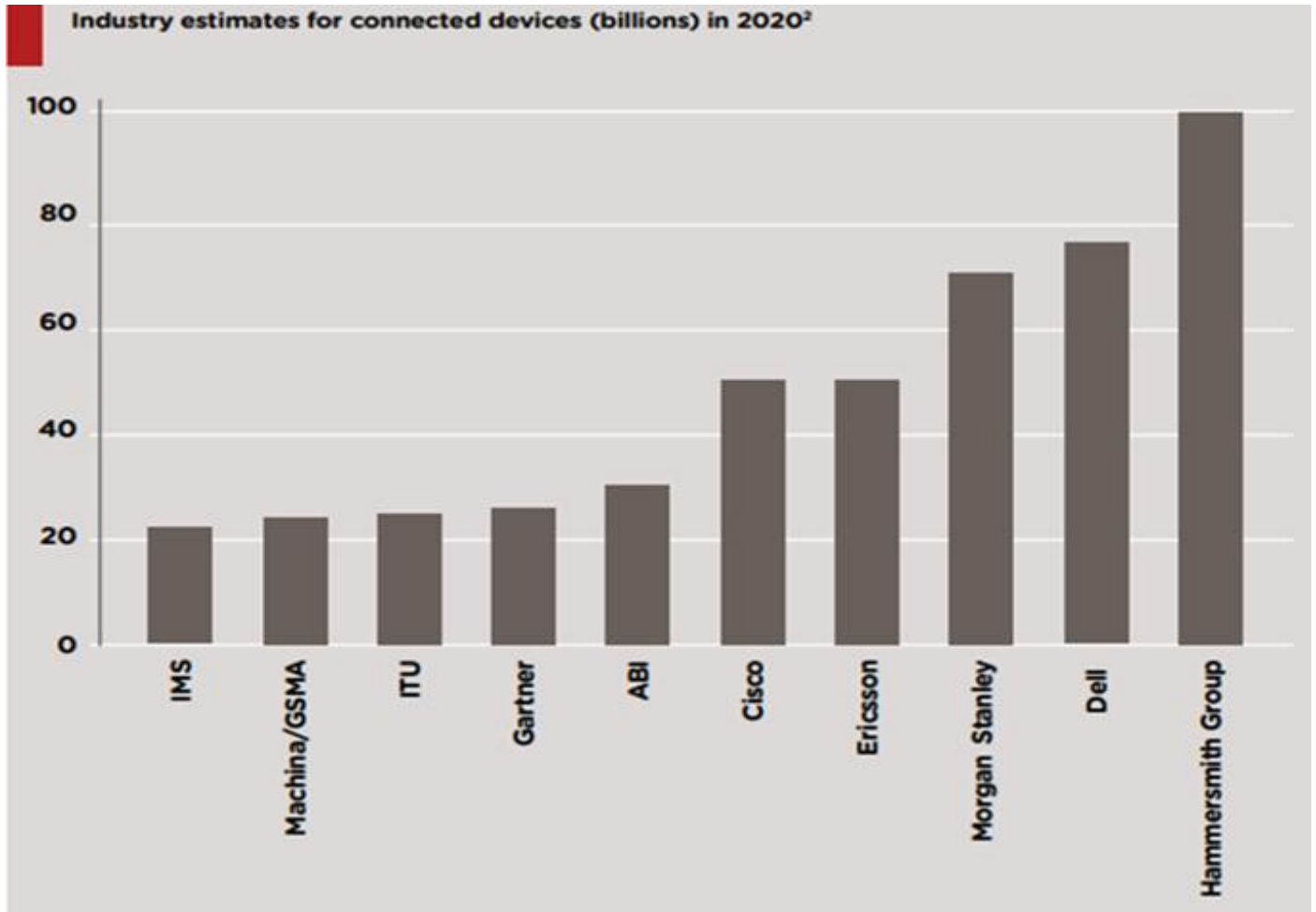
Some of this growth is likely to relate to the growing adoption of smart phones and the related technologies such as connections between phones and car sound systems. Other aspects will be related to new and emerging technologies. Electronic cars brands such as Tesla grow in popularity. Smart speakers have become so ubiquitous that the Office for National Statistics includes them in inflation calculations. While these devices are popular, the government has identified issues with them in terms of privacy concerns which may lead to problems adopting them in future. The concern that they are ‘always listening’ might lead to lower use later.

