Data Management Assignment

Name: Jayadeep Sasikumar, Latisha Panwar, Nha Nguyen, Pallavi Jain
Student ID: D17123813, D17124379, D16123946, D16128318
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Lecturer: Louise O'Brien

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1. Report

1.1. Background - What happened?

Kobe Steel, Ltd. is a Japanese steel manufacturing company headquartered in Chūō-ku that operates worldwide under the brand name 'Kobelco' (KOBELCO is the corporate logo mark of the group as well). One of the major players in the Japan steel industry, the company is a major supplier of aluminium and copper products as well. Other businesses in which the company engages include wholesale power supply, real estate, electronic materials. Besides Asia, Kobe Steel, Ltd. (hereafter referred to as the Company) operates in Europe and the United States of America as well. Various consolidated and equity-valued companies from all over these areas make up the Kobe Steel Group.

On June 9, 2016, Kobelco released a statement saying that one of the subsidiaries (Shinko Wire Stainless Company, Ltd.) of an affiliate 30.7% owned by the Company was found to have tampered with the tensile strength test results for some of its products. This subsidiary had shipped this substandard product as well. Shinko Wire Stainless Company had shipped 55.6 metric tonnes of this inferior product during the period, of which about 74% was used in household appliance and goods, 12% in water heaters and other gas equipment and 6% in the automotive field. This was not the first occurrence of displaying a lack of compliance, the first being the JIS (Japanese Industrial Standards) violations by a subsidiary of Kobe's in 2008.

Consequently, the Company commenced a quality assurance audit in April 2017. This internal audit focused on covering all business divisions to determine whether the quality of shipped products conformed with both the public standards as well as the customer specifications. In August 2017, all the Kobe Steel Group companies were instructed to carry out quality assurance inspections on themselves. The whole investigation revealed that the altering of the test results had been an ongoing process from April 2007 to May 2016.

On October 8, 2017, the company made another press release declaring that its Aluminium and Copper Business had resorted to falsification of test results and shipping of substandard products to its customers from the period of September 2016 to August 2017. The products shipped were estimated to be include about 38,700 tonnes of Aluminium products and another 2,200 tonnes of Copper products.

Further investigation conducted by an Independent Investigation Committee (IIC) revealed that four different plants under the Aluminium & Copper Business division had indulged in the misconduct and in two of the plants (Moka plant and Chofu Works), the falsification of the test results had started no later than the 1970s. Outside the Aluminium & Copper Business division, two plants in the Machinery Business division and one in the Iron & Steel Business division were found to have been involved in similar deviant proceedings. Another twelve companies under the Kobe Steel Group (four in Aluminium & Copper Business division and eight in other divisions) were also found to be in the wrong. During the investigation, it was also discovered that no fewer than six executive officers in the Aluminium & Copper Business division did not behave as required of them despite having the knowledge of the ongoing malfeasance. As of March 23, 2018, a total of 688 customers have been identified to have been delivered affected products from the Company, out of which the safety verification efforts for 661 customers have been successfully conducted.

1.2. Why it happened?

The management evidently failed to detect and deal with the above-mentioned incidents, which itself highlights a major problem. Such incidents can be avoided in future if the answers to why it happened, how it happened and why the misconducts went undetected for such a long time are discovered. Investigations and analyses conducted by Cause Investigation Task Force, one of the four temporary task forces that were formed by the Company to investigate the misconduct, revealed following causes:

1) Focus on Profit

According to experts, the economic slowdown from the 1990s forced Japanese firms to restructure their business models and concentrate on cost cutting and extreme efficiency. This resulted in employees and managers stretching to their limits, and in some cases, even overwork and misconduct.

The management at each business unit emphasised on profit so much, that as long as the plants were generating profit, they did not feel the need to do enough to look into if there were misconducts with respect to quality control or production activities.

2) Insular Organisational Culture

Management structure, which do not take necessary steps to help the plant with the issues it is facing, even when they are brought to attention, results in insular organisational culture. This happened at many plants and business units, where issues escalated by subordinates did not garner the warranted attention, or the officials who were aware of the misconduct did not act as was required of them.

3) Culture that prioritised results over the process

The highest number of inappropriate cases were found in the Aluminium & Copper Business. The plants or locations which were involved in the cases have reportedly suffered from the inability to contribute to the entire Group's profit while adhering to the standards and procedures. The eagerness to remedy this situation led to these plants agreeing on specifications without adequately examining the specifications with their own process capability or evaluating trial products. This suggests that they underrated the importance of understanding their own production capability. This approach resulted in putting pressure on the plants to improve their capacity utilisation rate and also on the employees to improve on-time delivery rate. However, it apparently resulted in substandard products and sometimes even in deadlines that were not met.

