

Customer Journey Funnel Pre-case Exercise

15.814 Fall 2018, Due October 31

In the analytics session we introduced the concept of a funnel. Funnel analysis is sometimes known as a customer journey when the journey is “linear,” that is when each step in the customer journey requires that the previous step be completed. The customer-journey funnel is related to the advertising funnel that we discussed in the session on “Communicating Wisely.” Both funnel analyses provide a means to diagnose your marketing tactics and increase your marketing effectiveness.

A funnel analysis is useful because it enables you to focus on each step in the customer journey to diagnose what is going right and what is going wrong. For example, you might offer a free gift for a customer to sign up for your service. This gift might be highlighted on banner advertising and drastically increases click-through rates. But when the customer gets to your website, most of those customers find that the service does not meet their needs. Very few website visitors sign up for your service. In this example, you have great click-through rates (CTRs), but very low conversion given click-through. Had you not used funnel analysis, you would only know that something was wrong with the campaign—it wasn’t leading to service sign-ups. Instead, with the funnel analysis, you can see that the CTR is fine—the free-gift promotion is getting customers to click-through. However, the low conversion rate tells you either that the banner advertisement is not targeted to the correct customers or that the service is not perceived well by the customers who visit your website. You can initiate investigations and experiments to diagnose which of the two explanations (or both) are the correct explanations. Once you know the correct explanation, you can take actions to fix it and make your marketing more effective.

Our goal in this exercise is to help you create and use a funnel to forecast sales and evaluate alternative media. Each situation is different, so we do not (in this exercise) consider what causes the various steps in the funnel to be either effective or ineffective. Doing so will challenge your diagnostic skills, but it will be worthwhile because it will make your marketing more effective. For example, you might discover that you are targeting the wrong customer, or that it is difficult for a customer to sign up for your service, or that the banners are not communicating benefits, etc.

The basic concepts of funnel analysis are relatively easy. Once you set up a funnel for your firm (or your project), you can then be creative and investigate each step in the funnel to identify improvements.

As an illustration, we pose a purely hypothetical example of a firm that offers automobile loans to its customers. It is loosely based on real situations, but simplified the analysis for this exercise. After you complete this funnel, you should think about how you would improve each step or, at least, diagnose whether each step is successful. This exercise builds on the Romanian Bank and BBVA illustrations presented in the analytics session.

Customer-journeys/funnel analyses are sometimes based on spreadsheets. More advanced firms use database management software and analytics software, e.g., R. For this exercise, a spreadsheet will

suffice. We created a companion spreadsheet, “Customer Journey Funnel Fall 2018.xlsx.” It is available on Canvas. The spreadsheet already has the data for the funnel. You are asked to use these data. Feel free to play with the percentages in any step of the customer journey if you want to see how improving that step affects the answers.

Basic Managerial Challenge

You are a brand manager of an automobile loan company. You have been approached by two banner advertising networks, two search engines, a telemarketing firm, and marketing firm that can place “take-1s” with automobile dealers. Take-1s are mini-brochures about auto loans. Take-1’s are put on display in automobile dealers and potential customers are encouraged to take one home.

Each media company has experience with other automobile loan companies and has answered your questions about the customer journey. They told you how much they will charge and how many potential consumers they will reach. For example, Banner Network A will charge you \$600,000 and promises 310 million impressions. (One impression is one consumer visiting a webpage that displays the banner one time.)

But you are astute, so you ask other questions such as “What percent of consumers will click through?,” “If they click through, what percent will start a loan application?,” and “If they start a loan application, what percent will complete it?” The answers to these questions and other questions are given in the table below (and already entered in the spreadsheet, first worksheet).

The revenue varies by medium, because the different media reach different potential customers. Some potential customers sign up for larger (or smaller) automobile loans. For example, customers who visit websites on which Banner Network B advertises buy more-expensive vehicles and sign up for larger automobile loans. Those who use Search Engine D sign up for much smaller loans.

