

How the Novartis Capability Team Scaled Their Data Training

Datacamp Webinar

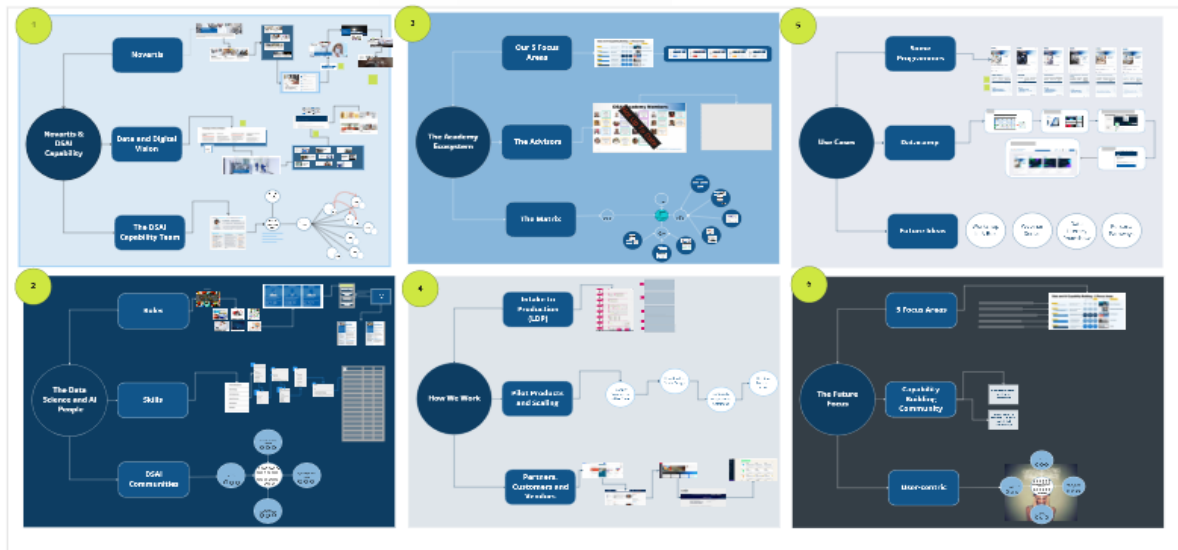
Kemi Phillips, Head of Capability Building, Data Science and AI
Novartis - London
July 2022

Abstract

The Novartis Data Science and Artificial Intelligence (DSAI) Academy uses DataCamp to train thousands of employees in data skills as part of an organization-wide data transformation program to "Go Big on Data and Digital".

In this webinar, Kemi Philips, Head of Capability Building - Data Science and Artificial Intelligence, presents her story of running a large-scale data academy. She discusses the challenges and successes of the program, along with practical tips for how to scale training at your organization.

- 1 About Research and Development - 5 mins
- 2 About Data Science in Research - 5 mins
- 3 The Data Science and AI Capability - 5 mins
- 4 How We Work - 5 mins
- 5 Novartis Data Science and AI Strategy - 10 mins
- 6 The Future of Data Science and AI - 5 mins



1

About Novartis and The DSAI Team

1. Novartis as an organisation
2. The Data and Digital Strategy
3. The DSAI Team and Network

5
mins

2

About Data Science in Novartis

1. DS roles
2. DS Skills
3. DS Communities

5
mins

3

The DSAI Ecosystem

1. The DSAI Academy
2. Our 5 Focus Areas
3. The Matrix

5
mins

4

How We Work

1. Intake to production - Learning Design Process
2. Pilot Products and Scaling
3. Partners, Customers and Vendors

5
mins

5

Some Use Cases (use of Datcamp included here) - 15 mins

1. Current pilot programmes
2. Datcamp Use Cases
3. Future ideas not yet worked on

10
mins

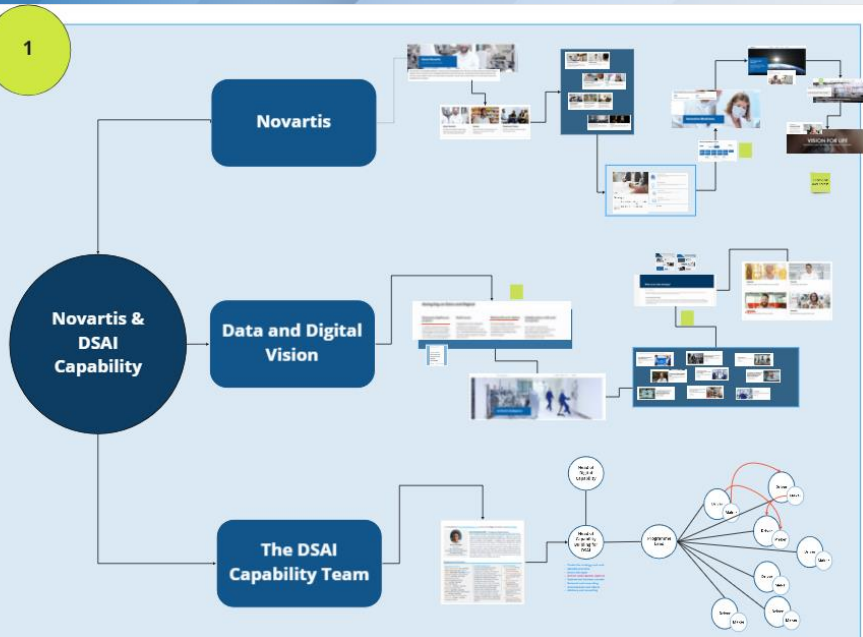
6

The Future Focus

1. 5 Focus Areas
2. Community
3. User-centric

5
mins

1



Novartis & DSAI Capability

About Novartis

Learn about our company and people

Our purpose is to reimagine medicine to improve and extend people's lives. We use innovative science and technology to address some of society's most challenging healthcare issues. We discover and develop breakthrough treatments and find new ways to deliver them to as many people as possible. We also aim to reward those who invest their money, time and ideas in our company.



About Novartis

We discover and develop breakthrough treatments and find new ways to deliver them to as many people as possible.



Access

We are committed to bringing more of our medicines to more people, no matter where they are.



People and Culture

Novartis is building an Inspired, Curious and Unbossed culture.



Unleash the power of our people

We are transforming our culture to ensure people can fully apply their talent and energy. We're creating an organization where people are inspired, curious and unbossed.

[Learn More](#)



Deliver transformative innovation

In our pursuit of transformative treatments, we challenge medical paradigms and explore possibilities to cure disease, intervene earlier in chronic illnesses, and find ways to dramatically improve quality of life.

[Learn More](#)



Embrace operational excellence

We are rethinking how we work, embracing agile teams and building better productivity into our company to free resources that we can invest in innovation and help boost returns.



Go big on data and digital

We aim to spark a digital revolution at Novartis, embracing digital technologies, advanced analytics and artificial intelligence to help drive innovation and improve efficiency.

