

Review Article

Building a Data-Savvy Organization: The Intersection of Organizational Change Management and Data Literacy

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Abstract - This paper investigates the critical interplay between data literacy and Organizational change management in fostering adaptable, data-informed organizations. It emphasizes the necessity of data literacy—defined as the capacity to comprehend and apply data in decision-making processes—and its integration within the broader organizational culture through change management practices. The study synthesizes literature and case studies across sectors to illustrate the transformative impact of combining data literacy with change management strategies on organizational effectiveness. By highlighting best practices, the research advocates for a strategic approach to inculcate data literacy, underscoring change management's role in ensuring sustainable adoption and aimed at facilitating organizations' journey through digital transformation; this paper provides actionable insights for building a future-ready, data-literate workforce. The Paper contributes a practical framework for leveraging data literacy as a catalyst for organizational success in the digital age.

Keywords - Data literacy, Decision making, Change management, Data-driven organizations, Digital transformations, Stakeholder management, Adoption of change, Data and Analytics, Business intelligence.

1. Introduction

Data permeates every facet of personal and professional life. Data literacy emerges as a cornerstone of decision-making and strategic planning. Data literacy, defined as the ability to read, understand, create, and communicate data as information, has become an indispensable skill set in navigating the complex, data-driven landscapes that characterize modern organizations (Ridsdale et al., 2015). Concurrently, Organizational change management—principles and practices designed to steer individuals, teams, and organizations through transformative processes—plays a pivotal role in embedding a culture of data literacy. It provides the methodologies necessary to adapt to and embrace the use of data in decision-making processes (Hayes, 2014).

Data literacy is recognized as a foundational skill for participating in the modern data-driven world. According to Murray-Rust et al. (2019), 80% of organizations are expected to deliberately develop competencies in data literacy due to a significant deficiency in this area (Murray-Rust et al., 2019). This underscores the urgency for organizations to foster a culture where data literacy is a core competency. Furthermore, Deahl (2014) highlights the critical need for developing data literacy skills among youth, preparing them to think critically and ethically about data (Deahl, 2014)

This survey paper aims to explore the symbiotic relationship between data literacy and organizational change management, examining how they collectively contribute to building resilient, informed, and adaptable organizations. By delving into the intricacies of both domains, the paper seeks to highlight the challenges and best practices involved in fostering a data-literate culture underpinned by effective change management strategies.

2. Objectives of the Survey Paper

- To elucidate the concept of data literacy and its significance in the digital age.
- To explore change management theories and their applicability in fostering data literacy.
- To examine the interplay between data literacy and change management within organizational contexts.
- To identify challenges and propose strategies for enhancing data literacy through change management.
- To highlight future directions in the integration of data literacy and change management practices.

In the following sections, we will delve into the conceptual frameworks of data literacy and change management, explore their interrelationship, and discuss practical strategies for fostering a culture of data literacy in organizations undergoing digital transformation.



2. Theoretical Framework

2.1. Data Literacy

Data literacy encompasses a comprehensive skill set that allows individuals to extract meaningful information from data, facilitating informed decision-making and strategic planning. As defined by Gartner, data literacy is “the ability to read, write, and communicate data in context, including an

understanding of data sources and constructs, analytical methods and techniques applied, and the ability to describe the use case, application, and resulting value” (Gartner, 2020). This definition underscores the multifaceted nature of data literacy, highlighting not just the technical skills involved in handling data but also the critical thinking required to interpret and leverage data effectively.

