INFS5700

Introduction to Business Analytics

Week 8: Design Thinking for Analytics

(T2 2022)

Agenda

- Recap on Week 7 topic - BAM
  Assignment Project Exam Help

- Topic on Design Thinking
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Business Analytics Methodology (BAM)

- It provides managers with a process framework and a practical set of tools for developing and analysing an organization's business model and analytics portfolio

- The purpose of BAM approach is to support an organization in gaining value from BA - from initial thoughts right through to completed analytics

Business Analytics Methodology (BAM)

- A top-down analysis process that focuses on the business model of the organization and seeks to develop a business analytics development portfolio

- A bottom-up approach that is grounded in data, tactical work, model building, and technology

TOP-DOWN ANALYSIS
FOCUS: BUSINESS MODEL
AIM: BUSINESS ANALYTICS PORTFOLIO

2 STREAMS OF WORK
DATA
TACTICAL
MODELLING
TECHNOLOGY
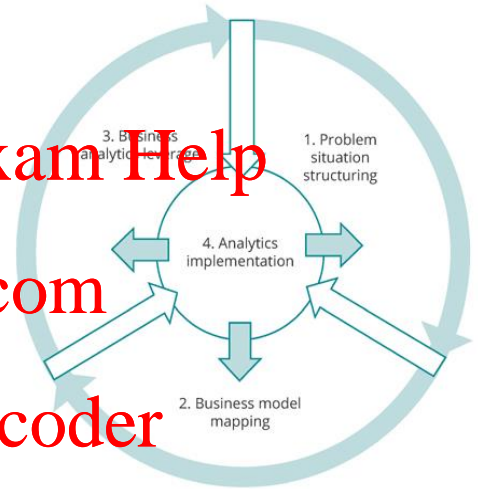
BOTTOM-UP ANALYSIS

Business Analytics Methodology (BAM)

1. Problem Situation Structuring

2. Business Model Mapping

3. Business Analytics Leverage

4. Analytics Implementation

3. Business analytics leverage

1. Problem situation structuring

4. Analytics implementation

2. Business model mapping

Problem Situation Structuring

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Business Model Mapping

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Business Analytics Leverage

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Opportunity Matrix

- It uses BMC developed to identify leverage points for business analytics – the application that are most likely to lead to creation of value and the best use of scarce resources

- The components of BMC are systematically mapped in matrix form against potential analytics applications

Opportunity Matrix Example - GoGet

- Front-office business analytics opportunities matrix for GoGet

Canvas element	Business question/issues	Potential applications of analytics
Customer segments	What sub-types of customers do we have? What motivates customers to use GoGet? To stop using GoGet? How can we increase GoGet usage by existing customers?	Customer segmentation models Behavioural models of individual customers Customer churn prediction
Value propositions	Are customer mobility needs being met? Is the environment being improved?	Environmental impact modelling Customer satisfaction modelling
Revenue streams	Which pricing strategies work best?	Pricing models, including experimentation (e.g., dynamic pricing)
Channels	Which channels (combination of channels) are best for communicating with customers?	Modelling and assessment of different channels and communication methods, e.g., browser-based, app-based, call centre, social media, print media, above-the-line advertising
Customer relationships	How can service interaction be personalized?	Experimentation and modelling of relationship building, e.g., use of social media platforms Customer lifetime value modelling

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Opportunity Matrix Example - GoGet

- Back-office business analytics opportunities matrix for GoGet

Canvas element	Business questions/issues	Potential applications of analytics
Key activities	Where should vehicles be located? Do we have the right vehicle available in the right place at the right time?	Geospatial mapping of vehicles to visualize coverage, location of service users, travel times, journeys, distances. Geospatial analysis to predict how many vehicles and of what type are needed. Short-term predictive modelling of vehicle location. Simulation and optimization of vehicle fleet operations
Key resources	Vehicle fleet How should the Internet platform be developed and maintained? How can best use of the parking pods be made?	Vehicle reliability modelling to help select vehicle supplier and model. Predictive modelling of technology platform performance to help developing with ease and test. Pod utilization modelling and optimization
Key partners	Which organizations are most likely to outsource their fleet operation? Which body shop performs best?	Profiling of potential enterprise fleet customers to support sales and marketing. Analysis of body shop performance (quality, time, cost)
Cost structure	Can costs be reduced? Collisions, insurance claims, vehicle reliability, vehicle recovery	Analysis of collision data and predictive modelling of at-risk drivers. Identification of drivers who may fail to return their vehicle or return it damaged