This is significant for Dynamic Marketing. They are looking for a new store location that will be selling a range of smart home equipment including smart speakers. By making sure that these products are marketed correctly, acknowledging these concerns they are more likely to be successful in that goal.

This research is also an important indicator of the way that the company will be able to achieve its goal to increase speaker sales. The company will be able to sell more speakers by using this data to focus on the objection to buying speakers – by knowing that they are always listening, the company will be able to train staff to overcome this in their new store and this will help to boost the sales.

This data will also help the business to stock its store. They are already in the market for smart speakers but do not stock anything from the automotive category and so there might be a need for them to seek appropriate goods to add to the range. This would be significant because the business would be able to grow revenue with a wider range which is also a business objective.

Figure 1



Microsoft's 2019 Manufacturing Trends Report indicates that the average price of an internet of things (IOT) sensor has declined from \$1.30 in 2004 to \$0.44 in 2018.

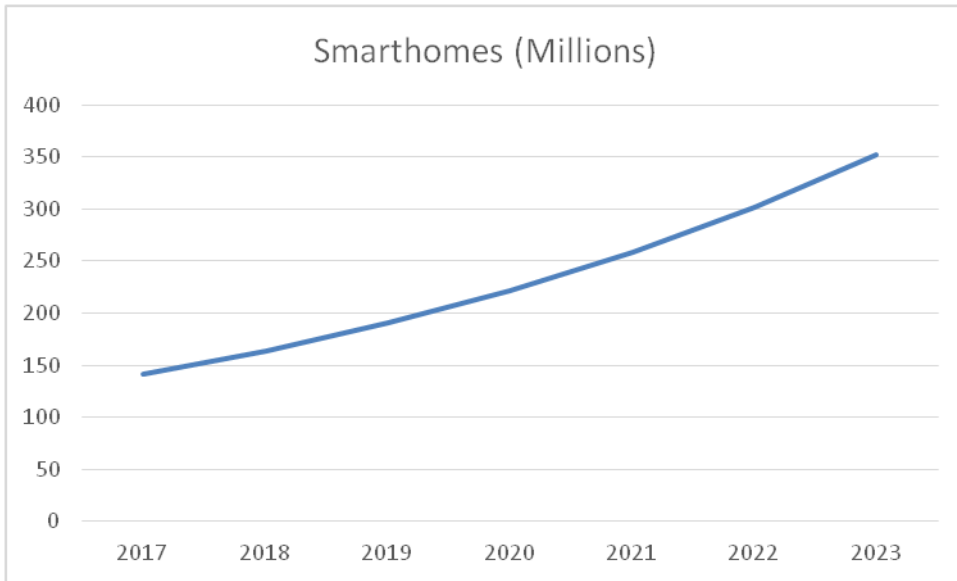
Professional services firm, PWC, advise that purchasing intentions are increasing, with 30% of people planning to purchase a home smart device.

The correlation of lower cost sensors and therefore lower cost end-user devices suggests that the purchasing of devices is driven by their reduction in cost.

The number of houses that have a smart device is forecast to grow. Statista publish their predictions for the years up to 2023, indicating that the number will more than double worldwide, showing large potential for profit.

This is significant to objective number 2 which is to boost sales of the newly launched products. By recognising this growth in the market and potential for profit, the company will be able to invest resources in promoting their range in order to stimulate sales and boost overall revenue.

Figure 2



Popular brands of smart speaker include:

- Amazon Echo
- Bose
- Google Home
- JBL
- Sonos

Market share is distributed between the big players in the market. This is dominated by big companies with others providing a service to niche customers. For example, Sonos focus on quality.

This is key data for the business because they want to boost sales in general (objective 2) and speaker sales (objective 3) which means that there is a need to consider this competition. By knowing about the big brands in the market, they can study these products and consider the features of them and use this to train their staff. The sales staff will be able to advise customers on the best products to buy by comparing the features of the rival products with the products they have in store.

As seen in the table, market share is focused on 2 big companies. This makes it important to be able to stock the popular brands who are most likely to buy.

