MASTERING MASTER DATA MANAGEMENT

– A BUSINESS VIEW

Abstract

This document describes the importance of properly managing master data in an organization and business challenges that come up as a consequence of fragmented, poor quality and non-standardized master data. The paper also attempts to take an Information Management Strategic approach to providing business with the right view on Master Data.

Overview

Enterprises today have complex environments with multiple data stores, processes and potential inconsistencies. Master and transactional data is distributed throughout multiple systems. Let's go ahead and take a few situational examples to illustrate the debilitating business impact that a sub-optimal Master Data Management capability can have.

Situation 1:

A global leader in automotive parts manufacturing were supplying their products to various large OEMs (Original Equipment's Manufacturers). Conventionally, it was a regionally managed organisation and had heterogeneous IT landscape across different regions. The company had various R&D centres across the globe, which were not able to share information with each other due to differences in the way product attributes and design information were being stored. It was observed that more than one R&D centre was working on similar products, losing the opportunity to reduce the cost through reusability and internal synergies. The inability to have common parts definitions globally was also constraining the company from having a part-search capability across inventory, thereby leading to extensive stockpiles in one region and out of stock in another on the same part.

Situation 2:

One of oldest organizations involved in business standards definition has diversified into different business segments like supply chain risk management, auditing, training etc. The company has a large customer base owned by old business segment and it wanted to utilize the synergies to cross-sell services and products offered by the new business segment. However, fragmented and non-standardized, customer master data has become a key inhibitor for driving success in mining a customer and expanding on the customer share of wallet. Also, multiple customer touch points across different business segments were resulting in customers getting inconvenienced in different ways like getting multiple invoices, volume based discounts not being applied etc. This led to deterioration in customer satisfaction.

Situation 3:

A leading retailer that also operates a financial services arm wanted to develop a unified customer experience (CX) strategy for their operations who would provide them with a consistent and rewarding brand experience. However, the customer data across the two lines of business were managed independently and had challenges in terms of customer data quality and ability to extract relevant customer insights. A lack of a

single view of customer was perceived to be the greatest limiting factor in embarking on a CX strategy journey. In this case, the definition of the single view of customer included a robust customer data management strategy, customer insights and intelligence layers supplemented to the same.

In each of these cases, the lack of a robust Master Data Management capability renders business incapable of servicing its key strategic business goals such as mentioned. Further, the fragmented, low quality and non-standardized master data leads to business challenges stated below:

- Low confidence by business users on the quality of data and reports provided by decision support systems.

- Fragmented information silos leading to multiple versions of the truth thereby leading to extensive data reconciliation and validation needs before use.

- Lack of intelligence and insights driven by a proper master data management leading to cost and revenue impact for business as below:

  › Inconsistent product data slows time-to-shelf for new products, creates inefficiencies in product engineering/R&D organization, leads to sub-optimal supply chain efficiency, increases cost of product compliance and result in weak market penetration.

  › Sub-Optimal customer data leads to poor marketing return due to misguided campaigns, low conversion of quotes, lost customer loyalty and inefficient fulfillment impacting cash to cash cycle.

  › Fragmented, non-standardized and inconsistent vendor data lead to sub-optimal supply chain, inefficient procurement leading to spend leakage, increased fulfillment risk and erroneous payments.

