

Implementation Challenges of Data Quality Management

—Cases from UAE Public Sector

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Abstract

Data quality is a significant concern in today's world. The majority of organizations are being challenged by the data quality issues both in the structural and systematic context. Bad data quality is still being experienced even though expensive tools have been innovated and incorporated into the data quality control practices. Common measures of data quality metrics are accuracy, completeness, proper dissemination, integrity, validity, uniqueness, and consistency. For this reason, intense analysis and evaluation of the most applicable ways in managing data quality can serve as a roadmap that can be utilized by the company's executive team, practitioners and even learners in formulating efficient planning as well as implementing feasible data and information quality control and management programs. This paper is based on intensive research and the use of practical examples and will seek the evaluation of the challenges faced in data quality management. The paper will also provide an analysis of data quality management from the local and global context by giving critical inspection trends to improve the data quality, the tools, techniques, and the policies that are necessary for achieving the data quality management goal. By using the Civil Project Division (CPD) in Abu Dhabi National oil company (ADNOC) and Dubai Health Insurance Corporation in Dubai Health Authority (DHA) as the real-world examples, the paper will give a critical viewpoint of the challenges, trends, policies, and techniques that apply to data quality management.

Keywords

Data Quality, Data Management, Data Implementation, Data Challenges, UAE Public Sector

1. Introduction

Many innovations have occurred in the field of technology over the past few years which include social networking, Internet of Things, cloud computing and block chain among other technological innovations in information technology. Due to these technological developments, a massive increase in data has been witnessed, and the accumulation of this data has resulted in what is being termed as big data (Wang et al., 2016). However, this data may not be beneficial to an organization if it is not analyzed appropriately, therefore inappropriate data is considered as unwanted data. Thus, quality data can be obtained, facilitating proper decision making within the company and bringing focus within the organization. Therefore, this will direct employees towards the realization of the vision, mission, and objectives of that company.

Data quality management (DQM) describes the set of processes which are carried that to maintain high standards of information. These processes range from obtaining the data and implementing innovative data processing techniques in data warehouses to ensure that quality data is acquired (Batini et al., 2015). It is acceptable that DQM is a basic achievement in data analysis because quality data helps in deriving actionable and exact intuitions from the obtained information.

Therefore, the thesis statement of this paper is that organizations face many challenges in instigating data quality management techniques in the process of obtaining the data and analyzing it to extract valuable information.

There has been some significant progress by some organizations in an attempt to address these data quality management challenges. For instance, Dubai Health Insurance Corporation in DHA introduced eClaimLink in 2012 which integrates the management of all information regarding administration, medical and transaction history maintained within this health facility and converts it to unified standard healthcare languages communicated across Dubai (Ishad, 2014).

The eClaimLink tool has enabled DHA to achieve its goals in a faster and smarter way while at the same time facilitating the health care centers to standardized data tracking system. This tool is also significant in easing and regulating the billing of the health funding programs (Ishad, 2014). The tool has undergone numerous development stages and has proved helpful in supporting more than 2000 insurance billing providers and more than 60 payers/TPA. It is through this tool that the insurance service providers have been able to secure more than 3 million covered members in Dubai (Ishad, 2014).

The main objective for the establishment of eClaimLink by DHA is to promote the advancement of the systems and the operational policies that guide the insurance billing programs. The system has obtained applause from the Dubai societies by recording about 45 active stakeholders from the market who represent each of the companies. On this note, this paper will explore the challenges faced by DHA in implementing the eClaimLink system and the possible approaches to mitigating these problems.

On other hand, Civil Project Division (CPD) in Abu Dhabi National oil company (ADNOC) was looking for a unified collaboration solution that can manage the communication, document approvals and workflows throughout various Project Execution stages of Design, Procure and Build until handover of an asset which requires accurate data quality management, data quality and data analytics to handle all data received in ADNOC. However, the procurement process is handled by the existing SAP solution. The solution should be capable of handling unlimited number of projects. As a result, once a project kicks-off, the solution should tie the program execution to the project plan and strategy.

CPD implement Aconex which is construction software and engineering cloud platform to improve the workflow, it's a solution that helps user to manage their process and information across the project which shows some difficulty in implementing it which will be addressed in this study (Maria, 2018).