Figure 3

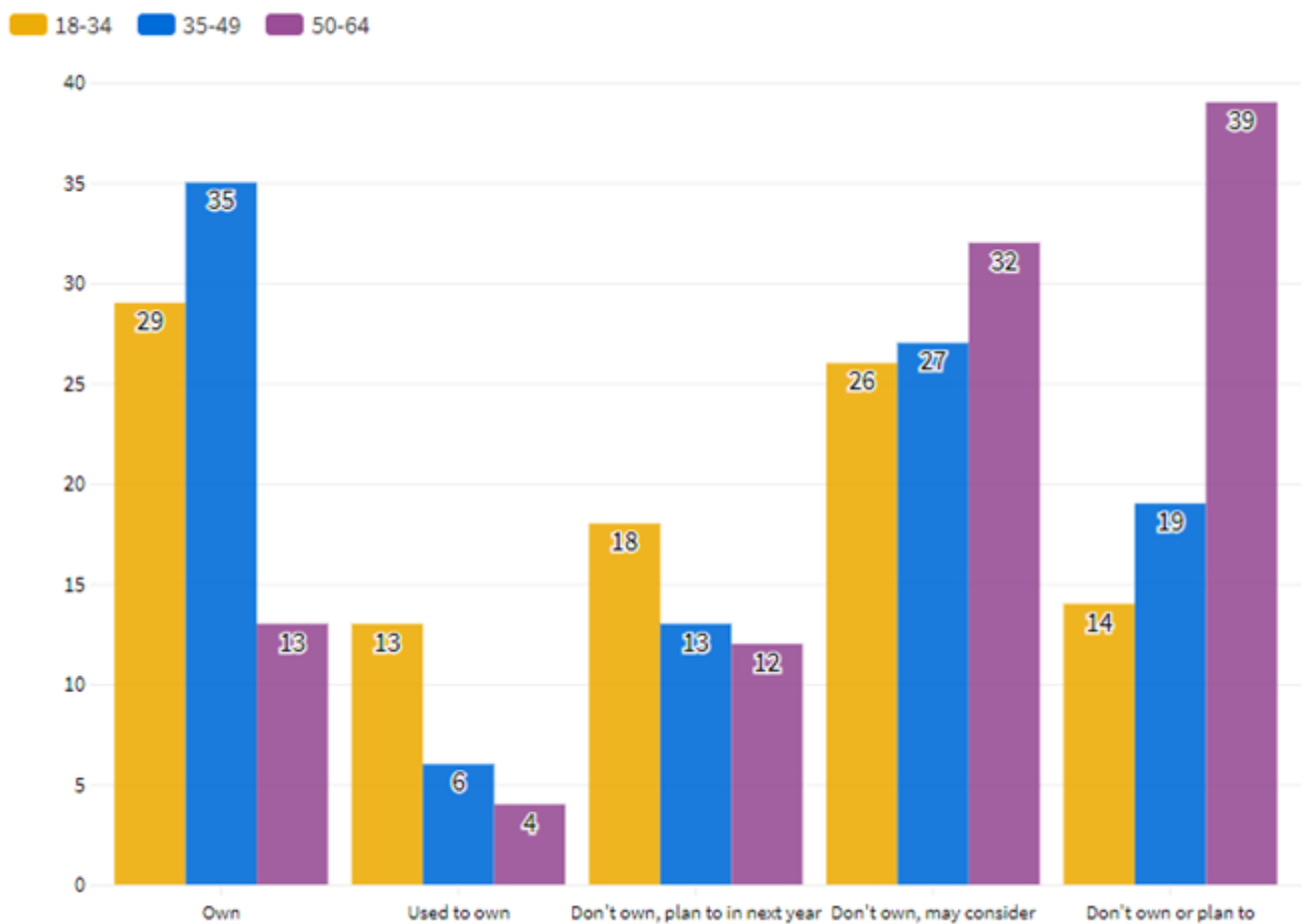
Brand	2019	2020
Amazon	61%	53%
Google	24%	31%
Sonos	2.2%	4.7%

Smart home is a specific segment in the IOT market. There are a number of brands in this area; some of the most popular are:

- Google Nest
- Hive
- LIFX
- Neos
- Philips Hue
- Ring
- Swann
- TP-Link

Use of smart home devices seems highest in the 35 to 49 age group. It also appears that large numbers of 18 to 34 year olds are also using the devices, but contrastingly very few people aged 50 and over are. In fact, most of that age group are very reluctant to engage with these products. This data is vital to the business because they plan to launch a new store and will need to locate the store in an area where this population is maximised in order to get the best chance for good sales.

Figure 4



The above chart is taken from Statista and shows the breakdown of the different age groups and their ownership intentions. The older the customer, the less likely they are to own one of these devices, or to want to own a device. The younger they are the more likely they are to own a device or want to own a device.