- Drives up cost to meet compliance with privacy laws requirements

An organization need to have a unified Master Data Management strategy in place to address the above challenges. Though data domains that need to be managed at the organization level varies based on the industry segment or business, typically product, customer, vendor and partner Master Data is considered to be of strategic value for organizations in a whole.
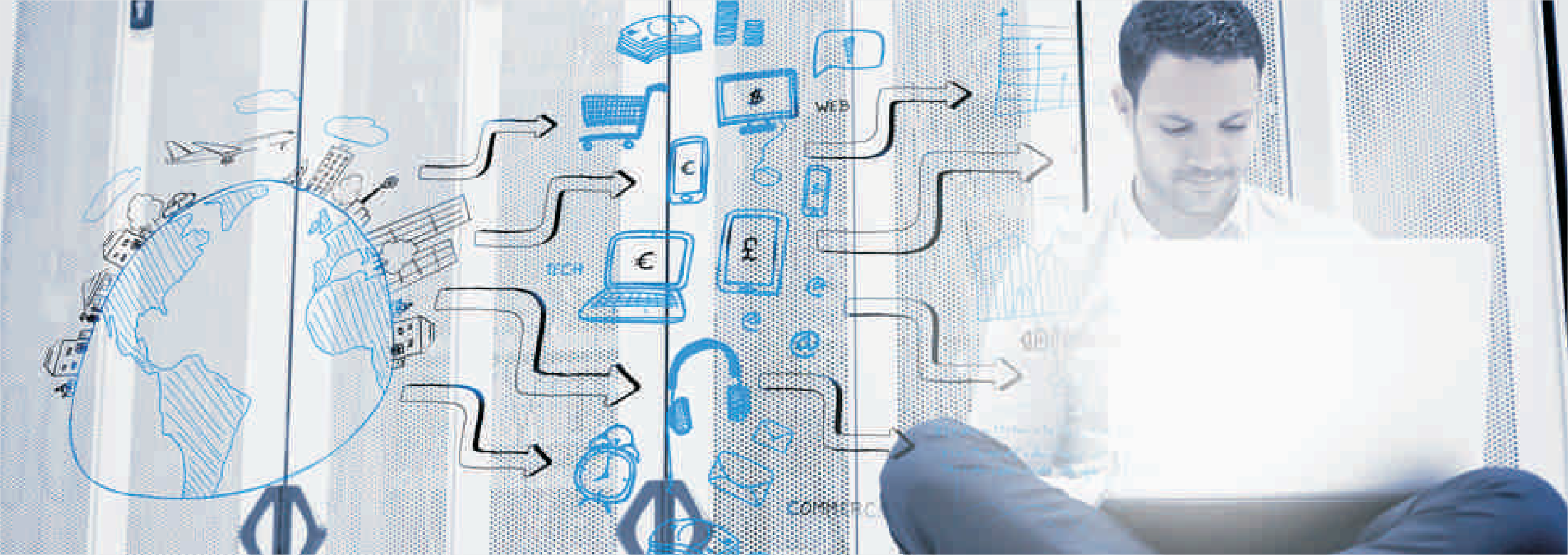
MDM Maturity Stages

It is important to note that MDM has evolved over a period of time and there have been a variety of approaches and methods used to drive effective MDM benefits to the enterprise. As organizations have evolved and grown, the nature of MDM has also changed consequently. An MDM Maturity Model for an enterprise can be used to understand how its concept has evolved over time:
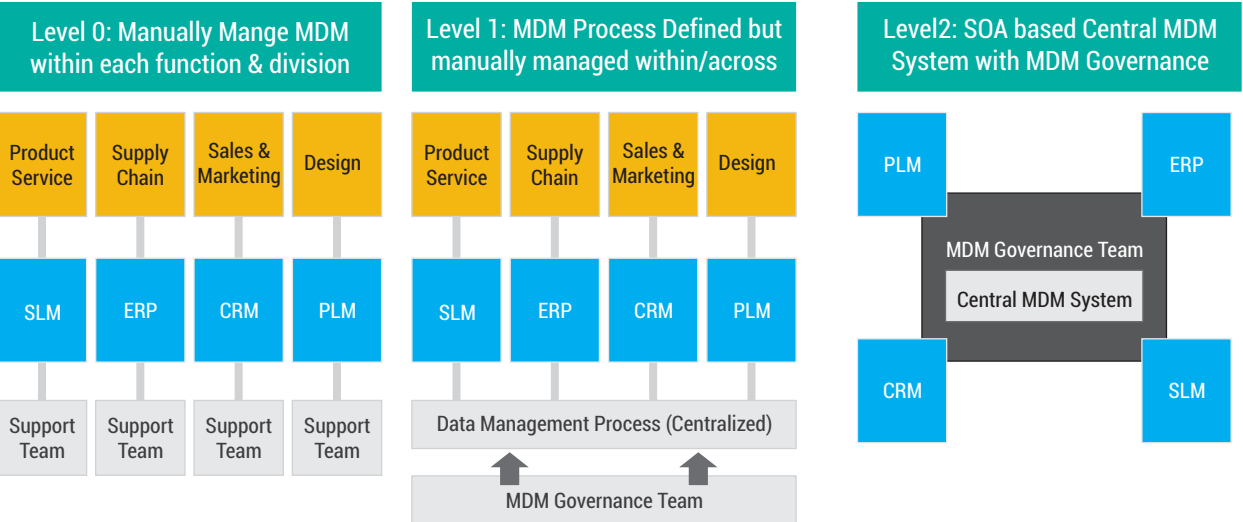
Level 0: In this maturity stage, master data is manually managed within each function and division and no organization wide standards are defined. Followings are the typical challenges faced by organizations in this maturity level:

- Replication across systems
- Duplication of effort across enterprise
- Lack of organization wide standards
- Lack of clarity on system of record

- Data quality challenges
- Lack of MDM data quality impedes business applications and reporting

Level 1: In this maturity stage, organization wide standards around master data is defined, but manually managed within/across different function and division. Standard MDM process definitions link all functional data needs and tasks. The same is deployed across the enterprise as per a MDM process management framework defined by Central MDM team. This helps to overcome following challenges faced by Level 0 maturity organizations. However, due to manual management of MDM processes, cost is maintenance will be high and responsiveness will be low.

