

[Neoteric Healthcare Company]

REPORT to the Board

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Executive summary

In this digital era, data is the vital resource for any organisation. Therefore, it is crucial to govern data for every organisation and their future businesses so that data or information cannot breach by any governance body such as individuals or expertise. Here, one report has been generated based on the Neoteric's data governance framework evaluation including the management of data quality and validity where Neoteric's strengths and opportunities are discussed in accordance with data governance system. In this report, Neoteric Healthcare is one of the Australia's leading provider medical diagnostic services. As Neoteric is planning many infrastructure regarding their internal and external data and struggling with many issues such as current data storage strategies and mechanisms for maintaining the security of big data, national and global regulatory limitations as well as data quality issues, there are some gaps and risks have been found from the Neoteric's data in relation to data governance that are highlighted in the following report. Eventually, to mitigate the gaps and risks, some recommendations are represented by following the data governance process as well as a stakeholder communication matrix or diagram has been designed in accordance with non-invasive data governance approach to influence the key decision makers to advocate for adoption of ethical data management practices.

Strengths:

As data governance process contains internal data standards and policies (corporatefinanceinstitute 2023), therefore the existing strengths in the Neoteric's data governance systems are given as below:

Neoteric's Strengths	Details of strengths
Neoteric's Data	<ul style="list-style-type: none"> • Patient medical records (including name, address, and medical history) • Patient insurance claims and financial transactions • Statistics (i.e., hospitalisations, patient demographics, diagnoses, procedures, name of physician/hospital/billing) • Health surveys • Clinical trials • Patient/disease registry • Operational and analytical data from the web portal • Behavioural and preference data from SmartWatch MVP • Neoteric financial and payroll/HR/sales data.
Neoteric's existing infrastructure	<ul style="list-style-type: none"> • Billing and accounting using a popular online software solution • Customer relationship management (CRM) solution to integrate sales, marketing, and customer service • Electronic records database containing medical and personal information (and which is categorised as sensitive data) – the digital history created every time a patient engages with a doctor or medical service. • Identify management software for the validation of registered (username and password) members (classified as single practitioners, group practitioners, hospitals, and private users). • Web portal and mobile app providing real-time access to a secure database of patients' results.
Fostering Doctor-Patients relationship	<ul style="list-style-type: none"> • The impact of this approach has been to develop a company whose services are optimally aligned with the needs of the physicians and their patients.
Neoteric's Coalition	<ul style="list-style-type: none"> • Neoteric's operations are structured as a coalition, with individual subsidiaries and geographical divisions working synergistically to achieve best practice outcomes in terms of service and business excellence.

As Neoteric is representing its own data, infrastructures, inter-relationship, coalition, and aggregation approach, I anticipate that these are the Neoteric's valuable assets that can be used in the data governance system to protect and use the data adequately.

Opportunities:

As Data Governance purpose is to provide high-quality and authenticated data to the organisation, it is considered to focus on some opportunities for improvements in the Neoteric governance system. These are:

Neoteric's digital transformation plan for storing and delivering data

Neoteric is currently considering a significant change management initiative by moving their legacy electronic health record system to the cloud which will help Neoteric to build hybrid or federated data structure or model by exchanging the centralising plan (FIRICAN n.d).