Business locations exposed to such a culture for a long time will result in employees leading to improper conducts to achieve the deadlines and promised volume of products, in order to achieve unreasonable profit.

4) Lack of personnel movement

The plants and businesses under the Company were structured in such a fashion that there was little to no movement of personnel between the different units. This enabled the employees who were involved in the misconduct to remain at the same locations and even be promoted to higher positions. This closed organisational culture resulted in the non-existence of a completely autonomous quality assurance body as well. Consequently, constraints were not placed on the manufacturing departments.

5) Testing processes allowing falsification and fabrication

As is shown in the case of the Aluminium & Copper Business, possibly the staff who was responsible to collect test data, tampered it for the quality assurance department. The inspection process in place did not make it difficult to fabricate the results.

6) Excessively strict internal standards

Some plants such as Moka plant have adopted internal product standards which are stricter than customer standards. These internal standards were introduced with the aim of identifying any deficiency in the process capability of a plant at an early stage, and hence preventing a delivery of lower standard product, by fixing it. However, the idea did not work as intended, because sometimes, the internal standards were too strict to be met. Consequently, employees started to vitiate the test data for the data which were unable to meet the internal standards, instead of improving the production procedures, rectifying the issue or talking to customers to mollify their demand.

7) Prioritising avoidance of customer complaints over the integrity of the products

The company's business policy aims at manufacturing products with high added value, where employees work jointly with customers, receiving and understanding their orders, and handling any complaints from customers. Because of this, some employees started giving more importance to the amount

of complaints received than to meeting the standards demanded by the customer. Then, those employees started falsifying data and process capability in a range that would avoid customer complaints.

8) Ignorance and lack of awareness

Lack of awareness of the need to adhere to standards and the importance of quality assurance coupled with ignorance by the employees, led to continuance of misconducts. As time passed, the range of misconducts enlarged and at some locations, these misconducts would be ignored because the supervisors were involved in carrying out the inappropriate conducts. Once a misconduct went untouched for a long time, it would go unnoticed or would not be discussed over. This leads to an environment where employees would start looking over such issues and would lose awareness of the need to adhere to specifications and standard.

9) Lack of Audits

The failure of the company to carry out thorough quality audits led to continuation of misconduct. The product quality audit function did not exist in the Planning and Administration Department, and the Technology Control Department, which are under direct control of Aluminium & Copper Business. Manufacturing processes and Product quality systems were carried out within each plant by each plant's local management.

1.3. Impacts

1) Self-realisation and an investigation into its culture

The announcement of the misconduct after its discovery and the subsequent appointment of IIC to investigate the scandal both point towards the Company's intentions and willingness to change.

2) Realised the need to carry out audit and quality control and quality assurance function

- A Quality Assurance Department in the Aluminium & Copper Business was established to carry out audit functions.

- A Quality Assurance Section was placed under Quality Assurance Department, which will be responsible to confirm quality assurance under the direct control of head chief of each business location. This will be independent of the manufacturing department to distinguish clearly between Quality Control function and Quality Assurance function.
- A Quality Audit Department has been established at the head office in January, 2018 to inspect the status of quality audit conducted by quality assurance department of each business unit. It will also carry out audits over quality of each business location of each unit and group company.

3) Realisation of the need for compliance

The Company plans to place a comprehensive internal training program deploying e-learning tools, to assure that employees throughout the company understand the need to comply with the specifications.

4) Restructuring of the administrative hierarchy of the Company

The company realised that one of the big reason misconducts were carried out, was due to the insular nature of the organisation. Hence, it is strengthening the governance system and organisational structure.

1.4. Repercussions

1) Drastic drop in the market value

Figure 1. Share prices of Kobe Steel, Ltd. from April 2017 to March 2018

Figure 1 shows the share price of the Company over the past year. Following the disclosure of the misconduct in October 2017, the share price fell from 1368 JPY to 805 JPY in the space of just a week. The Company still has not recovered from the fall, with the current share price being 1085 JPY on April 3, 2018.

2) Restructuring at the top administrative level

Since the IIC delivered its investigation report on March 6, 2018, Kobelco has made 4 separate press releases announcing changes in the top level of its administrative body. Some of the top officials stepped down from their positions, including the then Chairman, President and CEO Hiroya Kawasaki and the then Executive Vice President Akira Kaneko. Besides, temporary pay cuts for up to 80 percent of all internal directors and executive officers were announced.

