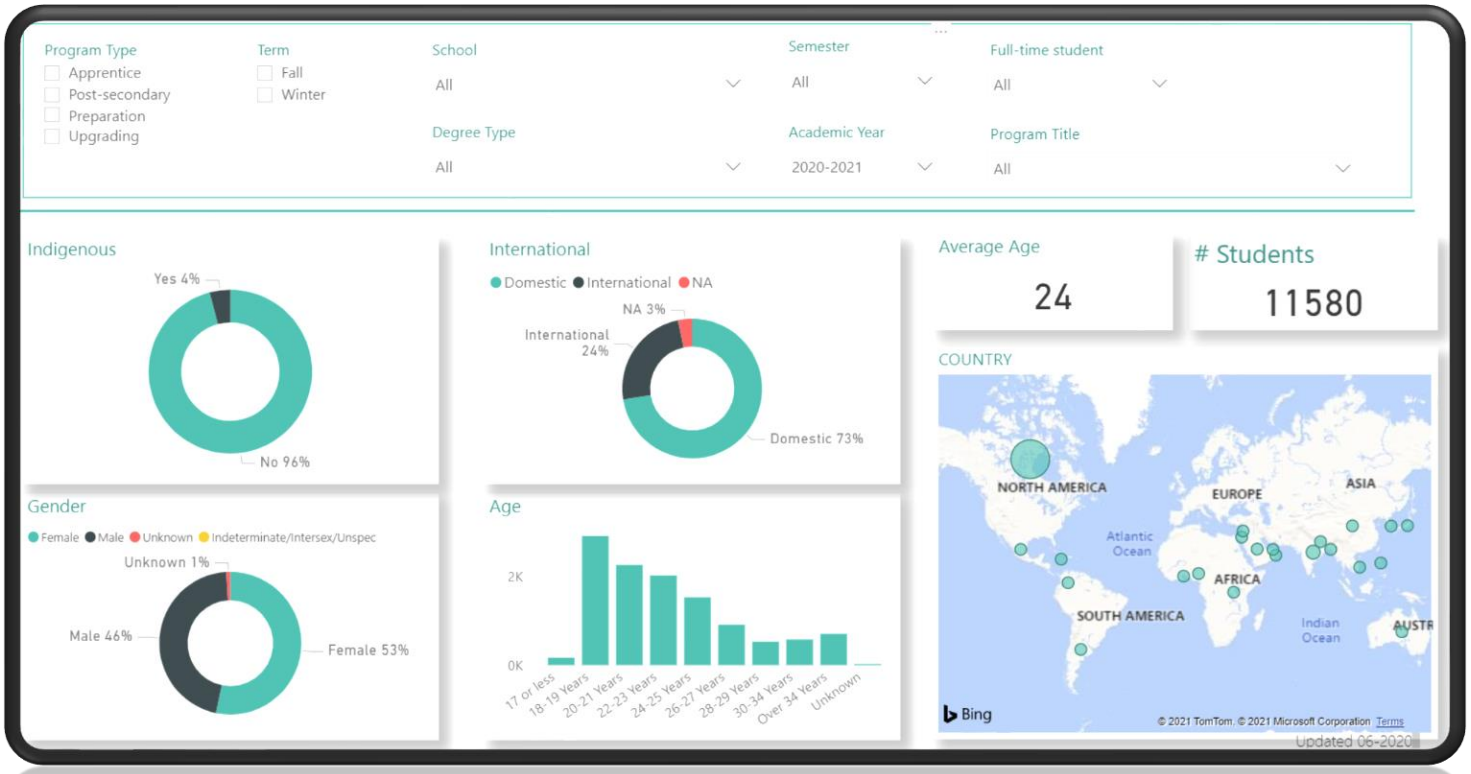


Business Intelligence and Data Analytics Guide

July 2021
Version 1.0

Business Intelligence and Research Services

FLEMING

CONTENTS

PREFACE TO VERSION 1.0

'Data is the new oil' – now a common mantra for Data Analytics these days, but like oil, data "unrefined cannot really be used" (Rodriguez, 2017). This Business Intelligence and Data Analytics Guide (BIDAG) is a dynamic and living document that starts Fleming on a path toward building and increasing the College's data maturity level. This endeavour will depend on the entire organization's willingness and commitment to adopt this BIDAG and its activities into the fabric of everything we do so that we can improve data-driven and evidence-based decisions. As a work-in-progress, we start this guide with Version 1.0 in July 2021. Future versions of this plan will incorporate new learnings and practices that will be explained in each Preface. The Appendices too of the BIDAG will also be expanded and refined in progressive versions.

As the College moves to make the concept of data collection, analytics, dissemination and use more routine, open and transparent, best-practice in data security and regulated privacy legislation will need to be aligned and integrated.

BUSINESS INTELLIGENCE & RESEARCH SERVICES

In March 2021, Fleming established the Business Intelligence and Research Services (*BIRS*) Department reframing the focus of the Institutional Research Office, the Project Management Office and the Workforce and Labour Market Office within the new department. *BIRS'* mission is to empower Fleming stakeholders with the business intelligence and analytics insights they need to build a better college, better college communities, and provide a better student experience. BIRS works collaboratively with all divisions, departments, schools, partners and our communities to collect, compile, develop and disseminate business intelligence and analytics. *BIRS* adopts a Systems Theory approach, recognizing that the College is made up of a cohesive group of interrelated, interdependent parts influenced by its environment, and defined by its structure and purpose (Meadows, 2008). This approach acknowledges that the whole is greater than the sum of its parts.

BIRS promotes reliable, verifiable, open and transparent business intelligence and data analytics (DA) across all facets of the college to support strategic directions, enhance evidence-based decisions, and improve operational activities accordingly. This guide is the first step in democratizing business intelligence for utilization by appropriate stakeholders.

BIRS Purpose

The College collects a substantial amount of data and information through regular transactional operations, survey information (collected locally, provincially and nationally) and external sources. With the expertise of *BIRS*, we are able to tap into live disparate data systems and sources used across the college and beyond such as Evolve (PeopleSoft), Live Alumni, Razor's Edge, Salesforce, OCAS, Open SIMS, EMSI/Burning Glass, Excel/Access files, etc. *BIRS* is able to blend data sets to analyze and produce data visualizations and infographics based on multiple data inputs. Using MS Power BI, these user-friendly and digestible business intelligence reports are interactive using various filters (variable slicers) and sorting mechanisms.

Like many organizations, Fleming has had a common affliction described by Baltzan (2019) as being ***data rich but insight poor***. The creation of the BIRS department provides a critical opportunity for improvement within the College. A College-wide dashboard system disseminates and makes accessible digestible, high quality (reliable and valid) data, analysis and analytics, leading to insightful business intelligence. This College has three **leverage points** described by Meadows (2008) for which a **Fleming Dashboard Network (FDN)** can have a significant positive impact:

1) Information and Data Delays – *The length of time relative to the rates of system changes*. Delays in pertinent data, business intelligence, and analytics are widespread problems. These delays are exacerbated by antiquated paper and PDF file information dissemination methods that are immediately stale after printing, posting or distributing. Without timely, relevant data, College stakeholders respond by making decisions that overshoot, undershoot or miss the target entirely.