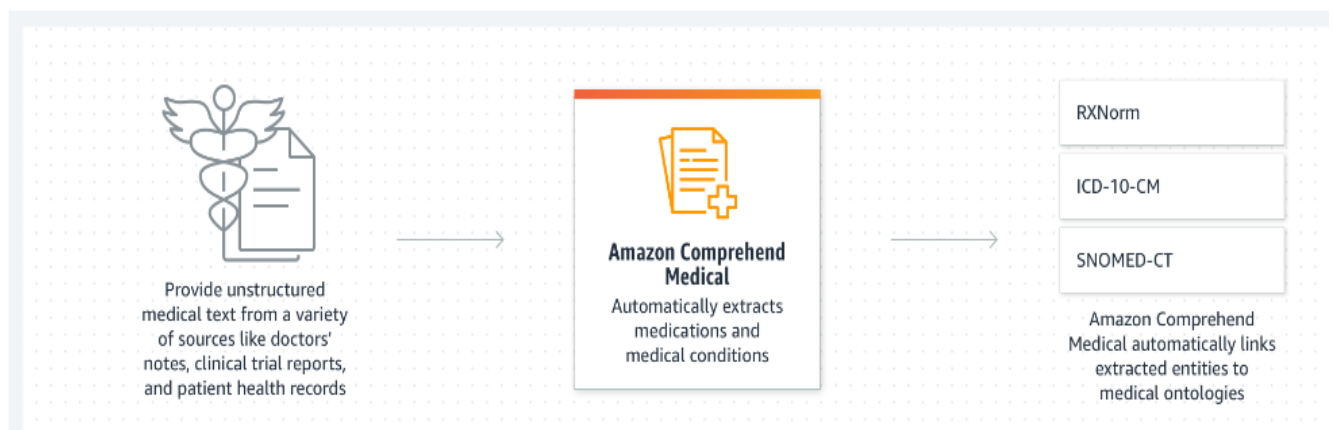
As Neoteric is planning to expand their businesses and moving their management in the cloud, Amazon Redshift and DaaS or Data as a Service can help to store big data from many different sources and deliver it to the users in a timely manner maintaining the speed and scalability (Jain and Raja 2018).

With the digital transformation, Neoteric is expecting real-time information delivery. In this case, if Neoteric apply the real-time processing method by following 'data pipeline management'(tdwi 2018) to consolidate intensive care insights with broader data, they can provide appropriate trends and patterns to the users on time.

Neoteric's Artificial Intelligence (AI) and Machine Learning (ML) approach:

Neo is planning to apply the natural language processing (NLP) techniques using the machine learning approach to develop its data governance system to analyse the emerging conversations in order to add contextual data points to individuals' profiles. This strategy will provide better output to Neoteric, if the data management process can improve which can help to get accessible, reliable, and usable data in accordance with users' demand (Kidd 2020).

"Apart from this, since healthcare has hundreds of thousands of languages, Neoteric healthcare company can use machine learning approach by following Amazon Comprehend Medical process to add additional data points. This process can develop data governance system transparently by increasing the availability to the users. In the following process, unstructured medical text such as doctors note, patients' health records have been provided to the Amazon comprehend medical service that automatically extracted as medications and medical conditions. Then this service links with the extracted entities or features to medical ontologies" (as shown in appendix A).



“Figure: Aws (2023) *Amazon Comprehend Medical*,
<https://aws.amazon.com/comprehend/medical/>

Here, machine learning approach using natural language processing (NLP) algorithm that supports medical knowledge categories.

Supported medical knowledge categories

The Healthcare Natural Language API supports the following medical knowledge categories:

Medical knowledge category	Description
ANATOMICAL_STRUCTURE	Complex part of the human body

Figure: GoogleCloud (2007) Healthcare Natural Language API,
<https://cloud.google.com/healthcare-api/docs/concepts/nlp>

To develop the Smartwatch app in improving with data governance, Neoteric can use ‘data masking’ technique which also known as ‘data obfuscation’ using the machine learning approach. As Neo is handling PII (Personally Identifiable information) in their Smartwatch app that use with other relevant data individually, ‘data masking’ technique will hide the actual data using modified content to protect their sensitive data.

