Forecasting Workforce Capacity applying Statistical Methods in R and Google Datastudio

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CONTENT

ABOUT
SOME FACTS

IT Organizations need to be able to scale the resources and skills to quickly adapt to upcoming demands and changing business priorities. Consequences of inappropriate staffing can adversely impact on performance, consumer experience and staff satisfaction alike.

For scaling the resources and skills, the workforce management process will involve the next steps: demand segmentation, demand modelling and forecasting and scheduling & rostering. The model proposed in this pdf is the sum of these four key components.

✓ **Demand Segmentation**

✓ **Demand Modelling and Forecasting**

✓ **Forecasting Evaluation**

✓ **Scheduling and Rostering**

DEMAND TYPE

KEY CATEGORIES

Demand deals with the influx of requests for IT services, maintenance, and operational support. The demand typically fall into three key categories

Operational Demand

This is the unplanned demand. Management of key IT assets that impact the company's ability to conduct its core operations – E.g: Requests & Incidents

Strategic Demand

This is the planned demand. Projects that have major strategic on the company and maintenance activities. E.g: a project or maintenance weekends

Tactical Demand

Routine, day-to-day things. E.g.: onboarding, meetings, etc

FRAMEWORK
OPERATIONAL DEMAND

1. Demand Segmentation   **2. Demand Modelling**   **3. Demand Forecasting**   **4. Forecast Evaluation**   **5. Scheduling and Rostering**

1. Demand Segmentation

The demand segmentation will help to define different services families and the skills required to deliver the services.

- Look up demand for each service (e.g. last 6-12 months).
- Create service families and skill mix for each service.
- Determine cycle time for each category family and the acceptable response time targets to each category.

FRAMEWORK

OPERATIONAL DEMAND

1. Demand Segmentation

2. Demand Modelling

3. Demand Forecasting
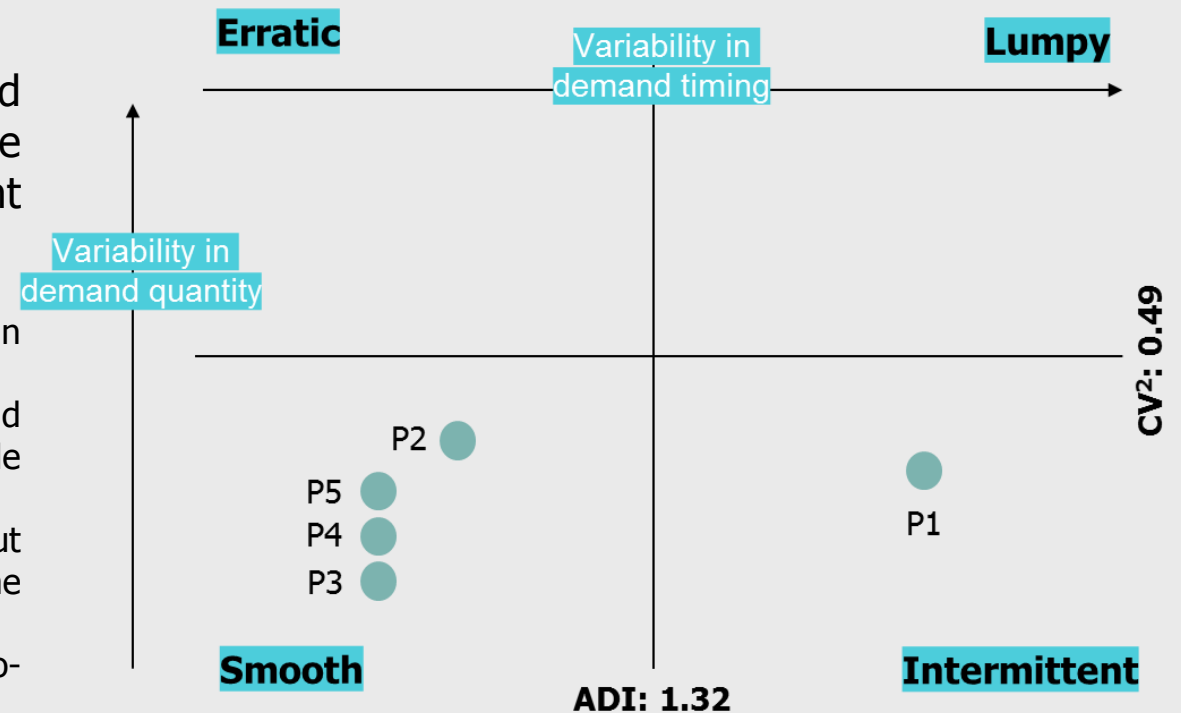
4. Forecast Evaluation

5. Scheduling and Rostering

2. Demand Modelling

Based on the Average Demand Interval (ADI) and the square of the Coefficient of Variation (CV2), the demand profiles can be classified into 4 different categories:

1- Smooth: the demand is very regular in time and in quantity.

2- Intermittent: characterized by extremely sporadic demand with a not accentuated variability in the quantity of the single demand.

3- Erratic: the great variability of the requested quantity, but the demand is approximately constant as distribution in the time.

4- Lumpy: characterized by a lot of intervals with zero-demand and a great variability in the quantity.