2) Information and Data Flows – *The structure of who does and does not have access to information.* This leverage point addresses stakeholder access to the necessary information to make decisions. It also identified the 'who' and 'how'.

3) Evolving and Self-Organization System Structures – *The power to add, change or evolve system structures.* Making data and information available in a timely way, will reveal issues and problems with current business practices, processes, and data/metric gaps. This understanding will precede necessary business changes to continue adapting and evolving Fleming's system by creating new structures and adapting new business behaviours.

BIRS Methodologies

Business Intelligence is defined as information from multiple sources that can be analyzed to reveal patterns, trends, and relationships to support strategic, evidence-based decision-making (Baltzan, 2019). Using various research and data analytics processes/tools (such as descriptive, predictive and prescriptive analytics), the College's performance can be estimated and enhanced.

The ***Key Stakeholder Analysis*** (KSA) (See Appendix I) considers Fleming stakeholders, their key requirements and the measurements we use to determine if the college is meeting those requirements. The KSA provides a framework for *BIRS*'s annual schedule of research projects and studies and can help in prioritizing research and data mining project requests.

Future Direction

An explosion of data analytics tools such as artificial intelligence (AI), machine learning (ML), and natural language processing (NLP) are reshaping business operations and decision-making around the world. Post-secondary institutions are in the midst of a data revolution that will see us engage with greater volumes of data from a variety of internal and external sources, creating a need for high quality data and competent data governance/stewardship. *BIRS* is the intersection between institutional research, statistical analytics, forcasting, optimization and business insights. Our department conducts in-depth research studies utilizing internal and external, using small and big data, to build a narrative around business intelignece (BI), predictive analytics, prescriptive analytics,

data visualizations and infographics. A comprehensive annual survey and data mining schedule can be found at **Survey Listing 2020 – 2021**.

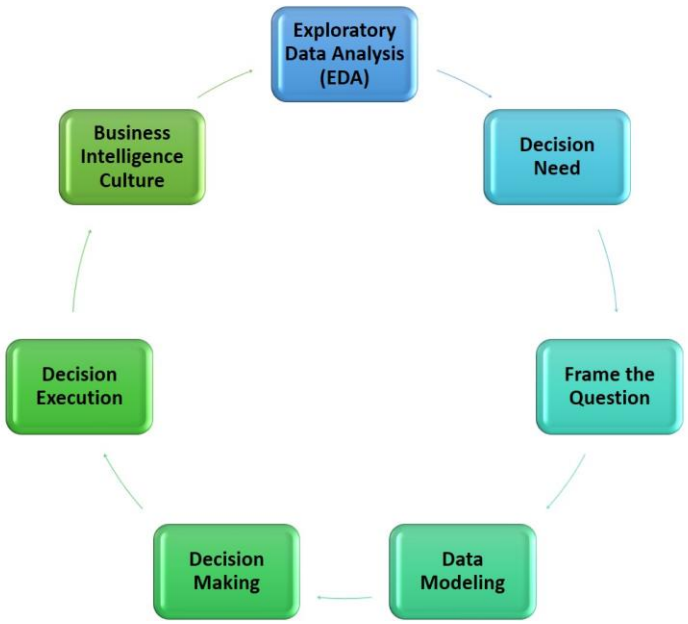
In support of traditional and emerging research and data modelling projects, we use SPSS Modeler, KNIME, XLMINER, SQL, R, Python, Power BI, SPSS, Excel and more.

Decision Support

Decision Roles

Fleming's ***Leaders*** are responsible and accountable for driving Fleming's culture of evidence-based decision making. The Workforce Labour Market Advisor and the Chief Business Intelligence Officer are corporate ***Advisors*** to leaders and partners providing insights from the collected internal and external research, data and analytics. The Advisors are supported by BIRS ***Research and Data Science Analysts*** who work to design, plan and conduct research and analytics.

Decision Support Framework



1. **Exploratory Data Analysis** – The interactive reports found on the FDNs can be used to understand the 'current state' and find answers to questions. EDA can lead to questions that need to be investigated through the Decision Support Framework.

2. **Decision Need** - Decisions that need to be made could be:
   a) *market driven* (e.g. student segments, geographic catchment, labour market info, competition)
   b) *introspective* (e.g. program delivery options, ERM, employee capabilities, R&D capabilities)
   c) *change/improvement driven* (data analytics and modelling: optimization analysis, value improvement, Learning-by-Experiment, Learning-by-asking/surveys, historical data mining)
   d) *process- and work-flow/improvement driven* (e.g. Six Sigma, Theory of Constraints, Agile, Lean)

3. **Frame the Question/Problem/Decision -** in terms of:
   a) Purpose and Objectives (see Decision Need)
   b) Context (i.e. organizational structure, systems, risks and culture)
   c) Scope and Constraints
   d) Envisioned future State

4. **Data Modeling** - A model is a representative and simplified version of reality. In a model, key variables can be manipulated to observe the results. They allow us to explore prediction,

optimization and 'what-if' scenarios. In building a model, analysts focus on decision variables within identified parameters.

5. **Decision Making** – *BIRS* Advisors support decision makers by providing recommendations from modeling results and insights. It is important that the decision-maker also engage and debate with key stakeholders to test out options and possible impacts while removing bias, and unfounded beliefs.

6. **Decision Execution** - The work of *BIRS* is to support the execution of the decisions which can include support from the Project Management Office within *BIRS* and/or ongoing reports and dashboards to monitor execution progress and performance of the decision. Communication with all stakeholders is key to successful execution of any project.

7. **Business Intelligence Culture** - The decision support process is complete by circling back to providing new performance and current state reports onto the FDNs. This continuous cycle supports Fleming's move to organizational the Data Fluency Maturity Stage (See Appendix VI).

FLEMING DASHBOARD NETWORK (FDN)

BIRS utilizes a combination of MS Power BI and MS Teams as the underlying technologies that drive its Dashboard platforms. As an early adopter with expertise in this platform, *BIRS* looks forward to working with all divisions, schools, and departments to help transition and disseminate college data reports to this new platform. Starting **July 2021**, all BI and data analytics (DA) residing in *BIRS* can be accessed through the Fleming Dashboard Network (FDN). A complete listing of dashboards on FDN and the populations they serve can be found in ***Online***.

The *BIRS* department will continue to receive and process surveys, other research and data mining requests through the use of the Institutional Research Request Forms. Research results and reports from approved requests will be posted to the appropriate FDN (Dashboard). Team managers will no longer receive results directly or by email.

Dashboard Management

Each Senior Management Team (SMT) member has one or more dashboards within the FDN to manage and approve membership access. In addition, SMT members will determine the roles and responsibilities of their dashboard members.

Please note: In all cases, dashboard information and reports are confidential to the internal Fleming community and are not to be shared with any external group without the permission of the dashboard SMT member

BIRS and other corporate service departments will post up-to-date and relevant reports and information to the Dashboards as required and requested. FDN also provides a platform to disseminate BI and data analytics on SMA3 performance metrics; progress on the Strategic Plan, Academic Plan and Business Plan; Enterprise Risk Management and Workforce and Labour Market insights.