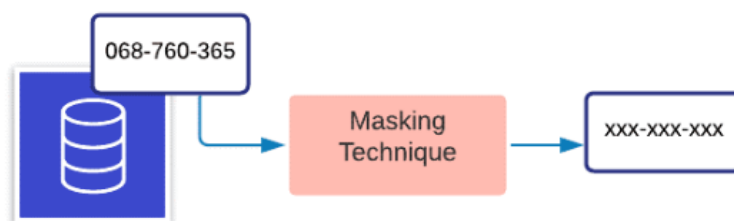


Figure: Wickramasinghe (2021), What’s Data Masking? Types, Techniques & Best Practices, <https://www.bmc.com/blogs/data-masking/>

Here, the most secure data masking technique can be used as ‘data encryption’ that masks the data and requires key to decrypt the data (Wickramasinghe 2021)” (as shown in appendix B). Using this technique, Neoteric can secure their data and improve their data governance system adequately.

Gaps:

Here, ‘Gaps’ refers to the anticipated circumstances between current state and the future state of the businesses or organisations. To analyse the gaps, it is considered to follow the ‘Strengths, Weakness, Opportunities and Threats (SWOT)’ analysis tool where strengths and weaknesses will be collected from the internal environment as well as opportunities and threats will be obtained from the external environment of the organisation. In relation to data governance, the following ‘SWOT’ analysis structure is applying to find the gaps between two states (Creately 2023).

<p>Strengths:</p> <ol style="list-style-type: none"> 1) Neoteric's Data such as statistics (patient demographics, diagnoses), health surveys, Neoteric's financial and payroll data. Using these data appropriately for the users and maintaining data governance principles, Neoteric will earn reputation and value for their entire organization. 2) Neoteric's existing infrastructure such as electronic records database containing medical and personal information (and which is categorised as sensitive data). 3) Fostering Doctors-Patients relationship approach to develop a company whose services are optimally aligned with the needs of the physicians and their patients. 4) Neoteric's coalition. According to data governance, Neoteric is representing collaborative culture where harmony and synergy are central standards (Dennis 2020). 	<p>Weaknesses:</p> <ol style="list-style-type: none"> 1) Aggressive expansion plan where Neoteric's currencies are vulnerable specifically in nationally. 2) In accordance with data governance, Neoteric's another weakness is data inconsistency or data inaccuracy which has been found from inaccurate diagnostic results due to actual or alleged mistakes or errors that are not met with the data governance principles. 3) Neoteric's insecure data. One of the security software of this hospital detected unauthorised access requests to the hospital databases. 4) Lack of understanding what's the vital in digital transformation and starting with the new technology such as using SmartWatch app. 5) As Neoteric is planning to expand their business to various location, it is hypothesized that the data will be delayed during transformation in various locations.
<p>Opportunities:</p> <ol style="list-style-type: none"> 1) Neoteric's digital transformation plan for storing and delivering data. Neoteric is currently considering a significant change management by moving their legacy electronic health record system to the cloud where Neoteric will get huge benefit to develop the future business using various technology and strategy such as Hadoop distribution, Amazon Redshift and so on. 	<p>Threats:</p> <ol style="list-style-type: none"> 1) If Neoteric cannot stable their currency rate at least in nationally, it will become a threat for their future development. 2) The data inconsistency or inaccuracy can cause customer churn or reputational damage which is not meeting with the data governance requirements. 3) Insecure data might bring large amount of penalties by breaching the users' confidential information as Neoteric is using

<p>2) Neoteric's artificial intelligence (AI) and machine learning (ML) approach will make an opportunity to improve data governance system by analysing contextual data points to individual's profiles. In this case, Neoteric can use several methodologies to make the high-quality data such as data masking, data encryption etc.</p>	<p>personally identifiable information (PII) in their databases which is completely against the data governance principles (Seiner 2017).</p>
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Here, Neoteric's above strengths and opportunities can help to mitigate their weaknesses and threats. Because Neoteric's digital transformation plan to the cloud can assist them to minimise the gap of delaying the delivery of the information. In this case, Neoteric can apply machine learning approach using some methodologies such as Hadoop distribution and Amazon Redshift (aws 2023). Moreover, using machine learning approach with ROI calculation, Neoteric can minimise threats of having revenue loss or reputational damage (Linna 2020).