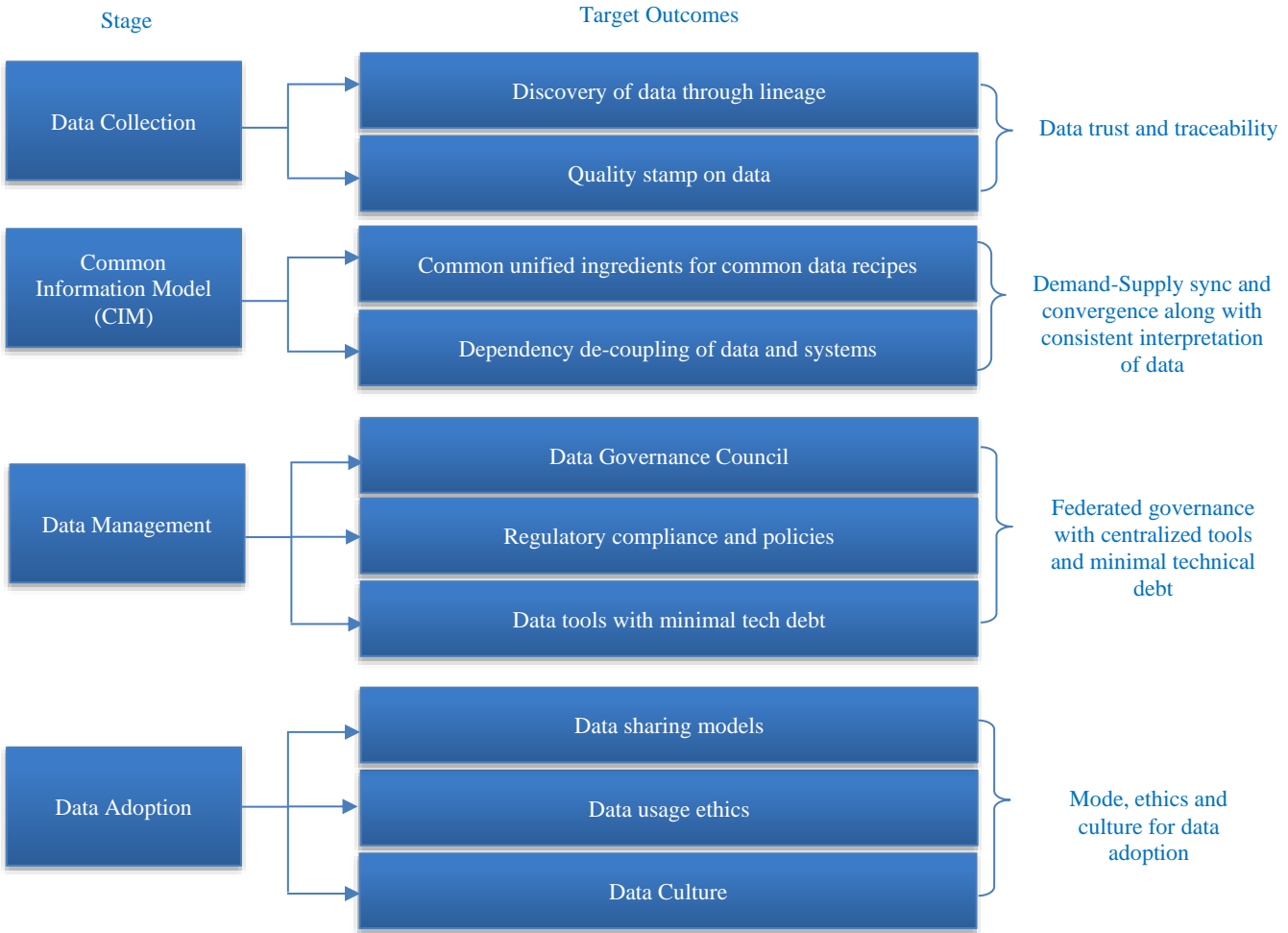


Fig. 1

Key Components of Data Literacy:

2.1.1. Understanding Data Sources and Management

Recognizing the origins of data, including both internal and external sources, and understanding how data is collected, stored, and managed.

2.1.2. Data Analysis and Interpretation

The ability to analyze data using various techniques and tools, interpret results, and draw meaningful conclusions.

2.1.3. Critical Thinking

Employing skepticism and critical thinking to question the validity and reliability of data, understand biases, and recognise the limitations of data analysis.

2.1.4. Data Communication

Effectively communicating findings and insights from data analysis, using visualizations, reports, and presentations to convey complex information clearly and persuasively.

2.2. Evolving Nature of Data Literacy

In the era of digital transformation, data literacy is no longer a niche skill reserved for data scientists and IT professionals. It has become a fundamental competency across various roles and disciplines. The rapid proliferation of data and advancements in analytical tools have democratized data analysis, making it accessible to a broader audience. Consequently, fostering a data-literate workforce is critical for organizations aiming to leverage data for competitive

advantage, innovation, and efficiency (Ridsdale et al., 2015).

