Data Science Manager

Data science managers are responsible for building data science capacity within an organization. They focus on making impactful use of data science to deliver projects focused on responding to business needs. Through culture and people management, a data science manager leads multiple project teams in the automation and modelling of business processes, as well as representing data scientists in various organizational settings to promote modern and sound methods. The responsibilities of a data science manager may include:

- Building an efficient and collaborative team.
- Understand and implement effective agile management techniques.
- Maintain an awareness of emerging methods and provide mentorship and coaching to team members.
- Create and encourage a data-driven culture.
- Remove roadblocks to ensure team members are able to work at their most efficient capacity (e.g. by ensuring appropriate access to training, infrastructure and software).
- Help the team prioritize workloads through clear frameworks and empower them to focus on objectives and become self-driven.
- Ensure the well-being of team members (e.g. support work/life balance to avoid burnout)
- Find opportunities for employees to engage in continuous learning and development.
- Understand the modelling process and the underlying model evaluation (quality) indicators, (e.g. accuracy, recall, F1 score)
- Application of the principles of business analysis in the planning, reengineering, requirement gathering for government business environments, operations, processes, and practices
- Developing and inspiring commitment to a vision of success; supporting, promoting and ensuring alignment with the organization’s vision, mission, and values
- Clearly communicate the complexities and nuances of data science work to non-technical audiences to promote understanding and the business value-add.
- Review the work and products of the team to control quality and provide feedback to team members
- Foster diversity (including diversity of academic and professional backgrounds), inclusion, and accessibility. Embrace difference as a source of strength.

Behavioural Competencies

Communication

Listening to others and communicating in an effective manner that fosters open communication.

Why this competency matters

Data Science Managers must use active listening skills to ensure they clearly understand both explicit and implicit messages from team members. They must be able to adapt their communication style to the widely varying needs of many groups - management, project teams, technical staff, and clients. They also need to ensure teams produce clear documentation related to methods and equations used. They are responsible to clearly communicate the complexities and nuances of data science work to non-technical audiences to promote understanding and the business value-add.

Proficiency Levels

Foundation	Intermediate	Advanced
x	3	4
N/A	● Probes to discover underlying needs, interests, issues, and motivations. ● Adapts style, mode, and tone based on client reactions and issues being addressed. ● Articulates linkages between evidence and recommended course of action. ● Handles complex on-the-spot questions ● Makes effective presentations in formal and informal settings. ● Able to interpret non-verbal cues, such as understanding that silence may be a sign of misunderstanding.	● Interprets complex and possibly contradictory information. ● Uses varied communication vehicles and opportunities to promote dialog and develop shared understanding and consensus. ● Makes a compelling case for all stages of a proposed initiative to senior decision makers. ● Conveys and justifies complex recommendations to senior management in clear and non-technical terms. ● Discusses organizational perspective with other departments and stakeholders regarding own programs.

Teamwork

Working collaboratively with others to achieve common goals and positive results.

Why this competency matters

Data Science Managers need to continuously work with others while providing advice on the operationalization of models. They interact with internal and external clients and stakeholders as part of effective analytical and ML solution development. They must be prepared to use creativity and flexibility in addressing client needs. They must be able to work as part of a diverse team as different resources are often brought together to interact

and develop options. When necessary, they must be able to take a leadership role, emphasizing team goals, helping to define the problem, and treating others with respect.

Proficiency Levels

Foundation	Intermediate	Advanced
x	3	4
N/A	● Assumes additional responsibility to facilitate the achievement of team goals. ● Helps stakeholder mitigate resistance to change in their environment. ● Builds on successful initiatives to gain support for ideas. ● Reviews work of others and provides constructive feedback.	● Coaches, challenges, and helps others develop their skills. ● Encourages team members to contribute to group processes. ● Guides others in making complex decisions. ● Capitalizes on strengths, expertise and differences of team members to achieve objectives.

Analytical thinking

Understanding when data can be used to inform or to support, as well as the process of interpreting data into identifiable problems and research questions.

Why this competency matters

Data Science Managers must be able to both understand and respond to complex issues. They see the connections between problems and issues and manipulate that information in order to develop short- and long-term plans and recommendations for management, clients and other stakeholders. They are capable of adapting their thinking style, using cause and effect relationships to analyze problems in a step-by-step way, interpreting information and developing recommendations. They systematically organize and compare various aspects of a problem or situation and determine cause and effect relationships in order to resolve problems in a sound, logical and decisive manner.