Eventually, it is anticipated that all operational units will utilize MS Power BI to post reports and information throughout the FDN as appropriate. As the main source of data dissemination and access, the **FDN system is the official source for corporate-wide business intelligence and data analytics.** The Data Governance teams will create clear data definitions, quality (validity & reliability) and SMT accountability.

The MS Power BI software is able to publish data visualization reports in public forums such as a link on the College website. It is anticipated that specific, approved public Fleming reports will be linked and available for use by our communities and partners.

The more widespread the FDN becomes, the more individual Power BI licenses will be required. It is anticipated that at some point a **'premium' enterprise license that integrates and expands data capability across the college** will be preferred to individual licenses. The projected cost of the Power BI premium is $31,037 per year as outlined in Appendix III.

Change Management

The rate of change we experience today has been spurred on by new technology and access, our insatiable need for information, and cultural shifts that are changing the business of the post-secondary sector and society as a whole. Considering that 90% of all data in the world today was created in just the last two years, it is undeniable that we are in an information explosion that is equally matched by the demand for more information (IBM, n.d.).

As an organization, it is vital that we continue to develop a culture of continuous improvement and learning to ensure that we are competitive and not stagnating. As an institution of

higher education with access to expertise and operational systems, Fleming is in an excellent position to understand and embrace data and analytics change. Fleming's 2019-2024 Strategic Plan and Academic Plan provides the College with the roadmap and framework to successfully guide us through change towards a progressive future.

Wide-spread BI practices will establish a data driven culture, quantify uncertainty so we can mitigate it and promote evidence-based decision making to drive growth. Transitioning the culture means that as an organization we must be adaptable to the changing landscape that is occurring both internally and externally to the college. The data will drive how we make decisions within departments across the college from academics to student supports to corporate services such as human resources, IT and finance. There will also be intersections and opportunities for integration that will make the college more efficient and effective. As more departments access and use their Dashboards to make decisions and adjust business processes, understanding, interpreting and using MS Teams and Power BI will be a standard competency for all employees. FDN format standards (See Appendix IV) have been created for brand compliance dashboards to generate familiarity and recognition for dashboard users.

Workshops and Training

Starting in the Fall of 2021, *BIRS* will begin offering workshops focused on FDN access, navigation and orientation. During these workshops, there will be an opportunity for bi-directional discussion on further possible utilization of the new platform and FDN.

Managers and their teams will be required to sign up their department's relevant workshops when available. FDN and its platform will be a useful and important tool for all members of the college.

DATA GOVERNANCE AND MATURITY

Data Governance

To ensure quality (reliable and valid) BI and data analytics, the College is adopting a best-practice model to data governance. This will require a cultural and structural move away from silos of data ownership to a data stewardship approach. Data is not proprietary and no single department and/or position 'owns' data. This shift will be a critical aspect of democratizing data, business intelligence, analytics and insights. The College owns the data and it will be made available to appropriate positions within the college who require this information to support College strategies, plans and operations. Underpinning the move to greater data access, data stewardship

and greater democratization of data is the adherence to privacy best-practices, regulations, and laws. Cross-college Data Governance Framework (*Appendix V*) is a collective responsibility of managers and the Senior Management Team.

> *"A business insight that is tucked away in a binder or on a worker's desktop is a missed opportunity to empower employees and help them contribute to their organization's success"*
>
> *Kamal Hathi, GM MS Power BI*

Data Maturity

There are many data maturity frameworks in existence to describe an organization's ability to utilize, optimize and benefit from its data structure. *BIRS* has adopted DataCamp's IPTOP Maturity model. IPTOP stands for **I**nfrastructure, **P**eople, **T**ools, **O**rganization, **P**rocesses and provides a Path to Data Fluency. This model will help guide Fleming's move towards the *Data Fluent* maturity stage (Vaildyanathan & Nehme, 2021). See Appendix VI for the IPTOP descriptions of each maturity stage.

Data Set Inventory

Future work in Data Governance will include conducting a data set inventory project. This data-set inventory will help enhance the corporate Data Governance Structure so previously disparate data sets can be understood and potentially utilized by the College at large for BI purposes. Additional data-governance work will be to establish a data dictionary to assist with providing a common understanding and language across the college on data definitions. As we start to acquire data from new data sources the Data Governance teams will work to address any conflicting information to coordinate multiple database information.

APPENDICES

APPENDIX 1 - Key Stakeholder Analysis (KSA)

The KSA identifies key College stakeholders, their requirements of the College and measurements to determine if requirements are being met.

Stakeholder	Key Requirements	Measurements
Post-Secondary Students (PT & FT)	• Quality Education (Hard & Soft Skills) • Experiential Learning • Job Readiness & Preparation • Success Support • Positive and Seamless Experience • Career Support and Guidance • Relevant Program Options	• Student Satisfaction (Survey) • Graduate Satisfaction (Survey) • Graduation Rate (SMA3) • Graduate Employment Rate (SMA3) • Graduate Employment Earnings (SMA3) • Experiential Learning (SMA3) • Apprenticeship-Related grads. (SMA3) • Skills & Competencies (SMA3)
Continuing Education (Con. Ed.) Student	• Quality Education (Hard & Soft Skills) • Experiential Learning • Life-Long Learning Experience • Success Support • Positive and Seamless Experience • Career Support and Guidance • Relevant Con. Ed. Program Options	• Institutional Strength /Focus (SMA3) • Experiential Learning (Con. Ed.)
Contract Training (CT) Organizations & Students	• Quality Education (Hard & Soft Skills) • Experiential Learning • Success Support • Positive and Seamless Experience • Flexible System that's easy to participate in • Relevant CT Program Options	• Institutional Strength /Focus (SMA3) • Experiential Learning (CT) • Private Sector Revenue (SMA3)
Alumni	• Good Credential Reputation • Ongoing and Helpful Engagement (Stay in Contact) • Events	• Graduate Satisfaction (Survey) • Alumni Survey • Institutional Strength /Focus (SMA3) • Graduation Rate (SMA3) • Graduate Employment Earnings (SMA3) • Apprenticeship-Related grads. (SMA3) • Skills & Competencies (SMA3)
Applied Researchers	• Good Research Reputation • Easy to use OARI System • Support and Opportunity Guidance	• Private Sector Revenue (SMA3)
Private & Public Sector Clients & Partners of Centres (CAWT & WFLM)	• Reputation of Centres • Ability to Engage with Centre • Scaled Support and Options for Assistance	• Institutional Strength /Focus (SMA3) • Private Sector Revenue (SMA3) • Labour Market Analytics Model (LMAM)
Employees (PT & FT) Support Staff, Faculty and Administrators	• Safe Work Environment, free from (harassment, bullying, & health & safety concerns) • Equity, Diversity, and Inclusion (EDI)	• Health and Safety Reports • ERM Report • EDI Reports • Faculty Activity (SMA3 22-23)