Data literacy transcends traditional boundaries, requiring a tailored approach that considers the unique attributes of different disciplines (Hou, 2019). This necessitates a move away from one-size-fits-all training programs towards more nuanced, discipline-specific data literacy education (Hou, 2019). Stakeholders across various fields, including educators, policymakers, and nonprofits, are involved in shaping the discourse on data literacy, emphasizing its importance across the spectrum of societal roles (Corrall, 2019).

2.3. Change Management Fundamentals

Change management refers to a structured approach to transitioning individuals, teams, and organizations from a current state to a desired future state. It encompasses methodologies, tools, and strategies to manage the people side of change, ensuring that changes are smoothly and successfully implemented to achieve lasting benefits (Kotter, 1996).

2.3.1. Overview of Change Management

At its core, change management focuses on addressing the human aspects of change. It is predicated on the understanding that for change to be effective and sustainable, it must be embraced and adopted by the people it affects. Change management involves preparing, equipping, and supporting individuals to adopt change, thereby driving organizational success and outcomes successfully.

2.3.2. Theories and Models of Change Management

Several change management models and theories have been developed to guide organizations through the complexities of change. These include:

Kotter's 8-Step Change Model

This model outlines a step-by-step approach to implementing change, starting with creating a sense of urgency and culminating in embedding new approaches into the organization's culture (Kotter, 1996).

Lewin's Change Management Model

This model describes the change as a three-stage process involving unfreezing the current state, making the change, and then refreezing to stabilize the new state (Lewin, 1947).

ADKAR Model

A goal-oriented change management model that focuses on the individual level, emphasizing awareness, desire, knowledge, ability, and reinforcement as key elements of change (Hiatt, 2006).

These models provide frameworks for managing change but must be adapted to the specific context and needs of each organization.

2.4. Interplay between Data Literacy and Change Management

The synergy between data literacy and change management is crucial for organizations seeking to navigate the complexities of the digital era. Data literacy empowers individuals with the skills to make data-driven decisions, while change management ensures these data-centric initiatives are embraced across the organization. This interplay creates a dynamic ecosystem where data literacy initiatives are supported by structured change management processes, fostering a culture that values and leverages data effectively.

Kratcoski et al. (1000) describe the Thinking with Data (TWD) project's interdisciplinary approach to developing data literacy skills across the curriculum, highlighting the necessity of integrating data literacy within the broader educational framework (Kratcoski et al., 1000). This approach aligns with change management principles by emphasizing the importance of cross-functional collaboration and the need for a shared vision.

2.4.1. Application of Change Management in Data Literacy Initiatives

Change management principles can be strategically applied to introduce and enhance data literacy within an organization. The following strategies illustrate this application:

Creating a Sense of Urgency

Communicating the importance of data literacy in achieving organizational goals and staying competitive. Highlighting success stories and case studies where data-driven decisions have led to significant improvements.

Forming a Powerful Coalition

Assembling a cross-functional team of leaders who are committed to fostering data literacy. This team can champion data initiatives, provide resources, and remove barriers.

