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This is a graded discussion: 6 points possible

due Apr 3 at 4:29pm

Hospital Discharge Prediction Tool Case Study: Model Results [Video 1.8 and Discussion 1.3]

26   77

📄 (https://classroom.emeritus.org/courses/9054/modules/items/1506891)

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📄 (https://classroom.emeritus.org/courses/9054/modules/items/1506905)

There is one video and one discussion on this page. Please scroll down to view and complete them.

Video 1.8: Model Results (9:25)

How do you know that you've successfully built a good predictive model? In this video, Retsef explains how the model he built for the hospital's prediction tool achieved its original goal.
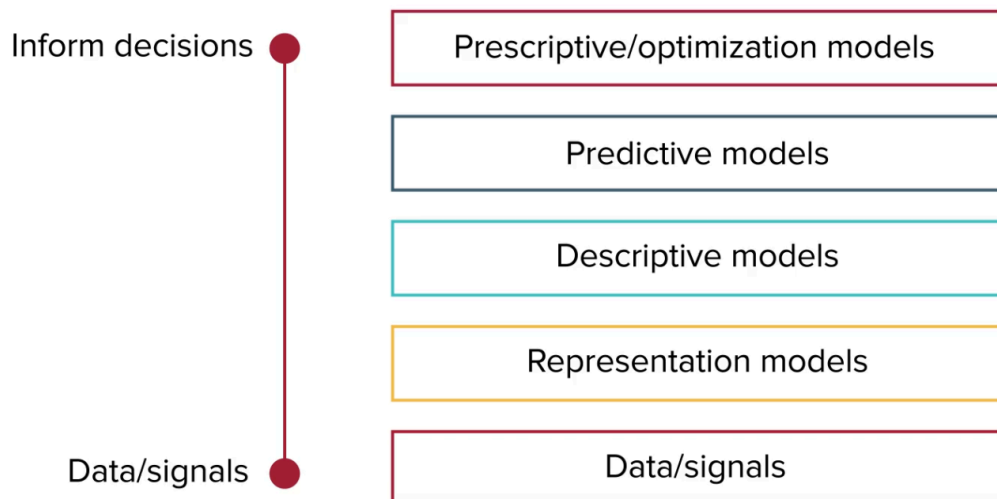
Discussion 1.3: Modeling Layers [20 minutes]

🎯 Learning Outcomes Addressed:

- Identify the five modeling layers within a business example.

This is a required discussion and will count toward course completion.

Data analytics is a broad term that essentially means to derive business decisions from aggregated data. As your data evolves, so will the use of your business analytic tools. The way you choose to interpret the data will become more nuanced over time. To understand these changes, you can use the following layers of modeling as a scale to guide organizations down the right path to get the most from their data.

Modeling Layers

Inform decisions ●

| Prescriptive/optimization models |
| Predictive models |
| Descriptive models |
| Representation models |
| Data/signals |

Data/signals ●

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Let's start with an example scenario of how a specific organization's data model may change over time.

Bob's Corner is a local beer and wine retailer with various locations across the city. The owner, Bob, wants to digitize his business and start collecting sales data. He begins by collecting data from each transaction and storing it in a database. Bob's end goal is to use this data to track the performance of his business and drive business decisions, such as beverage promotions and customized customer discounts, to generate more attention for his store. Of course, this is going to take time to build out and incorporate into the business, so Bob must come up with a plan with defined stages to track his progress.

Bob first collects customer sales data through their payment operating system, collecting customers names, time of purchase, items purchased, as well as a few other parameters. With this data bob can generate a model that describes how the business is performing. How many returning customers did Bob have last year, and what were Bob's overall sales.

By expanding his model even more, Bob generates a version that guesses what is likely to happen based on historical data. What customers are unlikely to return, who could be persuaded with a free beer coupon? What advertisements will be most successful in gaining Bob new customers? When should Bob order new inventory? This model then leads to historical data to answer more complex descriptive questions such as: Why did Bob's sales decrease last year? Why is Bob seeing fewer returning customers?

Finally, Bob has created the ultimate version of his model. Using all the data insights he has gained through his previous models; Bob generates a model that guides the store to take specific actions. This tool will automatically adjust prices according to customer demand and target individuals with customized advertisements. It can even flag employees who need additional training based on incident reports and sales numbers.

Based on Bob's model, write a response outlining the five modeling layers of his implementation. Once you have identified the different layers, make a suggestion for each layer on how you would improve the implementation given the model layering structure you have learned in this module. To add to this discussion, reply to a peer with any comments you may have on their analysis. Do you agree the modeling layers identified correctly? Do the suggested modifications fall under the scope for the given layer? What may they have missed interpretation?

Suggested Time: 20 minutes.

Rubric: Discussion 1.3

Criteria	Exceeds expectations	Meets expectations	Below expectations
Thoughtful and complete response to the question(s)	**4 pts** Fully responds to the question(s), post is supported by connections to the reading and real-life examples, and post makes additional connections to the field of data engineering with novel ideas, critical thinking, or extensive application of how to use the topic in future work.	**3 pts** Fully responds to the question(s), and post is supported by connections to the content or real-life examples.	**0 pts** Partially responds to the question(s), or connections to the content are missing or vague.
Engagement with the learning community	**2 pt** Posts thoughtful questions or novel ideas to multiple peers that generate new ideas and group discussion.	**1.5 pts** Asks questions or posts thoughtful responses to generate a single peer's response.	**0 pts** No responses to peers or posts minimal or vague responses to peers that do not motivate a response (e.g., "I agree.").

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↩ **Reply**

(https: **Yossr Hammad (https://classroom.emeritus.org/courses/9054/users/229118)**

Mar 28, 2024

⋮

- Bob started with collecting sales data **data /signals**
- No database (barrier), so he needed to collect the data from each transaction and sort it in a data base. **Representation model**
  Collecting customer sales data.
- Describes how many returning clients and what is the business sales. **Descriptive Model**
- Predict what is going to happen based on the previous data is the **Predictive Model**
- Automated system that adjust the price based on the customer's demand, customized advertisements and flag the employees need additional training is **Optimization Models.**
- Bob could use the data collected to know what is the most busy time to hire additional employees during the rush hours of the business.
- Also he could track from the transaction who is tipping more and when , that would allow him to figure what products are desired and better quality than others .
- Maybe also send survey about the place to get clients feedback, so that helps to increase customer retention.

↩ **Reply**   👍 (1 like)

(http **Manjari Vellanki (https://classroom.emeritus.org/courses/9054/users/231480)**

Mar 28, 2024

⋮

Hi Yossr,

I like the idea of collecting the data regarding busy hours to hire additional employees during these hours which ideally helps to work on Employee schedule matrix :)

↩ **Reply** 👍

Ricardo Anaya (https://classroom.emeritus.org/courses/9054/users/228915)
Apr 2, 2024

busy hours and busy days (holidays, sports, local events, pay days, etc) to cross-reference to number of employees and also to customized advertising and offers

↩ **Reply** 👍

Turki Alghusoon (https://classroom.emeritus.org/courses/9054/users/229165)
Mar 29, 2024

Hi Yossr,

great idea to track tipping as a proxy for client feedback. Are you assuming that all tipping is going to be electronic? or do you envision cash tips being recorded as well (e.g. calculating total tips in cash at the of the day)?

↩ **Reply** 👍

Yossr Hammad (https://classroom.emeritus.org/courses/9054/users/229118)
Mar 31, 2024

hello Turki,

My assumption is that since it is a retail store majority of the clients are uasing their cards for buying the goods, and if they are tipping either it will be on the card or it will be small amount in cash ,from an experience working at retail store before , the cash is recorded as well then distributed among employees.

If there is a part of the store includes a small bar, most of clients when they open a tab on a card they also tip on card.

for both scenarios i would say at least 80% of the tips are recorded in a way or another.

i hope this make sense.

Thanks

↩ **Reply**   👍 (1 like)

(https:/   **Manjari Vellanki** (https://classroom.emeritus.org/courses/9054/users/231480)   ⋮

Mar 28, 2024

To start working on the Model, it is always recommended to clearly define business goals and identifying the KPIs(Key Performance Indicators) which aids in collecting the data points and implementation of layer structure.

For this case, goals identified as:

1. Increase in Annual sales revenue.

2. Performance across Key holidays, events etc.

3. Identifying high demand product and adjust the price accordingly.

4. Target individuals with customized advertisements.

5. Flag employees who need additional training.

Identifying the KPS aids to turn the qualitative model to quantitative model. For example, Customer satisfaction and predict Customer return is qualitative and by conducting surveys or collecting information from customers actually make the goal to be measurable.

Data Signals Layer: Identifying the datapoints to be collected based on identified goals like information related to sales, customers, employee and information related to personalized discount program.

Representation Model Layer: During the implementation of this layer, we'll work on designing the data base by considering the different entities and identifying the relationship between the entities.

Descriptive Model Layer: During the implementation of this layer, by considering the data that occurs in past and current and Identifying the reasons to answer descriptive questions like "Why the sales decrease last year"?

Predictive Model Layer: During the implementation of this layer, analyzing the historic data to uncover trends, make smart extrapolations and identify likely outcomes. For this case, based on customer data to identify key seasons when the sales are likely to increase and helps in Inventory management system.

Prescriptive Model Layer: During the implementation of this layer, identifying the best solution for a given problem. In this case, taking insights from Employee data and provide training based on incident reports and additional sales number.

↩ **Reply**   👍

○

(http   **Ahmad Abu Baker** (https://classroom.emeritus.org/courses/9054/users/234460)   ⋮
        Mar 31, 2024

Hi Manjari,

Your breakdown of the modeling process is both comprehensive and well-structured, reflecting a clear understanding of how to align business goals with data analytics through the layered modeling approach. Starting with the clear definition of business goals and identifying the relevant KPIs is crucial, as it sets a focused direction for the entire data analysis process.