Stakeholder	Key Requirements	Measurements
	• Competitive Compensation & Benefits structure • Professional Development Opportunities • Opportunities for Advancement • Meaningful work contributing to College Goals and Objectives	• Faculty Compensation (SMA3 22-23) • Graduation Rate (SMA3) • Student Satisfaction (Survey) • Employee Engagement (Survey) • Graduate Satisfaction (Survey) • Skills & Competencies (SMA3)
Board of Governors	• Ensure the Overall Health and Wellness of Organization • Satisfied with Enterprise Risk Management (ERM) System and information • Ensure Strategic Goals are met • Performance targets are met (all SMA3) • Ensure Student, Employer, Community satisfaction with Fleming	• Student Satisfaction (Survey) • ERM Report • Graduate Satisfaction (Survey) • Graduation Rate (SMA3) • Institutional Strength /Focus (SMA3) • Community/Local Impact (SMA3) • Economic Impact (SMA3) • Graduate Employment Earnings (SMA3) • Experiential Learning (SMA3) • Private Sector Revenue (SMA3) • Apprenticeship-Related grads. (SMA3) • Skills & Competencies (SMA3) • Employee Engagement (Survey) • Sexual Violence Survey
Government (MCU & MLTSD	• Ensure SMA3 Performance Metric Goals and Targets are Met • Ensure SSM Performance Goals and Targets are Met	• Graduation Rate (SMA3) • Graduate Satisfaction (Survey) • Institutional Strength /Focus (SMA3) • Community/Local Impact (SMA3) • Economic Impact (SMA3) • Graduate Employment Earnings (SMA3) • Experiential Learning (SMA3) • Private Sector Revenue (SMA3) • Apprenticeship-Related grads. (SMA3) • Skills & Competencies (SMA3)
SSM Agencies	• Good supports for program creation • Programs for clients to participate in	• Economic Impact (SMA3) • Institutional Strength /Focus (SMA3) • Graduate Employment Earnings (SMA3) • Apprenticeship-Related grads. (SMA3) • Skills & Competencies (SMA3)
Employers, Industry and Partners	• Students are trained and educated with the soft and hard skills to accomplish jobs upon hiring • Relevant, quality programs that meet labour market jobs.	• Employer Satisfaction (Survey) • Graduation Rate (SMA3) • Institutional Strength /Focus (SMA3) • Community/Local Impact (SMA3) • Economic Impact (SMA3) • Graduate Employment Earnings (SMA3) • Experiential Learning (SMA3) • Private Sector Revenue (SMA3) • Apprenticeship-Related grads. (SMA3) • Skills & Competencies (SMA3)

Stakeholder	Key Requirements	Measurements
Donors	• Donation is meaningful - Feeling that donation will make a difference to students, employers and community • Various donation opportunities • An understanding of organizational aspirations and vision, as well as meeting performance targets	• Institutional Strength /Focus (SMA3) • Community/Local Impact (SMA3) • Economic Impact (SMA3) • Graduate Employment Earnings (SMA3) • Experiential Learning (SMA3) • Private Sector Revenue (SMA3) • Apprenticeship-Related grads. (SMA3) • Skills & Competencies (SMA3) • Alumni Survey
Community	• A Fleming partner that works to improve the community. • Provide caring and involved citizens	• Institutional Strength /Focus (SMA3) • Community/Local Impact (SM3) • Economic Impact (SMA3) • Graduate Employment Earnings (SMA3) • Experiential Learning (SMA3) • Private Sector Revenue (SMA3) • Apprenticeship-Related grads. (SMA3) • Skills & Competencies (SMA3)
Suppliers & Vendors	•	•

APPENDIX II - Fleming Dashboard Network

DASHBOARDS	ACCOUNTABLE	TEAM MEMBERS
Academic	VP AE	Deans Chairs Registrar Dir. A&SE Dir. AO BIRS
Academic & Student Experience	Director, A&S E	SE Managers Dir. A&SE BIRS
Advancement	VP ECD	Dir. Adv. BIRS
Alumni	VP ECD	Dir. Adv. WFLM Advisor BIRS
Equity, Diversity & Inclusion	VP OEHR	Chair, EDI Members, EDI Committee
BIRS Reports	CBIO	BRIS Members SMT All Managers
Finance	VP CF	Finance Managers
Human Resources	VP OEHR	HR Managers
IT	CTO	IT Managers
Marketing, Recruitment	Manager, M&R	M&R Managers
Office of Applied Research & Innovation	VP OARI	OARI Managers
PACs	VP AE	Admin Assists and Pgm Coordinators
President	Sandra A	Pres. Off. members
Program Efficacy & Review (PER)	VP AE	Prog. Review Leaders
Quality & New Programs / AO	Director, Q &NP	Qual & NP & AO Leaders
Registrar's Office	Registrar	RO Managers
Senior Management Team	Sandra A.	SMT Members
Strategic Enrolment Management	VP AE	SEM SC Members
Student Associations SA & FSA	VP SE	Student Government
Student Experience	VP SE	SE Managers
Teaching & Learning	VP AE	Teaching & Learning Faculty

APPENDIX III - Power BI Premium Cost Estimate

Power BI (Education Rate)	Per Unit Cost	# of Users	Monthly Total Cost	Notes:
Power BI Pro Monthly fee (per user / per mth)	$2.90	10	$29.00	as per Paul M.
Power BI Premium (1 P1 Node) (Node / mth)	$2,557.40	500	$2,557.40	(Total Users up to 2384 on 1 Node) (as per Newcomp)
Power BI Report Server included with Premium			$-	
Monthly Subtotal			**$2,586.40**	
Yearly Total			$31,036.80	
Plus Tax?				
Online Cost Calculator				
https://powerbi.microsoft.com/en-us/calculator/				

