KPIs Analyzed by Density

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Business Intelligence decisions can be more accurate leveraging density (continuous and forecasted) value analysis instead of relying on traditional punctual KPIs.

Traditional KPIs

With traditional static KPIs you are able to answer business questions in a simple and fast way, common business questions are:

- Do our salesmen accomplish their monthly goal?
- Is a tank on its limit of capacity?
- Is a machine using the amount of resources planned?
- How close is a due date?
- How far are we from a task completion?
- How was the level of occupancy of our buildings?

Traditionally these KPIs are presented using green/yellow/red qualifiers indicating success/warning/failure. But nowadays that is not enough because business behavior is not static it is continuous.

The Fundamentals of Density Analysis

KPIs

KPIs are a measure of performance of a particular task; using them we are able to answer business questions in a simple and fast way. Defining KPIs had always been a simple and deterministic task, as has analyzing them. It is not very helpful to have a single number to quantify success or failure. For example when you analyze a report which reads "Sales: USD $ 100.000". Without context this is meaningless. Even red, green and yellow gauges tell you little if you do not know how positive or how negative this number really is. It may be that $100,000 is great if you

are selling Girl Scout Cookies but may be an abysmal number if your product is BMWs.

The point is: facts always need to be compared with goals in order to provide business meaning.

Density

The definition of density mathematically is mass per unit of volume, in other words how much of an entity is within a fixed amount of a container, in business terms could mean, for example, level of accomplishment of a goal or how close are we from a target. Geographical Intelligence uses a more complex analysis method based on density and continuous values and could be applied to any analysis you would like to do, for example to analyze influence zones or temperature.

Forecast

Forecasted models provide more accurate information than budgeting on periods of time, taking as an example the annual budget, how can managers plan on how to use resources based on a monthly budgeting model allowing updating it every end of the month, is it suspicious that they are always reaching their goals?

The right way to define your business goals is to rely on forecasted values since they are based on the past and actual behavior of your KPI's. Also more structured models allows including several and complex variables like seasons or economic indicators.

Let´s compare the answers for the questions above using both approaches:

| Business Question	Traditional Answer	Using Density Analysis
Do our salesmen accomplish our monthly goal?	Half of the salesmen accomplished the goals.	Half of the salesmen accomplished the goals, three that sold more than expected, one just barely reached the goal, the other two did not.
Is a tank on its limit of capacity?	Almost reached	Almost reached but in one week the total capacity will be reached, we have some time to react.
Is a machine using the amount of resources planned?	Yes, it is	Yes, it is but we are allocating too many resources on that, it can work with less and use the remaining for other tasks.
How close is a due date?	It is close	It is close; we must produce 30% of the total within 5 days.
How far are we from a task completion?	Almost done	Almost done, we are at 98% of the total and 2 weeks left. Let´s use some resources to support another task
How was the level of occupancy of our buildings?	Almost half of the time the units are rented	90% of the time the units are rented but there are a couple of weeks of vacancy, they can be used to upgrade and increase prices for next season.

Let's focus on the last business question in detail, remember dashboards does not usually expose numbers, just the indicator.

	% Occupancy	TRADITIONAL	DENSITY
Building 1	10	🔴	
Building 2	50	🔴	
Building 3	90	🟡	
Building 4	101	🟢	
Building 5	200	🟢	
Building 6	280	🟢	

Using a Traditional approach, what information will you get from there?	Using a Density approach, what information will you get from there?
- 50% of our buildings did not accomplish the occupancy goals - 33% of our buildings are reporting vacancies - 1 building almost does it. There is not too much to say about those.	- 50% of our buildings do not accomplished the occupancy goals - 33% of our buildings are reporting vacancies - 1 Building will need some upgrade - Building 1 did really bad compared with the group of assets - Building 2 did not accomplished the goal but was not that bad - Buildings 4, 5, and 6 occupancy was over the goal, Asset Managers deserves a bonus - Bonuses can be distributed according to occupancy or vacancy - Who could support another Asset Manager? - Should we re-distribute our Buildings among the Asset Managers? - Building 6 occupancy was higher than Building 5 and this one higher than Building 4

Adding Time and Forecasting
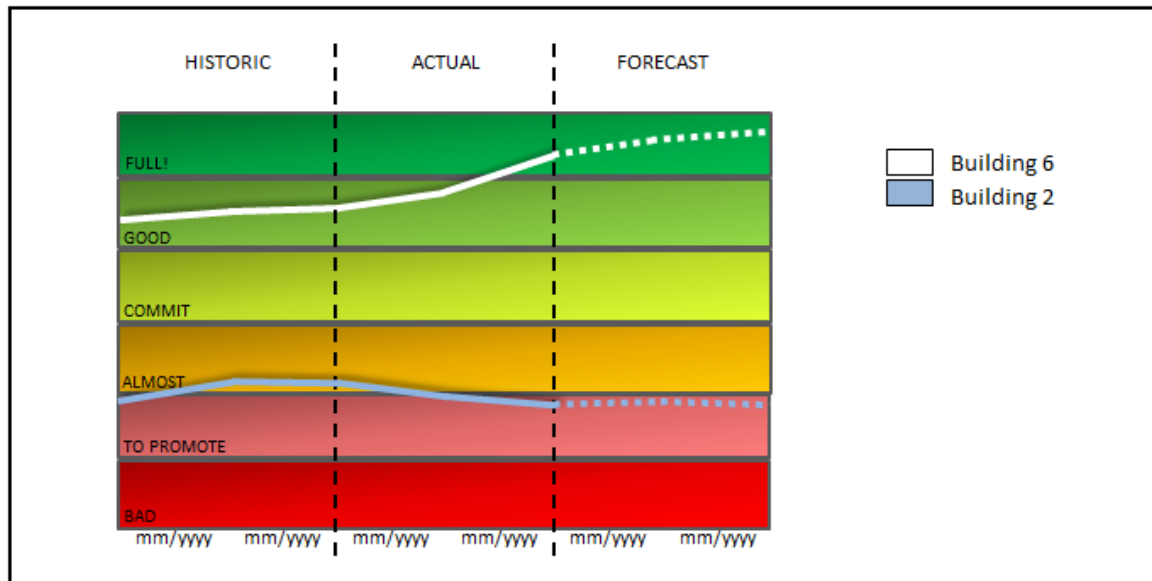
In a traditional approach an answer like "Yes, I accomplished the monthly occupancy goal" sounds good, but an answer like "Yes, I accomplished the monthly occupancy goal by 30% more and we are now forecasted to maintain this trend" sounds better.

Density Analysis

It is important to always keep the focus on having the right combination of a fact against its goal. Independently they have no context, together and combined with a time dimension you will have a meaningful and clear KPI. Further by analyzing your fact in combination with time you will establish a compete measure that gives you the ability to not only deterministically analyze a result but to also forecast that result.