

An Overview of Business Metrics for Data-Driven Companies

With a few examples



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Measurement [Source]

As I am further into the data science journey, I had realized that the data-driven companies need people to have business intelligence and communication skills equally (or more than) data analysis / Machine Learning skills. One does not imply the other.

Taking certain courses to fulfill this need will not teach us everything you need, if it could, there was no place for MBA degree. However it will certainly open up our thinking towards knowing the gaps part of which can be filled before the interview, and partially learned at job. We will be able to be more authentic in resume or saying in interview, “I want to help organizations to draw valuable insights from the data to convert into actionable items”.

With this kind of basic business knowledge, we would be able to analyze and explore the data better and readily map it to possible increase in revenue, profitability or reducing the risk.

Essentials Business Skills for Success:

- Learn best practices for using data analytics to make a business achieve its objectives
- Learn to recognize the most critical business metrics and distinguish those from mere data
- Clearly understand the roles played by Business Analysts, Business Data Analysts, and Data Scientists
- Know exactly the skills required to be hired and to succeed in each of these

What about Business Metrics?

- Metrics help us ask the right questions, and measure success, give feedback to improve on the strategies
- There are three metrics: **Revenue, Profitability and Risk Metrics**:
- Revenue metric is related to sales and marketing, Profitability is related to efficiency, operations, Risk is related to sustainability given present cash-flow conditions.
- There are traditional Vs Dynamic Metrics. Any change is not easy to see in traditional metrics, like Quarterly revenue. It is easy to measure in dynamic metric like website visits getting converted to clicks and eventually purchase
- Consider a hypothetical business model: the business has to give cash on delivery for raw goods from the vendor, takes one month to produce and sell its product, payment terms are “**Net 60**”. This means 3 months delay in getting return on investment. This is technically called “**Negative Float**”. As the business receives

more and more orders month on month, even if it had cash reserves to start with, eventually it would face cash flow problems [issue is it has to pay its vendors immediately for increased raw goods needed!]. This can be prevented with a loan against accounts receivable. More orders meant more **profitable** as per the book, as cost per unit production goes down, but business would go bankrupt if negative float is not handled. Important point to note is **profitability metric** alone is not sufficient; Handling **risk**, not encouraging rapid growth is also important part of the game.

Traditional Metrics : Personal Sales.

This is an example of not data driven metric

- There is something called “Traditional Enterprise Sales Funnel”. It historically refers to big sales which need full time involvement of sales people in your company. It can involve multiple meetings, visiting prospective customers etc
- The amount of revenue that a traditional enterprise sales brings should justify the cost, or else firm would go out of business. Thumb-rule is, \$250k one time or recurring yearly sale of \$100k should be the revenue that it brings to sustain the business.
- People are normally happy to talk about how interested they are in your product and introduce you to many people who actually may not have any budget to buy, and even make you travel and present at your own expense. Business needs to be cautious of such cases.
- Great sales guys in an organization have a knack to identify decision makers, weed out the rest, quickly get past the gatekeepers.
- But this still does not mean sales has happened. Lot of things can go wrong, like decision maker quitting, company getting acquired, the project getting scrapped.
- **Some key metrics** are sales leads, qualified sales leads, time taken in getting to the right person, making them say yes

Dynamic Metrics :

Computer Sales — Data Driven — This section covers Revenue Metrics

- Explained by taking example of Amazon. This can be extended to any business, retail or otherwise, that makes most of its sales through a web interface.
- Dynamic metrics examples are click rates, most sought after items, people who viewed this items also viewed these etc.
- Customize based on user activity in real time, that is “right now”!
- When a search string is typed in Amazon, there is a complex mechanism which retrieves best sellers related to user query that will maximize the probability of buying. **Key metrics** : top subject area categories related to search terms, top best selling books within each subcategory closely matching the query
- **Why despite showing frequently bought together items, Amazon does not offer a discount? Obviously their data has shown that doing so has not resulted in increase in sales. — I found this an interesting counter-intuitive point.**
- Amazon is not telling us what percentage of people who bought “this” book bought “that” book too, but clearly it is tracking that data, which is formally known as co-occurrence data. **Co-occurrence sales is an important Dynamic Metric** for Amazon.
- Also note that it does not say “most frequently bought together”, only “frequently bought together”. There is a possibility that out of top 100 co-occurrence data, the choice to display this co-occurrence over the other is made due to an A/B testing that results in better sales and **revenue**. These numbers are dependent on book price and volumes, remember!
- Amazon also maintains a co-occurrence for click data, so that it can tempt the user into buying just by showing “people also viewed this item” list.

Profitability/Efficiency Metrics:

- Inventory Management: Take any retail that sells goods, where inventory and stock keeping unit (SKU) come into picture. Sales price being the same, cost to manage inventory is the deciding factor. More number of days item is in the “inventory” — that is at shelf or storage, lesser the profit because of many factors explained. **Average number of days in inventory-called “days inventory”- is one of the Profitability Metric.** The company's inventory on hand at the end of the year

divided by the total annual cost of goods sold and then multiplied by 365 for days of the year is a very good estimate of average days inventory.

- Too few inventory can cause customer go empty handed, never visiting the store again, hard to know. **A good metric to capture this lost customer is number of times inventory of any particular SKU reached zero.**
- Good practices: If a customer walks out empty handed, follow them up with a question + gift voucher on whether there is anything they wanted and could not find. Another practice is to make it a practice to ask them at the checkout anyway and record. This kind of data could be used by data analyst effectively.
- Hotel Room and Airline Examples: If one seat in a flight is not occupied, that is lost opportunity, similarly with a hotel room not rented. The variable cost per unit is negligible compared to huge fixed cost. It is called “sunk cost”. So, there is concept of variable pricing. **Analyze** the occupancy rates for weekly or seasonal patterns etc, **predict** expected occupancy rate. Based on these factors the hotel can offer three different types of rates, rack rate, intermediate or promotional rate and floor rate

Risk Metric:

- When a company owes more than it is worth — “**Excessive Leverage**”, it is unlikely to survive
- Reputation risk: Prevention of brand getting bad reputation is often done by “Level one product recall”. **Time to product recalls is a good risk metric.** Example of Costco: Easy to track, because of membership requirement. In Jan-Feb 2010, 272 people in 44 states got sick with genetically identical strain of salmonella. Someone analyzed purchase records of Costco and traced down the product which caused this.

Acknowledgment

Thanks a ton to Daniel Egger: the one who taught the course business metrics on Coursera.

A final note

The reason why I refrain from writing about core machine learning skills or project is, there are already enough number of articles on various platforms, which are very

informative. AnalyticsVidhya and MachineLearningMastery almost cover everything needed for a beginner to start and excel at developing skill-set. TowardsDataScience covers State of the Art techniques. Kaggle provides a platform to practice. I don't want to be repetitive. Instead I decided to touch upon a few rarely discussed topics in data science community. Hope this provides value and motivates aspiring data scientists to educate themselves on the business side.

Evidence of my machine learning knowledge can be found here. Please feel free to star and fork if you like.

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