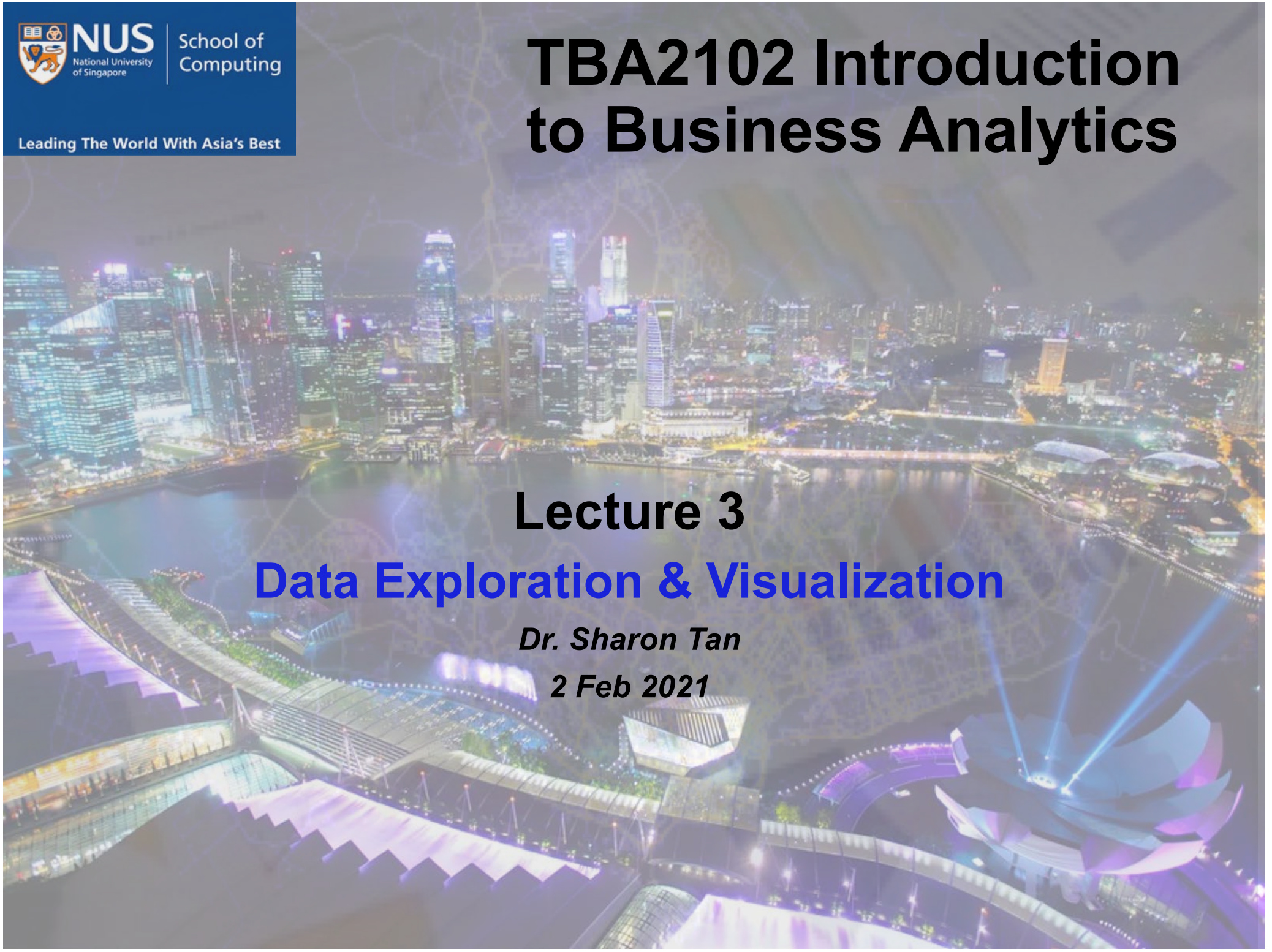
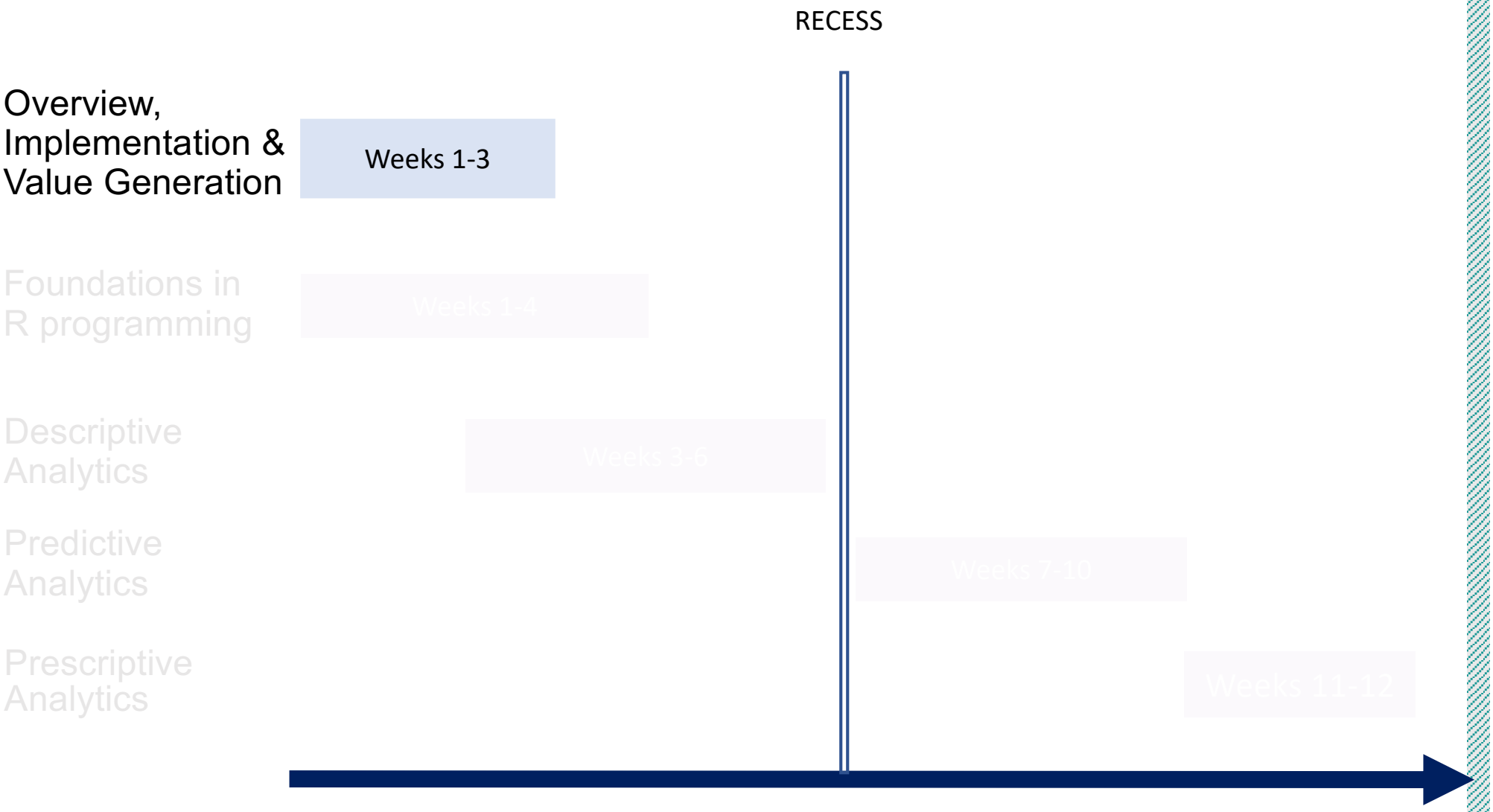