- Helps lower effort in maintenance
- Drives better data quality
- Adherence to standard
- Clarity on responsibilities
- Reduction in duplicates & missing attributes
- Process management can be handled at function level or by a central team
- Faster response due to improved cycle times

Level 2: In this maturity stage, SOA based central MDM System with MDM governance is implemented through a central repository (SOA based), fed by workflow capabilities, to access all master data attributes. The MDM system feeds all-consuming applications and process needs. Following are the benefits:

- High responsiveness and flexibility
- Internal system/Partner synchronization
- Data quality reported and measured
- Data governance and stewardship
- Easy access to data
- Lower cost of maintenance – ease, flexibility
- Better decision support
- Better compliance
- Higher service responsiveness

Approach to define a formidable MDM strategy:

A multi-faceted MDM Strategy focusing on following areas is essential for establishing strong foundation for a successful program.
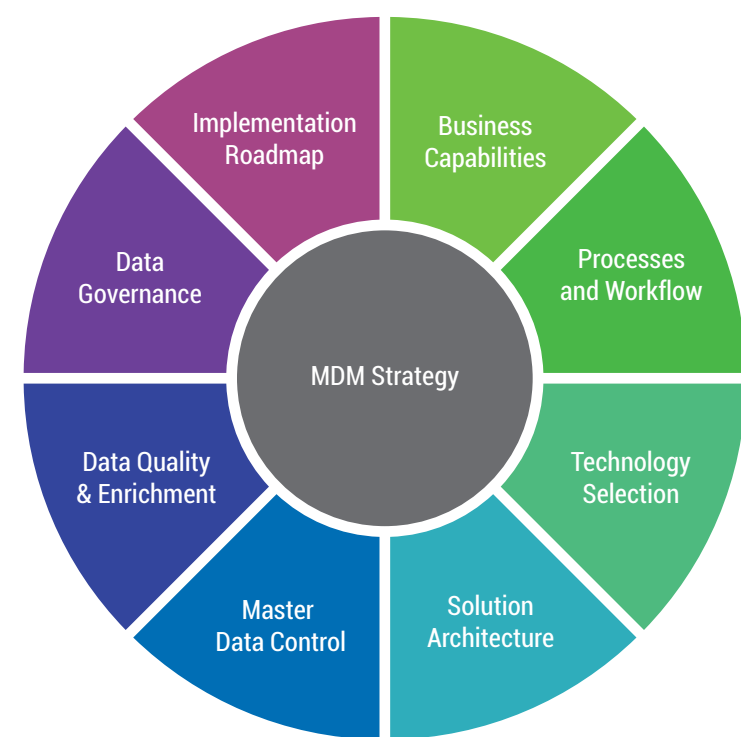
Business capabilities: Before starting an MDM strategy program, it is important to align business and IT stakeholders about the need. This can be done by preparing a business case that lists down existing and future business capabilities that should be addressed through the MDM solution. The business case should also identify a set of initiatives and programs that would benefit the most from MDM. Involvement of the stakeholders anchoring such initiatives and programs will be critical for the success of the MDM program.

Though the business initiatives which can benefit from a unified enterprise master data management varies based on the industry segment and business of the enterprise, list below are some of common business initiatives that can benefit from product, customer and vendor data management.