Analytics Leverage Matrix

- To categorise a large number of opportunities identified in the opportunity matrix and to reduce this to a working list of potential projects

- The leverage matrix is created by considering two dimensions, i.e., **perceived difficulty** and **potential for value creation**. Together, they give four quadrants:

  - ➢ *Quick wins*: These are high-value areas where analytics can be applied to create value with positive ease (i.e., using technologies and techniques that are tried and tested)

  - ➢ *Major projects*: These are also high-value areas, but they are considered more difficult to achieve

  - ➢ *Fill-ins*: These are lower-value projects, but as they are not considered to be difficult to implement, they may still merit inclusion

  - ➢ *Hard slogs*: As these analytics projects are likely to be low in value and difficult to achieve, they are best avoided

Analytics Leverage Matrix Example - GoGet

- *Quick wins*: Building a predictive model to identify customers at high risk of causing vehicle damage

- *Major projects*: Modelling customer lifetime value (a key part of managing customer loyalty and revenue generation)

- *Fill-ins*: Predictive modelling of performance of technology platform (but not currently a business priority)

- *Hard slogs*: Optimizing the fleet through simulation models

Design Thinking

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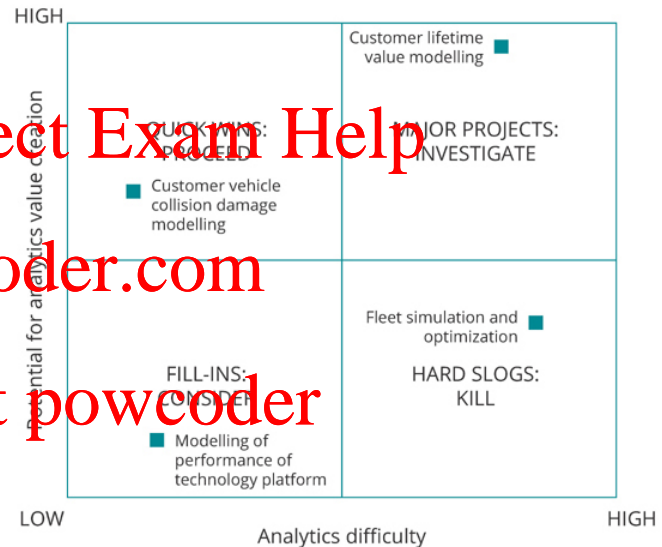
Why Design Thinking?

- Facilitate the process of integrating and embedding analytics solution into the business process for value creation
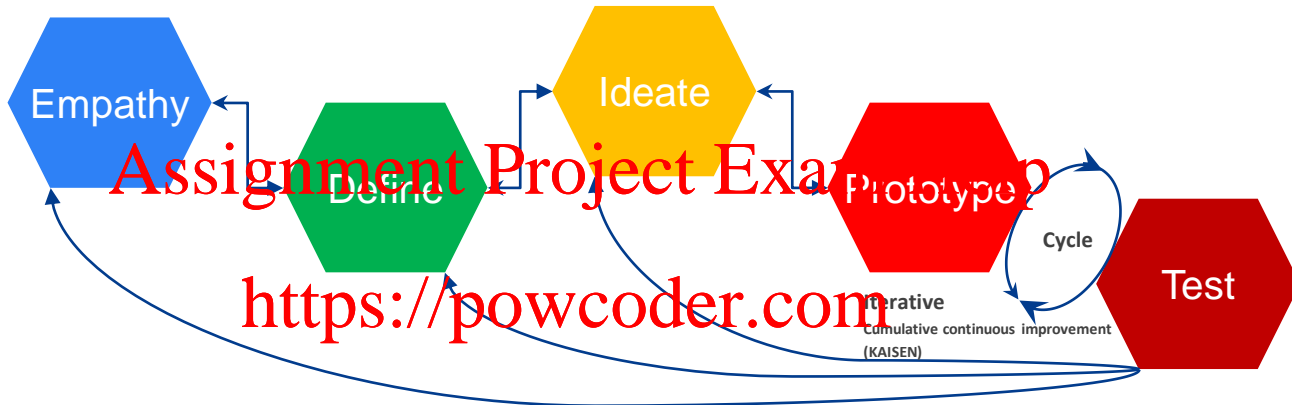
  - ➤ Paradigm shift from an 'analytics world' to a 'business universe' perspective

  - ➤ Human-centred designs and outcome-oriented approach to to solve problems in a creative and innovative way

From analytics world	To business universe
A focus on building predictive models	A focus on business outcomes
Predictive models deliver "automatic" benefit to the business	Predictive models deliver capabilities - business projects deliver benefits
Return on investment (ROI) is king	Broader view of what constitutes a benefit is needed
Analytic business case	Business value case
"Trusting the gods" to deliver benefits from analytics investments	Managing risk to deliver benefits; managing benefit paths beyond completion of the project

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What is Design Thinking?