APPENDIX IV – Dashboard Format Standards

Design Type = Classic

Font colour #01b8aac

Title – Top left

IRO logo - Top right

Line under title - colour #01b8aa

Report date – Top right under IRO Logo

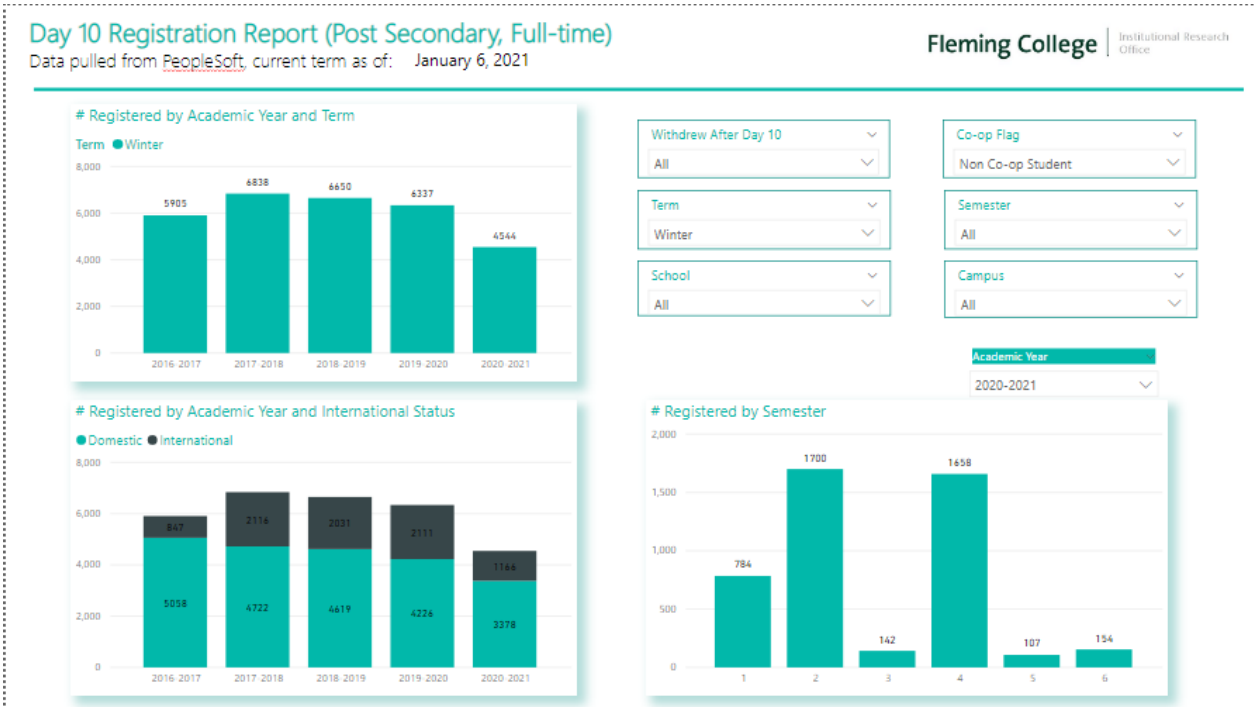
Filters - colour #01b8aa, font size 10, light grey background or boarder with colour #01b8aa

Graphs – Title colour #01b8aa, font size 12 with shadow boarder

ReadMe tab - sources data and other relevant information in the report

- Articulates the Research Question the data report is answering

Centre fields in tables when possible



- Start each report with a high-level summary page
- Include a Tab for a PDF version of the Survey or other instrument/instructions
- Add relevant filters
- Try and incorporate top 10 and bottom 10 where possible (or a sort button)
- Limit charts, tables and figures to 4 per tab.

APPENDIX V – DRAFT Data Governance Framework

DRAFT
Last Revised April 1, 2021

Data Governance Framework

Purpose

This document describes the data governance framework for Fleming College. It identifies designated roles within the college that have specific decision-making accountabilities regarding institutional data. The framework also defines the roles and accountabilities for data stewardship and data management.

This framework establishes a well-aligned data governance structure by delineating the business and IT roles, aligning data stewardship accountabilities with the college organizational structure, and facilitating holistic and inclusive data management decision-making. This is achieved through adoption of data governance industry standards in areas such as data classification, data quality dimensions, and data access.

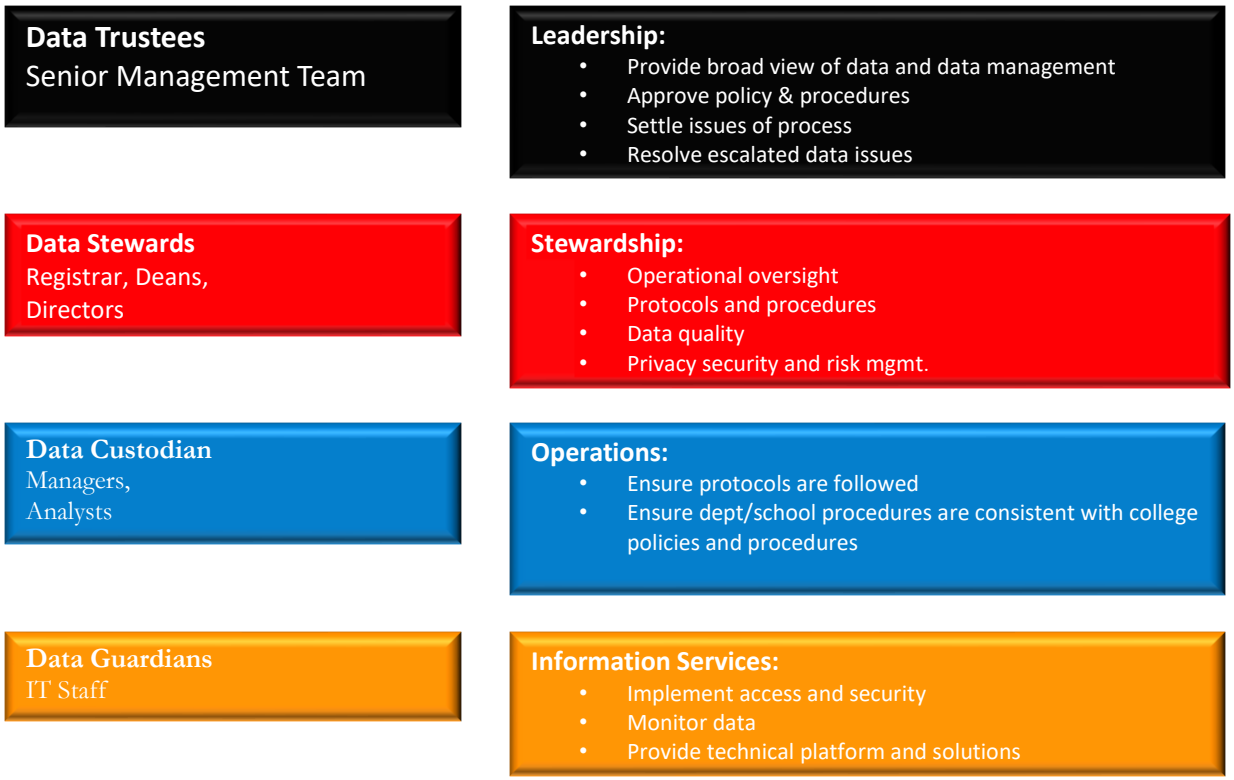
Data Stewardship Organizational Structure

The Fleming data governance framework establishes five roles within the data stewardship organizational structure. The five roles are:

1. **Data Trustees** – Highest-ranking individuals accountable for what happens with and to data.
2. **Data Stewards** – Individuals in business units who are responsible for promoting appropriate data use through planning, procedures and protocols at the institution.
3. **Data Custodians** – Individuals in business units responsible for ensuring that policies are followed within a specific area and that local processes are consistent with college policies and procedures.
4. **Data Guardians** – Individuals in IT who have operational level responsibility for data management activities related to the creation, storage, maintenance, cataloguing, use, dissemination and disposal of data.
5. **End Users** – Individuals who access and use institutional data.

The relationship between these roles and their responsibilities as applicable at the college are shown in the diagram below and are described in more detail in the following section. Appendix A includes a list of roles and responsibilities. Appendix B provides data management-related definitions.

Data Governance Framework



Roles and Responsibilities

Data Trustees (Senior Management Team)

As a group, the data trustees are responsible for:

- Data Governance Leadership.
- Approving data management policies, guidelines, standards and procedures.
- Approving changes to the scope of data in functional areas.
- Resolving issues of procedure.