The article structure is as follows: in part one the research and the topic and the problem are introduced. In part two a detailed literature review covering Data Quality for Business Intelligence, Local and Global Trends to Improve Data Quality, Policies and Techniques in Data Quality Management, and Opportunities for Adding Value in the United Arab Emirates are discussed. In part three the research methodology is discussed and it covers Study Area, Data Collection Tools, Sample Design, Data Gathering. Part four covers Results and Data Analysis. Part five, six and seven present the discussions, conclusion and recommendations respectively.

2. Literature Review

This section will seek to evaluate the challenges and issues facing data quality management within organizations as researched by other scholars. The focus will be on the Dubai Health Authority (DHA) and ADNOC Civil Project Division (CPD) that will be used as the case studies. The section will cover various sub topics that include data quality business for business intelligence, policies, and techniques in data quality management. The literature review will give an interlude on how the implementation of Aconex has seen several challenges.

According to Merino et al. (2016), data duplicity is the most challenging aspect that organizations are facing in today' era. Companies obtain multiple copies of the same data, which effect the organization's storage and analyzing costs. This challenge is usually due to errors made by the people during data collection or by the use of ineffective algorithms.

Research conducted by Sadiq and Indulska (2017), shows that incomplete and inconsistent data also affect the quality of data to great extents. Sometimes data becomes corrupted and some files may go missing. This compromises the quality of OD data. Moreover, the data may be in different formats, which may render it to lack interrelationships, and this makes it hard to analyze. Accessibility of data may also be a challenge because the data sources may not be promising (Kim, Lee, & Choe, 2019). In some cases, it may be challenging to identify the

most appropriate source of data due to the occurrence of data in chunks.

Implementation of data quality management techniques has been a core challenge for many organizations for quite some time. From some research done by scholars, there is an estimation that many organizations use equivocal information obtained from imprecise data in making decisions. This is quite unsafe, and in most cases, it puts the organization at the verge of making losses or losing a lot due to poor decisions that are controversial to the market trends (Merino et al., 2016).

2.1. Data Quality for Business Intelligence

An organization can only achieve its objectives by ensuring that the normal processes and operations are run in the most efficient way. This can be ensured by obtaining big and quality data which will allow the executive to make intelligent and informed decisions (Redwood et al., 2017). Successful organization operations in most contemporary environments require the maintenance of big and quality data, which is the core aim of business intelligence. The preservation of such information involves passing a continuous process of acquiring, updating, and analyzing the data to gain better insights that identify the most suitable strategies to expand the organization (Foster, Smith, Ariyachandra, & Frolick, 2015). The obtained data must also be updated and analyzed now and then so that better considerations can be made on how the business can be expanded are identified. For this reason, data quality management can ensure that there is business intelligence in any organization. For instance, the eClaimLink has helped the DHA by enabling the healthcare providers in the submission on claims on behalf of the patients by offering an online platform for the same. Had it not been for the quality data that was obtained, then such a decision of adopting the web-based system could not have been adopted. According to Meier et al., (2018), the Aconex software has helped the ADNOC's CPD in facilitating building and construction management as well as monitoring. The business intelligence obtained here is that the workflow in the company has been improved and this has offered impeccable solutions.

2.2. Local and Global Trends to Improve Data Quality

The implementation of Aconex and eClaimLink has faced several challenges even though the organizations remained determined in the process of adopting those (Al Hadhrami et al., 2017). Therefore, there have been changes in trends in the approaches and techniques applied in data collection. The approaches applied in capturing data have undergone several improvements over the years so that the quality of data obtained is of high quality and reliable. During the collection of data, the researchers have adopted criteria for preventing the capturing of duplicate records to ensure that data redundancy is alleviated. Moreover, there have been enhancements that have employed data normalization so that data is organized in warehouses and databases in a systematic way that prevents

redundancy and anomalies (Sadiq & Indulska, 2017).

2.3. Policies and Techniques in Data Quality Management

There are several policies and techniques in DQM but the most prominent one is the analysis of information got business value. According to the policies in DQM are significant in ensuring that data is not compromised and inaccurate data does not affect the whole set. Moreover, application of proper techniques in information analysis ensures that the organization does not incur extra costs in the pursuit to restructure the data or if wrong decisions are made (Janssen et al., 2017).

According to Jammoul (2015), remarks that the tools used in obtaining data must be relevant and guarantee accurate results. It is also necessary that the DQM guidelines used must be tied with the business needs and no irrelevant data is obtained. This ensures that data which does not add value to the organization is discarded.