This has clear implications for the marketing of the different smart home devices. The business will want to boost the sales of their products in general (objective 2) and their smart speakers (objective 4) which means they need to focus their marketing activity on the specific activities that appeal to the age groups that are most interested in these products. This helps the company to organise appropriate promotional activity to boost the sales of targeted products.

Part B

I am going to identify datasets that will be relevant to the client brief based on a selection of possible options. For each dataset, I will show why it has been selected with reference to the objectives of my client.

ages_sctr is the first dataset that I have selected. This dataset is a good fit for the corporate objectives. The company will need to ensure that there are appropriate numbers of people in the target demographics, as defined by age groups, in the postcode areas that they target. This dataset will allow the identification of appropriate areas but will need to be cleaned first prior to use. The data will need to be consolidated into broader age groups; the age brackets are too narrow with 6 age groups for under 18 year olds. This will be a simple task and can be automated using software such as Power Query. There are some incomplete rows that need to be removed from this dataset in order for it to be of use to the business and to ensure that the analysis is valid. Some duplicate values need to be removed to reduce potential bias in the dataset. This is a public dataset and contains no personal indefinable information and so there will be no data protection issues and no intellectual property issues.

number_of_bedrooms is also useful; the business needs to identify customers with larger houses, and this is a good proxy for the size of the house - the more bedrooms a house has, the larger it tends to be. This is also a potential proxy for wealth. Larger houses with more bedrooms tend to be more expensive so this might indicate where more affluent customers are based within a region. As with the previous dataset, this is a public dataset excluding IP issues and is an anonymous dataset meaning that there are no issues with data protection principles being violated. As before, this dataset will need to be cleaned to remove blanks and to remove duplicates.

number_of_rooms will also provide a useful indication of the size of houses which helps find suitable locations, as customers with bigger houses will buy more and so this is an important metric. This data is subject to the same issues about legality and bias as the previous sets and will also need to be cleaned. The data can also be simplified by adding the counts of houses with more than 5 rooms together to help remove the bias created by outliers in the dataset.

CLIENT_PRODUCT_LIST clearly gives details of the products that can be sold. This can be matched with sales records and the details of customers to help inform decisions about what could be stocked in different stores.

CLIENT_DATA_SALES shows what different types of customer have bought. This can be used as a basis for working out what different types of customers are likely to buy and therefore what it is possible to sell in new stores in different postcode sectors.

CLIENT_DATA_PERSONAL can be matched with sales records to work out which products have been sold in which postcodes which would allow the business to gain insights into which products are popular in different areas which would contribute to the objective to set up new stores by helping identify suitable locations.

The other datasets either contain irrelevant data or data that is not usable due to a lack of identifying characteristics.

Part C

I have monitored this work in relation to 3 main laws:

- GDPR and other data protection law
- Copyright law

GDPR involves controlling the way that the data is stored and transferred by Dynamic Marketing and by our client. We must ensure that personal data relating to specific individuals is protected and have requirements to meet if we breach this law, for example the notification of subjects if their data is compromised.

In terms of client data in the spreadsheet files provided for this task, I have reviewed the data and have concluded that because the data has been anonymised and contains nothing that is identifiable, we have no issues in our compliance with this law, but I recommend to our clients that we take a “best practice” approach with our data and secure it and transmit it safely as it was an issue. This is to meet the clients need to keep the data secure and away from competitors. Whilst there is no issue with the data being identifiable to the individual sales it would be of interest to a competitor as it breaks down the confidential sales figures hence we must protect this data.

Therefore, I recommend the use of encryption of files with passwords and sending this sensitive client data using secure mail servers instead of just using normal email. This would also include ensuring that the password was sent separately to the document to protect its safety and ensure that if one is intercepted that they are less likely to have the other.

We are meeting the GDPR rules, which means that we are also meeting the rules in the Data Protection Act.

Copyright law is a more significant issue. If the data set spreadsheets were to be sourced from a commonly cited entity such as the Office of National Statistics (ONS) then these would come with a “commons licence” that allows us to use this data for our research. The source of the data sets should be verified to ensure that they are usable under a “commons licence” to ensure compliance within the law and we would therefore not need to apply for permission if we acknowledge our source.

In terms of the secondary data, we must be more careful. This data is not made freely available and has been found in published places on the open internet. This means that the copyright in the information belongs to the people who wrote it, and we must consider whether we need their permission to use it for our research. I would recommend that, because we only use a small amount of data from each source, we are within what is called “fair use” which is where we can use a small amount of a piece of copyright data if we acknowledge the source, which is why I have produced a bibliography for the secondary sources.