3) Civil complaints filed against the Company and some other Kobe Steel Group companies

On March 5, 2018, a civil lawsuit was filed against the Company and some other Kobe Steel Group companies in a district court in California. The lawsuit has a specific automotive manufacturer as the co-defendant as well. This manufacturer is claimed to have used certain affected metal products supplied by the Company. The claim was that the use of substandard material had resulted in the violation of implied warranties and an unprecedented diminishing of the resale value of the complainants' vehicles and also that the money paid by the complainants as customers were unfair considering the quality of the components. The compensation sought is in excess of 5,000,000 USD. A similar complaint was filed in the Supreme Court of British Columbia on November 22, 2017 as well.

4) Revoking of JIS seal and government-sanctioned seal

JIS certification body, Japan Quality Assurance Organization (JQA) conducted an examination following the initial announcement of misconduct in October 2017. Consequently, the Company was revoked of its JIS seal. This meant that the Company was no longer authorised to sell its products with the JIS label, potentially restricting its sales opportunities.

Also, an investigation into the Company's quality control conducted by a certification firm resulted in the stripping of the government-sanctioned seal on insulated copper tubing from one of its prime Copper product plants. The same plant, Hatano, has also lost its ISO 9001 quality certification from the International Standards Organization (ISO).

2. Recommendations

2.1. Establishing data governance within the organisation

One of the prime reasons for the misconduct was the evident lack of awareness the Company (and its employees at various levels) had about the importance of data. The Company found it difficult in restructuring itself to focus on cost-cutting and increasing the efficiency. One of the failures contributing to this was that the data at hand was not managed properly. Data, when managed properly, has the potential to become valuable to an organisation. In fact, this is the driver of the data management process – to derive value from data. Considering the amount of data that is likely generated by an organisation of the Company's enormity, it is highly recommended that the Company sets up a Data Management programme and commit itself to strive towards becoming a data-centric organisation, an organisation that considers data as an organisational asset and invests in managing the data through all the different phases of its life cycle. Becoming a data-centric organisation means that the data will not be viewed as a byproduct of the organisation's operations.

The primary requisite for setting up a Data Management programme within an organisation is the implementation of Data Governance. It is Data Governance that states how Data Management is supposed to properly function. A key driver for Data Governance is reducing regulatory risk, which should be one of the primary goals for the Company after the incident of misconduct. Previously, even after promoting risk management improvement activities, the Company had failed to increase the management's awareness because of the lack of substantive information. Daily work assignments were not related to risk management assignments and as such risks were failed to be detected. Implementing Data Governance in the Company would help the Company move forward in this direction.

2.1.1. Setting up a Data Governance Organisation

Implementing Data Governance would require the initiation of a Data Governance programme in the Company. This programme can be overseen by a Data Governance Organisation. A Data Governance Steering Committee should be formed to lead this organisation. This committee should be comprised of cross-functional group of senior executives. The recommended structure of the Data Governance Organisation is shown in Figure 2. The initiation, implementation and maintenance of the Data Governance programme as a whole can be supervised by Data Governance Office. The committee would be the highest authority for data governance in the Company and would be responsible for oversight, support and funding of Data Governance activities.

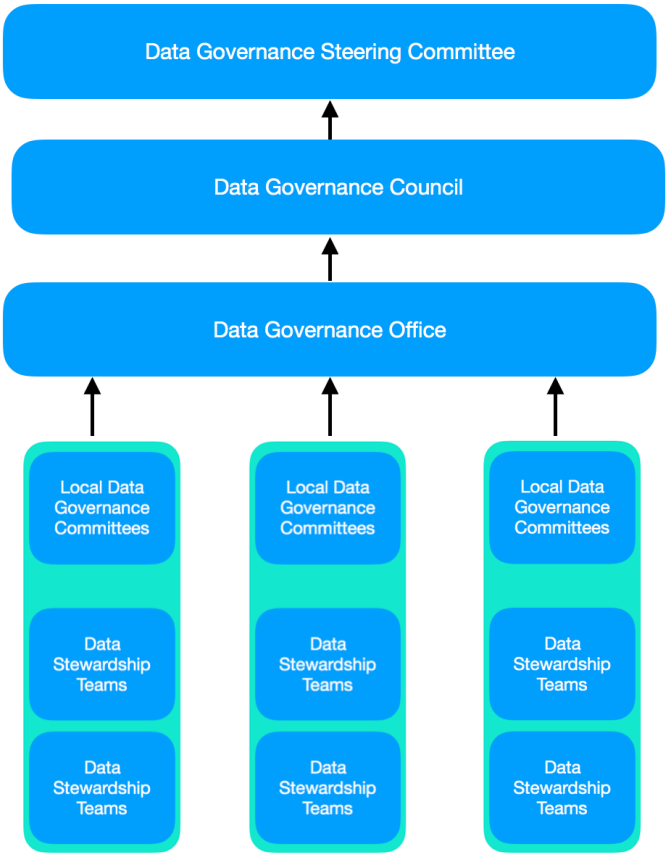

Figure 2. Recommended architecture for Data Governance Organisation

The Data Governance programme should encompass clearly explaining the following –