2.4. Opportunities for Adding Value in the United Arab Emirates (UAE)

In the UAE, effective quality data management has the potential of improving the operations of business organizations since it maintains a knowledge-based economy. Monitoring of production processes will be easier through tactical information sharing exercises that involve regular data updates (Rowland-Jones, 2013). Consequently, managers in the UAE are always aware of what is happening in the country in order to ease supervision, leading to higher productivity (Kwantu, 2016). Information sharing eases the inception of new innovative ideas in the country. Such data techniques create solutions to problems in teams and acquisition of new knowledge from consumers, experts, and other relevant organizations. Hence, most business operations in the UAE are run under a collective knowledge-based economy, which focuses on generating a higher value to corporate stakeholders as well as the developed country.

To recall, DQM is a disciple that entails quality maintenance and effective control of information. The different tools and software used in data quality and data analytics, whether complex or simple; assist in the management of information by controlling its initiation, dissemination, and context. Consequently, the disparities between data analysis and analytics precisely enlighten on each concept's task. The differences are depicted on how data quality is utilized for business intelligence as well as local and global trends that improve data policies and techniques. All these factors are instrumental in the method through which DQM is applied in the UAE. In the country, DQM enables a knowledge-based economy to create opportunities through information sharing.

3. Research Methodology

The information concerning the challenges in data quality management and im-

plementation of tools and techniques for obtaining data was gathered from different stakeholders of the two organizations; DHA and ADNOC. The data was collected using interviews. The data obtained from the interviews utilized a cross-sectional survey research design in that it was collected from both male and female employees who gave their views pertaining to the general inception and development of the advanced methods of ensuring quality data management.

In addition to that, a survey was conducted on the site and construction team which served to collect data about the project workflows and progress. The eClaimLink taskforce was also surveyed in DHA to determine the challenges faced and the suggestions of the interviewees about the possible solutions.

3.1. Study Area, Sample Design and Data Collection Tool

The study for this research was conducted in two areas, namely: Dubai Health Insurance Corporation in Dubai Health Authority (DHA) and Civil Project Division (CPD) in Abu Dhabi National oil company (ADNOC).

The interviews were conducted on senior managers and directors of ADNOC company and DHA including:

- Planning Engineer.
- Project Manager.
- Manager, Project Management & Constructions Department.
- Senior Vice President of Information Technology Unit.

Questionnaires with both closed-ended and open-ended questions were used in this research. Questionnaires were used to enable the respondents to give answers with ease and with an effort to save on time as well as enhance ease in the analysis of data.

3.2. Core Areas in the Interview

The following were the core aspects of the questions asked to the interviewees.

- What are the challenges faced in implementing DQM in organizations?
- How the organization overcomes these challenges?
- What are the benefits and shortcomings of the system?
- Does the execution add value to work quality?
- What are the opportunities for adding value in the UAE context?
- What are Local and global trends to improve data quality management?
- What is the difference between Analysis and analytics?

4. Results and Data Analysis

The data obtained from the interviews conducted indicated that there were a number of challenges that were being encountered through the implementation of Aconex and eClaimLink. For instance, question (i) and (ii) asked about the problems in instigating DQM in establishments. In response to part (i) the respondents, the main challenge that was identified is that there is lack of contin-

uous reporting and analysis of data on a daily basis and this limits the aspect of data quality management. According to one of the interviewees, the organization can overcome this challenge by reinforcing improvement and development that focus on mitigating the challenge. The challenge that was seen to be identified by the interviewees is the difficulties in maintaining data integrity and avoiding redundancy.

Moreover, in respect to whether the implementation of eClaim tool adds value to the organization, it is observed that the “Yes” answer dominated with the interviewees remarking that the tool has improved insurance operations in Dubai and standardized many processes as well as unified them for better services. Most of them also recognized the tool’s ability to add value in the organization by enabling real-time access to health records and ensuring that data accessibility is easy. From the study, it emerged that the tool has evolved the market transactions to promote the adoption of technology that employs the rules and guidelines that are provided in DHA. For this reason, the interviewees noted that the fully capturing of the quality data by those patients who visit the Dubai health facility has been ensured through the eClaimLink system.

In examining the benefits of the tool in relation to its shortcomings, which was the question (iii), it was undoubtedly clear that majority of the interviewees gave a number of advantages as opposed to their viewed disadvantages. They also noted that the tool has brought about standardization of the language which is used in the market and generally unified the processes. It is also perceived that the tool has the processing of claims in the paper alongside ensuring that the costs of processing claims are cut down. The viewpoint of the interviewees is that there have been efficient operations since the inception of the eClaim tool since claims can be submitted using the RCM tools in the EMR system. The other advantages include the ability track and have full visibility of the patient’s health records, medications, treatment, and fees, as well as the provision of the studies to that, depict the health trends of Dubai residents. The employees are also delighted that the tool has facilitated the prohibition of fraud practices and abuse of patients in the health facilities within Dubai. The only disadvantage noted by these employees is the enforcement of new rules and guidelines with regard to the usage of the tool sometimes consumes unexpectedly long time from the market before the market complies with it.