The business goals you've identified, such as increasing annual sales revenue, monitoring performance during key events, adjusting pricing based on product demand, targeting customers with personalized ads, and identifying training needs for employees, are pivotal for guiding the data collection and analysis efforts. These goals are not only relevant but also measurable, which is essential for tracking progress and evaluating success.

Your approach to turning qualitative aspects into quantifiable metrics, like customer satisfaction and return rate, through surveys or data collection, is a practical method for grounding the model in actionable data. This transition from qualitative to quantitative is key in making the model more reliable and insightful.

In the **Data Signals Layer**, the focus on gathering data relevant to the set goals establishes a solid foundation for the subsequent layers. It ensures that the data collected will be directly applicable to the analytical objectives, thus optimizing the resources and efforts put into data collection.

Moving on to the **Representation Model Layer**, your plan to design a database that reflects the relationships between different data entities is a critical step for efficient data management and retrieval. This structured approach will facilitate more effective analysis and insight generation in the later stages.

In the **Descriptive Model Layer**, your strategy to delve into historical and current data to explain business dynamics, such as sales fluctuations, shows a keen eye for detail and a deep analytical approach. Understanding the 'why' behind data trends is essential for informed decision-making.

The **Predictive Model Layer** is well thought out, with an emphasis on using historical data to forecast future trends and inform inventory management. This proactive approach can significantly enhance operational efficiency and market responsiveness.

Lastly, the **Prescriptive Model Layer**'s focus on deriving actionable insights from employee data to inform training programs illustrates a holistic view of business optimization, where internal operations are aligned with external performance goals.

Overall, your plan exemplifies a strategic and methodical approach to data analytics, with each layer building upon the insights gained from the previous one, culminating in a robust and dynamic data-driven decision-making framework.

↩ **Reply**   👍

(http   **Manjari Vellanki** (https://classroom.emeritus.org/courses/9054/users/231480)   ⋮

Apr 1, 2024

Thank you so much :)

↩ **Reply**   👍

(http   **Isabella Tockman** (https://classroom.emeritus.org/courses/9054/users/207395)   ⋮

Apr 7, 2024

Hi Manjari,

I thought your focus on setting clear business goals and KPIs was really insightful. It's something I overlooked in my response. Having a clear direction and measurable objectives is essential for our data modeling process. Your reminder made me realize I need to study this more. Thanks for bringing it up!

↩ **Reply**   👍

○

(http   **Manjari Vellanki** (https://classroom.emeritus.org/courses/9054/users/231480)
        Apr 11, 2024   ⋮

Thank you and nice to meet you :)

↩ **Reply**   👍

○

(http   **Victor Flores** (https://classroom.emeritus.org/courses/9054/users/197659)
        Apr 10, 2024   ⋮

Hello Manjari,
The fact that you aligned the structure of each of the layers to the organization's business goals and KPIs guarantees in advance a positive outcome of the exercise. Although the consideration of the KPIs can provide the layers with a more quantitative approach, individuals also have to come back to analyze scenarios which may not be necessarily quantitative but still required for the well-rounded analysis. An example of it can be the question related to "Why the sales decrease last year?"

On the predictive layer, I agree that discriminating returns based on seasons can aid to fine tune the model and make full usage of historical data.

Also, the 5 goals you outlined clearly state the direction of the company and where the design and implementation of each of the layers will need to intersect.

↩ **Reply**   👍

○

(http   **Manjari Vellanki** (https://classroom.emeritus.org/courses/9054/users/231480)
        Apr 11, 2024   ⋮

Thanks Victor :)

↩ **Reply**   👍

○

(https:/   **Haitham Farag** (https://classroom.emeritus.org/courses/9054/users/233864)   ⋮

Mar 28, 2024

Bob's Beverage Business, Model Layer Key Features	Modelling Layers	Observation
guides the store to take specific actions: ○ *automatically adjust prices according to customer demand* ○ *target individuals with customized advertisements.* ○ *flag employee's capacity (who needs additional training based on incident reports and sales numbers)*	Prescriptive Optimization Model	<u>Caveat</u> Utilization of *Automatic* price adjustment would require a certain degree of model maturity. For example, there could be missed data relating to sales in the previous year being low on a specific weekend while the same weekend this year is expected to be long (e.g. that weekend precedes a public holiday falling on Monday). The case does not highlight Bob's business size (e.g. Walmart vs mom-and-pop store) and the degree to which *historical data* size would influence the model's AUC. <u>Risk</u> Some marketing literature suggests that excessive use of coupons could create certain consumer behaviours that may not be beneficial to businesses in the long run. <u>Overarching recommendation:</u> the different model layers are to be evaluated based on expected vs. actual results. This is to ensure the

		introduction of timely necessary tweaks to improve their respective precision.
what is likely to happen (What/If) ○ *which customers are unlikely to return,* ○ *who could be persuaded with a free beer coupon.* ○ *What advertisements will be most successful in gaining new customers?* ○ *When to order new inventory?*	Predictive Model	
○ *Why did sales decrease last year?* ○ *Why there are fewer returning customers?*	Descriptive Model	<u>Assumption</u> *Advertisement* and promotion (campaigns) are used synonymously. <u>Clarification</u> It is not clear how trigger/s for new customers are identified unless those customers use coupons or through direct inquiry (mini survey) where a new customer's response is recorded into the system with their sale (similar to airport tax-free Shops requiring boarding passes to be scanned with each purchase)
	Representation Model	Not clearly identified in the case. The layer might have been skipped.

		Describe the consumer buying process that may have been triggered by an advertising or marketing campaign and ends with an actual completion of purchase. Ideally, also describe the process where potential customers come into the store and leave without purchasing or with partial purchase.
business performance: ○ *customer retention/how many returning customers during last year,* ○ *overall sales.* *data from each transaction (i.e. Customer sales customers' names, time of purchase, items purchased, and other parameters)*	Data/Signals	Business performance can be significantly improved if it can be assessed based on market share or benchmarked against leading neighbouring similar businesses.

Edited by **Haitham Farag (https://classroom.emeritus.org/courses/9054/users/233864)** on Apr 2 at 11:18am

↩ **Reply**   👍

○

David Taylor (https://classroom.emeritus.org/courses/9054/users/233381)
Apr 1, 2024

I'm not sure what you mean by *"In Bob's case, the order of the predictive and descriptive model layers are switched".* Can you elaborate on that?

↩ **Reply**   👍

○

Haitham Farag (https://classroom.emeritus.org/courses/9054/users/233864)
Apr 2, 2024

Thanks for flagging David, it was an oversight from my first analysis draft. I have rectified.

← **Reply** 👍

○

(https: **Turki Alghusoon** (https://classroom.emeritus.org/courses/9054/users/229165)   ⋮

Mar 28, 2024

Modeling Layer	Description	Suggestions
Data/Signals	Collecting Sales data through the payment system, including customer name, time of purchase, items purchased, and other parameters.	Bob could expand on the data collected. For example, he could ask customers at checkout if they found everything they were looking for, and how the customers would rate their experience at the store. This could prove valuable in down the line in determining why customers would return or not return, for example.
Representation Models	No representation model was developed. Business went straight from data/signals modeling layer to the descriptive modeling layer.	Bob could benefit from developing a representation model to better structure the data in a format that could provide additional insights. For example, Bob could create multiple customer clusters based on the average total purchase amount per visit. This could help Bob develop a nuanced understanding of the customers behavior.
Descriptive Models	Aggregating customer profiles and purchasing data to describe the performance of the business in terms of: # of returning customers and overall sales.	Bob could expand on this model to generate additional insights such as: the top-10 most selling items, what items are sold together most frequently, what time of the day had the highest sales on average (or what day), and what do returning customers tend to by most…to list a few. Those additional insights could help Bob better understand his business performance.
Predictive Models	Using historic sales aggregates to forecast sales, determine future customer behaviors, and	Bob could expand on this model to include other predictions such as: what new items could the customers be interested in? what items should Bob discontinue, what hours of operations could

	identify the different actions that could have on different customer profiles.	use a sales boost through special prices (e.g. early bird discounts)…to name a few.
Prescriptive / Optimization Models	Building on representation, descriptive, and predictive models to prescribe actions the business should implement in order to optimize customer experience, and ultimately maximize the return of the business.	Bob could further improve this model by building on client satisfaction history (see suggestion for data modeling layer) to offer complementary items to returning customers with historically lower average satisfaction scores, in order to increase the likelihood of retaining them. In addition, the model could be improved to automatically re-order most popular items once the inventory reaches a set threshold in order ensure their availability.

↩ **Reply**   👍   (1 like)

(http   **Timothy Andrew Ramkissoon** (https://classroom.emeritus.org/courses/9054/users/226697)   ⋮
Mar 29, 2024

This is a very good analysis.
I like the idea of tracking bestselling items and relationships between items purchased. I also like the idea of loyalty bonuses for returning customers.

↩ **Reply**   👍

(http   **David Taylor** (https://classroom.emeritus.org/courses/9054/users/233381)   ⋮
Apr 1, 2024

I think *"what items should Bob discontinue, what hours of operations could use a sales boost through special prices"* are great suggestions, but I think those suggestions might better fit the "prescriptive/optimization" layer. Predicting which hours will be slow and which items will not be popular is slightly different than suggesting a course of action based on that prediction.

↩ **Reply**   👍

(http   **Turki Alghusoon** (https://classroom.emeritus.org/courses/9054/users/229165)   ⋮
Apr 2, 2024

Hi David,

Thank you for the feedback. Your suggestions make sense: deciding on items to discontinue and what hours to consider for special incentives do fit better under the optimization layer.

↩ **Reply**   👍

Yossr Hammad (https://classroom.emeritus.org/courses/9054/users/229118)
Apr 1, 2024

Great analysis Turki,

Offering complementary items is a great idea that keeps customer's loyalty to the same store, also the automation system to reorder is a time savior and it increase efficiency.