1) **Strategy** – this enterprise data strategy should be directly aligned with the overall business strategy of the Company.
2) **Policy** – global directives that codify principles and intent into tangible instructions pertaining to all aspects of data management during its lifecycle. Data policies would vary widely across the Company and would describe the 'what' of the Data Governance. The policies would be contained in a living flexible document and must be made available throughout the company.
3) **Standards and Procedures** – supported by the data policies, the standards and procedures describe the 'how' of the Data Governance. These would apply formal accountability to all the processes in the data management lifecycle.
4) **Stewardship** – a common label used to describe accountability and responsibility for data and all the processes that ensure effective management of data. Creation of core metadata and its management, documentation of rules and standards, data quality issue management and the execution of operational data governance activities all come under Data Stewardship. Quality assurance should be monitored and enforced at all phases of the lifecycle in all the businesses. The quality assurance team should be educated about the importance of data management and data governance in particular and assigned data stewardship responsibilities. The quality assurance teams can thus contribute heavily to the data governance, by working with other specialised data stewards appointed and deployed at different levels with varying degrees of responsibility.
5) **Compliance** – Data Governance, when done well, ensures regulatory compliance. Compliance and regulatory obligations should be clearly known for the drawing up of effective data policies.
6) **Issue Management** – this is a judicial function of the Data Governance. There should be clear directives as to how any data issue should be resolved and in what case and to whom any issue should be escalated.
7) **Data Management Projects** – data governance, if done well, will have positive financial impact. But substantiating this impact requires an in-depth grasp of the whole process, from designing and planning the process to

implementing it. The progress of the programme should be measured periodically using the metrics stated during the planning phase. It is recommended that the Data Governance rollouts for the Company be done in an incremental fashion by each region. This should be done while keeping the wider goals in mind. The responsibility of this need not be directly on the Data Governance Committee and should ideally be assigned to the Data Governance Council.

8) **Data Asset Valuation** – this is the process of measuring the value of data and assigning a monetary value to it. The process of evaluating a non-tangible item such as data is tricky as it should factor in the costs of generating, acquiring, storing, maintaining the data and keeping the risk associated with the data to a minimum. The financial benefits provided by the data should ideally outweigh the costs. High quality data has the potential to be a competitive differentiator.

This will be possible only with the support of the top level management of the Company and requires it to commit to change. The Data Governance activities should be guided by a data strategy that is aligned with the overall organisational strategy of the Company. Also, Data Governance is as much a business programme as it is a technical programme and should be implemented both at the enterprise level as well as the local levels. A Data Governance framework must be chosen and a core set of principles identified as part of the Data Governance programme.

2.1.2. Adopting A Federated Data Governance Model

Figure 3 shows the countries in which the Company or Kobe Steel Group (the Group hereafter) has its offices. Taking into consideration the geographical spread of the Company's operations, it is recommended that the Company follows a Federated operating model type for its Data Governance programme. This architecture takes into consideration the different business units and requires one Data Governance Organisation to exist and coordinate with these multiple business units. The Data Governance Organisation must be cognisant of the different data protection regulations that apply to the different operating areas

Figure 3. Countries in which the Company operates

As per the locations listed in their website.

while finalising its Data Governance principles. The Federated model type is chosen over the Replicated model type taking into consideration the insular organisational culture which previously contributed to the misconduct and the Company's keenness to move away from such a culture.

2.2. Enforcing data quality measures throughout the organisation

Ensuring data quality over a long period earns trust of the customers resulting in more business and reputation for a company. However, as a company matures, the CEO, board of directors and other personnel at senior positions start taking data quality for granted and get involved less in the quality procedures and reports. They entrust the responsibility on head or chief of quality department to ensure quality and assume that everything will course as desired.

Dr. W. Edwards Deming, regarded as the father of modern quality control, said that management is responsible for more than 85% of the quality problems. This

could have been what happened in the Company as well in that they were not aware of the importance of data quality.

In order to ensure that data quality is strictly ensured throughout the organisation, it is firstly important for all the employees to clearly understand why data quality matters.

Why does data quality matter?