[Learn More](#)



Build trust with society

We strive to build trust with society through our efforts to operate with high values and integrity, and to find new ways to expand patients' access to our treatments.

[Learn More](#)

Going big on Data and Digital

Enterprise lighthouse projects

12 Digital Lighthouse Projects embed data science and digital technologies across Novartis, from R&D to manufacturing and our commercial organizations.

Bold moves

Preparing for future disruptive healthcare scenarios and transforming standards of care, e.g. co-developed AI-powered app for heart failure patients in China with Tencent.

Making Novartis digital

Prioritizing digital learning, focusing on talent and investing in foundational platforms and capabilities are helping make Novartis digital.

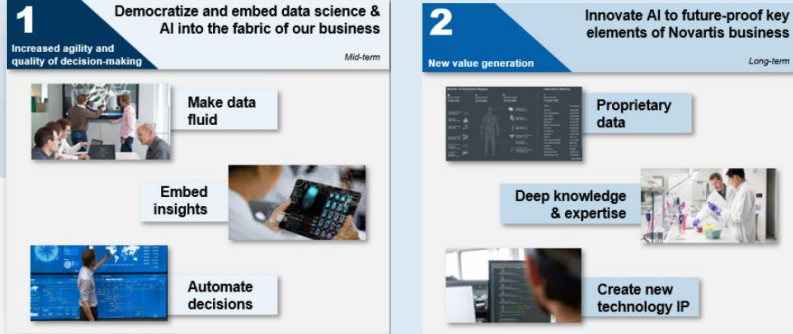
Collaborations with tech ecosystem

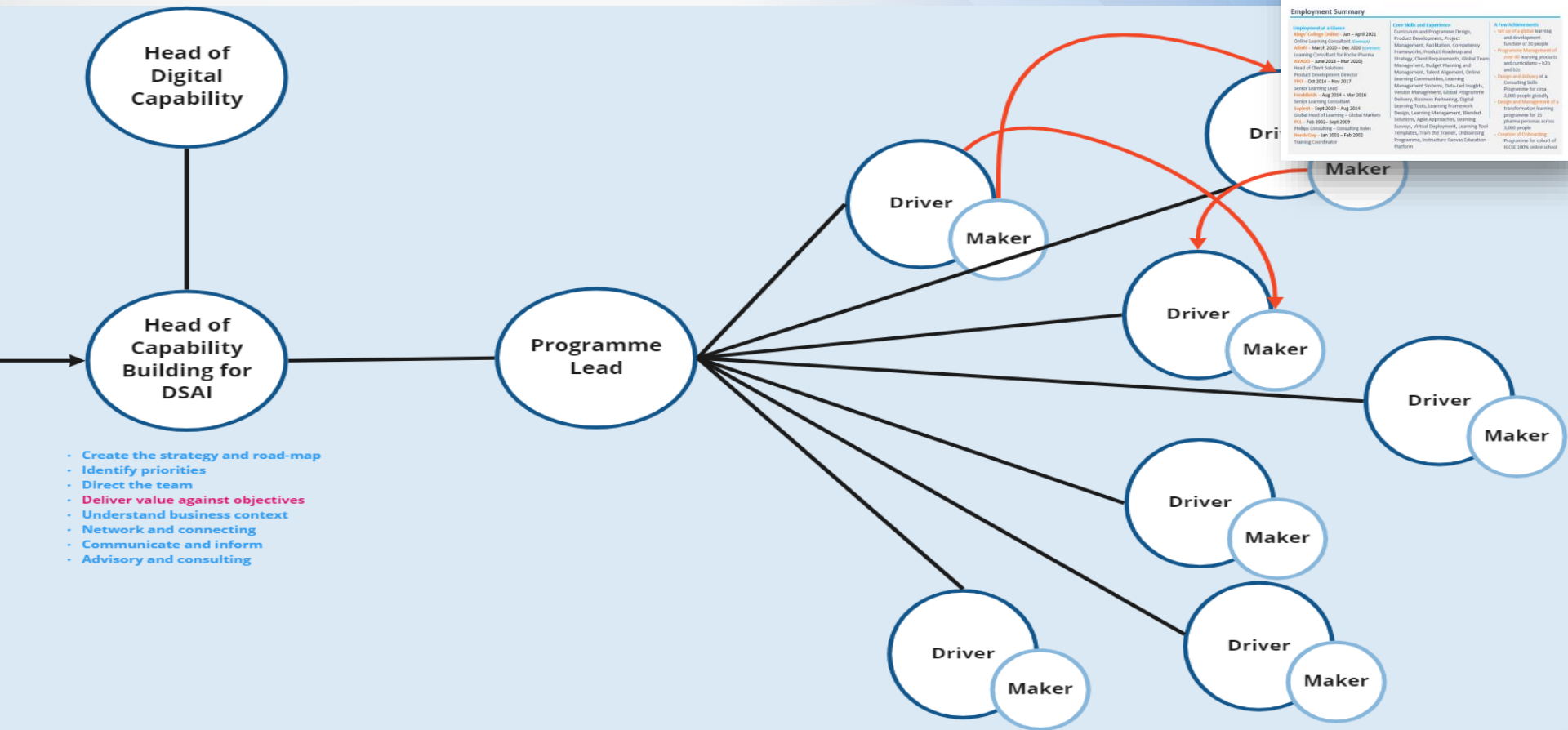
From nimble startups and innovative academic institutions to big tech players, Novartis is collaborating with the ecosystem to accelerate at scale.

Novartis' data strategy is to ensure that all our data is "clean and linked". In other words: all data at Novartis is of good quality and interconnected so that we can build our own knowledge graph, and answer the questions that even Google doesn't know.

How will Novartis do this?

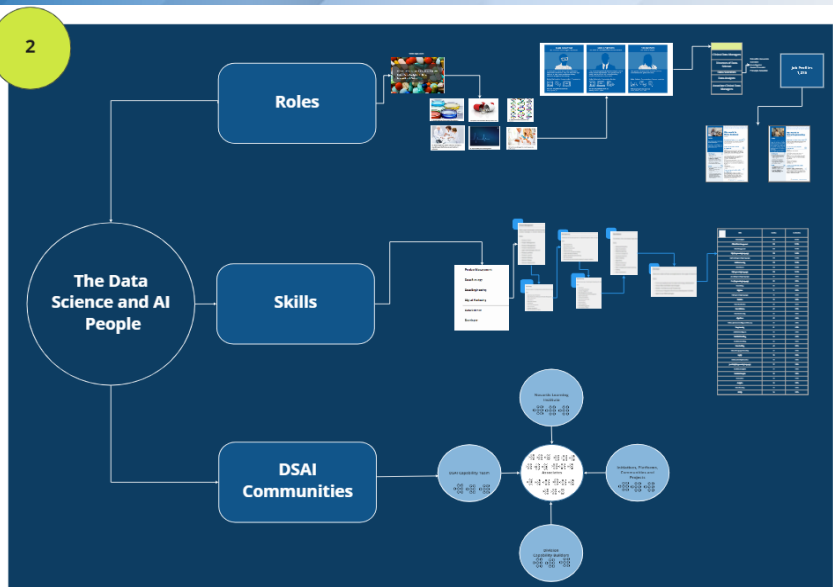
Novartis will do this by ensuring all information is Findable, Accessible, Interoperable and Reusable (FAIR) by allocating Universal Resource Identifiers (URIs) or unique identifiers to data elements. The two videos below will explain these concepts in more detail. In addition, the data strategy team have developed a [URI Builder](#) and [best practices](#) to help Data Professions -such as Data Stewards who define data across domains and Data Modelers and Data Engineers who design systems - to support the data strategy.