↩ **Reply**   👍

Ricardo Anaya (https://classroom.emeritus.org/courses/9054/users/228915)
Apr 2, 2024

great analysis 10 top selling

what about the 10 worst perfoming? it has to have and overall inventory management and apply models to manage it

↩ **Reply**   👍

Javier Di (https://classroom.emeritus.org/courses/9054/users/226884)
Mar 29, 2024

1) Data Signals: *digitize his business and start collecting sales data. He begins by collecting data from each transaction and storing it in a database. Collects customer sales data through their payment operating system, collecting customers names, time of purchase, items purchased, as well as a few other parameters.*
Suggestion --> Data could be aggregated to provide more insights by vertical such as grouping by Item type, Time of the Day and Price. This would yield insights into which items

are most popular, at what times customers buy most, etc

2) Representation Models: no representation was developed and went to descriptive models based on sales and how the business is performing

3) Descriptive Models (Qualitative Model): *With this data bob can generate a model that describes how the business is performing. How many returning customers did Bob have last year, and what were Bob's overall sales*
Suggestion --> Same suggesting using the refined data signals mentioned and grouping yearly sales and data by product, time of the day, etc would provide better insights to make better business decisions for Bob

4) Predictive Models: *Bob generates a version that guesses what is likely to happen based on historical data. What customers are unlikely to return, who could be persuaded with a free beer coupon? What advertisements will be most successful in gaining Bob new customers? When should Bob order new inventory? This model then leads to historical data to answer more complex descriptive questions such as: Why did Bob's sales decrease last year? Why is Bob seeing fewer returning customers?*
**Suggestion -->** This is key and the refined data by vertical time of the day, product type sales should be used to yield these insights as well as which customers are recurring who do not need a free coupon and which customers are not and may need a free coupon to be attracted. Seasonal and weather aspects should also be incorporated to understand if they're driver of changes in customer demand

5) Prescriptive/ Optimization Models (for decisions and improving decision process): prescribes actions the business should take to improve its performance.
Using all the data insights he has gained through his previous models; Bob generates a model that guides the store to take specific actions. This tool will automatically adjust prices according to customer demand and target individuals with customized advertisements. It can even flag employees who need additional training based on incident reports and sales numbers
***Suggestion -->** Products that sell a lot should command higher prices and inventory managed so that the product is available. Customers can be segment by their product/area of most demand and advertisement targeted accordingly making Sales & marketing spend more effective*

Edited by **Javier Di (https://classroom.emeritus.org/courses/9054/users/226884)** on Apr 2 at 12:45am

↩ **Reply**   👍 (1 like)

Jignesh Dalal (https://classroom.emeritus.org/courses/9054/users/229173)
Apr 1, 2024

Hello Javier,

Thanks for sharing updates your thoughts on Bob's business around 5 layers.

Data signals suggestions adding a tag for geolocation to share insights into seeing where most of the business is generated and also share insights into inflow and outflow of local vs visitors.

Predictive model is basically to if there were some customizations made to business operation around price points for inventory, or sales around products that are being sold most and market study around support for local vs global products. what are customers preferring ?

Based on analysis of predictive and suggestion the prescriptive/optimization model might have some help.

↩ **Reply**   👍 (1 like)

Timothy Andrew Ramkissoon (https://classroom.emeritus.org/courses/9054/users/226697)
Mar 29, 2024

Modeling Layers

Data Signals:

"He begins by collecting data from each transaction and storing it in a database. Bob first collects customer sales data through their payment operating system, collecting customers names, time of purchase, items purchased, as well as a few other parameters."

Representation Model:

Not clearly defined.

Descriptive Model:

"With this data bob can generate a model that describes how the business is performing. How many returning customers did Bob have last year, and what were Bob's overall sales."

Predictive Model:

"Bob generates a version that guesses what is likely to happen based on historical data. What customers are unlikely to return, who could be persuaded with a free beer coupon? What advertisements will be most successful in gaining Bob new customers? When should Bob order new inventory?

Prescriptive/Optimization Model:

"Using all the data insights he has gained through his previous models; Bob generates a model that guides the store to take specific actions. This tool will automatically adjust prices according to customer demand and target individuals with customized advertisements. It can even flag employees who need additional training based on incident reports and sales numbers."

The scope of Bob's project is to use this data to track the performance of his business and drive business decisions, such as beverage promotions and customized customer discounts, to generate more attention for his store.

Bab would need to create a representation of how his data would be interpreted.

Bob could also provide a customer satisfaction survey to gauge how the service of his business affects customers outlook on their experience. This would generate data from a qualitative perspective to give insight to the quantitative data that he has been tracking.

It also allows for him to create a more descriptive model for his approach. The quantitative data allows for his to identify which items attract recurring customers that can be used to make predictive models for how to stock his inventory, however the qualitative data would give insights to how the service provided create loyal customers. There are cases where customers return to locations because of service rather than price, purchase options or retail location.

In Bob's predictive model, he should also account for the analysis of his retail branches across the city to determine the trends of sales for inventory across each site and recurring customer trends. If the city has a diverse population that segregates in particular areas, then they may be more likely to purchase items based on cultural preferences or popularity amongst the communities.

Bob can optimize his model to account for holidays and events in the city as these could inadvertently drive spikes in sales. If he capitalizes on these with appropriate ads, then he may be able to attract new customers.

Edited by **Timothy Andrew Ramkissoon (https://classroom.emeritus.org/courses/9054/users/226697)** on Mar 29 at 6:17pm

↩ **Reply**   👍

(http   **Turki Alghusoon (https://classroom.emeritus.org/courses/9054/users/229165)**
         Mar 30, 2024   ⋮

Hi Timothy,

You bring up a good point about considering different inventory strategies for different branches to account for the different cultural preferences. This could significant in optimizing inventory. It might even help Bob determine if a slow-moving item in one location could be shipped to another location where that same item is selling out, which would help him decrease cost and increase inventory turn-over.

↩ **Reply**   👍

(http   **Jignesh Dalal (https://classroom.emeritus.org/courses/9054/users/229173)**
         Apr 1, 2024   ⋮

Hi Timothy,

Great insights into Bob's business and the idea around products to culture preference is of great value understanding the fact that now that things are global, Cultural restaurants also look for store that have inventory for traditional cultural beverages. Bob's business can be customized store to support local business.

Thanks for sharing.

↩ **Reply**   👍

(https: **Roman Jazmin (https://classroom.emeritus.org/courses/9054/users/225803)**
          Mar 29, 2024   ⋮

Data/Signals are inputs or sales generated, in the case of Bob, he "*… first collects customer sales data through their payment operating system, collecting customers names, time of purchase, items purchased, as well as a few other parameters*" represent the data or signals for the process. The best way to improve Bob's predictive results is to limit the data sources and inputs to the most recent or relevant timeframe and Bob's local store's demographics and location. This will help Bob's predictive process be more relevant and accurate.

Representative Models are the arrangement of data values that will show how a set of data values relates to other set of data values. An example is portraying weather log information into an excel sheet or report. In Bob's case it is compilation and representation all customer information and transactions represented in a report.

Descriptive Model occurs after Bob looks at and finished reviewing a report on transaction activities of his customers. He formulates a set of questions that need to be answered to determine relevant, hidden factors, and relevant data that will greatly affect his business process.

Predictive Model is a method or a tool where Bod takes his input data and associated factors to derive output data that will help him to answer questions that he is trying to discover or to understand.

Prescriptive Model occurs after running through many data sets, inputs and predictive models that will help Bob discover which factors are relevant to consider and find new factors to add in the predictive process to produce a better outcome.

↩ **Reply**　　👍

○

Roy Nunez (https://classroom.emeritus.org/courses/9054/users/229552)
Apr 1, 2024

⋮

Hi Roman,

Thanks for sharing. Do you think if Bob includes the customer's demographics data and seasonal data for the data signals, his predictive results can be improved?

↩ **Reply**　　👍　(1 like)

○

Javier Di (https://classroom.emeritus.org/courses/9054/users/226884)
Apr 2, 2024

⋮

Roy, I do think including data and seasonal data would definitely improve predictive results by understand at what times/days sales are higher and also think the weather should likely be included in this analysis to understand how much of a driver it is

↩ **Reply**   👍 (1 like)

⟨https:⟩   **Dawn Prewett** (https://classroom.emeritus.org/courses/9054/users/233112)   ⋮
              Mar 31, 2024

Data/Signals: Transaction data
Recommendation: Add to transaction, customer satisfaction and store traffic data as well. Understanding foot traffic as a greater whole can help better describe what is happening in the store, especially as models become more sophisticated. All data should also be cleaned and prepared for use by ensuring accuracy and quality.

Representation Models: Tracking business performance through transaction data
Recommendation: Create deeper understanding of the customer and their behaviors by adding demographic, purchase history, and preference data. Use this information to identify patterns and determine product performance.

Descriptive Models: The transaction data is used to describe how the business is performing, identify repeat customers, and overall sales.
Recommendation: Use customer segmentation to personalize marketing campaigns and promotions.

Predictive Models: Using historical data to predict which customers actions in response to oupons, advertisement, and inventory.
Recommendation: Refine algorithms further by including external impacts such as local events, holidays, weather, etc.

Prescriptive/Optimization Models: The tool guides the store to take specific actions, automatically changes prices, and advises which employees might require training.
Recommendation: Verify the model actually performing as expected and create a feedback loop to inform future adjustments to the model. This includes monitoring the AUC.

↩ **Reply**   👍

MATT DEFREITAS (https://classroom.emeritus.org/courses/9054/users/220100)

Apr 1, 2024

Hi Dawn, great post and insights!

The one comment I have here is when you mentioned "All data should also be cleaned and prepared for use by ensuring accuracy and quality." is that something you'd only consider within that layer or is that something you'd anticipate as a continuous practice across all layers?

As I'm sure you would agree, accuracy is everything when dealing with data. I've been a part of meetings where a leader will shut the meeting down if a stat is not accurate. This is not because they are a tyrant or dictator, but rather they are trying to help prevent the spread of false information as that could lead the conversations to focus on strategies that may not be worthwhile or beneficial to the company's success.

Have you or anyone else ever dealt with a situation like this?