Erratic

Variability in demand timing

Lumpy

Variability in demand quantity

CV^2: 0.49

P2

P5
P4
P3

P1

Smooth

Intermittent

ADI: 1.32

FRAMEWORK

OPERATIONAL DEMAND

1. Demand Segmentation

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3. Demand Forecasting

After the categorization of the each demand distribution, it is necessary to identify the best forecasting method for each category and find the forecasting method that allows obtaining the best accurate model. For example for the smooth demand, these are the forecasting methods applied: ETS, Naïve, Holt-winters, ARIMA and Drift

- Data Cleaning
- Convert data to time series data.
- Selection of forecasting method (ETS method, ARIMA, Theta, etc).

FRAMEWORK

OPERATIONAL DEMAND

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4. Forecast Evaluation

We can then measure the accuracy of the forecasts by summarizing the forecast errors between an observed value and its forecast. By measuring the Mean Absolute Percentage Error (MAPE)

- Robustness check of the model.

FRAMEWORK

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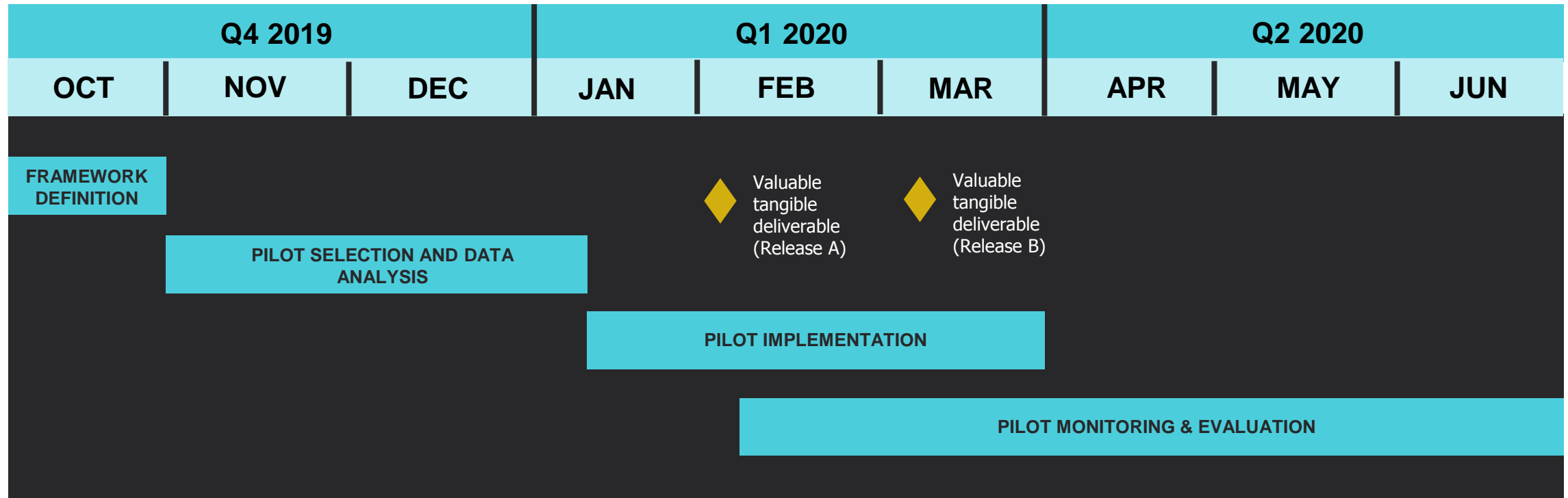
5. Forecast Evaluation

This step is designed to translate demand forecasts into a blueprint for planning staffing over a predetermined planning horizon. It is necessary to understand the rate of customer demand and the time that is needed to complete a process. Lean provides a good metric for this in the form of takt time, which is the throughput rate at which customers can expect the products or service to be delivered. The takt time and the cycle time calculated provides an opportunity to calculate the required number of employees.

$$\text{Takt Time} = \frac{\text{Total Available Time}}{\text{Forecast Demand}}$$

$$\text{Needed People} = \frac{\text{Cycle Time} * K}{\text{Takt Time}}$$

INITIATIVE SCHEDULE

BECAUSE TIME IS MONEY

Q4 2019			Q1 2020			Q2 2020		
OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN

FRAMEWORK DEFINITION

PILOT SELECTION AND DATA ANALYSIS

◆ Valuable tangible deliverable (Release A)

◆ Valuable tangible deliverable (Release B)

PILOT IMPLEMENTATION

PILOT MONITORING & EVALUATION

FRAMEWORK DEFINITION

-Identify issues and needs.
-Identify goal of the initiative.
-Develop a framework.
-Plan activitites.

PILOT SELECTION AND DATA ANALYSIS

-Gather relevant data to support pilot.
-Determine best forecast method per demand-type
-Develop models and forecasts
-Workforce Capacity Model

PILOT IMPLEMENTATION

-Establish Pilot agreement and launch implementation
-Determine success KPIs

PILOT MONITORING & EVALUATION

-Pilot monitoring, evaluation and reporting of the implementation.
-Sharing lesson learned.