Proficiency Levels

Foundation	Intermediate	Advanced
x	3	3
N/A	● Understand and respond to complex analytical issues. ● Develop short- and long-term plans and recommendations. ● Use cause and effect relationships to analyze problems, interpret information and develop recommendations.	

Ethics and privacy

Ensuring access, quality, and security while cleaning, processing, and transforming data for analytics to ensure access to accurate, reliable and high value information in support of data science and machine learning operations.

Why this competency matters

Data Science Managers must understand the ethical basis of managing large data sets with private information in them, and be able to describe the advantages and disadvantages of the use of record level data to achieve business outcomes. They discuss ethical concerns with stakeholders and, when necessary, seek out and use appropriate disclosure procedures. They take a balanced approach to managing risk by implementing appropriate privacy and security measures, and share evidence, research and decision making openly. They have knowledge of the responsible use of AI. They comply with ethical guidelines in the design and use of systems which automate decision making. Data Science Managers need to understand data relevancy to be able to assess biases in algorithms and ensure their outcomes are fair to everyone.

Proficiency Levels

Foundation	Intermediate	Advanced
x	4	4
N/A	● Able to assess the advantages and disadvantages of record level data, and their impact on analyses. ● Familiar with the ethical framework of the organization and uses appropriate disclosure procedures when necessary. ● Fosters an environment of transparency, trust and respect. ● Guides others in making complex ethical decisions. ● Advises on ways of accommodating and benefiting from differences and between groups. ● Ensures that standards and safeguards are in place to protect organizational integrity.	

Mobilize people

Inspire and motivate people and the organization in the adoption of advanced data analysis techniques. Manage performance, provide constructive and respectful feedback to encourage and enable performance excellence.

Why this competency matters

Data Science Managers inspire and motivate the people they lead. They manage performance, provide constructive and respectful feedback to encourage and enable performance excellence. They lead by example, setting goals for themselves that are more demanding than those that they set for others.

Proficiency Levels

Foundation	Intermediate	Advanced
x	3	4
N/A	• Creates a sense of common purpose and direction in the organization and among colleagues • Sets clear expectations, monitors and evaluates performance • Establishes learning and development plans and provides opportunities for continuous learning and development • Gives honest feedback, recognizes performance and addresses non-performance • Engages employees to gather ideas and input to build cohesive teams • Sets challenging goals for self and models dedication and high performance	• Invests time and resources to support continuous learning • Commits to the development of organizational and individual talent

Promote innovation and guide change

Actively encourages exploration of data to solve business problems through bold thinking, experimentation and intelligent risk taking. Willing to entertain the possibility of failure, and learns from it to improve future undertakings.

Why this competency matters

Data Science Managers have the courage and resilience to challenge convention. They create an environment that supports bold thinking, experimentation and intelligent risk taking. They use setbacks as a valuable source of insight and learning. Data Science Managers take change in their stride, aligning and adjusting milestones and targets to maintain forward momentum.

Proficiency Levels

Foundation	Intermediate	Advanced
x	3	4
N/A	• Stays informed of	• Ensures that employees

	emerging trends, identifying new requirements. ● Continuously acquires and applies new knowledge to improve job performance. ● Explains rationale for change and promotes the benefits of change. ● Substantially improves work processes through early adoption of innovative or non-traditional approaches or technologies.	apply sound risk management practices ● Identifies opportunities for and barriers to innovation and proposes creative approaches ● Implements practices to learn from setbacks and mistakes ● Adapts plans and strategies to respond to the scope and pace of change ● Demonstrates resilience, composure and a positive outlook in an environment of uncertainty and ambiguity

Achieving results

Mobilize and manage resources to deliver on the priorities of the Government, improve outcomes and add value. Consider the context, risks and business intelligence to support high-quality and timely decisions.

Why this competency matters

Data Science Managers mobilize and manage resources to deliver on the priorities of the Government, improve outcomes and add value. They consider context, risks and business intelligence to support high-quality and timely decisions. They anticipate, plan, monitor progress and adjust as needed. Data Science Managers take personal responsibility for their actions and outcomes of their decisions. They ensure the outputs of data science projects align with the departmental results and accountability frameworks. They promote understanding of data aspects of the program area to ensure long term alignment and monitoring capability.