	Banner Network A	Banner Network B	Search Engine C	Search Engine D	Telemarketing	Dealer Take-1s
Cost quoted by medium	\$600,000	\$400,000	\$500,000	\$300,000	\$200,000	\$100,000
Impressions, calls, or take-1s	310,000,000	47,000,000	20,000,000	50,000,000	10,000	\$1,000,000
Click Through Rate	0.010%	0.020%	3%	1.5%		
Percent reach potential customer (call or take-1)					70%	1%
Percent who begin the application	15%	25%	7%	2%	40%	10%
Percent who complete if they begin	40%	70%	15%	10%	80%	50%
Percent of completes who are approved	75%	90%	60%	50%	60%	60%
Percent who buy the auto and accept a loan	55%	75%	70%	50%	50%	50%

Revenue per loan (net of servicing cost)	\$850	\$1,000	\$700	\$550	\$800	\$900
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For the following questions, we assume that each medium reaches independent sets of potential customers. This is unrealistic. We making this assumption to introduce the concepts and counting on you to extend the concept to more complicated and realistic examples. For example, we assume that those customers who use Search Engine C are not the same customers who use Search Engine D. And, we assume the customers who use the search engines have not seen banner advertising, received a telemarketing call, or picked up a Take-1 at the dealer.

Questions When Media are Independent

1. What are the hit rates for each medium? For example, for every potential customer who sees an advertisement on Banner Network A, what percentage signs up for an automobile loan from your company? Do this for every medium using the spreadsheet.
2. How many customers (automobile loans) come from each medium if you spend as much on that medium as they will allow? For example, if you spend \$600,000 on Banner Network A, how many customers sign up for an automobile loan? Do this for every medium using the spreadsheet.
3. We want to see if each medium is a worthwhile investment assuming we have sufficient budget for all of the media. The total revenue is the number of automobile loans from a medium times the revenue per loan for that medium; the total cost is the cost of the medium; and profit per medium is the difference in revenues and costs. In which media, should you invest? (You can invest in more than one medium, but only up to the amount they allow.) What is your total profit?

Limited Budget and the Greedy Algorithm

You are told that you have a limited budget. You cannot invest in every medium; you have to allocate your budget among the media. You can also split your budget. For example, you do not need to spend the full \$600,000 on Banner Network A. You can spend \$100,000, \$200,000, or any number between \$1 and \$600,000.

4. Suppose you have \$1,000,000 to spend? What is the best allocation? (Trial and error is one method to solve this.)

This allocation challenge was relatively easy to solve with trial and error because there were not many alternatives. In real situations, there may be ten or more banner networks, multiple search engines, and a variety of offline media. There might also be “vehicles” within a medium. For example, “Modern Family” is a vehicle within television advertising. When there are a large number of options, we need an

efficient way to search through those options. When the options are independent, there a simple algorithm that helps you find the best allocation.

We are going to use a method called the “greedy algorithm.” Basically, we allocate first to the medium that gives us the biggest “bang per buck.” We first calculate the profit per dollar spent on a medium. For example, we calculate the total profit we get from Banner Network A divided the total cost of Banner Network A. We allocate up to the limit on the medium that has the best bang per buck. If we still have budget left, we keep allocating until we exhaust our budget.

5. Using the greedy algorithm, what is the best allocation of the \$1,000,000 in the communications budget? What is your profit? It should be the same as the answer to Question 4 if you found the best allocation by trial and error. Why is the profit in Question 5 less than the profit you calculated in Question 3? Is this a general principle?

More Advanced Managerial Challenge

In Questions 1 through 5, we assumed that all media are independent. This is clearly not the case. Banners often create awareness and interest among potential customers. Those potential customers then use a search engine to find out more about the automobile loans offered by your company. These interrelationship can become complicated quickly making the customer journey anything but “linear.” This is why some firms use methods that are more complicated and powerful than spreadsheets—they need to handle all of the interactions.

In this exercise, we consider a very simple set of interactions. We assume that search depends, in part, on banner advertising. Potential customers are more likely to search if they see a banner advertisement. For the purposes of the following questions, we ignore telemarketing and Take-1s. We also assume that search has no effect on banners. To keep things simple, we consider only one search engine and two banner advertising networks.

The interactions between banner advertising and search engines are summarized by the following table. For example, when consumers see banners from both Network A and Network B, 4% click through on when they see a search advertisement. When consumers see no banner advertising, only 1.5% click through when they see a search advertisement. From experiments, we know that 68% of the consumers are observed to search, search after seeing no banners from either Banner Network A nor Banner Network B. In addition, 25% of the consumers who search, do so after seeing a banner from Banner Network A. For these consumers the click-through rate increases to 2%. For the 6% of consumers who see a banner from Banner Network B, the click-through rate is 4%.