↩ **Reply**   👍   (1 like)

Dawn Prewett (https://classroom.emeritus.org/courses/9054/users/233112)

Apr 1, 2024

Hi Matt,

I agree, it is imperative that data is cleaned and prepared for utilization across all model layers. My previous comments were not intended to imply neglect of this critical step; rather, I perceived the layers as building upon one another, where thorough data management is a foundational and ongoing requirement. Upon reflection, I recognize that this may have been an overly broad assumption. Ensuring data integrity and readiness at each stage is essential for the accuracy and effectiveness of the models developed.

I have experienced instances where leadership has paused discussions or halted meetings altogether when confronted with invalid or insufficient data - I've even been that leader. This action reaffirms the principle that the true value of data lies in its accuracy. Erroneous data can lead to significant negative consequences, and as data volume grows, so does the noise within it. Actively filtering out this noise to cleanse the data is imperative for optimizing its value. The potential to be mislead by data, whether through misinterpretation or inherent flaws, is a constant concern. Even well-cleaned data can be presented in a misleading way, emphasizing the need for vigilant

and critical analysis. It's understandable, then, for leaders to stop discussions that rely on unreliable data, opting to wait for more accurate, decision-ready information. This precaution not only avoids the risks associated with misinformed decisions but also underscores the organization's commitment to data integrity.

Thank you for your thoughtful response-
Dawn

↩ **Reply**   👍

(http   **Javier Di (https://classroom.emeritus.org/courses/9054/users/226884)**   ⋮
Apr 2, 2024

Very interesting comments Dawn, mathematically would seem like once false data gets filtered it can contaminate and compound the problems with other data creating distorsions and wrong conclusion which seems dangerous

↩ **Reply**   👍

(http   **Dawn Prewett (https://classroom.emeritus.org/courses/9054/users/233112)**   ⋮
Apr 2, 2024

Absolutely Javier - managing incorrect data is crucial in data management. The approach to handling such data significantly depends on its nature and volume. In cases where the data is extensively flawed, it might be necessary to exclude that entire dataset to prevent it from skewing the analysis. It's vital to carefully consider the implications of any data modifications during the cleanup process to ensure the integrity of your findings remains intact.

↩ **Reply**   👍

(https:/   **Ahmad Abu Baker (https://classroom.emeritus.org/courses/9054/users/234460)**   ⋮
Mar 31, 2024

Bob's Corner, a local beer and wine retailer, embarked on a digital transformation journey, showcasing a practical application of the five modeling layers in business analytics, which can be connected to data engineering and its future prospects.

Starting at the **Data or Signals Layer**, Bob began collecting basic transaction data. This stage is foundational in data engineering, emphasizing the need for robust data collection systems. In the future, enhancing this layer with real-time data processing and automated quality checks could significantly improve the timeliness and accuracy of the data collected.

Moving to the **Representation Models Layer**, Bob organized this data to assess sales and customer trends. In data engineering, this involves designing efficient data storage and retrieval mechanisms. Going forward, adopting a data lake architecture could offer more flexible and comprehensive analysis capabilities, allowing businesses to adapt quickly to changing analytics needs.

At the **Descriptive Models Layer**, Bob analyzed historical sales to understand his business performance. This layer is where data engineering supports complex queries and generates insights from data. Enhancements here could include integrating machine learning to automate trend analysis, providing deeper and more actionable insights into customer behavior and business operations.

In the **Predictive Models Layer**, Bob used historical trends to forecast future business outcomes. This predictive capability relies heavily on the sophisticated data processing and machine learning models, areas where data engineering and data science converge. Future improvements might involve leveraging cloud-based platforms to refine predictions continuously and integrate various data sources for a more nuanced forecasting model.

Finally, at the **Prescriptive or Optimization Models Layer**, Bob developed tools to guide business decisions, like pricing adjustments and targeted promotions. This represents the pinnacle of data engineering's impact, where the infrastructure must support complex analytical tools that provide strategic insights. Future advancements could include the use of AI and optimization algorithms to create dynamic strategies that adjust in real-time, offering businesses a proactive stance in market adaptation.

In essence, Bob's journey through these modeling layers not only illustrates the practical application of data analytics in a real-world business but also underscores the critical role of data engineering. As the field evolves, integrating advanced technologies and methodologies at each layer will become essential, enabling businesses like Bob's Corner to harness data more effectively and sustain a competitive edge.

↩ **Reply**   👍 (1 like)

○

(http   **Dawn Prewett** (https://classroom.emeritus.org/courses/9054/users/233112)   ⋮

Apr 1, 2024

You have some interesting recommendations here to improve the flexibility and usability of the data. Having worked with large data sets (a terebyte an hour on average), I found the assertion that a datalake architecture would increase flexibility especially interesting. Our data was both logs and transactional in nature. The transactional data was saved directly to a nosql database while the log data was first processed through an ELK stack and then saved to an ElasticSearch instance, so another nosql database. I had never questioned it because this architecture supported our service well, but I have to wonder if we ever had needed to rebuild it, if indeed a data lake would have been a more purposeful option and would have lent itself to better data analysis - something we did struggle with. Thanks for the food for thought!

↩ **Reply**   👍   (1 like)

(http   **Chris Cosmas (*He/Him*) (https://classroom.emeritus.org/courses/9054/users/226607)**   ⋮
        Apr 3, 2024

Hello Ahmad,

Very nice analysis. I really like that you mention quality checks. It could seem very basic but saves a lot of time when cleaning data and can alert data owners instantly of inconsistencies before aggregating data and analyzing it further. I once had to perform a survey based on quantitative responses and forgot to include any rules in my Excel file. I had to spend a good chunk of time reading file by file reaching out to surveyees to make sure their numbers were interpreted correctly, and had to make many assumptions on other numbers due to surveyees responding in different formats.

A good lesson learned :)

↩ **Reply**   👍

(http   **Lee Lanzafame (https://classroom.emeritus.org/courses/9054/users/231975)**   ⋮
        Apr 8, 2024

I love the examples you provided, you did a great job at explaining the layers whilst providing examples. I'm currently a data engineer and i like the way you highlighted the strong impact data engineers have on data scientists and the field in general

↩ **Reply**   👍

Roy Nunez (https://classroom.emeritus.org/courses/9054/users/229552)

Mar 31, 2024

The five layers for Bob's model are as follows:

1. Data signals - Bob first started by collecting customers sales data, names, time of purchase, items purchased from each transaction and stored it into a database.

Improvement: Bob could potential enhance this data by adding parameters such as customer demographics, how they were purchased (online, in-store), and payment methods (cash, credit). He can also capturing details on abandoned carts and product browsing history. He can also consider seasonal sales as a parameter.

2 .**Representation models** - Bob uses data to generate basic reports that represents how the business is performing such as customer sales volumes and returning customers

Improvement: To improve Bob can incorporate market data to measure how his business compares to the overall market. He can combine this external market data with all the data from all of his stores in a data warehouse to reap greater benefits of this aggregated data.

3. **Descriptive models** - Bob starts to analyze historical data to understand patterns. He looks at whether customers return or not for customer retention, and items sales to uncover underlying patterns.

Improvement: To improve on this Bob can begin looking at basic statistics like means, modes, and then use descriptive analytics to find correlations. He can also start considering and then implement clustering techniques like K means.

4. **Predictive** - Bob expands his model to make predictions based on historical data. He considers things like making recommendations on advertisements that will help gain more customers or persuade customers to return that were not like tor return and how to optimize inventory needs.

Improvement: He can try to simulate and predict what market trends would look like using historical market data and his collective purchase data from all of his stores. He can use machine learning algorithms and test and validating these models to see how they perform over time, while regularly incorporating new data.

5. **Prescriptive/Optimization**: Bob has built a model that predicts customer purchase trends, makes more personalized recommendations, and drives dynamic pricing.

Improvement: He can now seek out AI optimization algorithms to continuously tune his business goals and use AI driven decision making to maximize buiness performance.

Edited by **Roy Nunez** (https://classroom.emeritus.org/courses/9054/users/229552) on Apr 1 at 1:06am

← **Reply** 👍

○

(http　**Jignesh Dalal** **(https://classroom.emeritus.org/courses/9054/users/229173)**　⋮

Apr 1, 2024

Hi Roy,

Much appreciated for sharing your insights in Bob's business model, Maybe one data signal that can help is if there is any products that are returned and how does the return scenario work. I am also trying to wrap my head around it?

← **Reply** 👍　(1 like)

○

(http　**Roy Nunez** **(https://classroom.emeritus.org/courses/9054/users/229552)**　⋮

Apr 8, 2024

Hi Jignesh,

This is a good thought. Thanks for sharing!

For the most part we get transactions that have posted but sometimes do get pending transactions. Need to follow up and see what percent of the pending transactions are never posted. Thanks again!

← **Reply** 👍

○

(http　**Haitham Farag** **(https://classroom.emeritus.org/courses/9054/users/233864)**　⋮

Apr 3, 2024

Hello Roy

The use of AI optimization algorithms for continuous improvements is a great idea, especially when coupling it with KPIs, that cover areas like total sales as well as specific sales (new products, new customers, less driven by seasonality...etc)

Thanks

← **Reply** 👍

○

(http　**Roy Nunez** **(https://classroom.emeritus.org/courses/9054/users/229552)**　⋮

Apr 8, 2024

Hi Haitham,

I completely agree. As these projects evolve they will be more tightly integrated with the KPIs. Thanks for sharing!

↩ **Reply**   👍

Chris Cosmas (_He_/_Him_) **(https://classroom.emeritus.org/courses/9054/users/226607)**   ⋮

Mar 31, 2024

Data/Signals:

He begins by collecting data from each transaction and storing it in a database.

Bob could also look into collecting customer satisfaction data which can be gathered with a short survey online or a pen and paper at each table. Bob could also collect data on the drinks he sells such as the type of beverage, flavor notes, and alcohol concentration. These can be paired with transaction data to perform better recommendations.

Representation model:

Bob first collects customer sales data through their payment operating system, collecting customers names, time of purchase, items purchased, as well as a few other parameters.