Data quality can refer to features associated with the data and procedures used to measures data quality or improve it. Data quality is directly related to the needs of the customer. Poor data quality is when the customer is not delivered what he/ she demanded, or the data was tampered to avoid complaints from the customers, and hence promising him to deliver a product which is not feasible according to company standards or policies. If the organisation ensures data quality that means it is delivering the product that the customer expected. On the other hand, if data quality is compromised or not taken seriously, then it can not only dissatisfy the customer with the product but also lose its trust in the company and business from the customer.

KOBE steel lost years of trust and faith of hundreds of clients, and with the inability to ensure data quality not only did they forfeit their business but also the business of the clients, who used those tampered products in their business.
Hence, it is important to strictly ensure data quality measures.

There can be several factors or issues that can lead to inferior data quality. There were many factors, as mentioned in the 1st part of the report, which led to poor data quality of products at KOBE steel, such as:

1) Lack of awareness or understanding of the need to ensure data quality and adhering to the specifications, standards and policies.
2) Lack of understanding of the impact or repercussions of poor data quality.
3) Lack of governance.
4) Lack of commitment by the personnel responsible, to ensure that data quality measures are being followed at all required stages.

2.2.1. Formation of Data Quality Programme Teams under Data Quality Management Department

It is recommended that a Data Quality Management Department should comprise of senior officials from each business unit. This department should be supervised by the Board of Directors. The Data Quality Programme Teams will report to the Data Quality Management Department and should be formed at each business unit and should comprise of at least one official from each department.

Responsibilities of the team will include:

1) Ensuring that all necessary techniques and procedures are being applied to achieve data quality.
2) Ensuring that data quality meets the set standards and demands in an authentic way.
3) Engaging data, technical stewards and stakeholders as well, when needed, in order to:
    1) assess data according to business requirements and key dimensions of quality.
    2) figure out root causes of data quality issues.
    3) understand cost of rectifying the issues and their impact if not rectified.
4) Ensuring that quality is not compromised at any stage in the process (from receiving an order till delivering it and maintaining it).
5) Ensuring that all the data is properly and correctly recorded.
6) Supervise the metadata management.
7) Dealing with any data related issues.
8) Ensuring data security.
9) Suggesting new improvements in data quality measures.

2.2.2. Adoption of PDCA or Deming Model

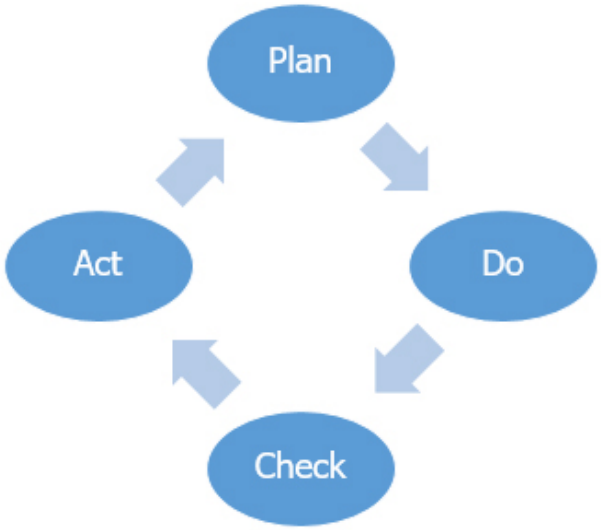

Figure 4. PDCA Model

As maintaining data quality is an ongoing process and demands improvement and changes over the time, hence, Data Quality Programme Team can adopt PDCA model to improve data quality. PDCA is a four stage model developed by Dr. Edward Deming, and is aimed at continuously improving data quality. The four phases of the lifecycle are described below:

Phase	Description
Plan	The team understands the current state of known issues and prioritise them by identifying their scope and impact.
Do	The team tries to tackle the root cause of the issues identified and plan for ongoing monitoring of data.
Check	The team actively monitors the quality of data and measures it as stipulated by the data quality metrics identified.
Act	The team tries to address and resolve any data quality issues that emerged during the previous phases.

2.2.3. Formation of a Quality Supervision Committee

A committee, comprised of internal and external officials should be established to strengthen the governance system regarding quality. Responsibilities of the committee include:

1) ensuring quality assurance.
2) looking over all the quality measures that are being taken in the Company.
3) reporting encountered issues to the Data Quality Management Department, clearly indicating the issue, and department, plant and unit the issue was reported from.
4) reviewing the process and measures being followed by the Data Quality Programme Teams, and if they are adhering to it.
5) suggesting new measures which can help the department to improve the process, to achieve maximum quality.
6) ensuring that quality guidelines are being adhered.