Product data management program can benefit business initiatives (and hence the business case for a Product Master Data Management initiative needs be linked to such initiatives) such as:

- Optimization of NPI (New product initiatives) process

- Improvement of R&D/product engineering center efficiency
- Product environment compliance
- Reduction in stock –out through supply chain optimization

Similarly, customer data management program can benefit following business initiatives:

- Improvement of customer satisfaction
- Improvement in campaign management effectiveness
- Rationalization of loyalty programs
- Call center process improvement
- Improvement in sales through cross-sale/up-sale
- Improvement in quotes conversion ratio

Vendor data management program can benefit the following business initiatives:

- Procurement cost optimization through effective vendor management

- Improvement of compliance on outsourced parts
- Optimization of supply chain
- Better management of supply chain risk

Processes and workflow: Here the focus should be around understanding the current processes impacting the master data domain (product, customer and vendor etc.)It is important to drive a process consumption view on master data that is as comprehensive as possible from an enterprise process perspective. As an example, any retail product/item master needs to assess how processes like merchandizing, pricing, sourcing, supply chain and replenishment, warehousing & logistics etc. consume or work on the product master data. Apart from process flow diagram, a CRUD (create, read, update and delete) model should be prepared to understand how different applications are responsible for either changing or consuming the master data. After understanding the As Is process flow and CRUD model, To Be process flow and CRUD model should be defined to address the objectives of MDM program. The better understanding of existing master data information flow between different systems and identification of data interfaces that will be required to enable the MDM solution should also be an outcome of this exercise.

Technology selection: From technology perspective, enterprises have various options and tools (as listed below) available that can help to reduce time to market and bring on the best practices in implementing the solution.

Option	Leading vendors
Commercial of-the-shelf MDM tools	Informatica, IBM, Oracle , SAP, Tibco
Open source MDM tools	Talend
MDM as a service (Cloud based)	Orchestra Networks, Informatica, Tibco
Bespoke	NA

Decision to go with any of the option/tool as listed above should be made on the basis of the features that are required to be supported to enable the business capabilities. Enterprises typically needs following features in the MDM tool. However, this may vary based on the industry segment and business capabilities that need to be enabled.

Category	Features
Data management	• Data acquisition and integration • Data cleansing • Flexible data models • Multi entity support • Data de-duplication • Matching and merging • Import/export • Mass edits • Audit trail
Technical capabilities	• Source system integration and data synchronization • Event management • Security and privacy • Workflow capability • Flexible and open architecture • Scalability , usability and performance • Process automation
Relationship/Hierarchy management	• Multiple hierarchies • Flexibility in definition and modification
Ease of use	• User friendly from data governance perspective • Easy to configure and administer • Search • Reports

Apart from MDM tool, implementing an MDM solution will need ETL, EAI and data quality tools as well, which need to be decided based on the requirements and enterprise standards.

Solution architecture: There are various styles of MDM architecture and the right one needs to be decided based on the requirements, legal and political considerations. Following section describes below most popular architecture styles and the scenario where it should be implemented:

Transaction style: This style will have a centralized master data hub responsible for authoring the master data. Upstream applications can write the master data to the centralized master data hub and all applications can subscribe updates published from the central system. Updates in transaction style is typically in real time and mostly implemented through SOA environment exposing layer of business services that can be consumed by different applications.

Transaction style MDM architecture can be implemented in the following scenarios:

- Need to support transaction-processing requirements across enterprise
- Senior level sponsorship and buy-in from organization as this architecture will require changes in most of the applications across enterprise dealing with the master data

Consolidation style: In this style, master data from different enterprise applications are extracted, matched, harmonized, cleansed and physically stored in a repository. Master data hub will not be responsible for authoring the master data and it can be used by other applications for read purpose only. Updates in consolidation style are after the event and typically carried out through a batch process.

Consolidation style MDM architecture can be considered in following scenarios:

- Creation of MDM repository for reporting , analytical and central reference
- Improve data quality , standardization and harmonization of master data coming several desperate systems

Registry style: This style is non-invasive approach of creating accurate and consistent master data. With this approach, only a unique global identifier is stored in the central register, which links physical data stored in different applications. This approach is typically faster to implement compared to above approaches, which requires maintenance of physical data in central data repository. This approach works on data federation approach to link master data from different databases in run time. It has following limitations:

- MDM system can be used for be read-only purpose as data authoring will not be possible
- Data quality issues cannot be handled as the master data is distributed across various source systems
- Reference master data may not be available, if corresponding source systems are not available during run time
- Master data does not get harmonized across different systems

Registry style MDM architecture can be considered in following scenarios:

- MDM system needs to follow a non-invasive approach with minimal disruption to existing systems
- Fast implementation of single view of real time master data, which can either used by operational or analytical system

Master data model: Data model is core to the implementation of an MDM solution. Data model should be built keeping in mind current and future business needs. It should be flexible enough to accommodate any changes arising due to change in business or due to acquisitions with minimal impact. There are certain Industry data models available for product and customer/vendor, which should be evaluated before deciding on custom data model. Data model should be designed in such a way that it should be able to support multiple as well as ragged or unbalanced hierarchy as per the requirements.