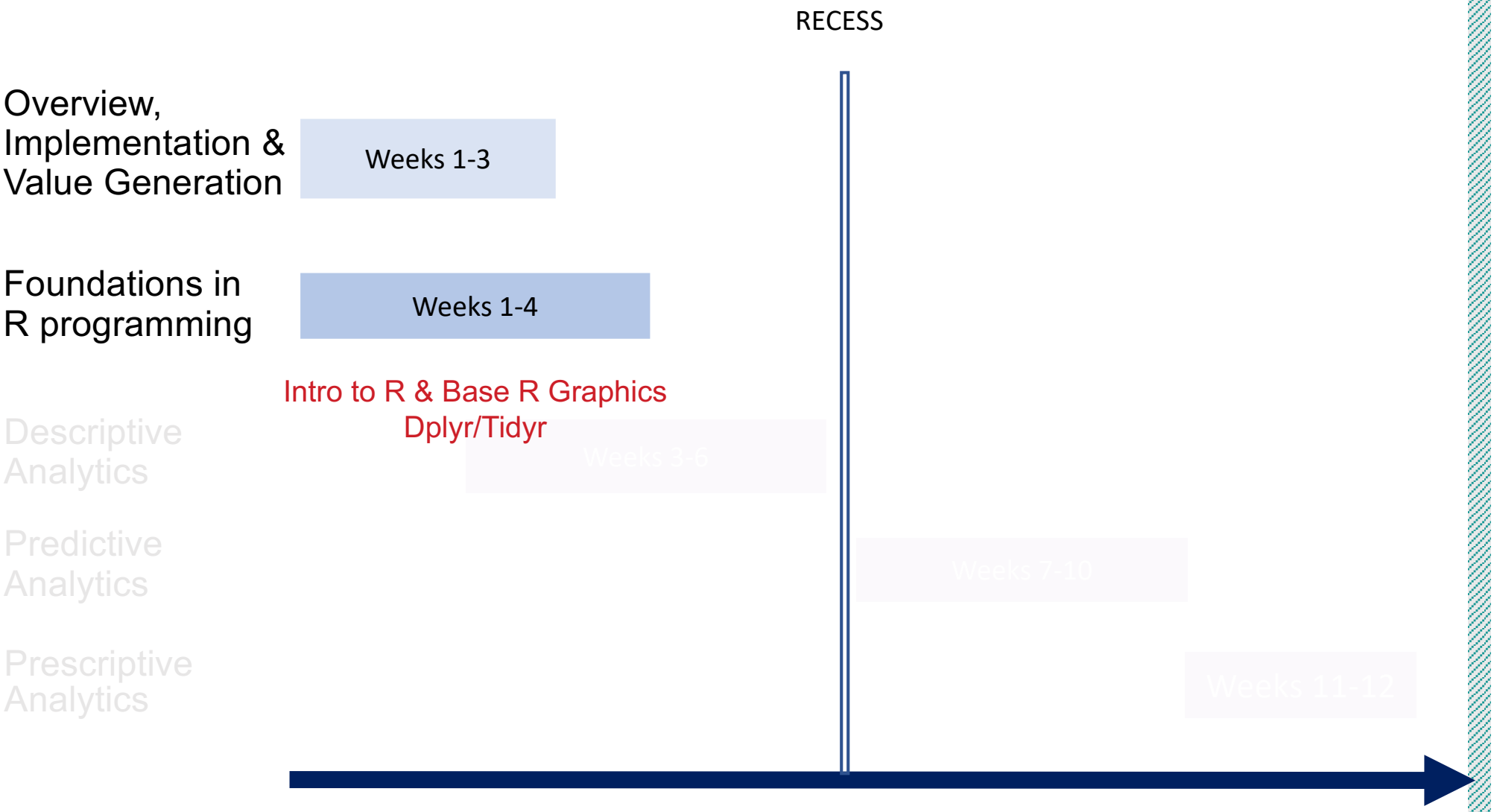