- Design thinking is a holistic approach that aims for **innovation** in a similar manner to the way designers would

- Design thinking is an **iterative process** in which we seek to **understand the user**, **challenge assumptions**, and **redefine problems** in an attempt to identify **alternative strategies and solutions** that might not be instantly apparent with our initial level of understanding

Design Thinking Process Flow Chart

Empathy

Define

Ideate

Prototype

Test

Cycle

Iterative
Cumulative continuous improvement (KAISEN)

Persona Development (Anthropology)

End User persona aims to develop a rounded view of stakeholders (i.e.
people that will interact with your analytics use case)

Diverge

Storyboard

A narrative storyline that aims at putting theory into practice scenarios (acting script) to identify potential problems and generate problem statements

Converge

Opportunity Matrix

Explore analytics opportunities with ideas generation that could translate into solutions.

Diverge

Leverage Matrix (Prioritise)
Opportunity Canvas

Sort ideas and opportunities according to practical implementation/value creation and prioritise for prototyping and testing.

Converge

Tools to help operationalise DT process for Analytics

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Empathize

- It is the foundation of a human-centred design process

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- The work you do to understand people, within the context of your design challenge

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- Your effort to understand the way they do things and why, their physical and emotional needs, how they think about the world, and what is meaningful to them

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Empathizing: GoGet example

- A two-day design thinking workshop, participants were provided with case study description and pre-readings in advance of the workshop

- A live-case session that is led by the representative from the case organization – GoGet
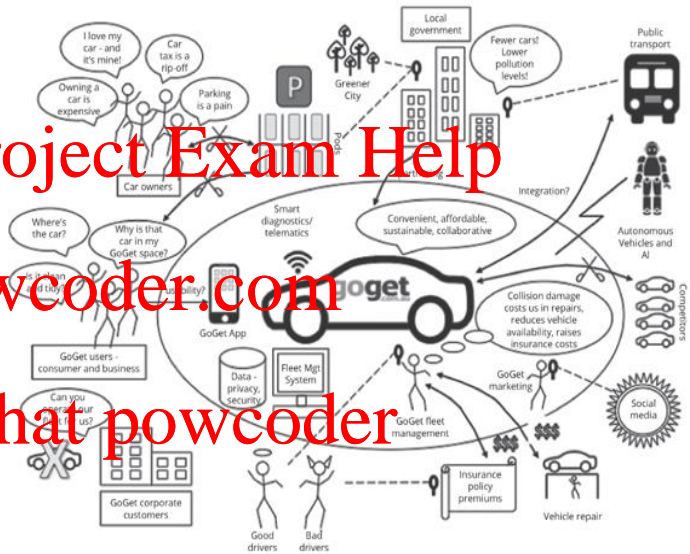
- Exploring the problem situation

Create a rich picture

- Purpose

  ➤ Rich picture helps to identify a range of factors (e.g., data, organization, technology, process, etc.) affecting analytics development and value creation in an organization

  ➤ It helps to identify strategic issues and priorities of an organization

GoGet car-sharing example

Business Model Canvas

- A template to define a new or existing business model. It divides the processes and internal activities of a business into nine different categories, each representing a building block in the creation of the product or service

- It helps to understand value creation and value capture by the business model of an organization

Key Partners	Key Activities	Value Propositions	Customer Relationships	Customer Segments
8. Who can help us leverage our business model?	7. What activities do we need to be able to perform well?	2. What is the bundle of products and services that will create value for the customer?	4. What relationships are we building with our customers? How do we acquire and retain them?	1. Who are we creating value for?
	Key Resources 6. Which key assets in our business are responsible for our business mode? What infrastructure is needed to create, deliver, and capture value?		Channels 3. Through which touch points (channels) do we deliver value to the customer?	
Cost Structure 9. Given the business model infrastructure, what is the cost structure?			Revenue Streams 5. What are the pricing mechanisms that will capture value from customers?	