Data security principles

We will follow the 7 principles of data protection in handling the data and any good practice recommendations from our stakeholders. We will form a data processing agreement with the client in order to inform the actions that we take to manage this material in storage and in transmission.

We will follow the information commissioner's office guidelines and we will make sure that we follow all internal procedures within our firm in order to manage data.

These are the 7 principles, and we will follow each.

1. Lawfulness, fairness and transparency – we will only process data when we have a legal reason to do so for any given individual and we will make sure that we will inform clientele about why we will store and process data in order to ensure transparency.

2. Purpose limitation – we will only collect the data that we need, and we will only process it for the purposes that we need to, for example we will not process customers addresses for reasons other than the ones we have shared with them, such as identifying areas with large numbers of existing customers based on anonymised data. We will not use the data that is different from the reasons that we told the clientele, and this means that we will have limited our purpose for the data. In this case, we will be using the previous sales data, to support future sales.
3. Data minimisation – we will only collect the data that is required for the work that we need to do, for example we might collect data on postcode sectors, ages and gender of our clients because this is relevant to identifying the target market of our audience and will help us to see how accurate our analysis of the market is, but we will not collect other personal information, such as sexual orientation, because this is not at all relevant to the work that we plan to do and is not relevant to marketing to a target market and so we will not collect it and in doing that we will have minimise the data that we collect and that we store. In the case of this activity, we have been able to gather data regarding the sales, but not the individual details of the sales themselves as they are not relevant to our purpose.
4. Accuracy – we will make sure tt our data is accurate by keeping it up to date and by making sure that if it includes errors and we are alerted to them so that we solve them without any waiting. This will include removing data that is not accurate or complete from the data set.
5. Storage limitation – we will only store data for as long as we need to keep it and we will not make an archive of any data if we do not need to. There will be no records kept for longer than a reasonable period of time.
6. Integrity and confidentiality – we will be honest about how we keep our data, and we will not break the rules. All our data will be confidential which means that we will not share it with anyone who has no right to access it so that means we will set up access controls on the data which will guide the decisions on what people can see.
7. Accountability – we will have clear rules and a member of staff in the organisation who will be able to act as the person in charge of data protection in order to ensure that someone can always deal with and take responsibility for these 7 principles. These principles will always stand up as the reasons why we make decisions for data and our data officer will oversee that. I will follow all company procedures relating to data protection when sending the data between myself and the client.

We will need to make sure that our data is covered from a range of threats such as:

- malware
- hackers
- viruses

We need our systems to be protected from malicious operatives both in and outside the company which means that we need to implement systems to protect our internal data and our client data.

We will need to protect against a range of attacks:

- brute force attacks – by having complex passwords with alphanumeric text and special characters and upper and lower case, which must be more than 8 characters long; the more complex, the more time it would take for a password to be brute forced, and so the less chance this will work. This means that we will need to ensure that we apply a complex password to the files that are being sent.

- credential stuffing – where stolen login details are put into websites to access data; we can change passwords every 12 weeks to make this a lower risk because by the time criminals have the data, we should already have new passwords. By changing passwords regularly as we update the data, it will ensure that someone who has the password will not be able to gain access a future document.
- ransomware – where computers are encrypted by malicious software and this causes the files to be sealed until a blackmailer is paid; this can be prevented by placing controls over who can install software and by limiting the use of devices like memory sticks on office computers. We will also ensure that sufficient backups of the data exist to reduce the chance of it being destroyed by ransomware.

There are other good practices we can put in place to keep our data secure, such as:

- maintaining a firewall to control network traffic and prevent any unauthorised intrusion into our system by third parties
- up to date antivirus – by using software to scan internet traffic and files on our machine to make sure that there are no malicious materials and if they are updated; by updating this it will lead to the latest threats being prevented
- levels of control and access rights for user profiles – not all users can access all the files on the network and some data, such as the customers of our clients, will need to be protected in order to ensure that confidential data is only accessible to people who need to use it, this helps us meet the principles of data protections

Another task that can be done to protect the data security is penetration testing. Hiring a white hat hacker to examine our computer systems to probe the security and find vulnerabilities in the systems to ensure that data is secure.

All of the activities mentioned above should ensure that we both follow data protection and copyright principles but also that most importantly our client's data is as secure as we can make it and the risk will be as minimal as possible.