As Neoteric is representing collaborative culture with the stakeholders (Dennis 2020), it will help experts and users to get trained more about data literacy so that they understand transparently more about vital things of the digital transformation such as data and its ownership (Anderson and Li 2017).

Apart from this, in relation to data governance, some terms are not being done yet at Neoteric Healthcare Organisation which should be completed for the organisation's future development. Neoteric needs to manage metadata that describes several ways of information using data catalogs, business glossaries and data lineage. Here, Knight (2023) suggests that 'data catalogs simplify the metadata developments by locating and guiding the datasets, business glossaries become backbone applying metadata management for assuring technology and business understanding as well as data lineage describes information on data origins, movement, and characteristics'.

"Moreover, some global industry-standard regulatory constraints around data privacy including sourcing, storage and use of data are not addressed yet. These are:

- Data dominion
- Data localization
- Privacy Acts (PROTEGRITY 2023)"(as shown in appendix C).

Risks:

If opportunities for improvement and gaps are not addressed, there are lot of risks can occur to the organisation and its stakeholders which are also not difference for the Neoteric Organisation. These are:

Opportunities for improvements	Gaps are not addressed	Types Of Risks	Details of risk
Neoteric's digital transformation plan	As different technologies in one hand, Neoteric needs to figure out which technology will be suitable for which task (MITCHELL 2019).	Individuals with lack of training and knowledge	Having high-quality data with a clear meta data will be ineffective, if individuals cannot access the data using the desired technology (Anderson and Li 2017).)
		Data Inaccuracy and inconsistency	Inaccurate diagnostic results due to actual or alleged mistakes or errors could result in financial loss and/or reputational damage as well as risk can associate with siloed data (Hilary 2019).
Neoteric's artificial intelligence and machine learning approach	Neoteric is using electronic records database containing medical and personal information which need to monitor regularly that are not addressed here (Elastic 2018).	Insecure Data	one of the European newspapers claimed the security software of this hospital detected several unauthorised access requests to the hospital data base which can cause customer churn for this organisation.
		Data delayed	If data is not monitor regularly, it will generate incomplete, and delayed data as well as action sometimes make patients' life and death consequences which can cause reputational damage for any organisation.
Neoteric's coalition	Neoteric should consider hybrid operating model.	Conflict can arise in decision-making.	The effect of cognitive biases on information interpretation

Neoteric wants to expand their business globally.	Neoteric hasn't addressed about data privacy and other values while sharing data.	Data ownership or accountability	In accordance with data governance, risk can associate with data ownership or accountability (Beckett 2014).
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Recommendations:

To improve the data governance capabilities of the Neoteric organisation, it is recommended to form the data governance team who can help to mitigate the risks and conflict that are hindrance during `govern` the data.

In this data governance team, According to HealthDataManagement (2019), 'Walton suggests splitting the data into two groups such as data stewards who make the recommendations about formulas or algorithms and C-suite level who make the decisions'. 'After making these groups, it is recommended to analyse the data quality and monitor the data quality issue regularly as well as amending the issue by following the workflow change'.

In this stage, the data governance team digs deeper into principal documents such as policy, ethical issues, legal and regulatory requirements and will ensure about protecting all documents transparently. Here, data governance team can be used 360-degree view with the meta data management model to start their initiatives (Talend A Qlik Company 2023). Apart from this, shared data, or data ownership where everyone knows who owns data would be governed by the data governance team (MITCHELL 2019).