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Construct Root Definition

- Purpose

  - A root definition is a short textual definition of the purpose and means of the system to be modelled. The root definition should tell us what the system will do (X), how it will do it (Y) and why it is meaningful for it to be done (Z).

  - This can be encapsulated in template form as: A system to do X, by (means of) Y, in order to do Z

	Scenario 1	Scenario 2	Scenario 3
What does the organization do (X)?	Reduce traffic congestion	Create a community of like-minded (environmentally conscious) members	Enable individuals and organizations to reduce their transport costs
How does the organization do it (operations, Y)?	By promoting journeys using car-sharing rather than individually owned cars	By working with local councils and public transport providers to create a joined-up approach to transport	Creation of a scalable vehicle sharing technology platform available to consumers and business organizations
Why does the organization do what it does (strategy/aims, Z)?	To improve the environment of the city (pollution levels, noise, pedestrian safety)	To improve local community cohesion and to promote awareness of environmental issues	To create a profitable and scalable commercial IT product

GoGet car-sharing example

Define

- The goal is to identify a grand challenge or problem faced by the focal company/organization

- It should be a guiding statement that focuses on insights and needs of a particular user, or composite character

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Define a problem: GoGet example

- Based on *business analytics leverage matrix:* one of the use cases was aimed at reducing the amount of vehicle damage caused by collisions
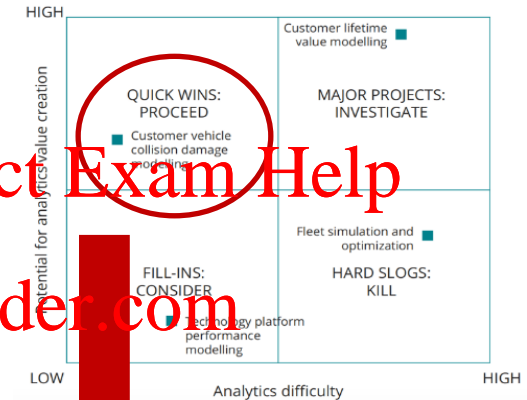
- The analytics use case can be expressed succinctly as a design challenge:

'How might we reduce the incidence of vehicle collision damage?'

Ideation

- To generate design solutions pertinent to the challenge statement

- It represents a process of 'going wide' with concepts and outcomes. It is concerned with 'Flaring' rather than 'focus'

- It provides a large repository of diverse ideas that are the source material for building prototypes to test with users

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How might we reduce the incidence of vehicle collision damage?

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Persona Development

- To explore the problem in a grounded way, empathising with the customer and thinking about the problem from their perspective (e.g., understanding of users' needs, experiences, behaviours, and goal)

- Creation of archetypes to represent a person's demographics, behaviours, beliefs, motivations, intentions

- It should be developed from perspective of people in the system (i.e., both external users, e.g., customer, or internal users, e.g., staff)

Persona Development： GoGet example

- **Persona Part A**

An out-of-town customer, Frida Kahloff, 52-year-old female with a partner and three children. She works in finance and is visiting Australia on vacation with her family. A typical day on vacation involves sightseeing and trips out in the Sydney area. For some of these trips Frida and her family need a car.

Persona Template

Out of town customer

My Name: ___ Frida Kahloff
My Age: ___ 52
Where I live: ___ United States
My Occupation: ___ Finance Manager
Who I live With: ___ Partner and three children

MY LIFE : [biography; lifestyle; work; family; hobbies and pastimes; attitude to life; what I am good at/enjoy; aspirations...]

I enjoy my job but my family are everything. My hobbies include running and playing the piano.

SOMETHING I WOULD TYPICALLY SAY

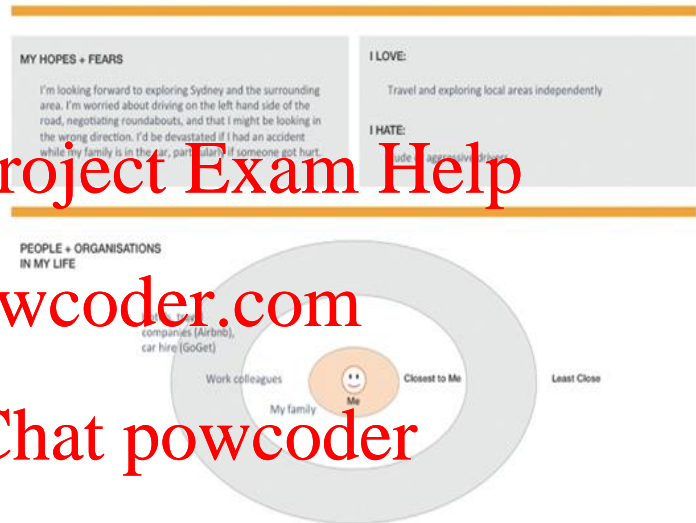What's the worst that can happen?