A number of the interviewees also recommended to recommend the tool to other companies as they recognized it to be the best choice in managing insurance systems and as a regulator.

5. Discussions

As per the results obtained above, it is undoubtedly clear that the tool has proved to be vital to healthcare recording tracking and maintaining. From the results, it can be argued that majority of the employees are pleased with the tool with a higher ratio number appreciating the advantages that have accrued to the health facilities and the country at large just because of implementing the eClaimLink

software. From the results, it was also clear that the number of benefits realized from the tool outdo the disadvantages significantly. On the other hand, it cannot be ignored that there are no challenges in implementing the tool but it is unreasonable to claim that it is not beneficial. Usually, any new technology comes with challenges, especially when shifting from the initial operations and challenges. In most cases, employees remain rigid when there is need to adopt new technologies. In the same case, the employees in DHA are not exceptional (Cai & Zhu, 2015). They also face the challenges especially that of enforcement of new rules, policies, and guidelines of which take the time to adopt and comply with.

The results also show that the biggest challenge organizations face is maintaining data integrity and avoiding redundancy. This has been observed as the most challenging aspect probably because the organization has not fully adopted the eClaimLink software and therefore integration can be so hectic and unwelcoming.

Limitations: the research is challenged by a tight time and limitation of resources. Covid lockdown was another barrier in reaching many potential interviewees.

Future research to focus more on technological solution and data quality and to have wider and deeper coverage including bigger number of organizations and cases with less constraints on time and resources will definitely lead to better results.

6. Conclusion

To sum up, the eClaimLink and Aconex systems have played a major role in contributing to the achievement of DQM. For instance, the eClaimLink has helped in the patient health record management and thereby saved time and space. The processing of data has also been enhanced by a substantial deal through this tool.

From the above discussion, it is undoubtedly evident that the research conducted unveiled the benefits that have been obtained from the tools are more worthwhile to consider as compared to the disadvantages. The challenges cannot be ignored but it would be unrealistic to drop the technology at the expense of those challenges mentioned. Generally, the challenges that were identified include the difficulties of adopting the policies and new rules that come with the tool, the problem of maintaining data integrity and the challenge of redundant data. We can agree that these challenges can be horrendous especially to the employees. The findings from the survey depict that the challenges are far beyond setting up the electronic transaction hub for the health facilities in Dubai. But it can be generalized that most of the employees contended with the benefits that have resulted from the technology and the tools because as they identified a single challenge, they would well counteract that problem with more than one of the witnessed advantages. If the advantages accrued from a tool outnumber the challenges and disadvantages, then it is realistic to go for the innovation or

equipment as you focus on limiting the identified shortcomings of that product.

Finally, it suffices to conclude that the tools presented in this paper come with both challenges and benefits, but the challenges are far much less than the advantages that are obtained.

Recommendations

As a general overview, the advancements and vast steps that have been identified from the Aconex and eClaimLink, there is a lot to acclaim. The challenges are however hindering the progress of these programs and unless appropriate steps are taken to counter these problems, then no much may be realized from the tools. For this reason, it is recommended that the planning team should ensure that business and validation rules are applied so as to ensure all the stakeholders comply with the outlined policies so that the objectives and mission of the tools are achieved. From the discussion, it was noted that the employees are not pleased by the new rules and guidelines that they are subjected to and usually find it hard to comply with them quickly. On this note, it is recommended that future research should be conducted on the employees before the new rules are imposed. The employees should also be mobilized to remove any sense of doubt from them so that they feel part of the innovation. Moreover, it is also recommendable that they should be given sufficient time to adopt the new technology, tools, and policies without any prompting from the organization.

According to Kruse et al. (2016), it is recommended to address the challenge of continuous data acquisition and analysis by allocating a team the role of handling the tasks of reporting and analyzing data. This will surely ensure that data quality management issues are mitigated.

Finally, it is recommended that these tools should be adopted by other companies because they will suffice to ensure that DQM is enhanced. This is because the tools bring more benefits than challenges and disadvantages to an organization.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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