NUS
National University of Singapore
School of Computing
Leading The World With Asia's Best
TBA2102 Introduction to Business Analytics
Lecture 3
Data Exploration & Visualization
Dr. Sharon Tan
2 Feb 2021

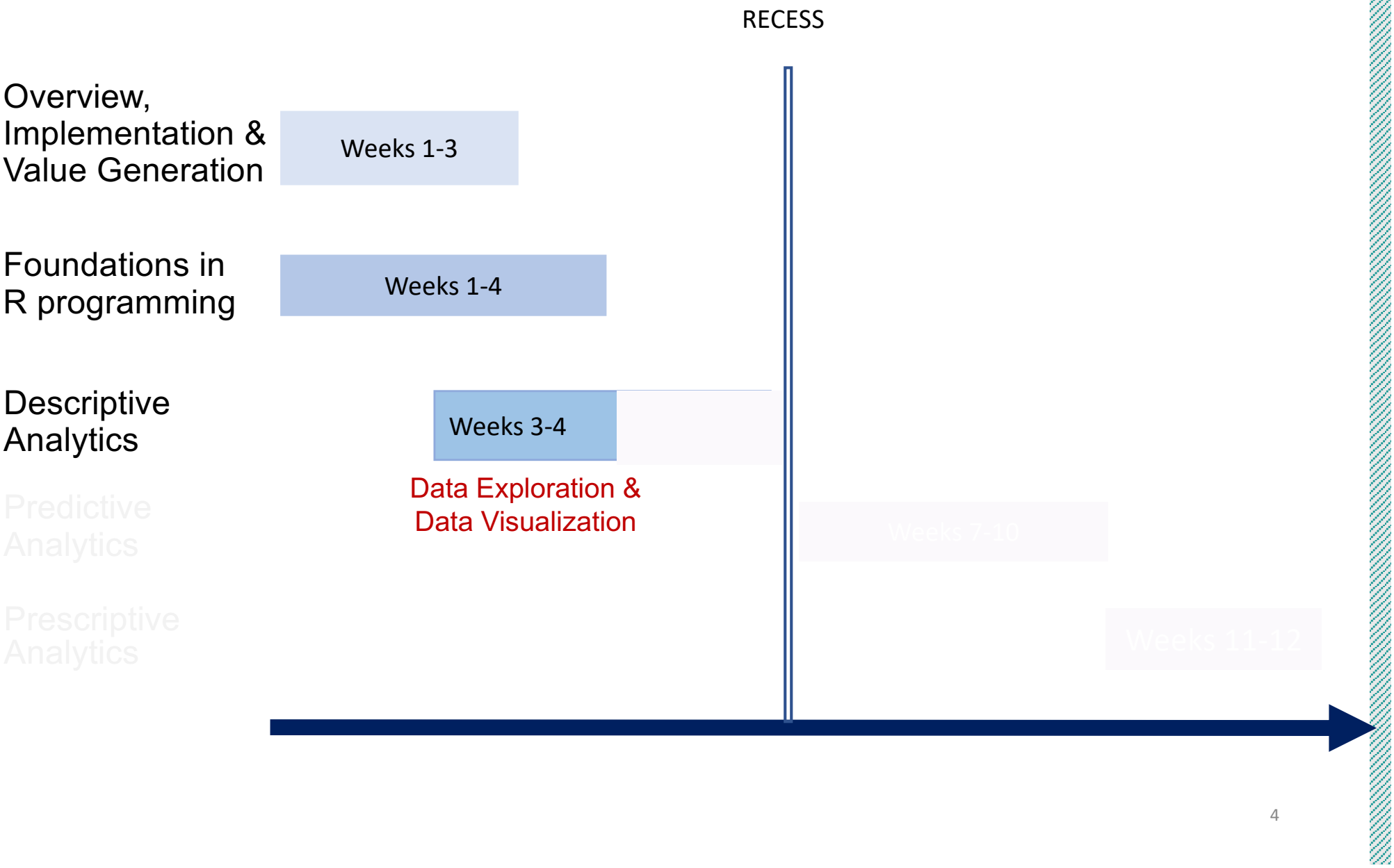
Course Map


RECESS
Overview, Implementation & Value Generation
Weeks 1-3
Foundations in R programming
Weeks 1-4
Descriptive Analytics
Weeks 3-6
Predictive Analytics
Weeks 7-10
Prescriptive Analytics
Weeks 11-12

Course Map


RECESS
Overview, Implementation & Value Generation
Weeks 1-3
Foundations in R programming
Weeks 1-4
Intro to R & Base R Graphics
Dplyr/Tidyr
Descriptive Analytics
Weeks 3-6
Predictive Analytics
Weeks 7-10
Prescriptive Analytics
Weeks 11-12

Course Map


RECESS
Overview, Implementation & Value Generation
Weeks 1-3
Foundations in R programming
Weeks 1-4
Descriptive Analytics
Weeks 3-4
Data Exploration & Data Visualization
Predictive Analytics
Weeks 7-10
Prescriptive Analytics
Weeks 11-12