Developing a Vision and Strategy

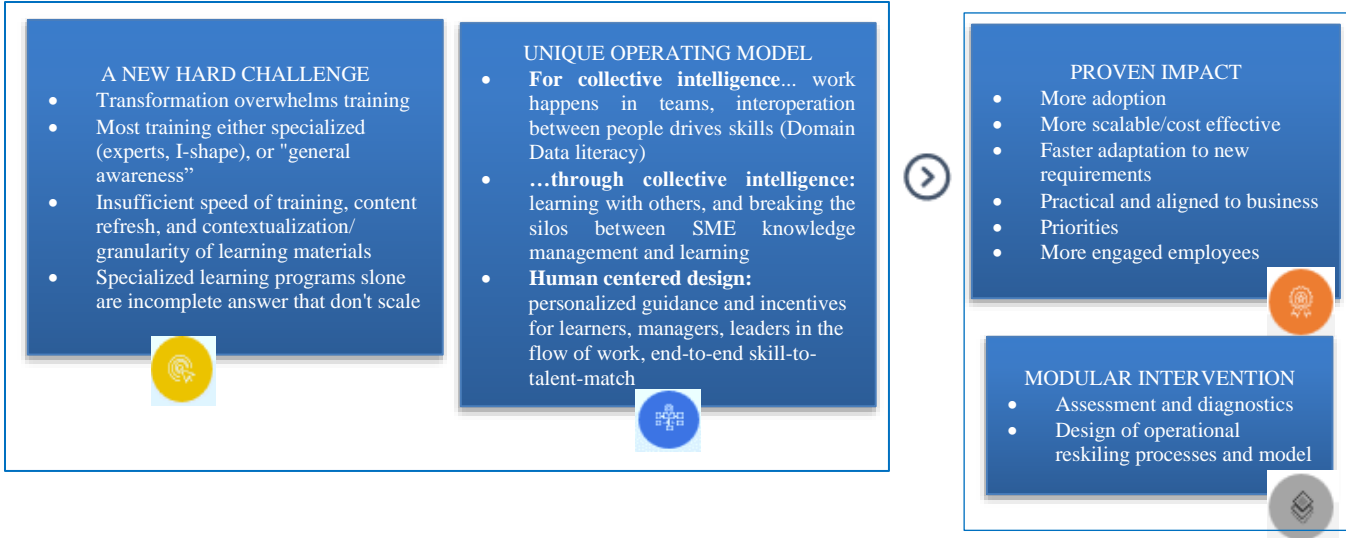
Establishing a clear vision for what the organization aims to achieve through data literacy, including specific goals and metrics for success.

Empowering Broad-Based Action

Removing obstacles to data literacy by providing training, tools, and resources. Encouraging experimentation and innovation in data analysis and use.

Generating Short-Term Wins

Recognizing and celebrating early successes in data literacy efforts to build momentum and demonstrate the value of data-driven decision-making.



2.4.2. Case Studies

Tech Corporation Transformation

A global tech corporation implemented a comprehensive data literacy program supported by a change management framework that included leadership endorsement, widespread training, and a rewards system for data-driven projects. This approach resulted in increased employee engagement with data tools and a significant improvement in operational efficiencies.

Healthcare Sector Innovation

A healthcare organization faced resistance to adopting Electronic Health Records (EHR). By applying change management strategies focused on training, support, and clear communication of benefits, the organization not only improved data literacy among its staff but also enhanced patient care through more accurate and accessible data.

2.5. Challenges in Enhancing Data Literacy through Change Management

While the integration of data literacy and change management offers numerous benefits, organizations often encounter challenges that can hinder their progress. Identifying these challenges is the first step toward developing effective strategies to overcome them.

2.5.1. Common Barriers and Challenges

Resistance to Change

Individuals may resist adopting new data tools and practices, often due to fear of the unknown, lack of understanding of the benefits, or perceived threats to job security.

Lack of Leadership Support

Without strong endorsement and involvement from leadership, data literacy initiatives may struggle to gain traction and secure necessary resources.

Skill Gaps

Organizations may face challenges in assessing current data literacy levels and identifying specific skill gaps that need to be addressed through training and development.

Cultural Barriers

A culture that does not value or understand the importance of data-driven decision-making can impede the adoption of data literacy practices.

2.5.2. Strategies to Overcome Challenges

Effective Communication

Clearly articulating the benefits of data literacy and change initiatives, tailoring messages to different stakeholders to ensure relevance and engagement.

Comprehensive Training and Support

Providing targeted training programs to address skill gaps and ongoing support to encourage continued learning and development.

Engagement and Involvement

Involving employees in the process of change, seeking their input, and addressing their concerns to foster a sense of ownership and commitment.

Cultural Transformation

Cultivating a culture that values curiosity, continuous learning, and innovation, making data literacy a core organizational value.

By addressing these challenges through targeted strategies, organizations can enhance their data literacy initiatives, supported by effective change management, to achieve lasting transformation and success.

The following section will explore best practices for fostering data literacy through change management, drawing insights from industry leaders and successful case studies.

