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## Analysis and Classification of Barriers and Critical Success Factors for Implementing a Cloud Data Governance Strategy

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### Abstract

The general consensus in literature seems to suggest that data governance refers to the entirety of decision rights and responsibilities concerning the management of data assets in organisations. These definitions do not however provide equal prominence for the data governance within the cloud computing technology context. As such, this deficit calls for in-depth understanding of data governance and cloud Computing. This trend contributes to changes in data governance strategy in the organisation, such as the organisation's structure and regulations, people, technology, process, roles and responsibilities. This is one of the great challenges facing organizations today when they move their data to Cloud Computing environments, particularly how Cloud technology affects data governance. The authors' general observation reveals that the area of data governance in general is under researched and not widely practiced by organisations, let alone when it is concerned with cloud computing, where research is really in its infancy and far from reaching maturity. This paper attempts to identify the possible common barriers and critical success factors for implementing cloud data governance in the hope that it helps the reader to be aware of these barriers and consider them in future developments in the field.

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**Keywords:** Cloud computing; data governance; cloud data governance; critical success factors (CSFs); systematic literature review (SLR), barriers.

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## 1. Introduction

Data Management is often confused with data governance, however, they are completely different. The Data Management Association (DAMA) defined data management as: “... is the development, execution and supervision of plans, policies, programs and practices that control, protect, deliver and enhance the value of data and information assets”. Data management in general focuses on the defining of the data element, how it is stored, structured, and moved. Although there is no official standard definition of data governance, nonetheless, to provide clarity, we refer to the most cited definitions offered by some important organizations and specialists.

According to the Data Governance Institute (DGI)<sup>1</sup> data governance is “a system of decision rights and accountabilities for information-related processes, executed according to agreed-upon models which describe who can take what actions with what information, and when, under what circumstances, using what methods”. While the IT encyclopedia defines data governance as: “... the overall management of the availability, usability, integrity, and security of the data employed in an enterprise. A sound data governance program includes a governing body or council, a defined set of procedures, and a plan to execute those procedures”. DAMA on the other hand defines data governance as: “the exercise of authority, control and shared decision-making (planning, monitoring and enforcement) over the management of data assets”. According to DAMA, Data governance is therefore, high-level planning and control over data management<sup>2</sup>.<sup>3</sup> have also argued that data governance is different from data management; that data governance complements data management, but does not replace it.

Recently, many organisations have become aware of the increasing importance of governing their data, to ensure confidentiality, integrity, quality and availability of customers’ data<sup>3-5</sup>. There is no single approach to the implementation of data governance program in all organizations<sup>6,7</sup>. A good data governance can help organisations to create a clear mission, achieve clarity, increase confidence of using the organisational data, establish accountabilities, maintain scope and focus, and define measurable successes<sup>3,8</sup>. Moreover, many authors suggested that developing an effective data governance will lead to many benefits for organizations. These benefits are: enabling better decision-making, reduce operational friction, and protect the needs of data stakeholders as central to a governance program<sup>4,7</sup>. In addition, other benefits include: training of management and staff to adopt common approaches to data issues, build standard, repeatable processes, reduce costs and increase effectiveness through coordination of efforts, and ensure transparency of processes<sup>9,10</sup>.

A recent development in technology is the emergence of cloud computing<sup>11,12</sup>. Cloud computing model enhance availability and is composed of five essential characteristics, four deployment models and three service models<sup>13</sup>. The essential characteristics of cloud computing include on-demand self-service, broad network access, resource pooling, rapid elasticity and measured service<sup>14</sup>. The cloud deployment models are private, public, hybrid, and community model<sup>12</sup>. In addition, cloud computing include three service delivery models which are: Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS)<sup>15</sup>. Cloud computing offers potential benefits to public and private organisations by making information technology (IT) services available as a commodity<sup>16,5</sup>. The general claimed benefits of cloud computing include: cost efficiency, unlimited storage, backup and recovery, automatic software integration, easy access to information, quick deployment, easier scale of services and delivery of new services<sup>17</sup>. Though, cloud computing is still not quite widely adopted because of many factors<sup>18</sup><sup>19 20 16,21,22</sup>. One of the main reasons that impedes the wider adoption of the cloud computing model have been linked primarily to aspects related to data governance<sup>23,24</sup>. While security shows to be the most cited challenge to cloud adoption,<sup>25</sup> show that 41% of the security problems in the cloud are related to governance and legal issues. The cloud computing model is expected to be a highly disruptive technology and the adoption of its services will, therefore, require an even more rigorous data governance strategies and programmes, which can be more complex, but necessary. Data governance is therefore considered as one of the most important aspects of cloud governance<sup>26</sup>.

There was strong consensus that cloud computing will lead to change on the strategy of traditional data governance in organizations<sup>27</sup>. Data governance programs, built for on-premises IT infrastructure, cannot be deployed for a cloud infrastructure and service provisioning, which would require a completely new requirements, design and

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