Sources

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Examiner commentary

The student has identified all the relevant datasets from the materials provided and has shown some evidence of cleaning that data. In their secondary research, the student has selected a range of sources of relevant data and has carried out some analysis of patterns and trends in that material, recognising the weaknesses of the material that they have sourced. In doing so, they have shown a secure grasp of the skills needed by a recruit in this industry.

The student has been able to show a clear understanding of patterns and trends in their secondary data and has identified all the relevant material from the sets provided, clearly explaining their choices. They have shown a reasonable understanding of security measures. In doing so, they have shown some evidence of their ability to carry out complex and non-routine analytical tasks.

The student has been able to identify ways in which data sources meet business needs and they have sourced material that is relevant to solving business problems, although they have not shown relevance to the business in the short, medium and long term.

The student has been able to include some relevant data in the form of tables and charts but should have made greater use of this format to present their findings. The student has identified a range of sources of relevant data and analysed points from credible sources with links drawn to different business objectives. This places the work at the borderline for a distinction.

The student has met the relevant steps that could be taken to protect data. The student has reviewed their data in terms of relevant legislation with reference to business needs and talks about GDPR and intellectual property law and seems to reflect a secure knowledge of key principles relating to this area. They identify these measures effectively, but do not do so with clear links to the dataset, as such the work is on the borderline for a distinction.

The student has explained the data security principles that they would need to follow, showing a good understanding of these issues. They have identified specific aspects of data security and have been able to show how they would deal with a range of operational security issues, but this is not linked clearly to the context in the case study, nonetheless, the work contains sufficient detail to place it on the distinction borderline.

Grade descriptors

The performance outcomes form the basis of the overall grading descriptors for pass and distinction grades.

These grading descriptors have been developed to reflect the appropriate level of demand for students of other level 3 qualifications and the threshold competence requirements of the role and have been validated with employers within the sector to describe achievement appropriate to the role.

Grade	Demonstration of attainment
Pass	The evidence is logical and displays the basic knowledge and skills expected of an employee in this sector in the context of the set brief.
	The student demonstrates theoretical knowledge of the sources, foundations, usage and quality of data that is used for analysis. They are able to carry out routine administrative and analytical tasks using simple datasets.
	The student demonstrates an understanding of data blending techniques and is able to carry out routine data blending tasks.
	The student is able to give a simple explanation of how and why data is analysed by a business. They are able to follow the data process in order to build and test a dataset.
	The student is able to demonstrate understanding of visualisation and communication techniques. They are able to provide evidence of communicating data which is relevant to stated business objectives.
	The student is able to state legal and professional principles that are relevant to the manipulation of data. They are able to carry out routine tasks using data in a way that complies with relevant laws and professional standards.
	The student is able to explain how appropriate sources of information can be selected and evaluated. They are able to search for relevant information and can assess the reliability of the knowledge that they generate.
Distinction	The evidence produced in response to the brief is precise and logical, displaying a secure grasp of the knowledge and skills that would be expected of a new recruit in the industry.
	The student demonstrates a thorough understanding of the sources, foundations, usage and quality of data that is used for analysis. They are able to carry out complex and non-routine administrative and analytical tasks with minimal supervision, using both simple and complex datasets.
	The student demonstrates a secure understanding of a range of data blending techniques and is able to carry out both routine and non-routine data blending tasks competently.
	The student is able to demonstrate a detailed understanding of the reasons why a range of businesses might analyse data. They are able to use their own initiative to follow the data process with minimal supervision in order to build and test a complex dataset in response to a specified business problem.
	The student is able to demonstrate a detailed understanding of a range of visualisation and communication techniques that might be appropriate to a range of organisational needs. They are able to work collaboratively to communicate and visualise data, showing links to business objectives in the materials that they produce.

	<p>The student is able to explain the legal and professional principles that are relevant to a range of different data manipulation tasks. They are able to consistently carry out both routine and non-routine tasks in a way that complies with legal requirements and professional standards.</p>
	<p>The student is able to give a detailed explanation of how to select and evaluate a range of different sources of information for a specific task. They are able to search for data that is appropriate to a given task and can corroborate their findings using appropriate methods to evaluate the suitability of data and making appropriate recommendations for improvements in the collation of data for future tasks.</p>

Document information

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Change History Record

Version	Description of change	Approval	Date of Issue
v1.0	Published final version.		May 2021
v1.1	NCFE rebrand		September 2021