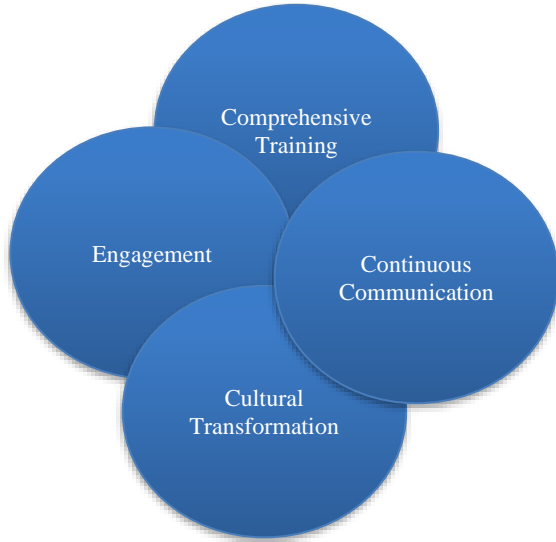


Fig. 2

2.6. Best Practices for Fostering Data Literacy through Change Management

To successfully integrate data literacy within an organization's fabric, leveraging change management principles is key. This section outlines best practices that have been identified through research and real-world success stories, offering a roadmap for organizations looking to enhance their data literacy capabilities.

2.6.1. Establishing a Data Literacy Framework Define Clear Objectives

Establish specific, measurable goals for what the organization aims to achieve with its data literacy initiative. This could include improving decision-making processes, enhancing operational efficiency, or fostering innovation.

Secure Executive Sponsorship

Gaining the support of senior leadership is crucial for securing the necessary resources and legitimizing the initiative across the organization.

Develop a Comprehensive Training Program

Tailor training to meet the diverse needs of employees, from basic data comprehension to advanced analytics, ensuring relevance to their roles.

2.6.2. Creating a Culture of Data Promote a Data-Driven Mindset

Encourage employees to ask questions that can be answered with data, fostering a culture where data-driven decision-making is valued and rewarded.

Foster Community and Collaboration

Establish forums or communities of practice where employees can share insights, challenges, and successes related to data literacy.

Recognize and Reward Progress

Acknowledge achievements in data literacy at individual and team levels to motivate continued engagement and improvement.

2.6.3. Leveraging Change Management for Sustainable Impact Communicate Effectively

Use clear, consistent messaging to explain the benefits of data literacy, addressing what changes will occur, why they are necessary, and how they will benefit the organization and its employees.

Provide Ongoing Support

Offer resources and support mechanisms, such as help desks or mentorship programs, to assist employees in navigating new tools and methodologies.

Measure and Adjust

Continuously evaluate the effectiveness of data literacy initiatives against set objectives, being prepared to adjust strategies in response to feedback and changing needs.

3. Methodology of Literature Review

The review of the literature was done using a step-by-step method to make sure we looked at all the important and existing studies about data literacy and managing changes without any bias.

3.1. Search Strategy

We used academic websites like Google Scholar, IEEE Xplore, and JSTOR and searched for terms like "Data literacy," "Change management," and "Digital transformation." We only looked at studies published in the last ten years to make sure we found the most up-to-date and relevant information.

3.2. Inclusion and Exclusion Criteria

We included studies that were about how data literacy and change management are used, the problems they face, or the best ways to do them in organizations.

We did not include articles that were not peer-reviewed, were not in English, or did not focus on strategies for data literacy or change management.

3.3. Data Extraction and Synthesis

We carefully pulled out important information from the chosen studies, like their goals, methods, findings, and suggestions.

This helped us see what most studies say about the topic, find new ideas, and see what is missing in the studies already done, which helped in making this survey paper.

4. Findings from the Literature Review

- Data literacy is essential for strategic decision-making in today's data-driven world, emerging as a key skill across all organizational levels.
- Integrating change management with data literacy initiatives is crucial for organizations to adapt and thrive, making data-informed decisions a norm.
- With most organizations aiming to boost data literacy skills to close existing gaps, it is clear that developing these competencies is an urgent priority.
- Data literacy involves not just handling data but also critical thinking and communicating insights, highlighting its multifaceted nature.
- As data analysis becomes accessible to more roles, a tailored, discipline-specific approach to data literacy education is necessary.
- Change management addresses the human side of transitions, using structured approaches to facilitate smooth organizational changes.
- The interplay between data literacy and change management is vital, ensuring data-centric initiatives are widely accepted and implemented.
- Key challenges include resistance to change and skill gaps, with strategies like effective communication and targeted training suggested to address these issues.
- Successful data literacy enhancement relies on clear goals, leadership support, and a culture that values data alongside effective change management practices.