Data quality and enrichment: One of the main objectives of MDM program to improve the quality of master data such it can become trusted or reliable source of information across the enterprise. Apart from fixing data quality issues and aligning it to internal standards, it also needs to be enriched and standardized as per the global standards. Following are the key focus for defining a data quality strategy:

Profile data and understand key quality issues: Existing master data should be profiled on following parameters to understand data demographics and potential issues:

Completeness: Percentage of data missing or unusable

Conformity: Percentage of data stored in non-standard format

Consistency: Percentage of data values giving conflicting information

Duplicates: Percentage of repeating data records or attributes

Accuracy: Percentage of data incorrect or out of date

Integrity: Percentage of data missing or non-referenced

Data enrichment: Lot of useful information around customer/vendor or product data is typically not available with the organization itself. External data services companies such as D&B and Austin-Tetra can provide very vital information around various master data domains that can help in various business initiatives (like reducing supplier risk/minimizing supplier disruptions or improve compliance etc.). Other than this, they also help in aligning master data to an industry accepted standards, which in turn help in seamless communication of information with the partners.

Data quality monitoring: Continuous monitoring of data quality issues and a mechanism to address them is needed after the implementation of MDM program. For this data quality KPIs, which need to be monitored on a regular basis need to be determined. An alert based mechanism can be developed to notify the responsible person when the KPIs value falls below threshold defined.

Data governance: Success or failure of any Master Data management initiative is dependent on reliance and integration of data governance throughout the initiative. Data governance team acts as a central entity for laying down corporate wide strategies and guidelines for managing data capture, integration, maintenance and usage. They are fully responsible, authorized and accountable for every aspect of master data. They ensure that all the enterprise projects align to the data standards, policies and rules defined by them. Strong enterprise data governance will benefit the MDM program as well as strengthen the organization to manage all enterprise information activities. Typically, data governance team is setup to cater to the following needs:

Management of critical data elements: The purpose is to achieve consensus across organization around data elements associated with common business terminologies. This will also involve finding out the authoritative data sources, agreeing on their definitions and managing them in a master data repository.

Defining information standards, polices and rules: Data governance team is responsible for defining the business rules , standards and policies as well as making sure that it is adhered to. For example , data governance team can define standards for entry of address field in enterprise applications that can help in reducing the duplicates.

Enforce data governance across enterprise: It is responsibility of the data governance team to empower right individuals and enforce well defined data governance policies across enterprise.

Data ownership in an organization: Since benefits of an integrated and standardized master data is reaped by the entire organization, it often becomes debatable as to which business unit should take ownership of managing the master data. Based on our experience, we found that certain master data domains are more important from RTB (run the business) perspective for specific business units. Following diagram suggest, which business unit/department should ideally take ownership of different master data
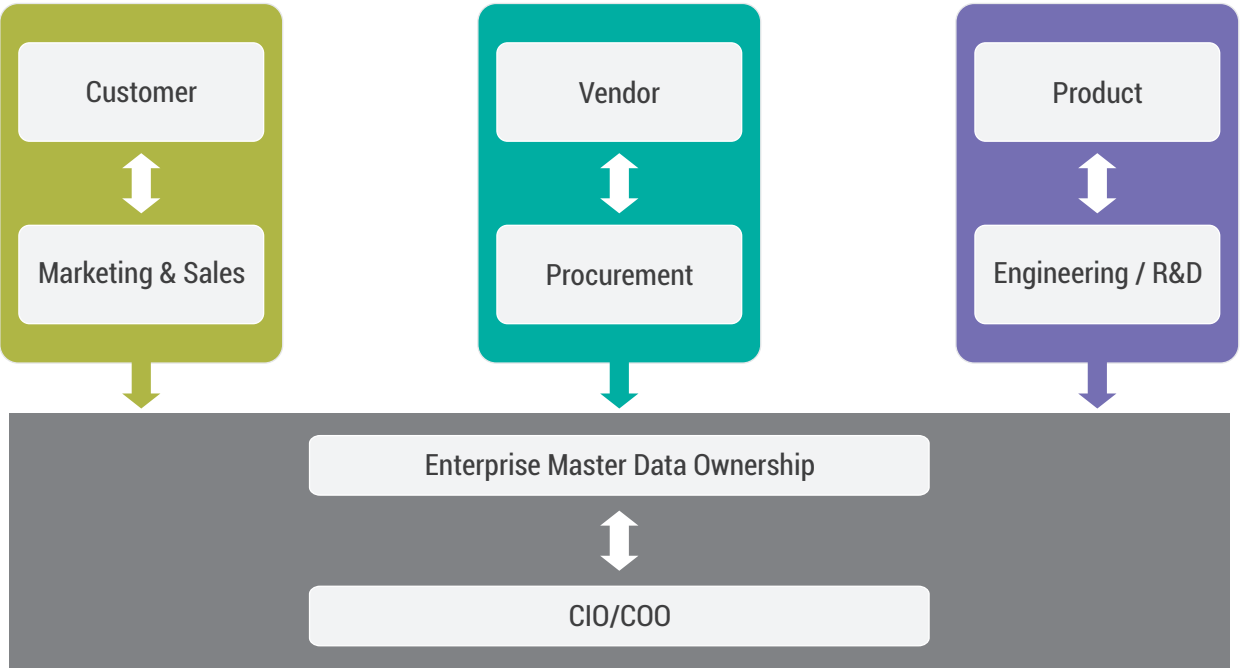
- Above business units need to establish the data governance team for their respective data domains. There should be data governance steering committee headed by CIO or COO responsible for defining followings:
- Data Governance program charter
- Data Governance operating model
- Data Quality effectiveness metrics