- Create the strategy and road-map
- Identify priorities
- Direct the team
- Deliver value against objectives
- Understand business context
- Network and connecting
- Communicate and inform
- Advisory and consulting

2



The Data Science and AI People

www.iqpc.com

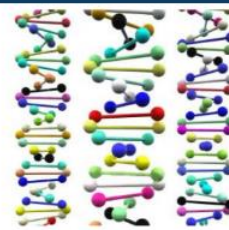
6 Ways Pharmaceutical Companies are Using Data Analytics to Drive Innovation & Value



#1: Accelerate drug discovery and development



#2: Optimize and improve the efficacy of clinical trials



#3: Target specific patient populations more effectively



#4: Better insight into patient behaviour to improve drug delivery and effectiveness and healthcare outcomes



#5: Improve safety and risk management



#6: Gain improved insight into marketing and sales performance

My world is Data Science

Outline

Examples of roles in my world

Common technical skills in my world

Challenges

Goals

Common transferable skills in my world

My world is Data Engineering

Outline

Examples of roles in my world

Common technical skills in my world

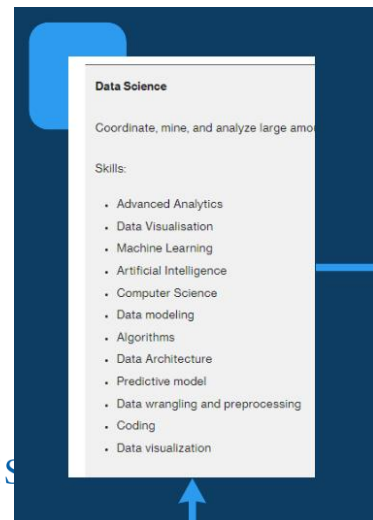
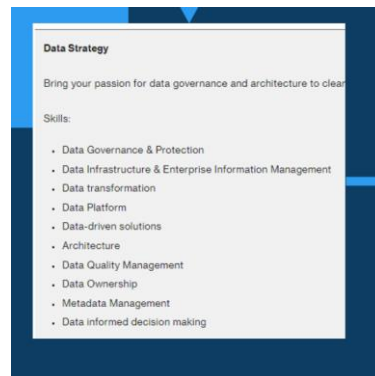
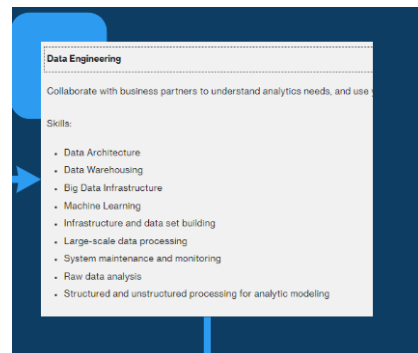
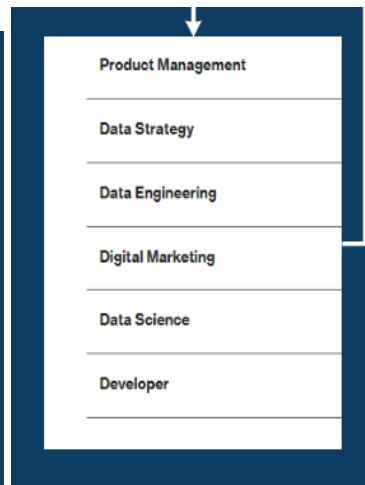
Challenges