2.2.4. Issue quality guidelines to be followed throughout the Company

A set of universal quality guidelines should be structured and established by the Company, keeping customer satisfaction and regulatory compliance as the top priorities. These guidelines should be in line with the quality guidelines issued by Japan Iron and Steel Federation.

2.2.5. Educating employees throughout the organisation regarding quality assurance

1) Internal Training Programmes – Internal training programmes throughout the organisation will help educating and increasing the awareness among employees about the importance of data quality assurance. These programmes will also help to educate the employees about the impact and consequences that can be faced:

   a)by the individuals, if not adhered by the guidelines and specifications.

   b)by the Company, such as losing trust and confidence of the clients, losing business, tarnished reputation, etc.

2) Continuous Assessments – Periodic assessments should be conducted to evaluate employees' understanding of the training programmes. The scores attained by employees scored on these assessments can be taken into consideration while evaluating their overall performance, so that the training programmes are taken more seriously.

3) IT Training Programmes – Employees should be provided with necessary IT training to educate them about any new software systems that might be implemented.

2.3. Measuring and monitoring data quality

2.3.1. Measuring

Objective measurability is one of the key principles of Data Quality. This means that Data Quality levels should be measurable in an objective and consistent fashion. Both the measurements and the measurement methodology should be agreed upon by the stakeholders. There are several measurable characteristics of data, which are called data quality dimensions. Some of the generally accepted data quality dimensions and the respective recommendations are listed below –

1. Completeness – the proportion of the required data that is present. This can be ensured by making all the needful fields mandatory.
2. Uniqueness – the property that mandates that no real world entity is represented more than once in the data. This is tightly coupled with accuracy. Usage of unique keys to represent different entities is a way of achieving uniqueness.
3. Accuracy – the degree to which the data represents the real world problems and entities that it is supposed to model.
4. Timeliness – encompasses a host of characteristics of data like volatility and latency. Volatility refers to the duration for which the data is current/valid. Latency refers to the time elapsed between the creation of the data and its availability for use. There should be system timeframes as per the SLA after which data entry should not be permitted.

5. Consistency – ensures the correct representation of data values across the whole dataset. Data standardisation can also be thought of as part of this in that characteristics expected for consistency can be used to form the basis for standardising data.
6. Integrity – includes ideas associated with completeness, accuracy and consistency. Maintaining the referential integrity and internal consistency of data entities fall under this dimension.
7. Validity – refers to whether data values are consistent within a predefined domain of values. This comes into picture when enforcing the values a variable can take. Use of dropdown menus, radio buttons and checkboxes are examples of different measures to ensure the validity of the data.

These data quality dimensions can be used to define the results of initial data quality assessments, as well as the ongoing measurement. It is recommended that the above data quality dimensions are measured and maintained by the Company to ensure Data Quality. A proper data entry system can be incorporated to aid in this.

2.3.2. Monitoring

As the Company failed in monitoring data quality at different business units, due to lack of awareness, lack of auditing, and ignorance by higher authorities, there is a great need of placing the data quality in a right way by implementing a monitoring system throughout the organization. Some of the recommendations are listed below –

1. Proper reporting system – As seen, there was a clear ignorance among the higher authority regarding the importance of data quality. The process in place enabled tampering of data without much difficulty. Higher authorities must be incorporated into the reporting system to rectify this issue.

2. Establishment of audit teams – Major reason for the failure of maintaining data quality was there was no audit team to keep eye on the data quality assurance. To make sure that there is no gap in data quality assurance, there should be two audit teams.

a) Internal Audit – internal audit team should do audit on regular basis without providing any prior information. A team of 3 - 4 data stewards (business or technical) should do the audit. It is recommended that this team be shuffled to minimise the risk of corrupt audits.
b) External Audit – apart from the internal there should be audit from external as well on random basis whose report will directly go to the higher management, so that quality assurance process is carried out impartially.

3. Multi-level test approval assignment system – Implementation of an automatic computerised system is also recommended, in which a submitted test report is assigned to multiple levels for approval. The system can possibly assign a team on random basis to do a retest and the retest results can be matched with the original test results as a check for veracity. This randomness can reduce the chances of falsification.

4. Transparent system – Implementation of transparency in organization is very important factor. This encompasses:
   a) Proper escalation process – There should be channel of escalations in place, which tells an employee or anyone whom to raise the concern if they find something wrong in the system, procedure and compliance.
   b) Freedom to raise issue by anyone – There should be open system where anyone can log the complaint or raise the concern due to lack of compliance, so that if someone tries to hide the wrongdoing there will always be a record on system and keep a bit awareness of not doing anything illegal or tampering.
   c) Providing access to customer to check on going progress will help in maintaining quality of data and less chances of falsification.