Bob needs to ensure consistency in all collected data, units of data and data points should be able to be paired without the need to be converted and need to integrate easily.

Descriptive model:

With this data bob can generate a model that describes how the business is performing. How many returning customers did Bob have last year, and what were Bob's overall sales.

Bob should also look at any trends that pop up in the data, do sales follow any sort of seasonality on a holistic level or a beverage level are some drinks preferred in some seasons over others? What types of beverages are sold to different types of customers? What are Bob's busiest times? With the collected data is Bob able to identify different customer segments?

Predictive model:

Bob generates a version that guesses what is likely to happen based on historical data. What customers are unlikely to return, who could be persuaded with a free beer coupon? What advertisements will be most successful in gaining Bob new customers? When should Bob order new inventory? This model then leads to historical data to answer more complex descriptive questions such as: Why did Bob's sales decrease last year? Why is Bob seeing fewer returning customers?

The model should also allow Bob to predict inventory needs. Inventory maintenance is an important aspect of business management, the model should tell him what goods he needs to keep in stock. Based on historical data and trends, Bob should also be able to tell which customer segments are most valuable and provide the most Customer Lifetime Value and should be taken care of the most.

Prescriptive/optimization model:

Bob generates a model that guides the store to take specific actions. This tool will automatically adjust prices according to customer demand and target individuals with customized advertisements. It can even flag employees who need additional training based on incident reports and sales numbers.

Bob should first set what his ultimate goal is, is it reaching a wider audience? Does he want to increase sales? Or keep returning customers? Based on the sales data and beverage data recommended in Data/Signals, the model could also start recommending what new beverages could be offered in his stores.

Edited by **Chris Cosmas (https://classroom.emeritus.org/courses/9054/users/226607)** on Mar 31 at 4:35pm

↩ **Reply**   👍

(http   **Shahrod Hemassi (*He/Him*) (https://classroom.emeritus.org/courses/9054/users/224267)**   ⋮
Apr 1, 2024

Hi Chris. Great analysis. I like your suggestion to look for trends in the data and to capture more information about the type of customer and to evaluate his data based on customer segments. One suggestion would be to try to gather information on the products that he is selling. A lot of your analysis is based on the customers buying at his store but what about analysis of how the products are selling in his store versus other stores in the region. Gaining access to regional sales figures from his vendors could provide some other useful signals for his model.

↩ **Reply**   👍

MATT DEFREITAS (https://classroom.emeritus.org/courses/9054/users/220100)

Mar 31, 2024

Data/Signals Layer

Based on my experience, if a company is not an advocate of data then this fundamental layer will never be achieved. The basics of understanding who your customers are is crucial for any organization. This base layer allows you to start unlocking the power of data.

Two improvements here may be to:

- start capturing demographic and device data to be able to further define who customers are instead of just their names.
- Ensure the environment is scalable for future growth

Representation Layer

This is where Bob starts to leverage his data for decision making. He can start understanding aggregate sales by day, product types (beer vs wine), and even by region to formulate who his customers are and start to measure his business. This is step one in enabling your data.

Improvements:

- Within this phase, Bob should be establishing standardized views of his business metrics. These fundamental questions should be able to be answered at the click of a button and will provide the operations with the information needed to make informed decisions retroactively.
- Hire an analyst: this step is usually supported through an analyst role where they are intimate with the processes and the data to be able to put together views of performance.

Descriptive Layer

This is where the power of data truly starts to shine. Within the descriptive layer, you can start to understand what factors are positively or negatively impacting your business. This is where you start to slice your metrics to understand them more in an attempt to understand what happened in the past or try to answer why something specifically happened.

Improvements:

- In my experience, this is where marketers leverage data the most. By identifying who is purchasing your products; and how often, you can start to create personas for your organization and even start sending targeted messages to your returning customers in addition to acquiring new customers.

○ Establish KPIs and benchmarks to compare performance and start to identifying tailwinds and headwinds for the organization.

Predictive Layer:

This is where Bob starts to leverage historical information to predict the future. This phase tries to predict what is going to happen based on historical inputs and outputs that can be measured and applied to the future. Forecasting is a perfect example of the predictive layer as Bob could not only forecast his sales but also his customer churn and/or retention.

Improvement:

Deploy time-series and/or regression models and continuously monitor for accuracy allowing for on-going improvements to the model. He could also leverage a dates table with seasonal dates such as holidays, events, community calendars to be able to create a connection between these events and his sales.

Prescriptive Layer

The prescriptive layer is a marketer's best friend. This is where data is leveraged to personalize an experience based on prior actions. If Bob were to observe that people who purchased 3 or more bottles at once also tend to purchase item X, he can start having the website drive item X for any customers who have 3 or more bottles in their cart.

Improvement:

Since he is predicting the future based on historical information, he should also begin creating scoring mechanisms on the likelihood for a customer to return and begin A/B testing these efforts to determine the best approach to enable more sales.

↩ **Reply**   👍   (1 like)

○

     (http   **Dawn Prewett** (https://classroom.emeritus.org/courses/9054/users/233112)   ⋮

                 Apr 1, 2024

Your recommendation for A/B testing is an important addition here. A/B testing can not only be used to decide which path is superior, but allow for testing between different subsets or groups. One A/B testing study I worked on considered how changing the color of a button on a e-commerce site would impact user behavior. The change sparked an incredible increase in sales, which was contrary to the offered hypothesis, but clearly offered invaluable information. This underscores the power of A/B testing and used in conjunction with ML models allows not only for each model recommendation to be treated

as a hypothesis, but also creates a feedback loop that can be used to improve the model overall.

↩ **Reply**   👍

○

(http   **Lee Lanzafame** (https://classroom.emeritus.org/courses/9054/users/231975)
Apr 8, 2024   ⋮

I didn't even think of A/B testing for this, good work in highlighting this as well as describing the different layers. Incorporating seasonality like holidays, events and community calendars is also a great idea!

↩ **Reply**   👍

○

(https: **Lee Lanzafame** (https://classroom.emeritus.org/courses/9054/users/231975)
Apr 1, 2024   ⋮

Write a response outlining the five modeling layers of his implementation.
Prescriptive/optimization models – Reason: Bob generates a model that guides the store to take specific actions. This tool will automatically adjust prices according to customer demand and target individuals with customized advertisements. It can even flag employees who need additional training based on incident reports and sales numbers.
Predictive models(Quantitative) - Reason: Bob generates a version that guesses what is likely to happen based on historical data. What customers are unlikely to return, who could be persuaded with a free beer coupon? What advertisements will be most successful in gaining Bob new customers?
Descriptive models (Quantitative)- Reason: The model describes how the business is performing. How many returning customers did Bob have last year, and what were Bob's overall sales.
Representation models (Quantitative)- Reason: He begins by storing transaction data from their payment operating system (collecting customers names, time of purchase, items purchased) in a database
Data/signals – Reason: Data is generated by an existing system ie Payment operating system

How you would improve the implementation?
I would compare the predictions with the actual observations. This might identify system level reasons as to why Bobs sales are decreasing/increasing. Like Retsef explained, it's important

to see how data and models interact also to see if things can be improved by seeing if we are using all the relevant data.

↩ **Reply**   👍

Jignesh Dalal (https://classroom.emeritus.org/courses/9054/users/229173)
Apr 1, 2024

⋮

Current implementation vs improved suggestions

This is how I defined the 5 modelling layer for Bob, along with suggestions and improving the implementation

Data signals Layer:
Current implementation - customer profile, sales data, transaction details and operational data.
Improvement suggestions:
Customer profile: basic demographics information like Name, age and postal code.
Transaction details: Time of purchase, item purchased, quantities, price
Sales channel: Location of purchase, payment method, loyalty purchase..

Representation Model Layer:
Current Implementation: Organizing gather information to create a representation model to capture the essential elements including market insights, profile, sales, performance and operational efficiency.
Improved suggestions: Refine to represent model to share business operations and customer relationships. Utilize data visualization tools to show information in understandable manner for better decision making. Needs to change.

Descriptive Model Layer:
Current Implementation: Examine historical data to show previous achievement, trends, customer conduct, business operations and market dynamics.
Improved suggestions:
Returning customer: number of customers returning in the past year, frequency of their visits, average spend per visit.
Overall sales: Total sales revenue for past year, broken down of product category, and store location.
Sales trend: Analysis of sales trends over time, including seasonal variations and peak sales period.

Predictive Model Layer:

Current implementation: Using previous data to create prediction models for future outcomes such as consumer behaviour, sales patter and market demand.

Improved suggestions:

Customer retention likelihood: Prediction of which customer is likely to return based on their purchase history.

Promotion effectiveness: Predictive analysis to determine which promotion are likely to persuade customer to return.

Inventory management: Prediction of inventory needs based on historical sales data and upcoming events(eg: holidays, special promotions)

Prescriptive/Optimization Model layer:

Current implementation: Pricing optimization, inventory management, marketing effectiveness.

Improved suggestions:

Dynamic pricing: Algorithmic adjustment of prices based on demand, inventory levels and competitors pricing.

Targeted advertising: Customized advertisements tailored to individual customer preferences and purchasing behaviour.Employee performance: Identification

↩ **Reply**   👍

○

(https:/   **David Taylor (https://classroom.emeritus.org/courses/9054/users/233381)**   ⋮
                Apr 1, 2024

Data/Signals

- using the point of service payment system to collect data
- suggestion: try to get information about who is local (potentially via CC payment info?) and how long customers spend in the store (which may be difficult if it required manual data collection

Representation model

- glossed over a bit, but referenced above by "a few other parameters"
- identifying events in the store that would lead a customer to return, or to not return
- identifying other factors outside of the store that would lead a customer to return or not
- suggestion: which type of customer is more important to overall sales, ie average price of items purchased vs # of items purchased

Descriptive model

- using the available data to determine how well his business is performing.
- doing preliminary connection of data points (such as returning customers, employee patterns, sales trends)
- suggestion: use data to describe how the placement of items within the store affect the sale of the item

Predictive model

- guessing what will happen based on historical data
- which customers will return, which promotions will be effective and to which customers.
- suggestion: predict which items will be profitable according to product type and brand

Prescriptive model

- the version of the model that gives him specific actions to take, such as changing prices, customized ads
- also deciding which employees need additional training
- suggestion: decide which items can be dropped or discontinued

Edited by **David Taylor (https://classroom.emeritus.org/courses/9054/users/233381)** on Apr 1 at 7:29pm

↩ **Reply**   👍

(http   **Diego Milanes (*He/Him*) (https://classroom.emeritus.org/courses/9054/users/228518)**   ⋮

Apr 1, 2024

Hi David,

Thank you for your thorough analysis of Bob's business. I have similar opinions on most of your model stages.