5. Contribution and Recommendations

As the landscape of data and analytics continues to evolve, so too will the strategies for enhancing data literacy and change management. Emerging trends include:

5.1. Increased Integration of AI and Machine Learning

As AI and machine learning tools become more accessible, understanding how to leverage these technologies for data analysis will become a component of data literacy.

5.2. Focus on Data Ethics and Privacy

Organizations will need to balance the drive for data literacy with considerations of data ethics and privacy, ensuring that employees are equipped to handle data responsibly.

5.3. Customization and Personalization of Training

Advances in e-learning and adaptive learning technologies will allow organizations to offer more customized and personalized data literacy training experiences.

5.4. Data Sovereignty and Compliance Automation

As SaaS platforms expand globally, they encounter diverse data protection laws (like GDPR in Europe, CCPA in

California, and others around the world). Future research could explore automated compliance frameworks that adapt to local data regulations dynamically, minimizing manual intervention and reducing the risk of non-compliance.

5.5. Federated Learning and Data Privacy

With the growing emphasis on privacy, research into federated learning models for cloud-based platforms can offer insights into how to train machine learning models across decentralized datasets. This approach would allow data to remain within its region of origin, adhering to local privacy standards while still contributing to global data insights.

5.6. Cross-Region Data Management Strategies

Developing strategies and technologies for efficient data management across different cloud regions and providers is essential. This includes optimizing data transfer to reduce latency, managing costs, and ensuring data integrity and consistency across geographically distributed databases.

5.7. Data Literacy in Multi-Cloud Environments

Research into best practices and frameworks for enhancing data literacy among developers and data engineers working in multi-cloud environments is crucial, which includes understanding the nuances of data storage, processing, and security in various cloud platforms and how to leverage them effectively in a unified strategy.

6. Conclusion

Integrating data literacy with change management is essential for organizations aiming to thrive in the digital age. By establishing clear objectives, fostering a culture of data, and leveraging best practices in change management, organizations can ensure that their workforce is equipped to harness the power of data effectively.

As we move forward, staying agile and responsive to emerging trends and technologies will be key to sustaining and advancing data literacy initiatives.

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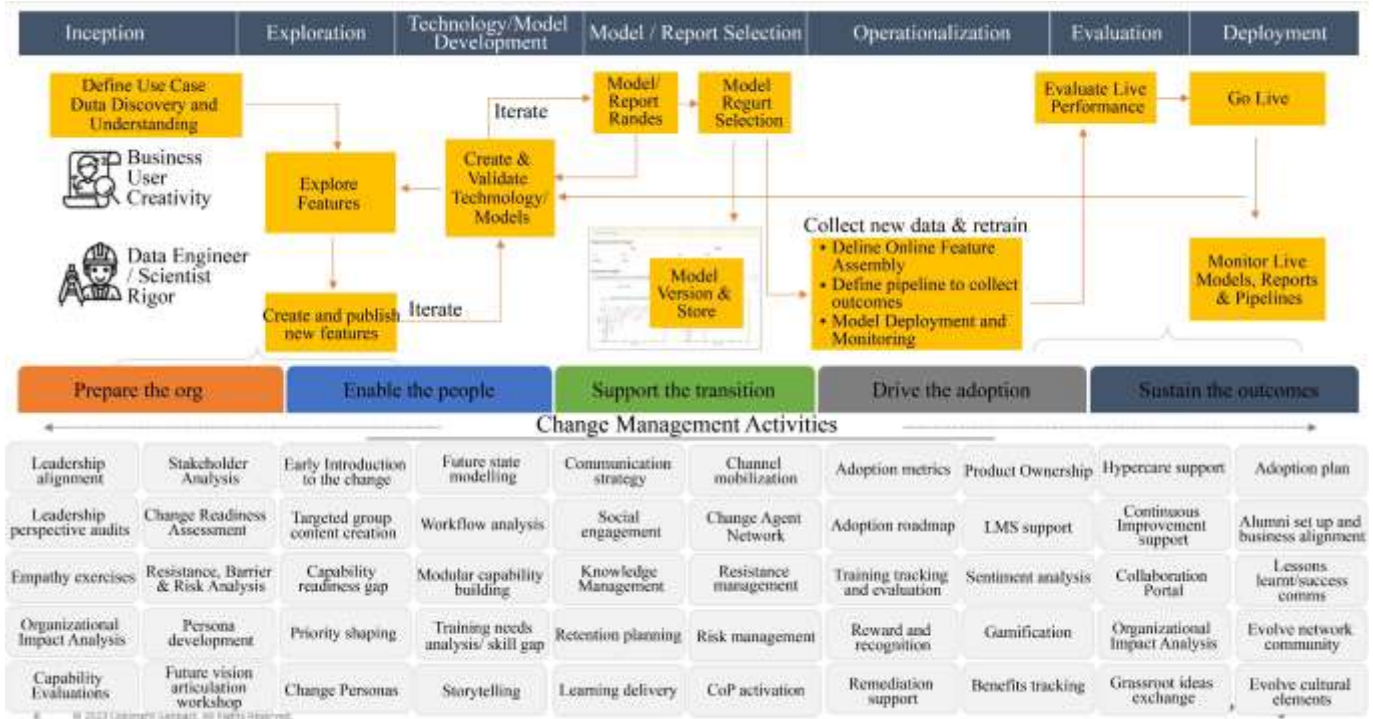