As individuals, data trustees are responsible for appointing data stewards and delegating data stewardship accountabilities in their functional area.

Data Stewards

Data Stewards are responsible for promoting appropriate use of data through planning, and protocols at the institution.

As a group, the data stewards are responsible for:

- Actively participating in the Data Stewardship Committee.
- Reviewing quality metrics and assessment of progress toward improvements in data integrity.

- Recommending privacy policies and standards across the college
- Prioritizing data issues for resolution.
- Defining the scope of business data domains and approving changes.
- Establishing and maintaining an easy-to-use, accessible data dictionary.
- Developing Quality Assurance process to identify data issues.
- Coordinating data definitions and resolving stewardship issues for data elements that span multiple functional areas and/or units.

As individuals, the data stewards also have specific responsibilities and authority for the management, access, use, definition and quality of data that pertains to their functional areas and/or is deemed to be under their purview. These responsibilities include:

- Appointing data custodians and delegate operational stewardship accountabilities.
- Establishing and managing working groups that define data and resolve data quality issues.
- Reviewing and approving data definitions, compliance and access classifications (public, internal, limited and restricted).
- Proposing, reviewing and approving new business terms.
- Approving the use of administrative data for the purposes of research, while ensuring that appropriate privacy and agreements about the use of such data are negotiated and documented.
- Approving and ensuring compliance regarding the release of, responsible use of and access to functional unit data.
- Approving the appropriate access of administrative data by vendors and agents, while ensuring that privacy and agreements about the use and disclosure of such data are negotiated, documented and compliant with regulatory requirements and college policies.

Both as individuals and collectively, the data stewards have a responsibility to promote and encourage an institutional view of the data resource and to ensure that its use is in line with institutional policy.

Data Custodians

Managers and analysts in departments/schools who are responsible for ensuring that data management policies and procedures are followed within their specific domain.

Both as individuals and collectively as part of a working group, data custodians' responsibilities include:

- Developing data definitions.
- Assessing and documenting data compliance classifications.
- Classifying data into access categories.
- Reviewing and approving requests for data access.
- Assessing data quality.
- Identifying and documenting data issues and ensuring the issues are addressed.
- Identifying source systems of record.

Data Guardians (IT)

IT personnel in networking, applications, platforms, and information security who have operational level responsibility for data management activities related to the creation, storage, maintenance, cataloguing, use, dissemination and disposal of data.

Their responsibilities include:

- Providing and maintaining data platforms and infrastructure
- Ensuring appropriate privacy standards, definitions, compliance, and access is maintained according to data policies and procedures.
- Implementing access and security controls based on access classifications.
- Facilitating and supporting the threat and risk assessment/privacy impact assessment (TRA/PIA) process.

Data Users

Individuals who need and use institutional data as part of their assigned duties or in fulfillment of their role at the college.

Data users are responsible for:

- Complying with the institutional data and privacy policies and following established procedures promoted by data custodians.
- Understanding the definition, quality and usage limitations of data.
- Safeguarding their data access privileges.

Data Governance Committees and Working Group

In order to support the data governance activities of the college, a three-layered structure of governance bodies exists. These committees and working groups meet on a regular basis to address data issues appropriate for their level of responsibility. They include:

- Senior Management Team (SMT) – Members include the Data Trustees.
- Data Stewardship Committee – Members include Data Stewards.
- Domain Working Group – Members include Data Custodians and Data Guardians.

Stewardship Responsibilities that Span Multiple Functional Areas and/or Units

Data stewards have stewardship responsibilities for particular elements and/or aspects of institutional data. However, in some cases data stewardship responsibilities for a particular data element span multiple functional areas and/or units resulting in shared interests among many stakeholders. For example, data about faculty has stakeholders in the Human Resources administrative unit, as well as in a dean's office, and academic operations. Student data becomes alumni data when a student graduates.

Within a department/school, a particular individual is designated as the data steward responsible for making data stewardship decisions. When data stewardship responsibilities span across other academic or administrative units, that particular data steward must ensure that consideration is given to all stakeholders for that data. This could be accomplished by including these stakeholders in the Data Stewardship Committee on an ad hoc basis.

If there are any data issues that cannot be resolved at the Data Stewardship Committee level, these should be escalated to the SMT.

Appendix A

Data Governance Framework - Data Trustees

Functional Area	Data Description	SMT Members
Privacy	Freedom of information and protection of privacy matters and Records Management	President
	Data pertaining to organizational strategy, planning and operations)	
Employees	Human resources data	VP OE & HR
Student Services	Student services data	VP Student Experience
Library & Student Employment	Data about library collections and circulation Student Employment Data	
Academics	Administrative data about teaching and learning activities. Academic programs and academic policy data; including Continuing Ed/Contract Training)	VP Academic Experience
Registrar's Office	Student enrolment, application, records data (e.g. Student data in Registrar's Office and	Registrar
Applied Research	Data created or derived from applied research, scholarly, and artistic activity	VP Applied Research & Flexible Delivery
	Administrative data about applied research activities	
Finances	Financial data	VP Corporate Services
	Data about the college's physical assets & capital	
Facilities	Building and facilities data Security data Health and Safety data	Chief Building and Facilities Officer
Advancement	Alumni, donor relations,	VP Economic and Community Development
Marketing & Student Recruitment	Marketing data student prospect and recruitment data communications data	VP Economic and Community Development
Business Intelligence and Analytics	Business Intelligence and Analytics (i.e. SMA3 Metrics, Competitive Analysis and institution level research)	Chief Business Intelligence Officer
PeopleSoft	Data pertaining to central EMS/ERP systems and platforms, infrastruture across all functional areas	Chief Technology Officer

Data Governance Framework - Data Stewards

Functional Area	Data Description	Positions
Privacy	Freedom of information and protection of privacy matters and Records Management	Privacy and Policy Officer
Institution-Wide Data	Data pertaining to organizational strategy, planning and operations	Chief Business Intelligence Officer
Employees	Human resources data	Director, Employee Experience
Student Services	Student services data	Managers – Student Experience
Library & Student Employment	Data about library collections and circulation Student Employment Data	Manager, Library & Academic success Services
Academics	Administrative data about teaching and learning activities. Academic programs and academic policy data; including Continuing Ed/Contract Training)	VP Academic Experience
Registrar's Office	Student enrolment, application, records data (e.g. Student data in Registrar's Office and	Manager, Business Operations & Systems
Applied Research	Data created or derived from applied research, scholarly, and artistic activity	Manager, Office of Applied Research
	Administrative data about applied research	
Finances	Financial data Data about the college's physical assets & capital	Director, Financial Services and Controllership
Facilities	Building and facilities data Security data Health and Safety data	Manager, Physical Resources Rep.
Advancement Marketing & Student Recruitment	Alumni, donor relations,	VP Economic and Community Development
	Marketing data student prospect and recruitment data communications data	
Business Intelligence and Analytics	Business Intelligence and Analytics (i.e. SMA3 Metrics, Competitive Analysis and institution level research)	WFLM Advisor
PeopleSoft	Data pertaining to central EMS/ERP systems and platforms, infrastructure across all functional areas	Manager, College Information Systems