I have a question on the Representative model: How do you think one can identify events in the store that lead the client to return or not? I mean, are you speaking of a particular event (which cannot be handled statistically speaking, .i.e. pandemics that force everybody to stay at home), or are you referring to a systematic event (i.e. constant dirty location)? Do you have an example of what you mean?

Thank you!

↩ **Reply**   👍

(http   **David Taylor (https://classroom.emeritus.org/courses/9054/users/233381)**   ⋮

Apr 3, 2024

What I mean is the latter. Like, yes, a dirty location, or a long line at the register, or paced around the store for a long time. The more quantifiable the better. "Aisles are 10% blocked with product waiting to be shelved".

↩ **Reply**   👍

○

[(https:/](https://classroom.emeritus.org/courses/9054/users/224267)   **Shahrod Hemassi (*He/Him*)** [(https://classroom.emeritus.org/courses/9054/users/224267)](https://classroom.emeritus.org/courses/9054/users/224267)   ⋮
                    Apr 1, 2024

DATA SIGNALS: Bob collects customer sales data through their payment operating system, collecting customers names, time of purchase, items purchased, etc.

Suggestion for improving this layer: It could be beneficial to capture information about the person who made the purchase such as gender and age group.

REPRESENTATION MODELS: Bob generates a model that represents the business performance based on historical sales data. This model predicts future performance based on the past performance (historical sales data).

Suggestion for improving this layer: Try to get vendors to provide historical data on their volume of sales of each product to all retailers in the vicinity of Bob's store. Being able to see how products sales are growing overall in the vicinity can be useful for predicting future sales of those products at Bob's store. Additionally, being able to compare Bob's sales data to total sales in the vicinity can show Bob's sales performance versus his competitors. Additionally, he can see if his sales performance is improving or declining at a different rate than his competitors.

DESCRIPTIVE MODELS: Bob captures data on whether the customer is a returning customer or new customer. Bob tries to describe the factors that lead to a customer deciding to come to the store or return to the store to make a purchase. Did the customer come because of an advertisement or promotion (such as a free beer coupon)? If so, which advertisements were most effective. Bob uses this descriptive model to try to determine why his number of returning customers has declined and his sales has decreased.

Suggestion for improving this layer: This model makes an assumption that advertisement and promotion is the primary factor in bringing new customers and returning customers to the store. But it does not capture other factors in the customer's buying decision. Maybe the

customer likes to have cold drinks when it is hot outside or hot drinks when it is cold outside. Recording the weather and analyzing against the items purchased could be helpful in describing the customer's buying decision. Maybe the customer is having a birthday party or hosting a BBQ or Super Bowl party. Or maybe the customer likes to buy wine and beer and drink at home if the weather is bad instead of going out to a bar. If Bob could find out what led to the customer coming to the store or what the customer plans to do that night or weekend, that could be helpful data to capture.

PREDICTIVE MODELS: Bob uses his historical sales data and the analysis of his advertisement and promotion data to predict when he should order new inventory.

Suggestion for improving this layer: Bob should try to capture the factors that led to the customer coming to his store. Was it because of a promotion or pricing, or was it because of another factor such as location, hours of operation, or knowledge of the sales staff on the products. He should identify what is important to his customers so he can improve his predictive model.

PRESCRIPTIVE/OPTIMIZATION MODELS: Bob creates a model that will automatically adjust prices according to customer demand and will target individuals with customized advertisements. He also is able to identify which employees need additional training based on incident reports and sales numbers.

Suggestion for improving this layer: Identifying opportunity to improve sales by increasing sales training and product training for his staff is a good consideration. Maybe having incentive programs for his sales staff would be helpful. Providing bonuses to top sales people can increase their motivation to drive sales. Also, providing rewards for returning customers could also be beneficial. Providing discounts and freebies for the top returning customers could keep them coming to Bob's store instead of to his competitors.

↩ **Reply**   👍

○

(http   **Gustavo Santana** (https://classroom.emeritus.org/courses/9054/users/120927)   ⋮
Apr 8, 2024

Thanks for sharing Shahrod, I liked the suggestions on the last layer about when Bob gets to such a high level data model he can start experimenting with it and check what would suit better his business.

← **Reply**   👍

○

[https:.](https://classroom.emeritus.org/courses/9054/users/228518)   **Diego Milanes (*He/Him*) (https://classroom.emeritus.org/courses/9054/users/228518)**   ⋮

Apr 1, 2024

○ Data: Data acquisition based on sales and customer information. the data sample can be improved by adding information on the specific location of the sale. Location data such as distance to the closest metro station, location capacity, attending employees, and other characteristics might impact the customer's preferences. Nice to also have a brief customer feedback survey.

○ Representation model: Determination of overall sales and identification of prototype of regular clients as the working point. The clients' satisfaction level is a natural form of representing the business.

○ Descriptive model: Use of the historical data to understand the business processes and to identify patterns that allows Bob to answer particular performance questions. Fragmentation of the data sample into customer type and location will add further information.

○ Predictive model: Use of historical data to predict business performance. This will forecast processes such as overall sales and inventory, among others. Bob could also foresee visual changes in the different locations to make it more appealing to customers and information on where to open future bars.

○ Prescriptive model: a final model that allows Bob to take specific actions on the business. Bob could additionally provide training and support to employees to leverage data insights in their shifts.

← **Reply**   👍   (2 likes)

○

(http   **Victor Flores (https://classroom.emeritus.org/courses/9054/users/197659)**   ⋮

Apr 2, 2024

Diego,

Your post was very clear and contributed to a better understanding of each of the modeling layers. I was attracted to the sentence where you highlighted client satisfaction as a crucial element for the representation model. On the optimization opportunities it was great to see that you identify the chance to train employees so they can grab additional information during their work shifts.

← **Reply** 👍

○

Todd Engle (https://classroom.emeritus.org/courses/9054/users/228910)   ⋮

(https:/

Apr 2, 2024

Data / Signals	customer's names, time of purchase, items purchased, as well as a few other parameters. To **improve** the amount of data, Bob starts a loyalty program. People sign up and answer basic questions. Such as gender, age, address, and favorite beer and wine.
Representation model *DATA VISUALIZATION*	Bob builds a model that represents how each store location is performing, how many returning customers Bob had last year, and what Bob's overall sales are by location. This model represents the overall performance of each store and can be represented by charts, graphs, or heat maps. He begins to build a dashboard with charts and graphs representing his business. Sacked Bar chart: **Sales by gender for each location.** Bar chart: **Product Category sales by location.** Bar/Line charts: **Product Category sales by age, by location.** Line chart: **Gross sales by month, by location.** Bar/Line chart: **Customer satisfaction trends by rating & reason and location**. **Improvement**: Include demographic data to correlate with customer addresses. This could give Bob <u>ethnic</u> preferences, <u>income</u> diversity, and <u>education</u> levels, and <u>marital status</u> for each location without having to garner too much personal information from his clients.

← **Reply** 👍

Descriptive Model *TRENDS*	Bob starts to build a model that describes the overall trends. What customers are buying from different locations, and how product sales differ from each location. **How does gender affect product sales?** Bob learns that women tend to buy more wine, and men tend to buy more beer. **What products sell by age?** Bob learns that younger people drink beer, while people in their 30s tend to drink more wine and craft beers. **What products are sold by location?** Bob sells more wine in one location than all the others. Another location sells much more craft beer than the others. **Do locations with higher income affect what products are being sold?** Bob notices that more expensive wines and craft beers are sold at the locations with higher incomes. **Improvement**: Bob could go to online rating services like Yelp, and Google to see what other people are saying about his stores and his competitors. He begins to capture trends in people's likes and dislikes when it comes to beer and wine shops. He incorporates these customer preferences in his satisfaction questionnaire.
Predictive Model *FORECAST*	Using historical data, Bob generates a model that guesses what is likely to happen based on historical data. After some time, Bob started to understand what advertising channels work and how to price his products based on demographic data. **Improvement**: to get an idea if there are external reasons for sales trends, Bob could start to include local events, ethnic holidays, and local college events and weather. Understanding these external factors would improve his predictive model.

	Bob could then learn that beer sales decrease before semester finals and increase after. The weather has also affected sales at the store near the interstate. During warmer summers, more people go to the lake and stop at his store on the way. He notices that when the annual art festival comes to town, there is an increase in wine sales that month.
Prescriptive / Optimization Model	Now that Bob has created a pretty good predictive model, he can start to see where he can make improvements and increase sales. In his more affluent areas, he has wine tasting and a local sommelier comes in and teaches different aspects of wine making. Through his customer satisfaction data, he has learned how to train his employees better. At the location by the college, he has learned to stock specific beers around football season and others during the off-season. Bob has also started to tailor coupons for each location based on local events and demographics. **Improvement**: Targeted Upselling and Cross-Selling: Bob could identify opportunities to suggest add-on products or upgrades based on customer selections.

Edited by **Todd Engle (https://classroom.emeritus.org/courses/9054/users/228910)** on Apr 2 at 3:15am

↰ **Reply**   👍

○

(http   **Priscilla Annor-Gyamfi (https://classroom.emeritus.org/courses/9054/users/226376)**   ⋮
Apr 2, 2024

Well outlined Todd.

I agree with this improvement in the descriptive model.