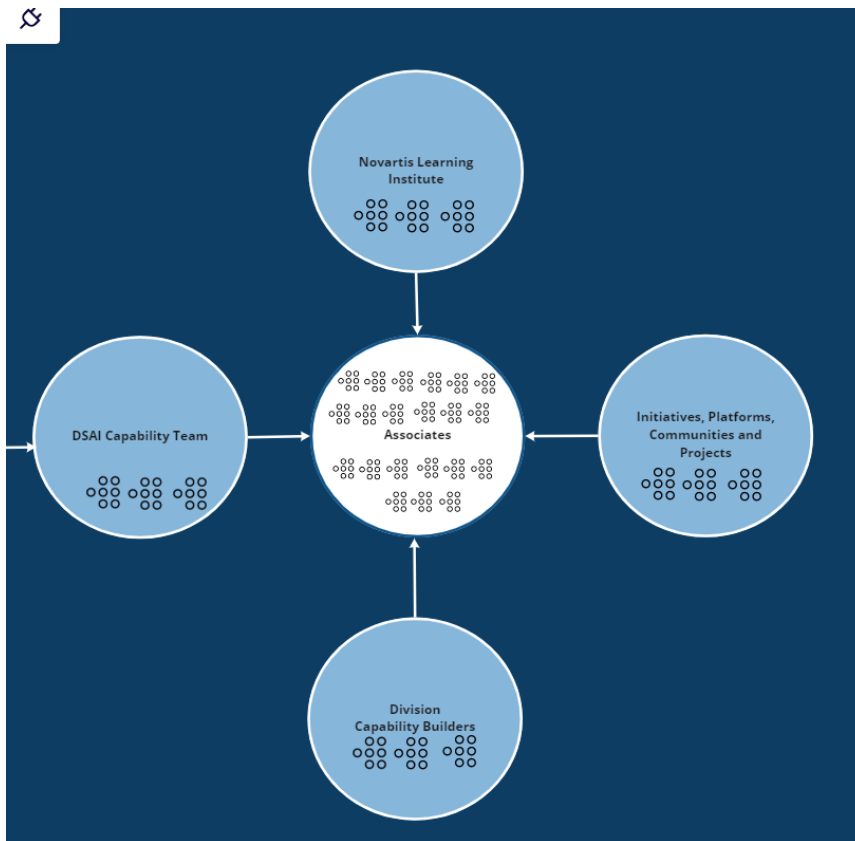
Goals

Common transferable skills in my world

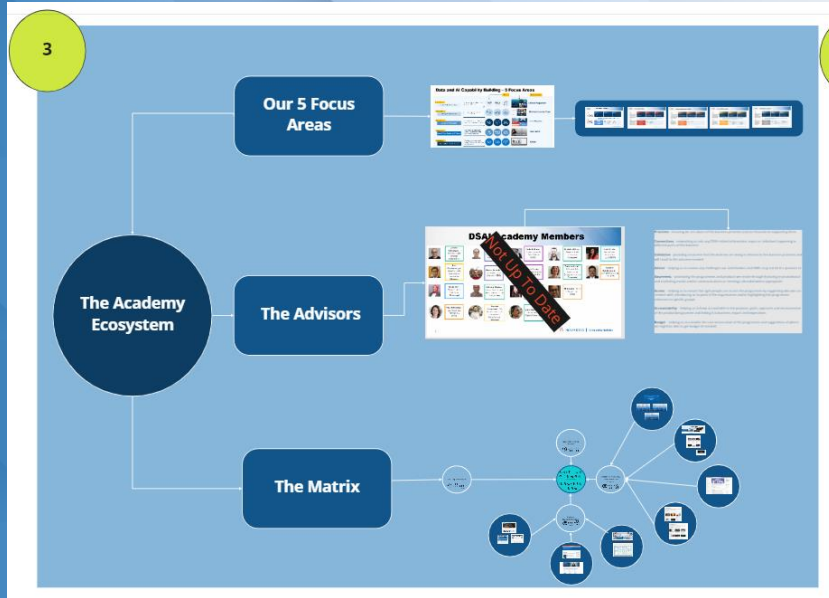
Job Profiles
1,275

1275 Total profiles	Skills	Profiles	% of Profiles
	Data Analysis	298	23.37%
	Clinical Data Management	265	20.78%
	Data Management	246	19.29%
	SQL (Programming Language)	189	14.82%
	Python (Programming Language)	183	14.35%
	Machine Learning	173	13.57%
	Data Science	140	10.98%
	R (Programming Language)	129	10.12%
	Java (Programming Language)	97	7.61%
	C++ (Programming Language)	83	6.51%
	Data Mining	80	6.27%
	Big Data	71	5.57%
	C (Programming Language)	70	5.49%





The Academy Ecosystem



Our 5 Focus Areas

Data and AI Capability Building – 5 Focus Areas



I am a DSAI professional

How can we do this? The organization from the loss of talent, create consistency in capability and create a user group of game changers?

As a user, I want to have access to learning that helps me to develop my capability and build my Data Science career.

Key Drivers: Play and gain, Raise the ceiling, Create game-changers

Key Outcome: Development skills across Novartis, Specialist and focused skills, A brand that attracts relevant talent

Key Approach: Content stories and pathways, On the job tools and communities, High end advanced programs

Single Measure: DSAI practitioner skill levels

Business Impact: Innovation in AI

Novartis | Reimagining Medicine

I am a Data Citizen

What can we do to create an organization of people that are aware, motivated, skilled and can share data and the role they play in enabling our data strategy?

As a user, I want to develop my understanding and ability around data so that I can apply it within my role and support the Novartis data strategy.

Key Drivers: Raise the bar, Data driven culture, Data literacy

Key Outcome: I will advance, Data-driven culture across Novartis, Novartis Data/Driver path

Key Approach: Self service learning content, On-demand learning pathways, Modular, shareable and reconfigurable

Single Measure: Data skills in all roles

Business Impact: Data first corporate

Novartis | Reimagining Medicine

I am an ambassador for DSAI

How can we create leaders who are inspirational ambassadors of our DSAI strategy and are motivated to contribute to the internal and external brand of Novartis DSAI ambitions?

As a user, I want to understand and fulfil my leadership role for DSAI so that I can actively drive and support this strategy.

Key Drivers: DSAI Brand leader, Enable DSAI opportunity and potential, Build Novartis external DSAI brand

Key Outcome: Achieve Business Impact, A number of DSAI building ambassadors, Promote internal and external DSAI brand

Key Approach: Influencers, Expert, Operators, Academics, Discussion workshops and problem-solving, Conferences, Events, Seminars

Single Measure: Leaders engaging in DSAI

Business Impact: Data as part of business strategy

Novartis | Reimagining Medicine

I am a DSAI careerist

How can we support a pipeline of talent within Novartis that encourages knowledge transfer, protects our domain expertise and strategically builds re-learn pathways?

As a user, I want to be able to develop the required skills to move into DSAI roles, regardless of my current role, so that I can progress my career.

Key Drivers: Career progression, International marketplace, Develop skills for DSAI opportunities

Key Outcome: Year on year DSAI talent retention, Increasingly needed DSAI skill opportunities, Data domain and category knowledge

Key Approach: Targeted and published associate groups, Partnership with Talent & Acquisition, Academic pathways

Single Measure: Leaders plans for DSAI pathway

Business Impact: Increased talent opportunities

Novartis | Reimagining Medicine

I build DSAI capability

What can we do to prepare for the likely proliferation of DSAI capability building programmes, so that we are accessing and reusing these efforts across the business?

As a user, I want to have one place I can go to so that I can understand the full range of DSAI capability-building options in Novartis.

Key Drivers: Simplify access, Reuse ability, Metrics and Data on DSAI capability efforts

Key Outcome: Reduced duplication, Increased awareness, Increased opportunity

Key Approach: Right Hand DSAI writer, Personalized content, Individuals in Digital programs

Single Measure: 1 DSAI Capability Building Hub

Business Impact: Measure DSAI effort, quality, volume and scale

Novartis | Reimagining Medicine

DSAI Academy Members



Priorities - ensuring we are aware of the business priorities and are focused on supporting these

Connections - networking us into any DSAI-related information, topics or initiatives happening in different parts of the business

Validation - providing assurance that the work we are doing is relevant to the business priorities and will result in the outcome needed

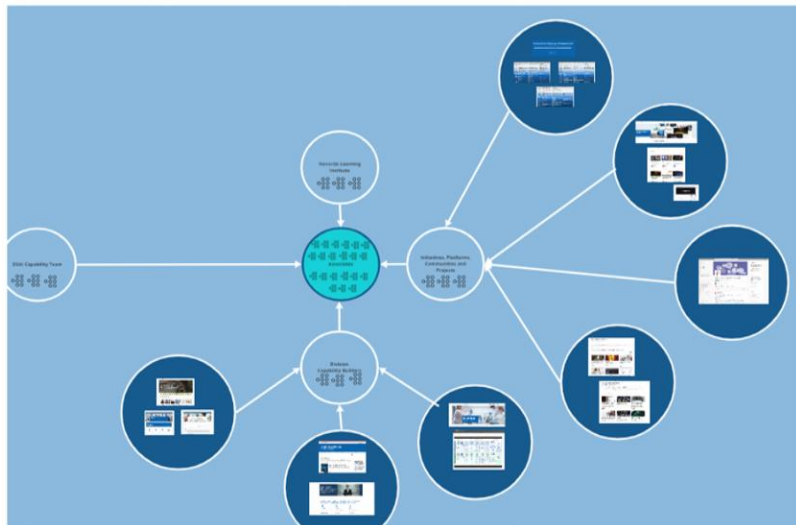
Advice - helping us to resolve any challenges our stakeholders and SMEs may not be in a position to