	Banners		Search Engine			See Banner from A & B
	Banner Network A	Banner Network B	See no banners	See Banner from A	See Banner from B	
Cost quoted by medium	\$600,000	\$400,000		\$500,000		
Impressions	310,000,000	47,000,000		20,000,000		
Percent in each exposure category			68%	25%	6%	1%
Click Through Rate	0.010%	0.020%	1.5%	2%	4%	4%
Percent who begin the application	15%	25%	5%	6%	10%	10%
Percent who complete if they begin	40%	70%	10%	10%	60%	60%
Percent of completes who are approved	75%	90%	40%	50%	80%	80%
Percent who buy the auto and accept the loan	55%	75%	50%	50%	75%	75%
Revenue per loan (net of servicing cost)	\$850	\$1,000	\$550	\$850	\$1,000	\$1,000

Questions When Media are Interdependent

- For interdependent media, compute the hit rate, total customers, total revenue, total cost, profit per medium, and profit per dollar spent for the search engine. We entered the data from the above table on the second worksheet of "Customer Journey Funnel Fall 2018.xlsx."

(The direct effect of banner advertising has not changed. As a check, you may wish to compute these numbers for Banner Network A and Banner Network B.) The easiest way to calculate the number of customers and total revenue is to calculate it for each column, then sum. Calculate profit per medium and profit per dollar spent using the totals. Hit rate is more complicated, but we're confident you'll figure it out.

- What is the total profit if you invested only in banner advertising? That is, calculate the sum of the profits from the two banner networks alone.
- What is the total profit if you invested in only search advertising? To calculate what would happen if there were no banner advertising, recognize that, if there were no banners, 100% of

the consumers who searched would search after seeing no banners. Use the click-through rates, and other percentages from the column headed “see no banners.”

9. What is the net gain in revenue from search advertising that can be attributed to banner advertising? Given this number, what is the total profit that should be attributed to banner advertising?
10. Extra credit: Consider scenarios in which you can only invest in Banner Network A or Banner Network B, but not both. You will have to make reasonable assumptions about how the percent in each exposure category gets redistributed.

Additional Questions

You should be able to answer these additional questions by simply thinking about the spreadsheets, but feel free to try different percentages to see if you can produce examples.

- A. Would you ever invest in a banner advertising network with low click-through rates if doing so dramatically increases the click through rates on subsequent search? Why?
- B. Suppose you could bargain on the price quotes. How can you use the spreadsheets, especially the spreadsheet in which media interact, to bargain with the media representatives?
- C. If you could not get the relevant percentages from the media companies, how would you obtain them?

Comments About Search Advertising

Questions 6 through 10 illustrate interactions among digital media. We greatly simplified search-engine costs by assuming the search engine charges per impression. In reality, Google AdWords and other search advertising are based on an auction system in which you pay on a cost per click basis. This mechanism rewards firms with high-quality campaigns and products/services that consumers are likely to want.

Banners increase click-through rates, but they also increase conversion after the consumer clicks through to the website. If conversion is higher, a click-through is more valuable. There are also issues about holding onto the customer for future sales, about up-selling, and other ways to make a customer, once obtained, more profitable.

To allocate the costs of search advertising in a real market, we need to take the auction mechanism into account. Doing so is beyond the scope of this exercise. While it is tempting to assume that the cost per click-through stays the same, this ignores the auction mechanism because Google itself predicts how many customers will click-through. Google chooses the bid that gives Google the highest revenue. (Details are proprietary.)

In addition to allocations among banner networks and search engines, good marketing practice considers other factors such as the position on the page, the quality of the advertising statement, and the selection of which search terms upon which to bid. For example, the top AdWords (in the \$50-\$60 range) include business services, bail bonds, casinos, lawyers, and asset management. You can often target search advertising by time of day, by geographic location, and by device.

We are confident that, if you understand the basic concepts of marketing analytics, you can extend these concepts to deal with more complexities. Marketing analytics is a rich topic; we only wish we had more time to cover more advanced methods in Marketing Innovation.

We encourage those students who have experience with buying digital media (or media in general) to help those students with less experience.