Appendix B

Data Governance Framework - Definitions

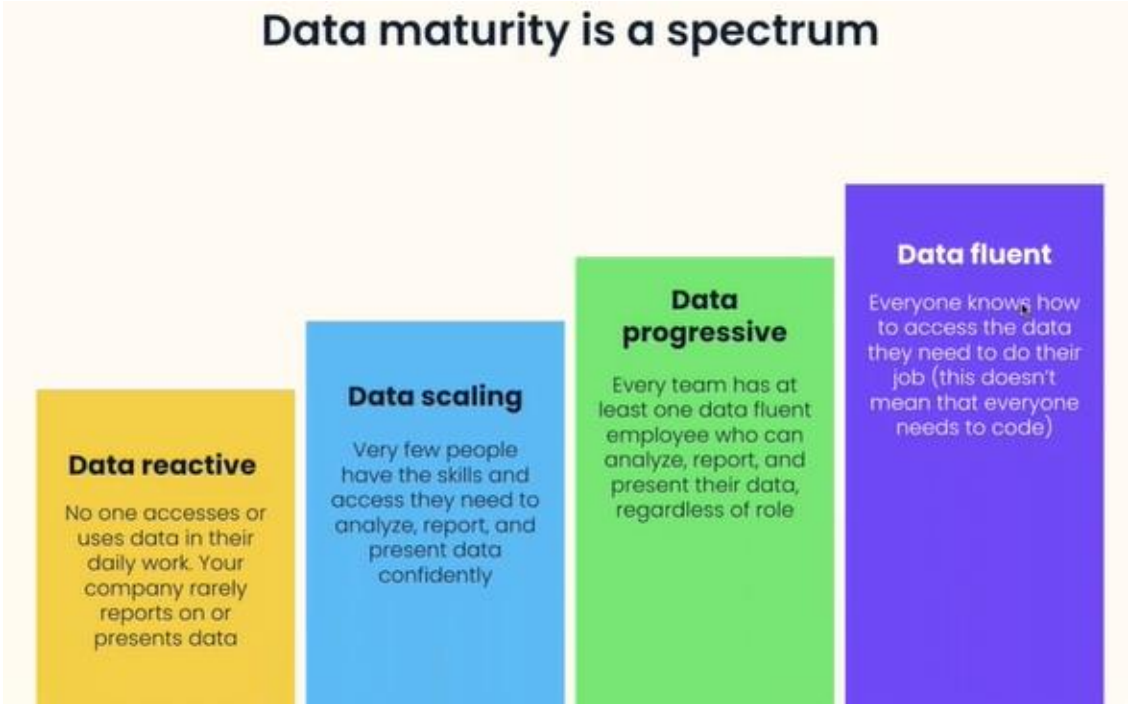
- **Institutional data** – Data that is created, collected, and stored by all units and members of the college community, in support of academic and administrative activities.
- **Data stewardship** – Ensuring that all data is reliable, consistent and of high quality and that they are accessible for appropriate purposes, people and systems; ensuring that institutional management practices comply with government legislation (e.g. PIPEDA, HIPA) and industry standards (e.g. Payment Card Industry Data Security Standard).
- **Data management** – Encompasses activities that relate to the creation, collection, storage, maintenance, cataloguing, use, dissemination and disposal of institutional data.
- **Data governance** – Establishing and maintaining the processes by which decisions regarding data are made. It includes establishing the data governance framework, approving data processes and resolving disputes concerning data issues.
- **Data classification** – The act of grouping data into categories that are used to facilitate access to institutional data. The categories balance the sensitivity of the data with business need to access the data, while taking into consideration the impact of unintended disclosure of the data.
- **Data quality dimension** – A data quality dimension can be defined as an attribute that can be measured or assessed in order to understand the quality of data.
- **College community** – All students, employees, faculty, postdoctoral fellows, alumni, agents, contractors, authorized guests, persons or organizations acting for or on behalf of the college.
- **Derived data** – Data that is transformed from other data using a mechanism such as an arithmetic formula, composition, or aggregation.
- **Personal data** – Data that contains personal information about an identifiable individual as defined in the Provincial Local Authority Freedom of Information and Protection of Privacy Act (LAFOIPP). This data, if compromised or used inappropriately, would have implications to the privacy of an individual.
- **Third-party data** – Data that is created or owned by a third party and is being used in support of academic, research and administrative activities. This data if compromised or used inappropriately would have implications for the third party. This includes data such as licensed software or software components, and copyrighted material.
- **Research data** –Data about research, scholarly and artistic activity, such as research grants held and publications generated, is considered institutional data.
- **Functional areas** – A major category of data that groups data based on type and

administrative use, such as student, employee, and alumni. These can be further divided into business data domains.

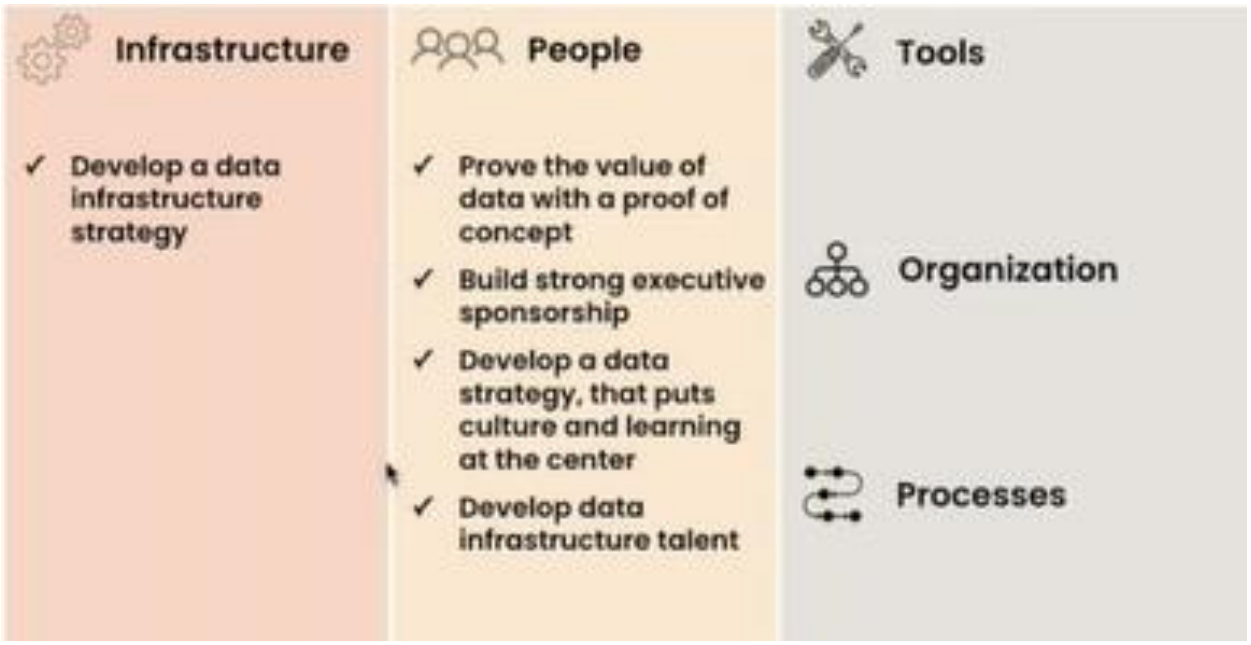
- **Business data domains** – A sub category of data that represents a distinct business function within administrative areas.