Fig. 3 Organizational change management framework for enterprise data literacy

References

- [1] Chantel Ridsdale et al., “Strategies and Best Practices for Data Literacy Education: Knowledge Synthesis Report,” Dalhousie University, 2015. [Google Scholar] [Publisher Link]
- [2] John Hayes, *The Theory and Practice of Change Management*, Palgrave Macmillan, 2014. [Google Scholar] [Publisher Link]
- [3] Gartner, Gartner Glossary: Data Literacy, 2020. [Publisher Link]
- [4] Kurt Lewin, “Frontiers in Group Dynamics: Concept, Method and Reality in Social Science, Social Equilibria and Social Change,” *Human Relations*, vol. 1, no. 1, pp. 5-41, 1947. [CrossRef] [Google Scholar] [Publisher Link]
- [5] John P. Kotter, *Leading Change*, Boston, MA: Harvard Business School Press, 1996. [Google Scholar] [Publisher Link]
- [6] Jeff Hiatt, *ADKAR: A Model for Change in Business, Government, and Our Community*, Loveland, CO: Prosci Learning Center Publications, 2006. [Google Scholar] [Publisher Link]
- [7] Prosci, *Best Practices in Change Management*, Prosci Benchmarking Report, 2020. [Publisher Link]
- [8] Sheila Corral, “The Wicked Problem of Data Literacy: A Call for Action,” *LILAC: The Information Literacy Conference*, 2019. [Google Scholar] [Publisher Link]
- [9] Erica Deahl, “Better the Data You Know: Developing Youth Data Literacy in Schools and Informal Learning Environments,” *SSRN*, 2014. [CrossRef] [Google Scholar] [Publisher Link]
- [10] Mark Frank, and Johanna Walker, “Some Key Challenges for Data Literacy,” *The Journal of Community Informatics*, vol. 12, no. 3, pp. 232-235, 2016. [CrossRef] [Publisher Link]
- [11] Jonathan Gray, Carolin Gerlitz, and Liliana Bounegru, “Data Infrastructure Literacy,” *Big Data & Society*, vol. 5, no. 2, 2018. [CrossRef] [Google Scholar] [Publisher Link]
- [12] Xiaorong Hou, “Research on the Necessity of Data Literacy Cultivation Based on Data Lifecycle,” *International Core Journal of Engineering*, vol. 5, no. 9, pp. 75-78, 2019. [CrossRef] [Google Scholar] [Publisher Link]
- [13] Yeonji Kim, and Hyuk Suh, “The Direction of Literacy Education in the Context of ‘Datafication’: Reviewing Alternative Discussions on Data Literacy,” *Korean Literacy Society*, vol. 13, no. 5, pp. 379-411, 2022. [CrossRef] [Publisher Link]
- [14] Annette Kratoski et al., “Thinking with Data: A Cross-Disciplinary Approach to Teaching Data Literacy and Proportionality,” *Educational Studies in Mathematics*, vol. 81, pp. 179-205, 2012. [CrossRef] [Google Scholar] [Publisher Link]
- [15] Catherine Murray-Rust et al., “Data Literacy as a Pathway to Data Science at Georgia Tech,” *Research Library Issues*, 2019. [Google Scholar] [Publisher Link]