Implementation roadmap: Last step in defining MDM strategy will be to define roadmaps. This will require following information:

- Set of initiatives that benefit most from MDM should. This will be the driver to decide sequence of capabilities that should be implemented first
- Dependencies based on ongoing and planned projects
- High level timelines and cost estimates

In the final analysis

We believe Master data management should not be looked merely as a technical solution as it requires extensive involvement of business pre and post implementation. MDM tools can facilitate management of data, however if aspects like vision, strategy, process and business capabilities are not addressed adequately, it may not yield the desired results. The business case for a MDM initiative is far beyond the conventional aspects of cost avoidance; rather it is intrinsically linked in the business cases of a whole bunch of business initiatives that need this as a foundational requirement. Hence, the focus should be first to establish how master data fits into overall business strategy, assess how it will bring value in the existing business capabilities and enable new capabilities and then use this information to build effective MDM strategy, data governance and processes.

MDM Strategy Case Examples

Global leader in automotive parts manufacturing

Client context

Historically the client has been a regionally managed organisation. This was a major challenge as it was not able to effectively utilize the internal synergies to compete with global players. An integaretd master data management solution was needed to help the customer to integrate information across various units from design to delivery considering focussed management information needs around product, Customer and Supplier data.

ITC Infotech approach

- Defined business case articulating the benefits of an integrated MDM solution
- Established common minimum information dictionary through master data models around product, customer and vendor data domains.
- Defined technical solution architecture, data governance mechanism as well as team structure
- Defined MDM implementation roadmap

Benefits

Global business performance management: Due to fragmented master data, information management systems were not able to provide global information view. MDM solution established "common minimum information dictionary" mandated across all information systems helping in global business performance management

Business System integration: Master data model established a single source of truth for all business systems across the organization for crucial business information allowing integration of various business systems in to a coherent structure.

Improved global supply chain management: Single nomenclature of product and vendor data across different plants/warehouses/regions helped client to improve global supply chain efficiency and optimize the cost with unified visibility around part, vendor, pricing, inventory etc.

A Business Standards company

Client context

The Client is one of oldest company involved in business standards definition. Over a period of time, it diversified into different business segments like supply chain risk management, auditing, training etc. Despite having large customer base, theclient was not able to effectively utilize the synergies to improve revenues for new business segments through up-sell and cross-sell. The client needed a common customer data management solution across all business segments.

ITC Infotech approach

- Defined business capabilities that customer data management solution will address
- Defined technical solution architecture, data governance mechanism as well as team structure
- Defined MDM implementation roadmap after taking into consideration the initiatives that will benefit most as well as other ongoing initiatives and dependencies

Benefits

Improved cross-sell/up-sell efficiency: Integrated customer data across all business segments provided a unified view on customer buying patterns helping to improve cross-sell/up-sell efficiency.

Improved customer experience: Ability to analyze the experiences with the customer and make appropriate segmentation helped in improving customer experience.

Improvement in quotes conversion ratio: Visibility into total value and profitability of a Customer to arrive at a differentiated quote/contract, which in turn improved the quotes conversion ratio.

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