APPENDIX VI – Data Maturity Model

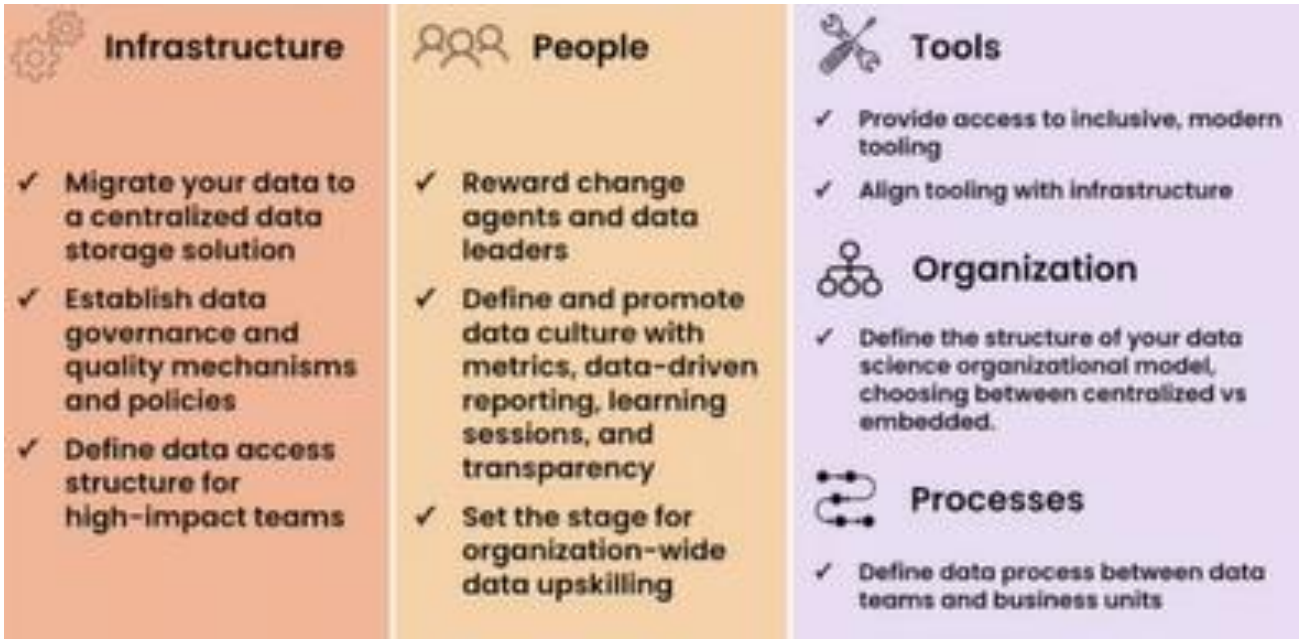
Four Stages of Data Maturity



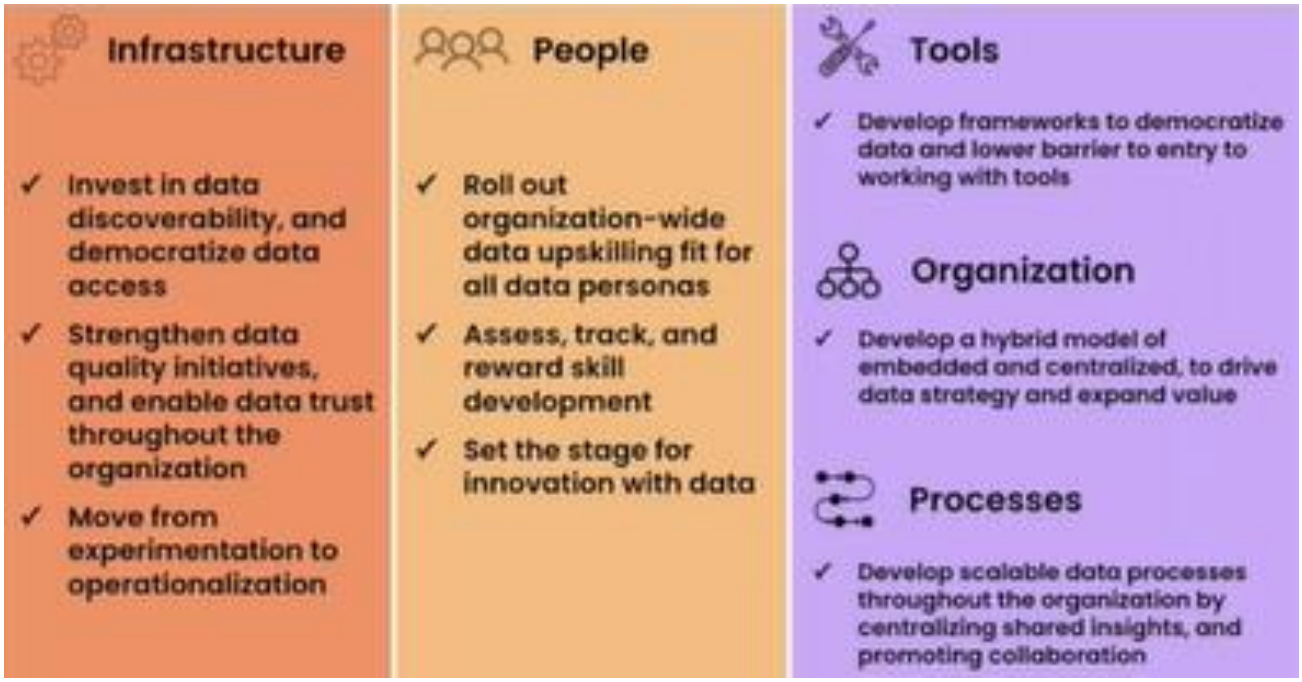
Data Scaling IPTOP



Data Progressive IPTOP



Date Fluency IPTOP



GLOSSARY

Business Intelligence (BI) Business intelligence (BI) combines data analytics, data mining, data visualization, data tools and infrastructure, and best practices to help organizations. Information from multiple sources can be analyzed to reveal patterns, trends, and relationships to support strategic, evidence-based decision-making.

Data Analytics (DA) A data management solution and business intelligence subset, referring to the use of methodologies such as data mining, predictive analytics, and statistical analysis in order to analyze and transform data into useful information, identify and anticipate trends and outcomes, and ultimately make smarter data-driven business decisions.

Descriptive Analytics Can tell us what is happening now and what happened in the past to get us to this state.

Predictive Analytics Can tell us what will probably happen in the future.

Prescriptive Analytics Can tell what we should be doing to create better (optimized) outcomes and benefits.

Stakeholders Individuals or groups that have an interest in an organization and can either affect or be affected by the business. The stakeholders include students, employees, suppliers, partners, communities, governments, associations etc.

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