ENTERPRISE INFORMATION MANAGEMENT
- Managing data and information for business advantage

Introduction

This paper presents an overview of key literature (academic and practitioner) that has informed the Enterprise Information Management (EIM) Critical Capability (CC) of IT-CMF in the digital business context. The paper highlights the key insights that underpin the EIM CC, and presents an up-to-date view of key thinking in this area. The goal of an effective EIM capability is to ensure that quality data and information is available to support the business activities of the organization. It ensures availability of appropriate operational data and information for business transactions, and consistently enables timely and informed decision-making. An effective EIM capability must include strategic integration between business goals and the information and data management strategy to support these. Managing data and information effectively also requires that the IT function supports, rather than drives, an organization's strategic needs [1].

As a note on terminology, this position paper adopts the view, based on the *Data Management Association International's* (DAMA) Body of Knowledge [1] (p.20) that data and information are so closely related that a precise differentiation between their meanings cannot usefully be provided. In terms of how they are managed in organizations, however, it can be useful to make a distinction between them for the purposes of clear communication about the requirements and expectations of different stakeholders e.g. a sales report (information) based on data from the data warehouse (data).

The Fundamentals of Enterprise Information Management

The fundamental principles of EIM, in terms of the need to effectively manage the data and information in an organization in order to meet its goals, have not really changed since the development of recorded information. What clearly has changed are the ways in which that data and information can be generated, stored, and communicated, which have resulted in an increase in the volume and diversity of data and information. These developments, and the increased dependency of organizations on data and information, have increased the complexity of EIM. This has made EIM even more central to organizations, thus increasing the potential for strategic gain from EIM, but also increasing the risk if EIM fails or is not optimized.

The EIM capability underpins a range of core business transactions and the day-to-day operational activities of an organization, which in turn can enable the dynamic capability [2] to adapt and change in anticipation and response to environmental changes. It provides an information platform upon which new products and services can be quickly delivered and facilitates the rapid integration and/or interoperation with other systems such that business segments can be quickly turned on or off. EIM

even facilitates divestitures, acquisitions, business transformations, and business evolutions. The specific objectives of EIM are as follows:

- Provide flexible, dynamic, and comprehensive data platforms that enable the rapid integration or interoperation with new digital forms of data and information.
- Select and make available data capture, encoding, and decoding mechanisms for the processing, storage, and transmission of new digital forms of data.
- Support better decision-making and business insights with quality data and information, and data analytics.
- Enable the analysis of data and information to improve the identification and exploitation of new business opportunities.
- Improve the efficiency of business processes by making data and information available that is fit for purpose.
- Safely and effectively manage data and information throughout their life cycles.

Managing Enterprise Information in the Digital Context

Data and information are essential ingredients for successful digital transformation. Effective transformation requires making the right decisions about what to change. In order for change decisions to be evidence based, the organization requires the ability to collect, store, and share data and information. As such, getting the basics right of effective and secure data and information management is a necessary foundational condition for enabling digital transformation.

> *"In digital transformation, every change relies on converting data into actionable decisions" [3].*

In terms of building and controlling the EIM capability in the digital context, it is necessary to increase strategic focus and integration with the wider organization in its business ecosystem. EIM must be adaptive and flexible and able to deal with changes in data formats and provisioning channels and media types. These issues are summarized in the section below with a focus on the IT-CMF EIM CC capability building blocks (CBBs) of Strategy and Leadership, Enabling Data Analytics, and Information Security. In terms of updates to the IT-CMF EIM CC, the main change is a re-focusing of the relationship with data analytics. A new CC has been developed, Data Analytics (DA), to provide detailed guidance on DA, whilst EIM still provides guidance on enabling DA in terms of data and information management.

Strategy and Leadership

EIM which is well aligned to the needs of the organization is an essential foundation to enable data to be used for strategic transformation. The operational, in terms of getting the foundations of data and information management in place and running smoothly, enables the transformational [4]. EIM can play a key role in enabling business transformation and innovation. Research has [5] demonstrated that, in particular, integrating an Enterprise Information System (EIS) with other system(s) or with digital devices can support innovation. This research [5] also found that applying data analytics tools into data accumulated from EIS to extract new insights, led to innovative practices.