"**Improvement**: Bob could go to online rating services like Yelp, and Google to see what other people are saying about his stores and his competitors. He begins to capture trends

in people's likes and dislikes when it comes to beer and wine shops. He incorporates these customer preferences in his satisfaction questionnaire. "

The driving force for Bob's business is undoubtedly his customers hence the need to know what their preferences are and what they think of his products and services.

↩ **Reply**   👍

(http   **Koffi Henri Charles Koffi** (https://classroom.emeritus.org/courses/9054/users/208039)   ⋮
Apr 2, 2024

I like the outlining ,

I thought the Representation layer deal with the formatting of data to be processed by the model .

Todd is the presentation same as Visualization ?

↩ **Reply**   👍

(https:/   **Victor Flores** (https://classroom.emeritus.org/courses/9054/users/197659)   ⋮
Apr 2, 2024

Identification of Modeling Layers in Bob's Corner Business:

Data and Signals: the first layer is composed of information derived from essential sales data collected from the existing payment operating system: customer names, purchasing times, items purchased, and volume of purchases. This historical data will serve as the foundation for acquiring data and signals.

Representation Model: through primitive analysis on the data and signals obtained from the payment operating system, an idea or a general approximation on how Bub's Corner is being operated can be obtained. It would be a high-level overview intended to provide quick representation of the business and its drivers.

Descriptive Model: further evaluation and analysis of the basic parameters governing the operation of Bob's corner can yield to the construction of a descriptive model intended to depict the most probable behavior of customers, their potential actions, and immediate consequences.

Predictive Model: by unveiling existing data and incorporating any overlooked parameters, the most expected behavior of customers is simulated or predicted. End user will be able to predict the amount of purchases to be generated, understand the frequency of purchases, limitations on users preventing them to perform regular purchases, and the ability of the business owner to achieve growth within a specific period of time.

Prescriptive/optimization model: the assembly of a strong predictive model can assist business owners on making key business decisions to further improve the profitability levels of the business. Indeed, supported forecasting can easily influence management teams for making pricing adjustments, changes in forecasts and stock management, and the selection of drivers which will determine or not the incorporation and deployment of advertisement initiatives in line with the ultimate goals of the business.

Edited by **Victor Flores (https://classroom.emeritus.org/courses/9054/users/197659)** on Apr 2 at 5:11am

↩ **Reply**   👍

Priscilla Annor-Gyamfi (https://classroom.emeritus.org/courses/9054/users/226376)
Apr 2, 2024

Goal : to use this data to track the performance of his business and drive business decisions, such as beverage promotions and customized customer discounts, to generate more attention for his store. Of course, this is going to take time to build out and incorporate into the business, so Bob must come up with a plan with defined stages to track his progress.

Data/Signals : Bob first collects customer sales data through their payment operating system, collecting customers names, time of purchase, items purchased, as well as a few other parameters.

Suggestion : The other few parameter were not stated but Bob could also collect data on Customer demographics Age Group, Gender and location. Also he could take a quick review or feedback from customers on their service and experience. Bob could also collect an inventory data on all his beverages to know when to stock up to avoid running out on any of them. He could also do a little analysis on competition of similar stores in the area assessing pricing, quality of service and products. These will serve as great data sources to generate a great model that will best align with his ultimate goal.

Representation model : The data above is fed into this model giving a fair representation of data collected. For instance data on customers, type of products, services etc.

Suggestion: Once the additional data sources suggested are collected, there will be a well-defined representation of the parameters needed to generate an effective model that will align

with Bob's goal.

Descriptive Model : Bob being able to generate a model that describes how the business is performing. How many returning customers did Bob have last year, and what were Bob's overall sales.

Suggestion: With the above suggestions made on the first two models, Bob could generate a model that will give a better description of the kind of customers who visit his shop considering their age, gender and location? Which month or day of the week or time did he record the highest revenue as well as the lowest revenue? What type of beverage is purchased more and by which Age group or gender of customers? Where are most of my customers visiting from? What are the main keywords recorded in customer's review of feedback? Are customers satisfied with products and services rendered?

Predict Model : Bob generates a version that guesses what is likely to happen based on historical data. What customers are unlikely to return, who could be persuaded with a free beer coupon? What advertisements will be most successful in gaining Bob new customers? When should Bob order new inventory? This model then leads to historical data to answer more complex descriptive questions such as: Why did Bob's sales decrease last year? Why is Bob seeing fewer returning customers?

Suggestion: Bob could include a prediction for differences in seasons. What type of beverage is purchased more in a particular season(month, day, time) and by which group of customers? What was the outcome of previous promotions and marketing strategies on sales of the business? How can each age group of customers be targeted effectively when running promotions? What type of beverage should be stocked more and less within a period of time or season?

Prescriptive/Optimization Model : Bob has created the ultimate version of his model. Using all the data insights he has gained through his previous models; Bob generates a model that guides the store to take specific actions. This tool will automatically adjust prices according to customer demand and target individuals with customized advertisements. It can even flag employees who need additional training based on incident reports and sales numbers.

Suggestion: In addition to this, Bob could closely monitor the outcomes and performance metrics to assess the effectiveness of the model and make adjustments as needed to generate more attention to his store and sustain growth in terms of revenue, optimizing resource allocation and customer satisfaction.

Edited by **Priscilla Annor-Gyamfi (https://classroom.emeritus.org/courses/9054/users/226376)** on Apr 2 at 6:47am

↩ **Reply**   👍

Mariana Flores (https://classroom.emeritus.org/courses/9054/users/237198)

Apr 3, 2024

Hi Priscilla, so nice to meet you. Great post, I'm with you regarding the suggested improvements to Data & Signals – adding customer demographics and customer experience as well as competitor data would definitely enhance the goal of evaluating Bob's business performance. It is my understanding the Representation model is a qualitative framework to guide the quantitative model. I agree with the suggested recommendation for this model that there is a well-defined representation of the parameters as well as your insightful recommendations through the modeling layers.

What an excellent exercise in creating a framework for data-driven decision-making. I enjoyed learning more about your process and recommendations. Thank you for sharing.

↩ **Reply** 👍

Swati Sharma (https://classroom.emeritus.org/courses/9054/users/236938)

Apr 3, 2024

Hi : Its very nice to meet you! And you have outlined so well. I would also like to add that Bob could implement techniques such as A/B testing to determine the effectiveness of different marketing strategies and identify relationships between variables affecting business performance. This would be ideal for diagnosis and could assist Bob even before he gets to predictive modeling.

↩ **Reply** 👍

Koffi Henri Charles Koffi (https://classroom.emeritus.org/courses/9054/users/208039)

Apr 2, 2024

Data and signal

- *collecting data from each transaction and storing it in a database.*
  - *collects customer sales data through their payment operating system*
- *customers names, time of purchase, items purchased, as well as a few other parameters.*

Presentation

- *The data is represent in a format that can be saved in a database*

- data payment system

- Payment transaction

Descriptive Model

- describes how the business is performing.

- How many returning customers did Bob have last year, and what were Bob's overall sales.

- Why did the sale decrease last year

- Why is Bob seeing fewer returning customers

Predictive Model

- Model that guesses what is likely to happen based on historical data.

- What customers are unlikely to return,

- who could be persuaded with a free beer coupon

- Predict What advertisements will be most successful in gaining Bob new customers?

- When should a new inventory should be ordered

Prescriptive Model

- automatically adjust prices according to customer demand and target individuals with customized advertisements

- flag employees who need additional training based on incident reports and sales numbers.

↩ **Reply**   👍

○

Mariana Flores (https://classroom.emeritus.org/courses/9054/users/237198)
Apr 2, 2024

Anchor point for models and design work: Bob's end goal is to use data to track business performance and drive business decisions.

Based on Bob's model, the five modeling layers of his implementation would include..

Data & Signals

• Collecting sales data from each transaction through the payment operating system and storing it in a database. Data includes customer names, time of purchase, items purchased, total sales, and other parameters.

Suggested improvement – supplement data collection and signals to include store specific attributes for store performance and recommendations as well as Loyalty program for an enhanced view of the customer through demographic and behavioral data.

Representation Model

• Model presents Bob's business, Bob's Corner, a local beer and wine retailer with various locations across the city.

Suggested improvement – include representation on customer attributes the store locations are serving.

Descriptive Model

• The model describes how the business is performing by tracking performance and driving business decisions.

    o Number of returning customers in the last year and total sales.

Suggested improvement – include totals by customer cohorts and store locations.

Predictive Model

• Model expands to guess what is likely to happen based on historical data. This model then leads to historical data to answer more complex descriptive questions.

    o What customers are unlikely to return, who could be persuaded with a free beer coupon? What advertisements will be most successful in gaining Bob new customers? When should Bob order new inventory? Complex descriptive questions: Why did Bob's sales decrease last year? Why is Bob seeing fewer returning customers?

Suggested improvement – create predictive customer profiles and upsell or cross-sell product suggestions: Which products are customers likely to buy based on historical purchases?

Prescriptive & Optimization Models

• Utilizes insights gained through previous models to generate a model that guides recommendations to take specific actions.

    o Automatically adjusts prices according to customer demand and target individuals with personalized advertisements. Flags employees who need additional training based on incident reports and sales numbers.

Suggested improvement - use Loyalty data to enhance customer profiles & personalize customer shopping experience: automatically suggests new products based on pasts products purchased or product pairings.

Modeling Layers

Suggested improvements

Inform decisions

Prescriptive/optimization models	Model guides store to specific actions: automatically adjusting prices to customer demand & personalizing advertisements.	Enhance customer profiles & personalize shopping experience
Predictive models	Model guesses what is likely to happen based on historical data then answers more complex questions.	Create customer profiles and upsell or cross-sell product suggestions.
Descriptive models	Model describes how the business is performing by tracking performance and driving business decisions.	Include totals by customer cohorts and store locations.
Representation models	Model presents Bob's business, Bob's Corner, a local beer and wine retailer with various locations across the city.	Include customer attributes the store locations are serving.
Data & Signals	Sales Data, Customer Names, Times of Purchase, Items Purchased, etc.	Add store specific attributes, & Loyalty program data.