Proficiency Levels

Foundation	Intermediate	Advanced
x	3	4
N/A	● Evaluates project plans to ensure that goals are reached. ● Contributes to annual plans for the work unit considering a range of factors in the planning process. ● Breaks activities into smaller components to facilitate completion.	● Tracks progress of projects and adjusts as needed to meet strategic and/or operational objectives. ● Negotiates commitments and deadlines. ● Ensures development and use of objective criteria to measure and improve organisational work. ● Develops strategic plans

		considering short-term requirements as well as long-term direction.

Technical Competencies

Data Management

Ensuring access, quality, and security while cleaning, processing, and transforming data for analytics to ensure access to accurate, reliable and high value information in support of data science and machine learning operations.

Why this competency matters

Data Science Managers must be able to demonstrate a familiarity with DBMS applications and data lakes. They understand the process required to query and process data from structured and unstructured sources, move data between cloud and on-premise environments, and implement data integrity safeguards. They guide others in assessing data sources for quality and suitability, and make recommendations on logical and physical models to meet storage, availability, and performance requirements. They oversee the use of diagnostic and monitoring tools to prevent problems, enhance performance and availability.

Proficiency Levels

Foundation	Intermediate	Advanced
x	2	3
N/A	● Make effective use of relational databases and data lakes to address operational needs. ● Move data between cloud and on-premise environments while maintaining appropriate safeguards. ● Leverage diagnostic and monitoring tools to resolve problems.	● Make recommendations on logical models.

Mathematics and Statistics

Knowledge in a range of mathematical and statistical techniques, to understand and be able to apply them, and to know their underlying assumptions and limitations.

Why this competency matters

Data Science Managers must have an understanding of algebra and probability theories and techniques that will be applied at multiple stages of data science work. They understand the theoretical basis of analysis of variance, can describe the assumptions underlying statistical techniques, and understand the consequences of the assumptions not holding. They are able to effectively and accurately interpret statistical output. They can compare selected statistical methods and specify differences between them, selecting the most relevant statistical method for a specific analytical problem.

Proficiency Levels

Foundation	Intermediate	Advanced
x	2	2
N/A	● Demonstrate ability to perform exploratory data analysis and identify important relationship between variables. ● Possess knowledge of several statistical concepts, including statistical significance, regression, and hypothesis testing. ● Apply statistical techniques to extract valuable dataset from noise. ● Understands the pros and cons of various statistical tests and when they should be applied.	

Machine Learning

Possess a combination of knowledge and skills in developing self-learning algorithms, including the application of open source machine learning algorithms and libraries.

Why this competency matters

Data Science Managers must be able to understand different types of machine learning techniques (supervised, unsupervised, semi-supervised), related algorithms, and their advantages and disadvantages in terms of performance, speed, interpretability, and other factors in order to select the most appropriate technique in a given scenario. They must understand natural language processing techniques in order to ensure teams select the most appropriate scenarios when working with text data. They are able to understand the assumptions underlying model evaluation (quality) indicators (e.g. accuracy, recall, F1 score).

Proficiency Levels

Foundation	Intermediate	Advanced
x	2	2
N/A	● Demonstrate ability to evaluate machine learning models while putting into consideration intrinsic bias from the dataset and the model.	

	● Explains results obtained to stakeholders. ● Understands “how” and “which” machine learning techniques is appropriate to solve business problems. ● Ability to apply machine learning algorithms as defined in libraries to build and train AI solutions.

Programming

Knowledge and ability to design, define, construct, enhance, support, and maintain software associated with machine learning.

Why this competency matters

Data Science Managers must be able to use version control platforms to assist with collaboration. They consider privacy, accessibility, usability and interoperability. They must have knowledge of both commercial and open source software packages and solutions related to data science. They have knowledge of software construction, testing, configuration, deployment infrastructure and the range of system development methodologies and operating standards. They understand the differences between sorts of data structures (e.g. vectors, matrices, arrays, factors, lists and data frames).

Proficiency Levels

Foundation	Intermediate	Advanced
x	2	2
N/A	● Demonstrate ability to read and understand code. ● Use version control systems to work on projects. ● Understand software construction, testing, configuration and deployment infrastructure requirements. ● Understand the approaches to effectively maintaining privacy, accessibility, usability and interoperability. ● Have knowledge of commercial and open source software packages related to data science. ● Understand the difference between sorts of data structures.	

Data Visualization

The process of translating data into an accessible format utilising various tools and processes such as charts, graphs, maps, dashboards and other formats to aid others in seeing and understanding trends, outliers and patterns in data.