Awareness - promoting the programmes and products we create through featuring in promotional and marketing events and/or communications or meetings attended where appropriate

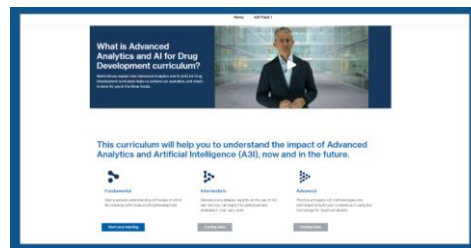
Access - helping us to ensure the right people can access the programme by suggesting who we can connect with, introducing us to parts of the organisation and/or highlighting the programme relevance to specific groups

Accountability - helping us to keep accountable to the purpose, goals, approach and measurement of the product/programme and linking it to business impact and imperatives

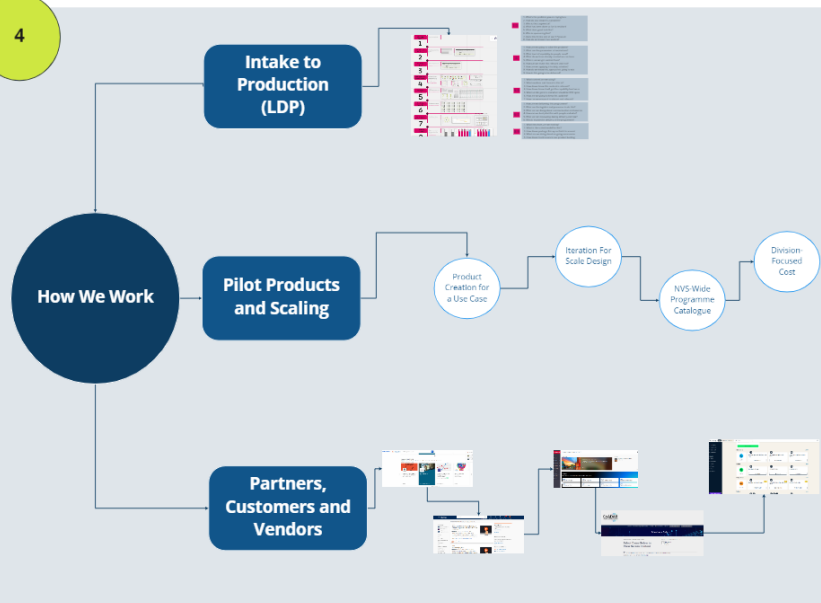
Budget - helping us to consider the cost versus value of the programme and suggestions of where we might be able to get budget (if needed)



Round 1	Slot 1 – 2:15 PM CET // 8:15 AM ET	Slot 2 – 2:35 PM CET // 8:35 AM ET	Slot 3 – 2:55 PM CET // 8:55 AM ET
Track 1 Business Application 1 Link to Recording	Low Data, No problem: Deep Neural Networks are Still Useful! CTS Lead Author: Amanda Szwed-Das	Smart Predictive Activation & Readiness for Cosentyx CTS Lead Author: Apurva Choudhary	Titan.AI Price excellence: Bid price prediction with augmented intelligence. SANDOZ Lead Author: Benedek Popovics
Track 2 Business Application 2 Link to Recording	Label Comparison automation with AI/ML GDD Lead Author: Anja Mikulovic	German Dossier Automation PIVABIA Lead Author: Natalia Kiyasova	Enhancing Cosentyx Therapy Onboarding of patients through explicable AI/ML modeling CTS, PIVABIA Lead Author: Ghazi Abou
Track 3 Business Application 3 Link to Recording	Automated Anomaly Detection (AutoAD) for Financial Controls & Compliance (FC&C) CTS Lead Author: Aron Probst-Ajcsen	Using AI and ML techniques to perform Market Research Analysis CTS Lead Author: Eijenshima Sato	Maximize the Medical Expert Engagement through Personalized Messaging CTS, ONCOLOGY, PIVABIA Lead Author: Suniti Kishore
Track 4 Science Application Link to Recording	Federated and privacy-preserving machine learning applied to structure-activity data NIBR Lead Author: Neo Flores	Digital twins powered by machine learning for real time insights in Pharmaceutical R&D and Manufacturing NINDOP Lead Author: Paras Kothari	Discover new relationships between salesforce executive KPIs and performance using ML PIVABIA Lead Author: Patric Viskley
Track 5 Cloud Data Science Practice Link to Recording	Using good data science practice and AI to establish Splicing as a new drugging modality GDD, NIBR Lead Author: Christian Keller	Ten simple rules to kick off Good Data Science Practice by a team: lessons from collaboration of Neurosciences (GDD) and Oxford Big Data Institute GDD Lead Author: Jolene Dijkstra	P1 in action: Learnings from a successful production deployment SANDOZ Lead Author: Julian Roberto Mugica
Track 6 Clinical Application Link to Recording	Integration of Spatial Transcriptomics Gene Expression and H&E Pathology Data NIBR, PIVABIA Lead Author: Angel Singh	Predicting fast progression from intermediate to late AMD Deep Image and Survival models for Optical Coherence Tomography CTS, NIBR Lead Author: Indira Uthman	The eye as an objective measure of cognition NIBR Lead Author: Jordis Susan Noss
Track 7 Technological Advances in AI/ML Link to Recording	AI-based personalized omnichannel orchestration for Cosentyx in Switzerland CTS, PIVABIA Lead Author: Arjan Singh	Knowledge Graph NGE Driving Personalization in commercial & sales CTS, PIVABIA Lead Author: Deepanshu Mittal	Deep learning of molecular properties for formulation design using quantum descriptors GDD Lead Author: Olivia Woolley
Track 8 AI for AI/ML Research Link to Recording	A Comparison of Algorithms for Feature Selection CTS, NIBR Lead Author: Elisabeth Becker	Discovering immune-oncology drug targets using advanced graph embeddings NIBR Lead Author: Hao Chen	Impact evaluation of new commercial strategies ONCOLOGY, PIVABIA Lead Author: Meris Buchanek