As data and information become even more central to organizational success, a culture change is required in how enterprise information is managed as data is key to strategy and not just day-to-day operations [6]. Implementing this culture change [7] requires new business and communication skills for those working in data management [4], and the roles of those working with data may also need to change [8]. As a response to the increased complexity and organizational scope of EIM, new guidelines have also been developed to facilitate more standardization and coordination within EIM in the public sector in Europe [9].

It is essential that EIM works in coordination with senior organizational teams developing the wider organizational strategy. Business professionals and technical data professionals need to work alongside each other to enable an EIM strategy that can support the organizational strategy. It should be a strategic priority that the organization is able to take advantage of new ways to leverage data [1]. EIM will need to reflect effective collaboration both internally and externally and, in particular, it needs to be part of new product or service considerations from very early in the conceptualization process phase. New data varieties may come from any function within an organization. EIM staff will need to be aware of who in the organization is monitoring opportunities for innovation and to respond appropriately to their information needs and requirements. EIM will need to work closely with other areas of expertise and possibly include staff with experience in other disciplines. As an example, data valuation digitization [10] may introduce new data varieties and new groups of stakeholders whose value perspectives might need to be considered. EIM leadership teams will also need to be more diverse to ensure that the mix of aptitudes, attitudes, and skills facilitates dynamic responses to a changing external environment. [11].

Enabling Data Analytics

Digitization and business transformations may necessitate the analysis of new data formats that are not supported by commercial off the shelf solutions. EIM needs to ensure that solutions appropriate to the business can be quickly deployed. Data visualization is becoming increasingly sophisticated and EIM needs to provide data in forms which support this [1]. Information management models, such as MIKE2.0 [12], are also planning to have the capability to provide guidance on dealing with unstructured information. Speed and agility will be difficult to maintain in the on-going explosion that is big-data [13]. Emerging tools and methods will need to be adopted to keep pace and develop advantages that are often short lived.

Organizations will need to ensure that their EIM processes and approaches are able to provide flexible, dynamic, and comprehensive data platforms that enable the rapid integration or interoperation [14], [15] with new digital forms of data and information. Domain expertise around the static and dynamic relationships between data and information may need to be expanded to understand new varieties and solutions to help with limits on velocity and volume to ensure that information modelling continues to reflect reality. EIM teams need to work with enterprise architecture management teams to reduce complexity and ensure stakeholders have simplified information views when and where needed. Core

stakeholder groups must be identified and their participation in data and information management is essential for success.

Information Security

The increased regulation around data and information management requires improved processes and structures [16]. Data management processes and policies need to enable the streamlined reporting of data storage and use to facilitate audit and demonstrate compliance [5]. There is also an increased need to communicate to more stakeholders regarding their responsibilities for governance and compliance.

Digitization continues to increase the number and types of devices that can view, store, and transmit data and information. The constant and persistent need to be vigilant with these devices may bring about fatigue and lapse of attention. A culture of 'must secure/will secure' needs to be maintained among all stakeholders, both internal and external. Security models and approaches [17]–[20] generally are not affected by digitization but the volumes of data and the types of data may change. End point security will grow and require more (hopefully automated) monitoring, with new skills and techniques being developed for the Internet of Things (IoT) security. In particular, an understanding of the vulnerabilities [21]–[23] and risks associated with new technologies may come from staff outside of IT.

Conclusions

Enterprise information management is a board level responsibility and all key stakeholder groups must be contributing members of an enterprise information management board. All parts of the business have a part to play and the use of cross-functional teams and communities of practice [24] will continue well into the future. Approaches to EIM must focus on confirming effective EIM as a strategic priority and managing its relationship with Data Analytics (DA) and Technical Infrastructure Management (TIM) capabilities. Organizations that want to understand and improve their current EIM capability have a structured and repeatable way to do so with the IT-CMF EIM CC.

Research Methods

The EIM CC was developed based on the input of a workgroup of academic researchers and industry practitioners, and an analysis of relevant practitioner and academic literature. In addition, before the CC was finalized, it was reviewed by selected academic and practitioner EIM experts.

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