Why this competency matters

Data Science Managers must be able to prepare data sets for visualization in a format best suited to the communication medium. They are able to communicate complex concepts by applying the adequate visualization technique to the data or analytical output at hand. They are able to simplify complex theories and data through visualization by focusing on key areas.

Proficiency Levels

Foundation	Intermediate	Advanced
x	2	3
N/A	● Evaluates graphical representations of data for accuracy or misrepresentation. ● Includes correct and relevant references, labels and citations. ● Demonstrate ability to create appropriate visualization to present patterns in a dataset. ● Ability to present and interpret data visualization concisely to management or business stakeholders. ● Draws attention to data aspects by uncovering patterns and drawing insights from data. ● Raises awareness of root cause vs symptoms that can be highlighted by data.	● Demonstrate ability to create appropriate visualization to present complex patterns in a dataset. ● Ability to present and interpret data visualization concisely to senior management, business stakeholders or external parties. ● Able to work with clients to provide the most appropriate visualization techniques to deliver the expected value.

Project management

Knowledge and ability to apply agile project management principles and practices during the planning, implementation, monitoring, and completion of projects, ensuring effective management of scope, resources, time, cost, quality, risk, and communications.

Why this competency matters

Data Science Managers need to understand the different project management approaches applicable to data and digital projects, including agile methodologies and project reporting. They apply formal project management principles and practices during the planning, implementation, monitoring and completion of projects. They identify issues and escalate appropriately to minimize project impacts. They participate in the development of project plans (e.g. project charters, work breakdown structure, estimates, change management plans, communication plans). They are also comfortable working on projects of different size, from proofs of concept to large and constantly evolving projects, through iterative development. They are able to independently manage small projects or components of larger projects, working closely with other team members to deliver work in small increments. Data Science Managers understand how projects and outcomes can impact employees and different organizational units and groups.

Proficiency Levels

Foundation	Intermediate	Advanced
x	3	4
N/A	● Manage a multi-stage data science project. ● Develop a project plan, including timelines, deliverables, milestones and costs. ● Identify potential roadblocks and risks.	● Manage complex, multifaceted/interrelated projects that span own area or departmental boundaries ● Conduct comprehensive risk assessment and develop plans for eliminating or mitigating the risks identified ● Mentor other project managers ● Understand the impact of the project on the department as a whole

Storytelling

Conveying results of work coherently and understandably through data visualization to present phenomena from a new perspective, using different approaches to build narratives in order for stakeholders to identify the best course of action.

Why this competency matters

Data Science Managers must be able to translate data science outputs into an appropriate visual design, defining the context of the story. They leverage best practices in visual design to streamline and ensure story clarity while demonstrating the scientific basis for the analysis.

Proficiency Levels

Foundation	Intermediate	Advanced
x	2	3
N/A	● Assesses audience needs, familiarity with data and understanding of subject matter. ● Ensures data presentations link directly to original questions and/or line of thinking. ● Uses stories to help the audience understand the complexity of the business area.	● Considers intended use of material to ensure fit-for-purpose. ● Presents new questions by uncovering patterns and drawing insights from data. ● Uses various storytelling techniques to provide advice to the business area. ● Carries the stories derived from data science work through the organisation,

		reflecting insights and wisdom derived from advanced methods.

Business acumen

Understanding and dealing with the risks and opportunities that will likely lead to a positive outcome. Effectively communicating ideas to management, clients, and the public.

Why this competency matters

Data Science Managers are able to deal with large amounts of knowledge and translate it effectively for a non-technical audience. They maintain a working knowledge of current and upcoming trends, and are able to acquire the foundations of relevant disciplines, concepts, and tools. Their knowledge and analytical skills of business objectives provide answers to current problems, and are able to propose actionable insights that can improve product quality. They work with the client to fully understand their needs, and regularly report on progress for feedback. They are able to understand the need to adapt the production process to the expected product and functionality.

Proficiency Levels

Foundation	Intermediate	Advanced
x	3	4
N/A	● Uses the organization's formal and informal channels to accomplish work. ● Seeks perspectives from clients to accomplish work. ● Applies analytical knowledge and skills to address current problems. ● Leverages client's priorities and objectives to enable required actions and make recommendations.	● Applies analytical knowledge and skills to propose actionable insights and improve product or service quality. ● Anticipates potential policies, issues and trends that may have an impact. ● Positions recommendations based on an understanding of the organization and its relationships with stakeholders. ● Understands the strategic implications of a problem or recommendations on the organization.