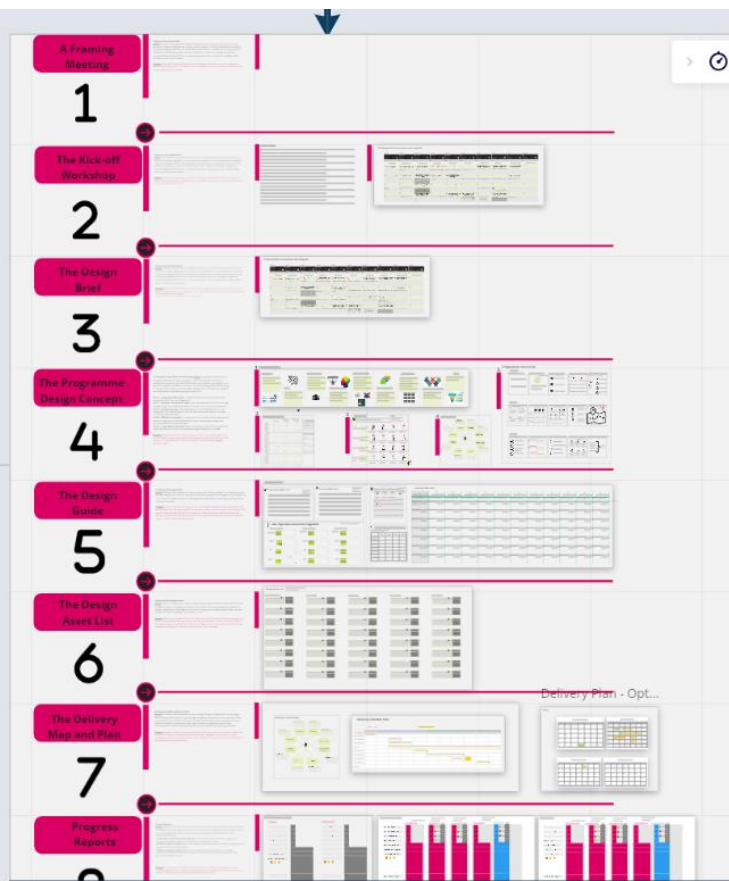


4



How We Work

Intake to Production



1-3

1. What's the problem you are trying to solve?
2. How do you know it's a problem?
3. Who is this targeted at?
4. What has been done so far to resolve this?
5. What does good look like?
6. Who is sponsoring this?
7. Does this fit into one of our 5 Focus areas?
8. How do we know it has worked?

4

1. How are we going to solve this problem?
2. What are the parameters of restrictions?
3. What level of capability do people need?
4. What do we have already created we can leverage?
5. Where can we get content from?
6. How can we make this relevant and real?
7. How are we applying it to daily activities?
8. How do we know this approach is going to work?
9. How is this going to be delivered?

5-6

1. What content are we using?
2. What medium and format is this in?
3. How do we know this content is relevant?
4. How do we know it will get the capability level we need?
5. What can be generic and what should be NVS-special?
6. How are we going to keep this updated?
7. How can we ensure it is vibrant and relevant?

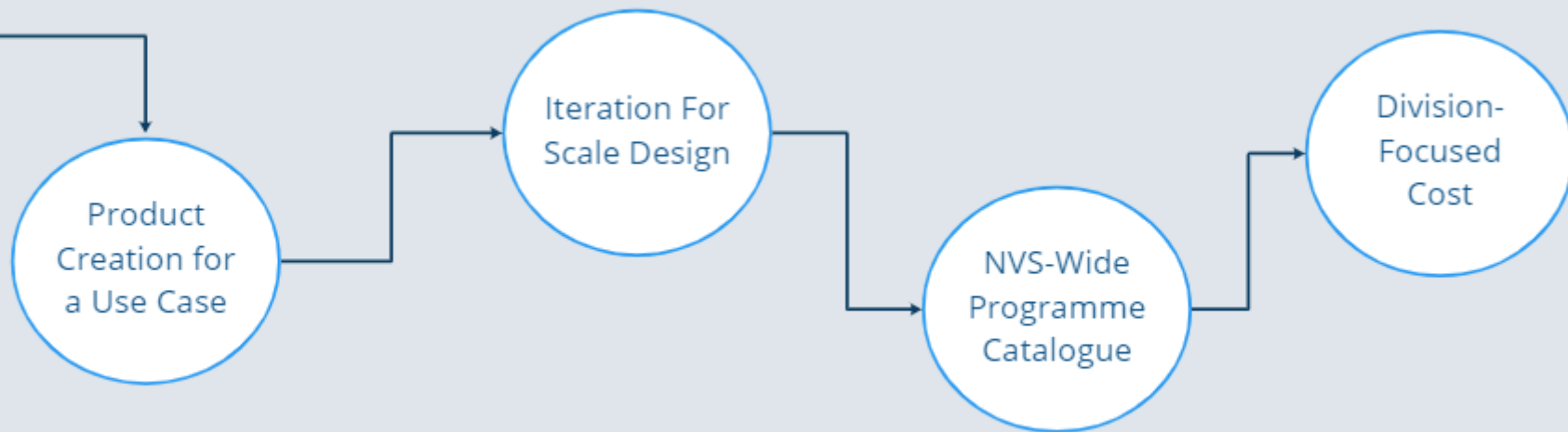
6-7

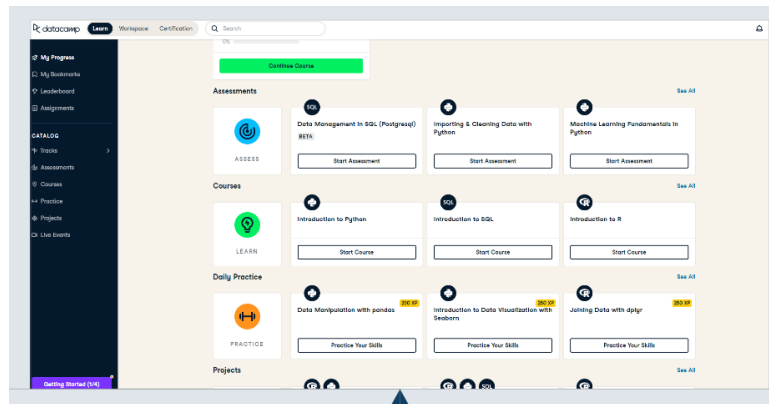
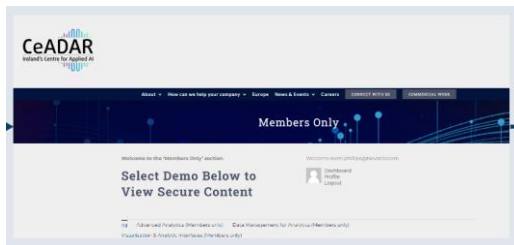
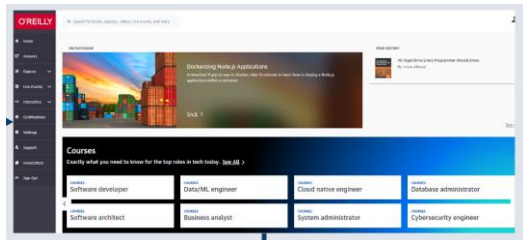
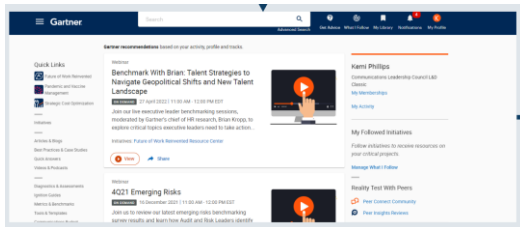
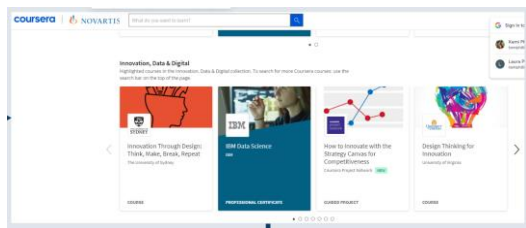
1. How are we delivering this programme?
2. What are the logistics and processes to do this?
3. What are we doing about communication and awareness?
4. How can we best pilot this with people and who?
5. What are we measuring during delivery and how?
6. Who is involved in delivery of the programme?