TYPICAL WEEKDAY

Wake Up   Go to Bed

Doing   ... and have breakfast   Check the day's itinerary   Return to hotel   Evening meal

Feeling   Relaxed   Excited   Interested, engaged, stimulated by the new   Tired and a little anxious   Relaxed

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Persona Development： GoGet example

- **Persona Part B**

In second part of the persona profile, we see that Frida is worried about driving on the left-hand side of the road and with negotiating roundabouts – in America, they drive on the right and roundabouts are rarely encountered.

MY HOPES + FEARS

I'm looking forward to exploring Sydney and the surrounding area. I'm worried about driving on the left hand side of the road, negotiating roundabouts, and that I might be looking in the wrong direction. I'd be devastated if I had an accident while my family is in the car, particularly if someone got hurt.

I LOVE:

Travel and exploring local areas independently

I HATE:

PEOPLE + ORGANISATIONS IN MY LIFE

companies (Airbnb), car hire (GoGet)

Work colleagues

Me

My family

Closest to Me

Least Close

Persona Development：GoGet example

- **Extreme case**

Stevie, a fraudulent customer who may damage cars deliberately

Persona Template

Fraudulent customer

My Name: Stevie Smith (not my real name!)

My Age: 32

Where I li__ Australia

__ __ __ __ hen I ___ to
Who I live With: At home with mother

MY LIFE : [biography; lifestyle; work; family; hobbies and pastimes; attitude to life; what I am good at/enjoy; aspirations...]

I don't enjoy work but need the money

SOMETHING I WOULD TYPICALLY SAY

Wh__ __ w__ __ ave to?

TYPICAL WEEKDAY

Wake Up:

Go to Bed

Doing | Get up late, wake up | Ad __ __ __ __ to visit out of town friend | Reg__ Go__ __ car wi__ fake ID | Drive to Wollongong and abandon vehicle | Night out with friend

Feeling | Tired from night out | Excited | Nervous | Looking forward to seeing friend | Happy

MY HOPES + FEARS

I'm bored with casual work and only work when I need funds to travel or go out with friends.

I LOVE:

Going out and travelling

I HATE:

Rules

PEOPLE + ORGANISATIONS IN MY LIFE

Causal jobs, e.g., restaurant work, office work

Friends

Closest to Me

Mother

Me

Least Close

Storyboarding

- It communicates a concept by visualising user interactions. They use the art of the narrative to focus on the experience of using company's service/product

- An excellent way of visualizing the business process and understanding the impact on the customer's journey

- An effective way to prototype your service concept

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Storyboarding: GoGet example

- Storyboard – Reducing vehicle collision damage

- To turn predictive analytics into actionable insight, we need to think about what to do with the output of the predictive model (the algorithm)

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Storyboard Template

Draw your service concept as a series of steps ("scenes") and interactions and describe what is happening in each scene. The journey story can span cross-channel touch points and represent one key aspect of the service or the entire service journey.

SHOW: [Draw the "who, what, where" of the service sequence; what are people saying, doing, thinking...]

1	2	3
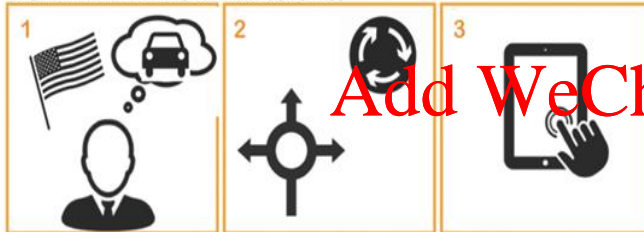
TELL: [Describe what is happening; who is involved; where is it happening...]

Customer is from the USA and on vacation in Sydney, Australia. They need to hire a car for a couple of days to do some sightseeing as a family unit.

USA drives on the right – Australia drives on the left. Australia has roundabouts – these are very rare in the USA. Must drive clockwise around roundabout and give way to traffic from the right – the opposite to the USA.