Outline for today

Key Highlights from Online Video on Data Exploration and Visualizations

Applications of Data Visualization in Business Analytics

Let’s try building some dashboards

Key Highlights from Online Video on Data Exploration and Visualizations

Importance of data visualization

Types of charts/graphs/tables

- purpose
- how to produce them in R

Importance of Data Visualization

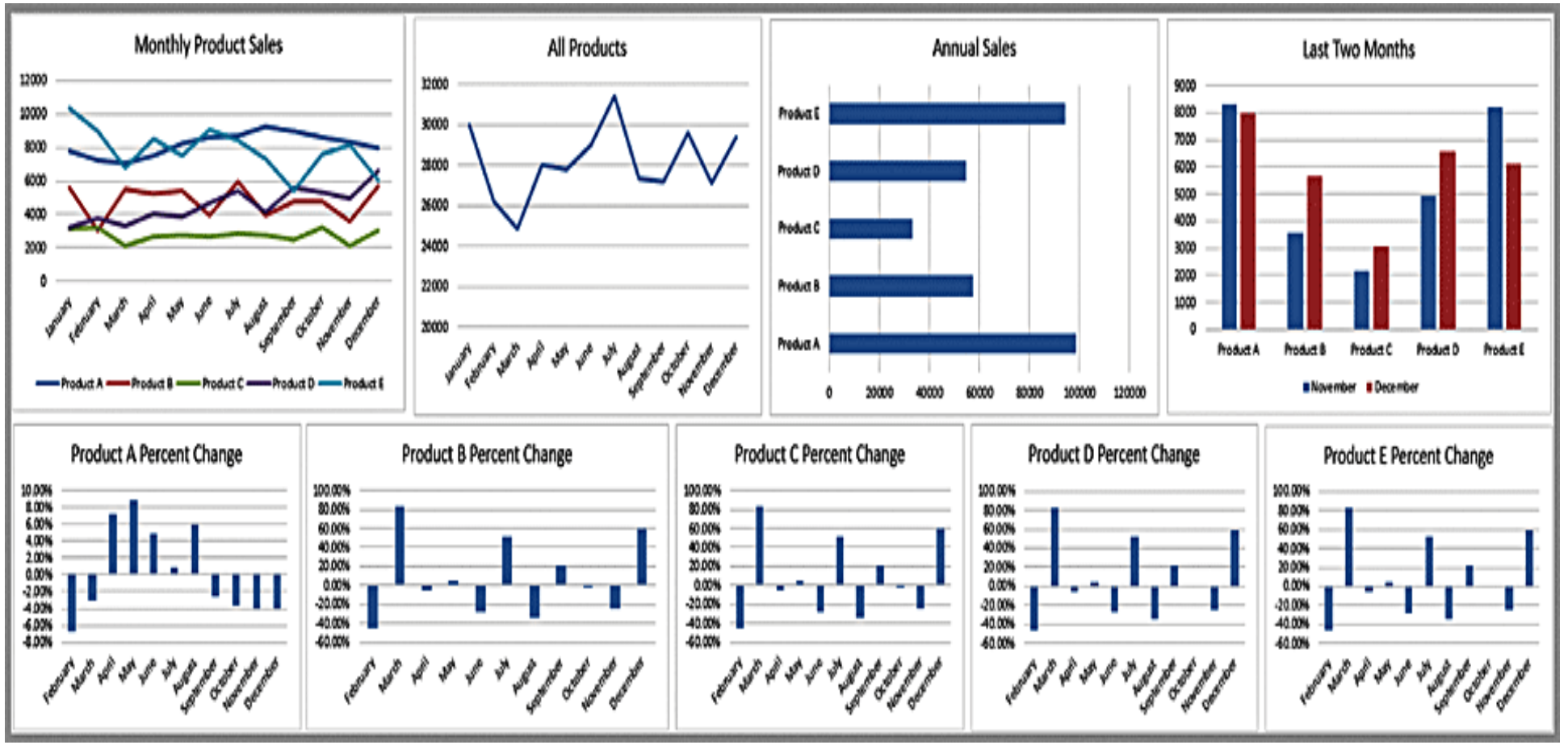
Summarizes data into key metrics

Present them visually to reduce cognitive load in processing and interpreting data

What are the key metrics required for Car Driver Dashboard?

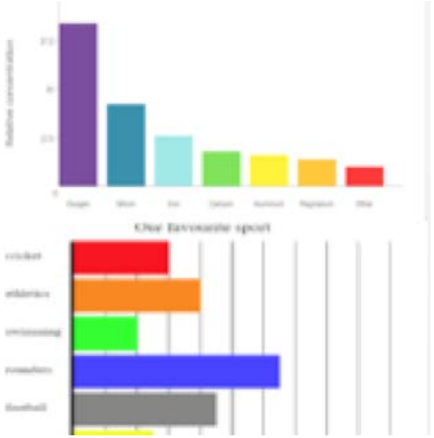
Business Dashboard

What are the key metrics for this Business Dashboard?

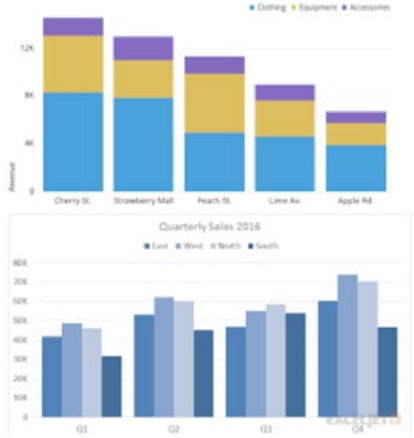


Types of Charts

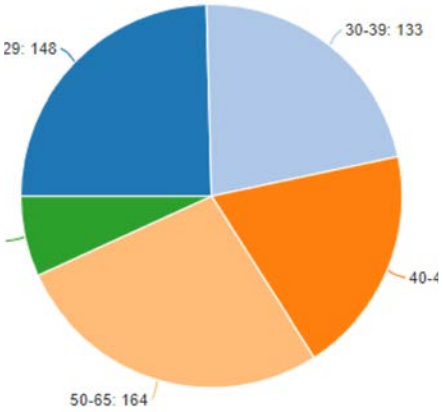
bar charts/ barplots (horizontal vs vertical)



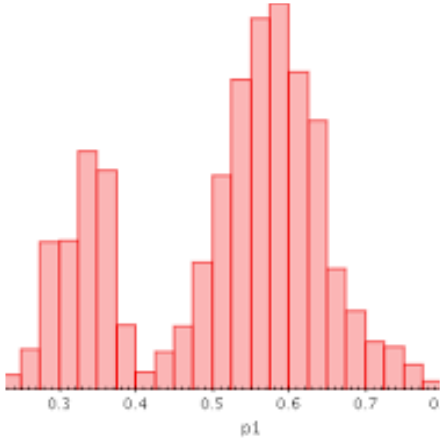
clustered bar charts/ group barplots (stacked vs beside)