Data & Signals

Based on Bob's Model

Edited by **Mariana Flores** (https://classroom.emeritus.org/courses/9054/users/237198) on Apr 2 at 9:28pm

↩ **Reply** 👍

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(http

Haitham Farag (https://classroom.emeritus.org/courses/9054/users/233864)
May 3, 2024

Great representation of the Modeling layers.

Thanks for sharing.

↩ **Reply** 👍

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(https:

Ricardo Anaya (https://classroom.emeritus.org/courses/9054/users/228915)
Apr 2, 2024

Data /Signals:

Sales data. (based on historical data)

From Payment system)

from each transaction and storing it in a database: customer name, time of purchase, items purchased

Improvement(not listed but assumed as the optimization model includes training) : note waiter,   add review system (5 Star) and comments for waiter and interested products

Representation models:

business performance

customers likely or unlikely to return

coupon performance

advertising performance

inventory management

suggestion: event management integrated into the sales information

include model based on events, local games, international games, sports, holidays, contact local companies, to have information about employees, organize corporate parties,e tc

Descriptive models

Sales numbers (decreased last year)

returning customers (reduced)

add Waiter and events, customer incidents, holidays, sports games , internation and local, pay days (to add promotions)

Prescriptive /Optimization models

adjust prices based on demand

customized advertising

train employees based on events and sales numbers

make offers and customized beers to local and international sports events, and have customized prodcuts for holidays.

↩ **Reply**   👍

Mariana Flores (https://classroom.emeritus.org/courses/9054/users/237198)

Apr 3, 2024

Hi Ricardo, so nice to meet you. Terrific call out on including notes and a review system data for suggested improvement to Data & Signals. If I understand correctly, I believe the Representation Model is a qualitative model describing Bob's Corner business utilized as a framework to guide the quantitative model representing business performance based on historical sales. The improvement suggestion to include employee information would be a great addition to this model.

The Modeling Layer was an excellent exercise in creating a framework for data-driven decision-making. I enjoyed learning more about your process and recommendations. Thank you for sharing.

↩ **Reply**   👍

Isabella Tockman (https://classroom.emeritus.org/courses/9054/users/207395)

Apr 8, 2024

Hi Ricardo,

I like your suggestions for improvement, such as adding a review system and incorporating event management into sales information, and it would give Bob good insights.

↩ **Reply**   👍

Lawrence Lumague (https://classroom.emeritus.org/courses/9054/users/225055)

Apr 3, 2024

With the Bob's Corner Example, we can see that Bob has many modeling layers that he has created for his business. Bob's intention to track the performance and improve his business falls under the prescriptive model. He can track which products are popular customer favorites and which of his products are not selling well. By keeping track of the data within parameters like this, his predictive models can lead him to decision processes for ordering more items that sell well and reduce the ordering of those items that do not. The descriptive model at Bob's business divides the which items are more frequently sold for any given time of the year. In his case, the descriptive model could extrapolate statistics which sales of beers sell better to

restaurants that serve fast convenient food around town. Bob's wines sell great with higher end restaurants that offer pairings with specific beef, fish, or pasta dishes. Representation models will process his historical data based on the tendencies of each customer and a create a profile as to the frequency and quantity of his customers orders. He also has enabled his business for data to create signals the form of discounts and sale items. By this business process, Bob can determine how customers will react to new or recurring purchases based on how these customers perceive which are good deals.

The way I would improve Bob's business model is through the enhancement of the predictive model paired with individualized data signaling. For instance, I will generate offers of free shipping ever third purchase order or 5% discount after the fifth order placed, in order to retain customers loyal to our store. I would also allow higher, one-time 10-15% discounts for those who have left to purchase their beverages at other retailers and see if they return as a customer to the business. All of this decision processes will continue to tailor towards rewarding loyal customers with savings, while trying to bring in new ones and bring back who have left as well.

↩ **Reply**   👍

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(https:/ **Swati Sharma** **(https://classroom.emeritus.org/courses/9054/users/236938)**
Apr 3, 2024   ⋮

The first layer to the model is Data/Signals : In this layer, data is being collected as per the needs and requirements. In the scenario, Bob is collecting data from the payment system to identify sales and revenue. He also collects customer information to identify potential promotions and other areas of growth. Bob should also consider collecting demographics like location, age etc for him to accurately create a model that would allow for better promotions.

The second layer is the representation model.Bob did look at the historical sales and returning customers and answered some of the primary questions through the representation model.

This layer focuses on describing past events and understanding what happened. Bob starts by collecting basic transactional data such as customer names, purchase times, and items bought. He uses this data to generate descriptive statistics about his business performance, like the number of returning customers and overall sales.Bob should make sure to collect enough dataset (histororical data) to accurately to predict trends.

The next layer is when Bob uses predictive modeling describing past events to predicting future outcomes based on historical data. For example, he uses predictive analytics to identify customers who are unlikely to return or who can be incentivized with coupons. Additionally, he predicts the success of advertisements and determines optimal inventory ordering times. Bob could improve this by creating a time series forecasting for the inventory management system

↩ **Reply**   👍

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(https: 　**Gustavo Santana** **(https://classroom.emeritus.org/courses/9054/users/120927)**

Apr 7, 2024   ⋮

Bob's Model

Data Signals: He understood the kind of data that he could get and that would be useful for his business, in this case, the transaction information from sales and client data. Gathering marketing data from social media could also boost his analysis.

Representation Model: He starts to have enough to represent how his business is doing in numbers, total sales, recurrent clients, etc. Having dashboards to see this data would make his job easier.

Descriptive Model: Having plenty of historical data now makes it possible to understand seasonalities of sales, clients' behaviors, and more. He could start to create reports to show the stakeholders how reliable the company is.

Predictive Model: Bob's refinement of the model leaves him able even to guess which advertisement would suit best each of his clients. Predicting the resources needed for local events could be in hand.

Prescriptive/optimization Model: Bob is now ahead of his time, with prices adjusting according to demand and figuring out the employees who need training. It's time to sell the company to Meta.

↩ **Reply**   👍

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(http 　**Mhelissa Yayalar** **(https://classroom.emeritus.org/courses/9054/users/233590)**

Apr 11, 2024   ⋮

Hi Gustavo:

Nice job summarizing the different models.

Another thing you can consider for your representation model is slicing the form of payment the customer uses (e.g., cash, credit cards, checks). I think since post-pandemic, may merchants has implement surcharges for customers using credit cards vs cash payments. Using credit cards add fees for businesses and therefore, they've push the cost onto the consumers to keep the their margins on their pricing strategies.

Thoughts?

↩ **Reply** 👍

Isabella Tockman (https://classroom.emeritus.org/courses/9054/users/207395) ⋮

Apr 7, 2024

1. Data/signals – Bob begins to collect data from each transaction. Suggestion: I would suggest to him to collect broader data, like gender, age, and their geographic information, so his model would have more data to analyze. He could encourage his customers to fill in a profile when making purchases.
2. Representation models – Here Bob organizes the data he has gathered through his payment operating system, organizing it into parameters so he can use it to build his models. Suggestion: Here I would suggest to him to analyze what other metrics he could be adding to his model, and convert the data into quantitative data, so it could be best analyzed.
3. Descriptive models - on this stage Bob can generate a model that tells him how his business is performing, how many returning clients he had in the previous years and his overall sales. Suggestion: I would encourage him to play with his model and explore a couple of interactive visualizations, and to introduce some errors so he can compare the predictions to actual observations.
4. Predictive models – Bob expands his model, and he can generate a version that is capable of work with historical data, so it can predict some possible outcomes for his business, like to whom to give free coupons, which ads will be more efficient, when to fulfill new orders for his inventory, and so on. Suggestion: He can incorporate real-time data to make his model as dynamic as possible.
5. Prescriptive/optimization models – and here, he manages to develop a more perfected version of his model, which can guide and recommend specific actions, and automatize some tasks like adjusting prices, targeting individuals with customize ads, and tracking employee's performance. Suggestion: Bob could implement feedback loops to ensure the

quality in the long-term, so he can improve his processes and keep up with customer behavior.

↩ **Reply**   👍

(http

Gustavo Santana (https://classroom.emeritus.org/courses/9054/users/120927)
Apr 8, 2024   ⋮

Hello Isabella, Thanks for sharing, I like that you mention feedback loops, it would be fundamental for his models to keep working and be enhanced.

↩ **Reply**   👍

(https:

Mhelissa Yayalar (https://classroom.emeritus.org/courses/9054/users/233590)
Apr 11, 2024   ⋮

The following models are what I've gathered from this exercise:

  1. **Prescriptive/Optimization Models**

   - Example Dynamic Pricing – Bob's Corner can take advantage of increasing its beverage revenue but adjusting the prices during special seasons, like Super Bowl or spring break. Then, during off-season, the prices gets back to competitive pricing using discounts and sales.

  2. **Predictive Models**

   - Example Customer Buying Habits - Bob's Corner uses the customer data and purchase history. A predictive model can analyze this data to predict which customers are likely going to purchase during the timing of special seasons, such as Super Bowl. By identifying these customers, Bob can take targeted ads (e.g., discounts rates, bundles) to up-sell more beverages to them.

  3. **Descriptive Models**

   - Example Sales Trends – Bob's Corner uses descriptive models to analyze historical sales of its current inventory. By visualizing trends, patterns, and seasonality, Bob can understand which beverages sell well during special seasons (e.g., cocktail beers) in order to procure future inventory.

  4. **Representation Models**

- Example Search Keywords Analysis for Customer Reviews - Bob's Corner uses representation models to extract meaningful keywords from customer reviews. By analyzing these, Bob can identify common themes (e.g., service, beverages variety, prices, sales) and then take steps to address specific areas for improvement.

5. **Data/Signals**

- Example Transaction History - Bob's Corner processes point-of-sale (POS) transactions. Each signal (data) contains information like item amount, time, and payment method. These signals help Bob track sales and inventory levels

↩ **Reply**   👍