8-9

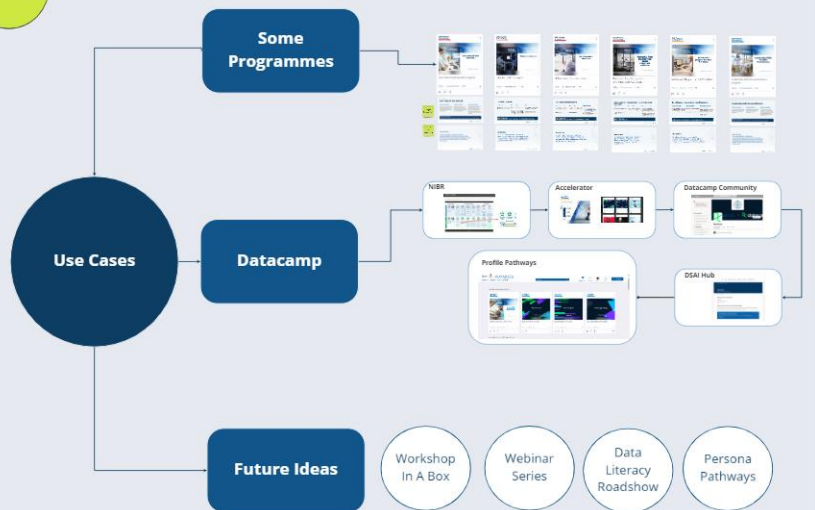
1. What iterations are we making?
2. What is the scaled model for this?
3. How do we package this up so that it is accessible?
4. What are we doing about on-going measurement?
5. How do we track issues in our product backlog?

Pilot Products and Scaling





5



Use Cases

Low code AI and Auto ML

Problem statement

How can we increase the number of associates that are able to build DSAI solutions without having to invest significant time and effort in learning coding language?

Problem evidence

Significant appetite for non DSAI individuals accessing low or no-code tools and training opportunities within Productivity Improvement, Automation, Dev Ops and Data Literacy.

Program description

The programme's overall aim is to support the upskilling of data citizens of Novartis by leveraging low code AI and auto ML tools Alteryx, Dataiku, Tellus, Microsoft are the tools accessible to Novartis associates.

Single Success Measure

An increase in the number of people that are able to create AI solutions that are not Data Scientists.

Data for Leaders

Problem statement

How can we make our leaders more effective customers of Data Science?

Problem evidence

Unclear on how to use data to drive strategic decisions and insights to solve complex problems; how to ask the business-relevant question and the process of solving data problems; how to effectively communicate in the language of data engineers and data scientists.

Program description

Data for Leaders is a training program to provide leaders with a working knowledge of the key concepts of data science and help them to better leverage data in the organization.

Single Success Measure

Business stakeholders are increasing their use of DSAI Solutions to make business decisions.

Leadership skills for practitioners

Problem statement

How can we improve the storytelling, communication and business context knowledge & capability of DSAI Practitioners?

Problem evidence

Misalignment, miscommunication and lack of effectiveness between Data Science teams and business stakeholders

Program description

This program is for all the DSAI practitioners as they tend to get too technical with non-practitioners while articulating the value of their work and this is causing difficulty for non-practitioners in understanding the value of their work.

Single Success Measure

Business stakeholders are increasing their use of AI Solutions to make business decisions.

Accelerator program for New Frontiers

Problem statement

How can we support DSAI enthusiasts in building DSAI skills so that we have a robust, quality pipeline of associates that can move into DSAI roles?

Problem evidence

Associates do not know how to bridge the gap between their skills set and the capability level required for them to move into a DSAI Practitioner role.

Program description

The aim of this program is to provide a learning journey for DSAI enthusiasts of New Frontiers community so they can develop DS skills and progress into DS roles. Learners will be working on use cases / projects / assignments to apply the skills.

Single Success Measure

Number of DSAI roles filled by associates who have been through the program.

Enterprise Data Management (EDM) awareness pathways

Problem statement

How can we create awareness around the need for harmonization and consistency of Data across the organization that inspires data citizens to follow a good data management practice?

Problem evidence

The Maturity Assessment score that Novartis has is lower than benchmark and Data Literacy is critical in helping to positively impact that score.

Program description

This program is targeted at all associates in Novartis with the intention of increasing literacy around Data Management. Aim is to ensure that Novartis associates understand that data literacy and management is not just the responsibility of people that sit in Data roles. This is an 'Awareness' only level program.

Single Success Measure

Increase in Data Maturity Index score.

UK Innovative Medicine

Problem statement

How can we develop the capability of the Marketing team in their ability to understand and utilize the full offering of data science teams to drive and measure their IDAPs?

Problem evidence

The budget marketing teams spend on DS projects is high, despite asking DS teams for the same data each year. There is no evidence they use or track data towards their goals.

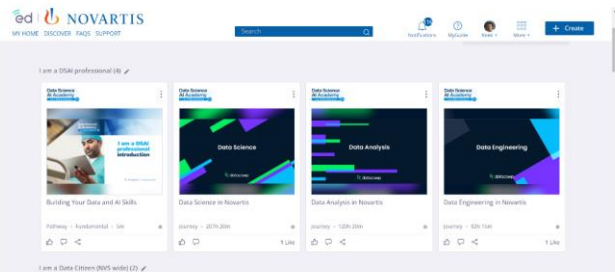
Program description

This program is for both Brand and Data Science teams. The main purpose of the program is to -
• Use numbers to derive the actions & tactical plans, to be evaluated at regular intervals and improve these plans accordingly
• Have increased understanding of business and how DSAI Teams can help achieve Strategy and business excellence
• Be able to evaluate and to end value cycle and who is responsible at what point

Single Success Measure

Reduced budget, reduced tactical plans and increase in quality of strategic decisions.