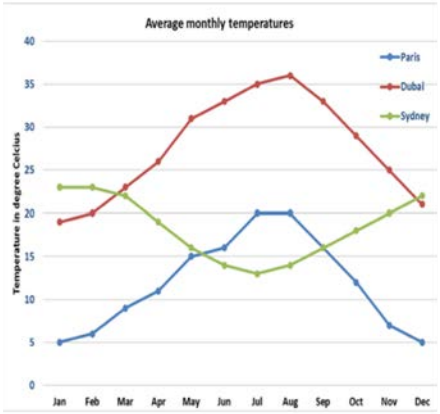
pie charts



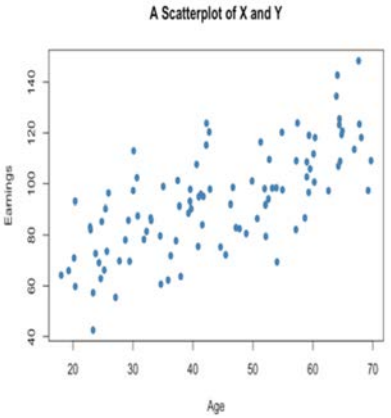
histogram



line charts



scatter plots



geographic plots

Types of Tables

frequency

contingency/ pivot tables

How satisfied are you with the services?	Frequency	Relative Frequency (%)	Cumulative Frequency (%)
Dissatisfied	13	31	31
Somewhat dissatisfied	12	28.6	59.5
Somewhat satisfied	15	35.7	95.2
Very satisfied	2	4.8	100
Total	42	100	

Class rank * Do you live on campus? Crosstabulation

Count

		Do you live on campus?		
		Off-campus	On-campus	Total
Class rank	Freshman	37	100	137
	Sophomore	42	48	90
	Junior	90	8	98
	Senior	62	1	63
Total		231	157	388

Applications of Data Visualization in Business Analytics

Dashboards for different business decision makers

Disclaimer:

- egs not exhaustive; purpose is to expose you to different dashboards & metrics used
- not endorsing any products

Revenue and Customer Overview - Q1 2016

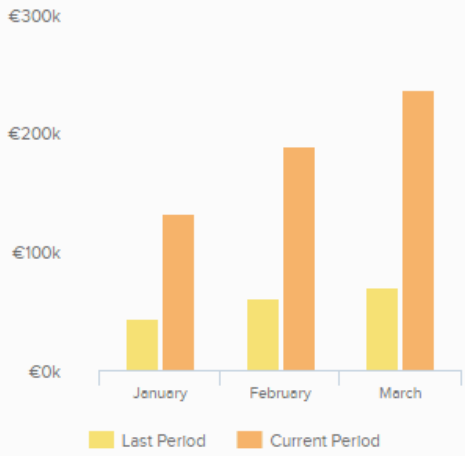
Revenue

€ 557.185 Actual Revenue

€ 471.360 Target Revenue

118 % Target Achievement

Compared to previous Year



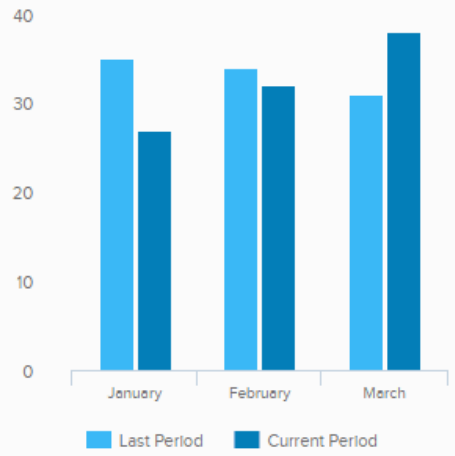
of New Customers

97 New Customers

110 Target

88 % Target Achievement

Compared to previous Year



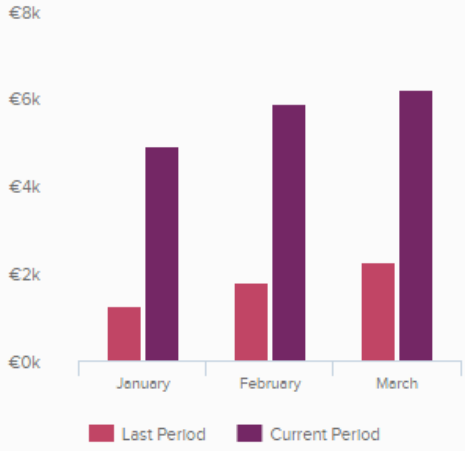
Avg. Revenue per Customer

€ 5.672 Actual Revenue

€ 5.600 Target Revenue

104 % Target Achievement

Compared to previous Year



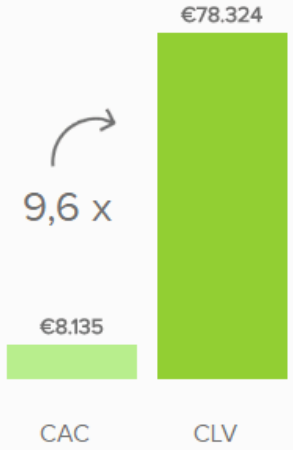
Customer Acquisition Cost (CAC)

€ 2.144 Actual CAC

€ 2.200 Target CAC

103 % Target Achievement

CAC vs Customer Lifetime Value (CLV)