Eventually, as Neoteric is planning to move their management to the cloud using artificial intelligence (AI) and machine learning (ML) approach, the data governance team should monitor regularly on technologies and tools so that it used by the right the people in a right way and doesn't breach any trust, rules and regulations against data and its confidentiality (Anderson and Li 2017)

Stakeholder Management Strategy :Communications matrix

The following communication matrix has been generated using the opportunities and risks that identified in the Neoteric organisation. Here, the communication plan diagram or matrix is built to influence the key decision makers to advocate for adoption of ethical data management practices that is given as below:

Data Governance Communication Plan Matrix

	Data Governance Roles						
Groups	Group 1		Group 2	Group 3	Group 4		Group 5
Communication types							
	Executive Leadership Team (ELT) (Executive level)	Data Governance Council (Strategic Level)	Enterprise Data Stewards (Tactical Level)	Data Stewards (Operational Level)	Information Technology (Support level)	Data Governance Partners (Support Level)	Deputy Data Stewards (Everybody Else)
Orientation Communications							
Program Presence & Awareness							
On-boarding Communications							
Charter and Principles	Create authoritative and accessible information and issuing the directive to govern data across the organisation.	Collect data to deliver services to the organisation and manage by considered policies, standards, and procedures.	The tactical level is responsible for developing and promoting data requirements.	The operational level assists in mapping data meaning and legacy across disparate information systems and data stores.	The Support level delivers tools associated with their business function including software focused on improving the Information Technology.	The Data Governance Administrator and Team uses vendor provided tools to improve the performance of their program and maximise value of the data governance.	Individuals are responsible to adopt the best practices and policies of the data governance program.
Role-based Activities	The steering committee approve, understand, and champion the enterprise strategic data	The Data Governance (DG) Council provides guidance, presides over program activities, and approves policies,	The Domain Stewards is responsible for escalating well-documented issues to	Operational Data Stewards are people who define, produce, and use data on a daily basis. The data Stewards are educated and often certified as	It is the role of the Support areas of the organisation and the associated team including Information Technology.	It is the role of the Support areas of the organisation including Data Governance Leadership	Individuals are formally accountable for data project management.

	governance plan and policy at the highest level of organisation.	methods, and tools.	the strategic level.	knowing the rules associated with data definition, production, and usage.		and Partners across the organisation including Audit, Legal and Project Management.	
Governance Documentation	Executive level focuses on data where structured data is for decision-making purposes and unstructured data is for conditional purposes that is provided through graphical dashboard.	The Council are focused on the data, information, records, and metadata that the organisation needs to become efficient and effective in how the data is managed as an asset.	People at the tactical level have formal accountability for data within a specific subject area or function.	Operational level drives the business and keeps it functioning by including structured and unstructured data, records, and metadata that are used by the people in business units to perform their function effectively.	The Support area such as IT Security is focused on the security discipline associated with their function.	The Support area such as the administration of program requires governed metadata in formalising accountability, inventorying the data.	Everybody is focused on data and its inventory management.
On-Going Communications							
Performance Metrics	1)Approve 2)Act	1)Acceptance 2)Participation 3) Performance	1)Subject 2)Quality Metrics	1)Accountability 2)Efficiency	1)Collect 2)Report	1)Collect 2)Report	1) Efficiency 2) Effectiveness
Alerts & Triggered Events	The executive levels' responsibility is to alert about the upcoming events to the Data Governance council.	The Strategic level proceed the events by making strategic decision and Data Governance process activities.	The Tactical level promotes, directs, and coordinates the Operational level activities of Stewards.	The operational level is educated and alerted daily with the producing and using data by following the events or data governance program.	The Support areas use their metrics such as collecting or reporting about the information regarding the information technology from the events.	The Data Governance Partners also use the above metrics to inform about the project management.	Individuals are relating to the data and tailor their data governance program to inform their insights.

Council/ Minutes/ Mass Comm	A face-to-face meeting with the Executive Team	Face-to-face/Microsoft Team Meeting	Face-to-face team meeting with metrics	In person/Face-to-face team meeting	A 30-minute phone call	Microsoft Team meeting/ Zoom meeting	In person/ Microsoft Team meeting
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Conclusion:

As information are always sensitive specifically in healthcare organisation, therefore, every organisation should follow some rules and regulations. Here, if Neoteric organisation follow the above policy and procedures regarding the data governance process, Neoteric's data will bring trust and confidence to the stakeholders as well as will bring reputation and revenue with their future digital transformation plan.

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