Customer does a Web search and comes across GoGet, a car-sharing scheme. The reviews are good so they decide to sign up and make a booking.

Storyboard Template

Draw your service concept as a series of steps ("scenes") and interactions and describe what is happening in each scene. The journey story can span cross-channel touch points and represent one key aspect of the service or the entire service journey.

SHOW: [Draw the "who, what, where" of the service sequence; what are people saying, doing, thinking...]

4	5	6
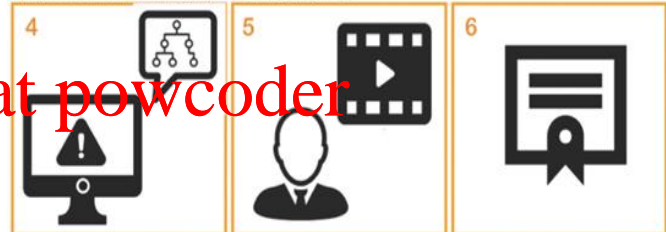
TELL: [Describe what is happening; who is involved; where is it happening...]

GoGet booking system algorithm flags customer up as high risk of having a collision and causing vehicle damage.

Customer sees increased insurance excess and/or increased rental rate. Customer offered opportunity to take driving awareness online training in exchange for reduced excess.

Customer takes online training, passes, and gets reduced excess.

Prototyping

- After having developed persona and storyboard (Empathy →Problem Definition → Opportunities for Solution Design → Implement)

- Prototyping can be developed through software, or build with physical materials (e.g., Blue-Tak, paper straws, cardboard, Lego) to give a tangible feel for the product or service

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Test

- Stakeholders can interact with prototype and provide feedback on design

- To help participants empathise more deeply with the problem situation

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From Design Thinking to Business Case - Opportunity Canvas

- To document the use case after having iterated it through design thinking

- It provides a basis for the preparation of a business case and presentation of the analytics use case to senior management for approval and funding

Users & Customers	Problems	Solution Ideas	Solution Use	User Metrics
2	1	1	5	6
	Solutions Today		Adoption Strategy	
	3		7	
Business Challenges		Budget	Business Benefits and Metrics	
4		9	8	

Opportunity Canvas

- **Problems**: what problem do users and customers have today that the solution addresses?

- **Solution ideas**: What are the product, feature, or enhancement ideas that solve problems for the target audience?

- **Users and customers**: Who are the users and customers that have challenges that will be addressed by the solution

- **Solution today**: How do users address their problems today? Any alternative solutions?

Opportunity Canvas

- **Business challenge**: If we don't solve these problem for our customers, how will it affect our business?

- **Solution use**: What will customers do differently as a result of adopting the solution and how will that benefit them?

- **User metrics**: What specific user behaviours can be measured that indicate they try, adopt and place value in the solution?

Users & Customers	Problems	Solution Ideas	Solution Use	User Metrics
2	1		5	6
	Solutions Today	1	Adoption Strategy	
	3		7	
Business Challenge		Budget	Business Benefits and Metrics	
4		9	8	

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Opportunity Canvas

- **Adoption strategy**: How will customer discover and adopt the solution?

- **Business benefits and metrics**: What business performance metrics will be affected by the success of the solution?

- **Budget**: What will our organization earn or save if the solution is created? What might it cost if the solution is not created?

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Opportunity Canvas: GoGet example

Users & Customers	Problems	Assumed current state	Solution Ideas	How will users use your solution?	User Metrics
Users – GoGet fleet management Customers – GoGet Customer (vehicle driver)	Vehicles that are damaged in collisions result in expensive repair costs and reduced ~~~~ **Solutions Today** All ~~~ are treated the same, regardless of risk profile		Build a predictive model to identify customers at high risk of being involved in a collision	High risk customers will be treated as special cases. This could include higher charges, increased ~~~ ~~~ service (e.g., driving on the correct side of the road and negotiating roundabouts) **Adoption Strategy** Users will be given report of high risk customers and prescriptive analytics will initiate action	~~~ in the number ~~~ collisions

Business Challenges	Budget	Business Benefits and Metrics
Repair costs are significant expense item for GoGet resulting in direct cost (bodyshop) and indirect cost (increased premiums). Customers face increased usage cost due to spreading cost of accidents across all users.	Budget to be developed	1. Reduction in number of collisions 2. Reduction in repair costs 3. Reduction in insurance premiums 4. Change in revenue due to change in customer behavior (e.g., impact of increased excess)

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Questions?

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