2016 Net Funds Raised

$2,488,659

2016 Online Donations

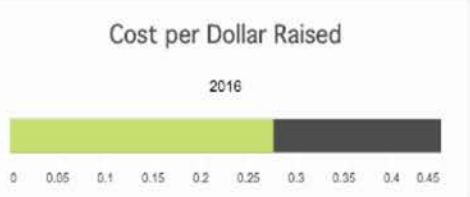
$1,041,306

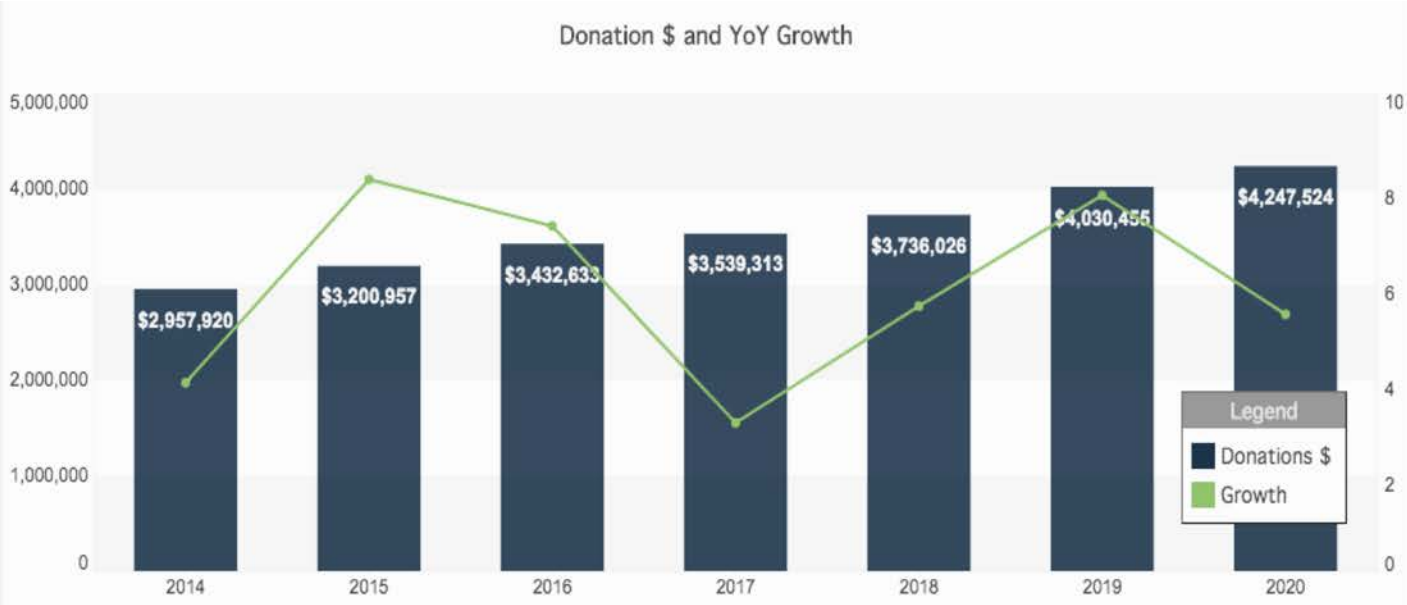
2016 Donations Secured

73,013

2016 Online Donations

22,172



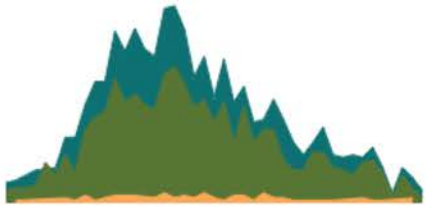


HR Attrition Management

Total Head Count

Breakdown by Dept

Age Distribution



Stackup by Dept

Most Costly Role

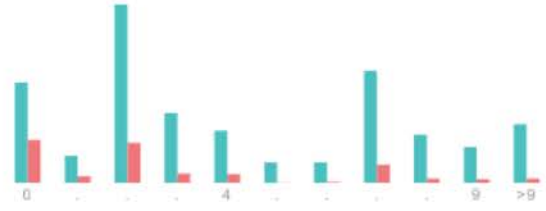
Breakdown by Role

Employee Attrition

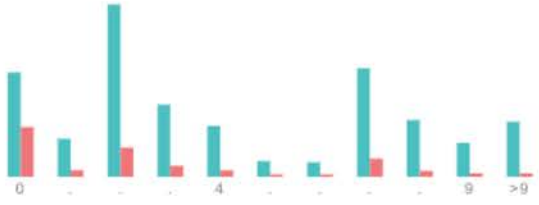
Attrition Head Count & Percentage

Attrition Share by Time Dimensions

Years with Company



Years in Current Role



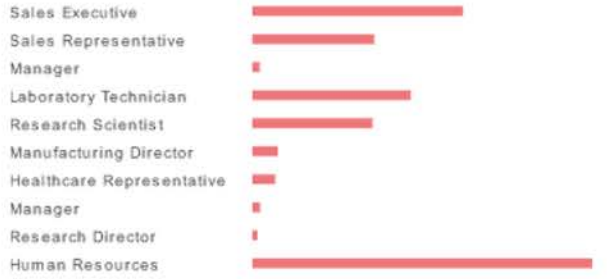
Years with Current Manager

Attrition Age Distribution by Gender

Total
882

Total
588

Attrition by Job Role



Marital
- Divorced
- Married
- Single

Travel
- Rarely
- No Travel
- Frequently

Attrition
- Yes
- No

Gender
- Female
- Male

Work Relationship Rating 1 4

Work/Life Balance Rating 1 4

Work Environment Rating 1 4

Monthly Payroll
21.04M
Click for Breakdown

Payroll Growth
2%

Overall Rating
2.73

Time: Last Quarter

AVG CONTRACT VALUE

$3,863 (+2%)

to previous period

AVG SALES CYCLE LENGTH

22.2 days (+11%)

to previous period

AVG LEAD RESPONSE TIME

1.0 hours (-3%)

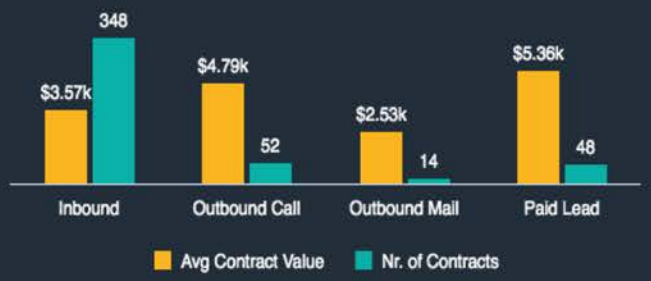
to previous period

AVG LEAD RESPONSE TIME

by Sales Rep

AVG CONTRACT VALUE

by Lead Source



FOLLOW UP CONTRACT RATE

by Rep and Nr. of Follow Up

Sales Rep	1st	2nd	3rd	4th
Bradley William	85%	62%	35%	9%
Isabell Ramirez	82%	45%	15%	0%
Kaleb Wallis	78%	52%	19%	0%
Ryan Ramos	87%	68%	48%	22%
Steve Gomez	99%	97%	95%	88%