5. Periodic transfer of employees – The insular and siloed organisational culture contributed to the factors that led to the misconduct. A policy to move the employees within different business units and plants without hampering their ability to contribute to the Company should be put in place.

6. Editing history system – Each and every interaction between an employee and the data should be logged with the employee's identity among the logged information. This will help with any audit or investigation that might be carried out in the future.

3. Business Case

Project Name	Implementing Data Governance and Improving Data Quality
Intended Audience	Board of Directors
Project Manager	CEO
Financial Year	2018-19
Executive Summary	This project aims to suggest recommendations about the measures that should be taken going forward, so that the misconducts that led to the whole scandal can be avoided and better data quality can be ensured. The recommendations that are suggested mostly focuses on data governance structure of the organisation, data quality measures that should be enforced throughout the organisation, and how it can be measured and monitored, both internally and externally.

Business Objectives	The goal of the project is to: • establish a proficient data governance system in the organisation • enforce data quality measures throughout the organisation • measuring and monitoring data quality, both internally and externally How the above mentioned goals will help business? • place trust and confidence of the employees again, if more rigid, better and strict measures are taken to ensure quality • improved image of the company • avoidance of misconducts on a large scale and over time • educated and trained employees, who knows the value of the assuring data quality and its impact, if not maintained
Benefits	This project will provide with following benefits in the future: • Increased product quality • Transparency in the processes and organisation • Increased business from the clients after reassuring their trust in the company • Increased revenue • Improved productivity
Scope	• Data governance and Data quality assurance • Measure and monitor data quality.

Estimated Costs	Software to monitor data governance scorecard = 35,000,000 Euro Software for reference and master data = 35,000,000 Euro Project Management = 30,000,000 Euro Software Team (**) of 5 for 3 months = 250,000,000 Euro (referred to Glassdoor website - **the cost of Software Team may be less or more basing on the Software Team is company staff or outsource and whether including or not maintenance, the number of apps, customer service and post-sale)