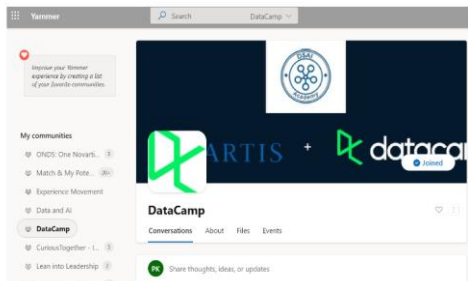
Profile Pathways



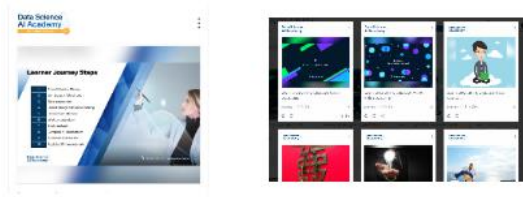
NIBR



DataCamp Community



Accelerator



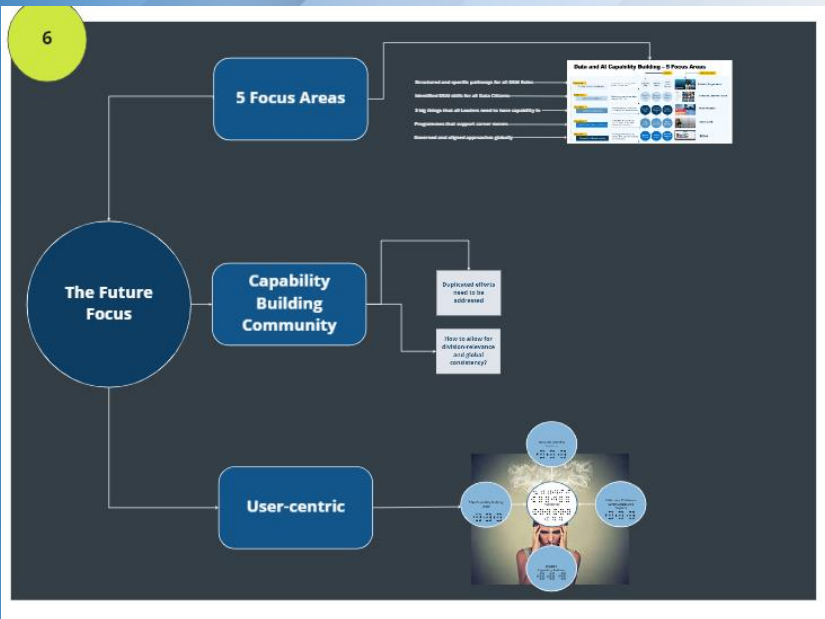
Workshop
In A Box

Webinar
Series

Data
Literacy
Roadshow

Persona
Pathways

6



Future Plans

5 Focus Areas

Structured and specific pathways for all DSAI Roles

Identified DSAI skills for all Data Citizens

3 big things that all Leaders need to have capability in

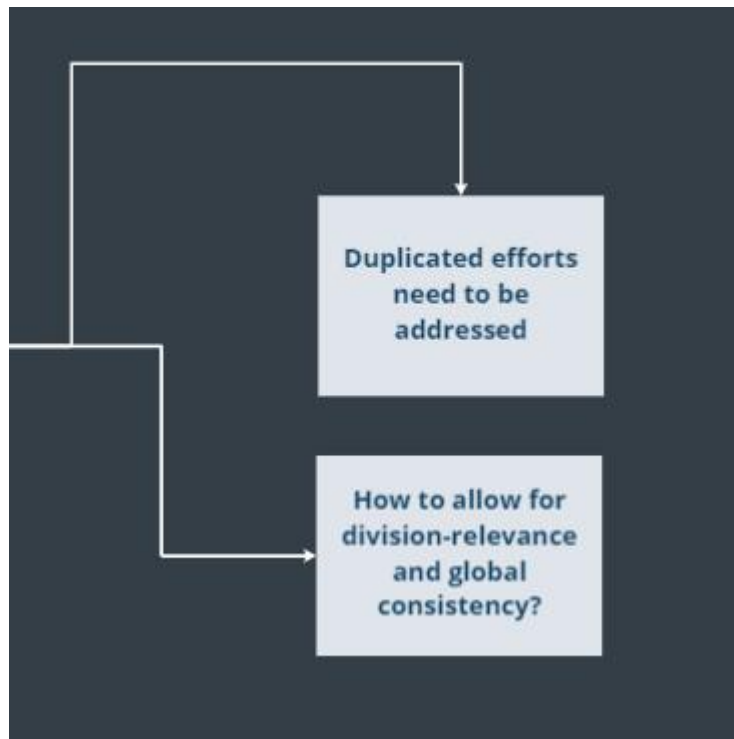
Programmes that support career moves

Governed and aligned approaches globally

Data and AI Capability Building – 5 Focus Areas

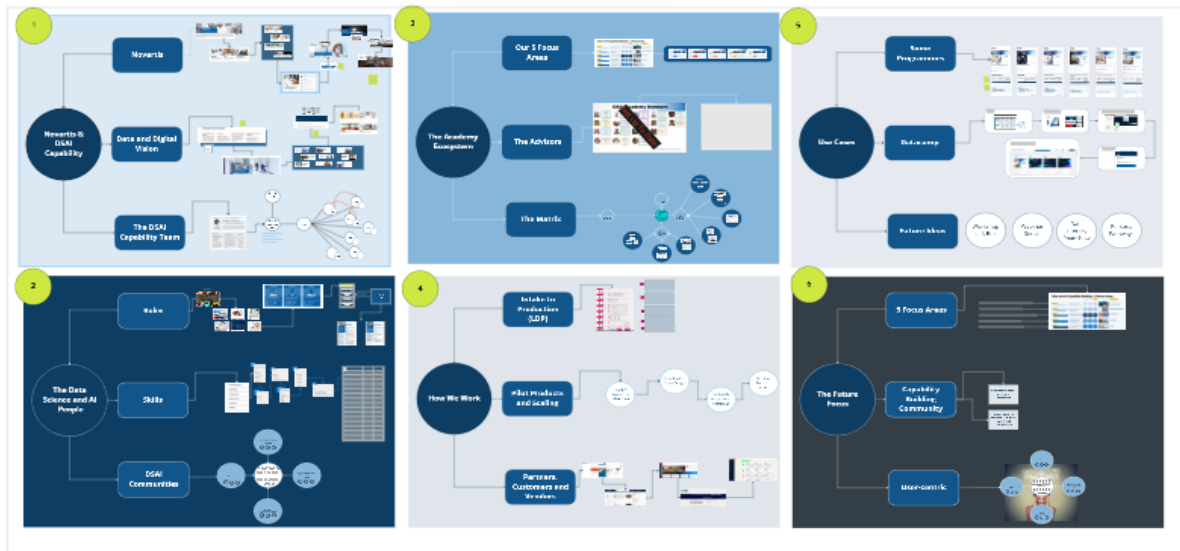


Capability Building Community





- 1 About Research and Development - 5 mins
- 2 About Data Science in Research - 5 mins
- 3 The Data Science and AI Capability - 5 mins
- 4 How We Work - 5 mins
- 5 About Data Science and AI Academy (including Novartis) - 10 mins
- 6 The Future Person - 5 mins



Thank you