AVG SALES CYCLE LENGTH

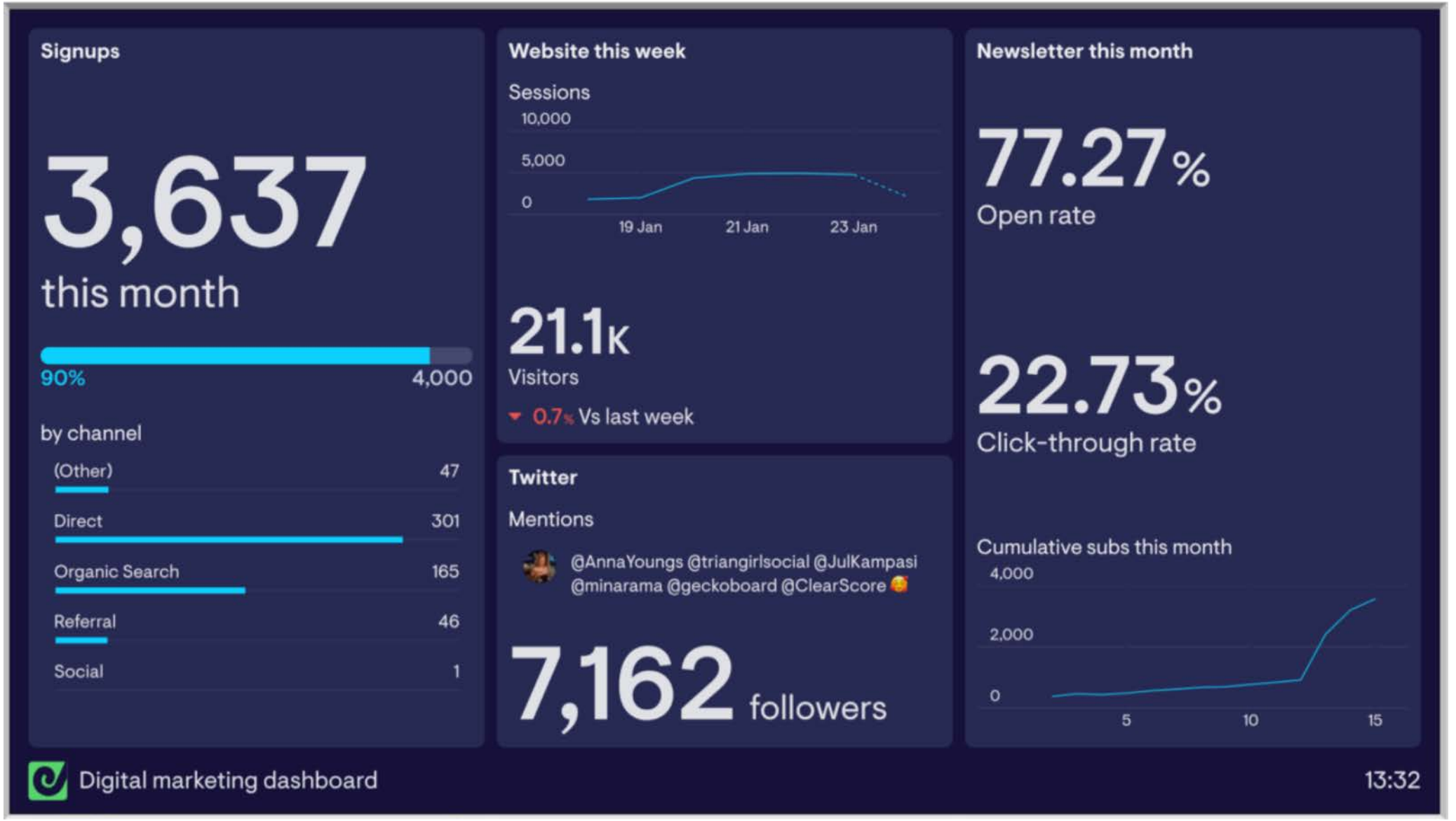
by Step in days

SALES ACTIVITY

by Type

TOP 5 DEALS

1. **Lakeman Corp** $15,600
   Sales Rep: Steve Gomez
   Sales Cycle Length: 34.1 days
2. **McMary Jones** $9,80(
   Sales Rep: Ryan Ramos
   Sales Cycle Length: 36.9 days
3. **Alice Chan Associates** $8,700
   Sales Rep: Kaleb Wallis
   Sales Cycle Length: 18.4 days
4. **Khan Industries** $6,500
   Sales Rep: Isabell Ramirez
   Sales Cycle Length: 23.2 days
5. **Clean Culture** $6,200
   Sales Rep: Isabell Ramirez
   Sales Cycle Length: 39.5 days


Signups
3,637
this month
90%
4,000
by channel
(Other) 47
Direct 301
Organic Search 165
Referral 46
Social 1
Website this week
Sessions
10,000
5,000
0
19 Jan
21 Jan
23 Jan
21.1K
Visitors
0.7% Vs last week
Twitter
Mentions
@AnnaYoungs @triangirlsocial @JulKampasi @minarama @geckoboard @ClearScore
7,162 followers
Newsletter this month
77.27%
Open rate
22.73%
Click-through rate
Cumulative subs this month
4,000
2,000
0
5
10
15
Digital marketing dashboard
13:32