4. Roadmap

4.1. Proposed timeline

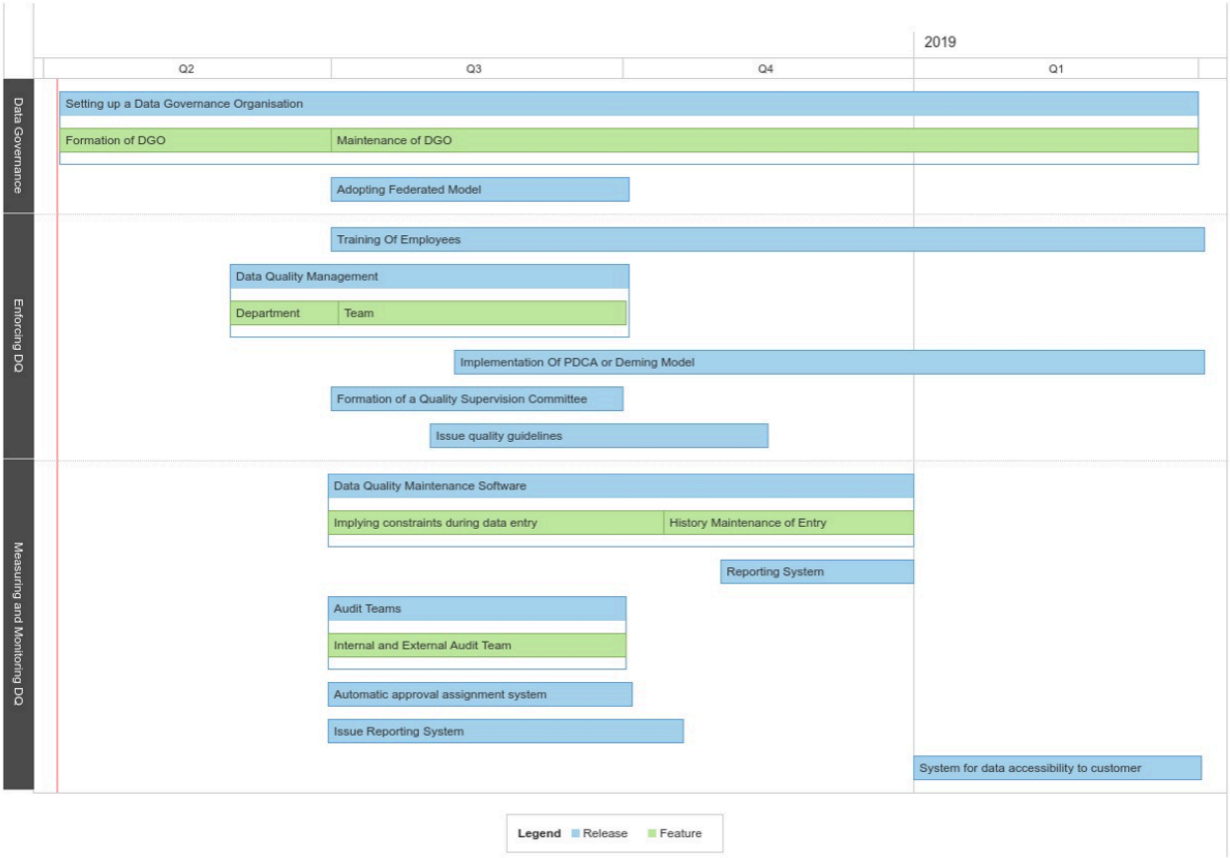

Figure 5. Proposed timeline for the project

4.2. An overview of recommended activities, resources required and expected benefits

Activities	Resources	Benefits
	Data Governance	
Setting up a Data Governance Organisation	Ongoing activity. Will start with the formation of Data Governance Steering Committee. The setting up will be in a top-down fashion. No resources need to be allocated exclusively for this activity.	Data Governance O is a prerequisite for Data Governance as it oversees the Data Governance programme.
Adopting Federated governance type	Another activity that does not require resources to be allocated exclusively. The proposed timeline is 3 months.	A data governance model that takes the geographic spread and administrative architecture of an organisation into consideration is a necessity for the programme to be a success.
	Enforcing Data Quality	
Formation of Data Quality Programme Teams under Data Quality Management Department	50 resources for the department and 20 resources for each team, at each business unit. The proposed timeline for the department is 1 month and 3 months for data quality teams.	Implementation of the department and teams will help to improve overall data quality and assure it.

Activities	Resources	Benefits
Implementation of PDCA or Deming Model	This will be an ongoing activity, and will be implemented by Data Quality programme teams.	Implementation of this model will help to improve the data quality lifecycle.
Educating employees	This is an ongoing activity and training programmes can be delivered either quarterly or half-yearly. No resources need to be exclusively allocated. Local Data Governance committee can conduct assessments.	Educated employees means better and improved understanding of quality assurance.
Formation of a Quality Supervision Committee	6 internal and 4 external resources can be appointed for this committee. Proposed timeline is 3 months.	Improved quality, save time and costs through efficiency, improved process
Issue quality guidelines	The suggested timeline would be 3 months. Resources need not be allocated for this activity as this will be done by senior most officials of the company in collaboration with Data Quality Management Department.	Employees will have a set of guidelines to look up to incase of any confusion, inconsistency etcetera in the process. Also, the universal nature of the guidelines will keep all the employees on the same page.
	Measuring and Monitoring Data Quality	
Software for correct data entry	IT Company- for modification in the current software, requires 3 Months (requirement specification and development)	This can make sure that data quality is maintained. And in future it will help in reducing resource requirement for Data Quality check.

Activities	Resources	Benefits
Software for correct data entry	IT Company- for modification in the current software, requires 3 Months (requirement specification and development)	This can make sure that data quality is maintained. And in future it will help in reducing resource requirement for Data Quality check.
Reporting System	No Resource required, Just to bring rules in system.- 1 Month	It will involve high authorities so that Kobe Steel Group, no more consider as Insular.
Internal and External Audit Team	Internal Audit- 10 employees from Quality assurance in each Business unit. External Audit-10 employees from customer side and outside from organisation QA team - Total 3 Months	Internal Audit Team- These employees will be go in team of 3-4 and be shuffled every time, will do audit without any prior notice to make sure everything going on as per standards. External Audit Team - This will make sure everything is in place as these audit will be random.
Automatic approval assignment system	Can be used already available software in market.-3 Months	Implementation of this system will reduce intervention of particular employee and create transparency among employees.

Activities	Resources	Benefits
Issue Reporting system	Can be used already available software in market.-3 Months	Transparent system to give employees freedom to speak and raise concerns so that any misconduct can be highlighted in early stage.
System for data accessibility to customer	Can be used already available software in market and Data Steward- 3 Months	System for customers to provide transparency on progress of their orders.
History maintaining system	IT Company- for modification in the current software. 3 Months (requirement specification and development)	System will keep history of every edit along with employee ID so that any misconduct can be backtracked.