Hospital Management Dashboard

Filters Overview

Hospitals: Hospital_2,Hospital_1

Doctors: All

Specialization: All

Date: 1/10/2020 - 2/17/2020

Doctors
40

Patients

Female	Male
91	91

Readmission Rate
3.28%

Readmissions	Admissions
2	61

Bed Occupancy Rate
41.82%

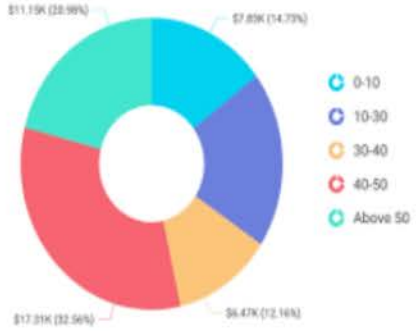
Occupied	Total
23	55

Admitted Patients
23

Average Length of Stay
4 days

Patients Count by Week

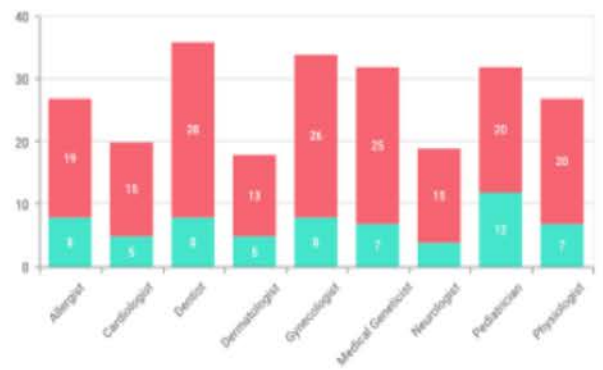
Average Treatment Cost by Age Group



Upcoming Appointments

Doctor Name	Specialization	Date & Time	Patient ...	Status
Carlos Yoress	Allergist	2/19/2020 11:12:00 AM	PT_51	Confirmed
Daniel Moreno	Dentist	2/28/2020 11:52:00 AM	PT_187	Pending
Felipe Mckenna	Allergist	2/27/2020 11:51:00 AM	PT_250	Pending
Janine Messner	Physiologist	2/26/2020 12:16:00 PM	PT_535	Confirmed
Laurence Moos	Cardiologist	2/20/2020 11:12:00 AM	PT_60	Confirmed
Laurence Moos	Cardiologist	2/27/2020 12:00:00 AM	PT_139	Pending
Laurence Moos	Cardiologist	2/28/2020 11:12:00 AM	PT_181	Pending
Laurence Saavedra	Medical Geneticist	2/27/2020 12:19:00 PM	PT_59	Pending
Lin Snyder	Gynecologist	2/23/2020 12:00:00 AM	PT_282	Confirmed

Patients Count by Specialization



Let’s try building some dashboards

Bank Credit Risk Analyses

Bank Credit Risk Data

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Bank Credit Risk Data												
2													
3	**Loan Purpose**	**Checking**	**Savings**	**Months Customer**	**Months Employed**	**Gender**	**Marital Status**	**Age**	**Housing**	**Years**	**Job**	**Credit Risk**	
4	Small Appliance	$0	$739	13	12	M	Single	23	Own	3	Unskilled	Low	
5	Furniture	$0	$1,230	25	0	M	Divorced	32	Own	1	Skilled	High	
6	New Car	$0	$389	19	119	M	Single	38	Own	4	Management	High	
7	Furniture	$638	$347	13	14	M	Single	36	Own	2	Unskilled	High	
8	Education	$963	$4,754	40	45	M	Single	31	Rent	3	Skilled	Low	
9	Furniture	$2,827	$0	11	13	M	Married	25	Own	1	Skilled	Low	
10	New Car	$0	$229	13	16	M	Married	26	Own	3	Unskilled	Low	
11	Business	$0	$533	14	2	M	Single	27	Own	1	Unskilled	Low	
12	Small Appliance	$6,509	$493	37	9	M	Single	25	Own	2	Skilled	High	
13	Small Appliance	$966	$0	25	4	F	Divorced	43	Own	1	Skilled	High	
14	Business	$0	$989	49	0	M	Single	32	Rent	2	Management	High	
15	New Car	$0	$3,305	11	15	M	Single	34	Rent	2	Unskilled	Low	
16	Business	$322	$578	10	14	M	Married	26	Own	1	Skilled	Low	
17	New Car	$0	$821	25	63	M	Single	44	Own	1	Skilled	High	
18	New Car	$396	$228	13	26	M	Single	46	Own	3	Unskilled	Low	
19	Used Car	$0	$129	31	8	M	Divorced	39	Own	4	Management	Low	
20	Furniture	$652	$732	49	4	F	Divorced	25	Own	2	Skilled	High	
21	New Car	$708	$683	13	33	M	Single	31	Own	2	Skilled	Low	
22	Repairs	$207	$0	28	116	M	Single	47	Own	4	Skilled	Low	
23	Education	$287	$12,348	7	2	F	Divorced	23	Rent	2	Skilled	High	
24	Furniture	$0	$17,545	34	16	F	Divorced	22	Own	4	Skilled	High	
25	Furniture	$101	$3,871	13	5	F	Divorced	26	Rent	4	Skilled	High	
26	Furniture	$0	$0	25	23	M	Married	19	Own	4	Skilled	High	
27	Furniture	$0	$485	37	23	F	Divorced	27	Own	2	Management	High	
28	New Car	$0	$10,723	11	15	M	Single	39	Rent	2	Unskilled	Low	

Base Data | Additional Data

Ready

Let's try building some dashboards

Bank Credit Risk Analyses

Let's build some dashboards to help credit analysts understand their customers better.

- Customer Profile Dashboard
  - purpose: To understand the customer profile better. (Assume: customer characteristics of interests are gender, marital status, age, savings)
  - charts? tables?

- Loan Profile Dashboard
  - purpose: To understand the frequency of loans taken by the customers
  - charts? tables?

- Loan Customer Analyses Dashboard
  - purpose: To compare loan types across different customer profiles (e.g. gender)
  - charts? tables?

- Savings Customer Analyses Dashboard
  - purpose: To conduct pareto analyses on savings to understand if there is a small proportion of customers that contribute to significant total amount of savings with the bank
  - chart? table?

THE END!

Thank You for Your Attention!