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eSig: Conversion Funnel Analysis

In November of 2015, Wayne Dalton, Director of Growth for the electronic signature startup eSig, was working on eSig's Q1 2016 plan. The plan needed to specify:

1. The number of new users eSig would acquire in Q1 2016.
2. How much to spend on each major paid marketing channel during Q1.

eSig's team had run a number of paid marketing experiments during 2015 and had expanded a few marketing channels to a reasonable scale. To evaluate options for the Q1 2016 plan, Dalton pulled data on the results of user acquisition efforts since February 2015 from several sources.

eSig Background

eSig was founded in 2013 and launched a beta version of its product in mid-2014. The beta designation was removed in February 2015 when the company released an improved product version and started scaling up marketing. At that point, eSig had about 70,000 registered users, 2,000 of whom were paying subscribers. eSig had raised \$1.2M in seed funding in late 2013 and a \$5M Series A in January 2015. As of November 2015, the company had 20 employees.

eSig's web browser-based product allowed users to electronically sign a PDF or Word document using their personal computer, eliminating the need to print, sign, and scan the document. The product also allowed users to send a document to a recipient with a prompt for an electronic signature. The company planned to launch Dropbox- and Google Drive-compatible iOS and Android mobile applications in Q2 or Q3 2016.

eSig's founders sought to disrupt the electronic signature market with a freemium business model. Incumbent rivals DocuSign and Adobe EchoSign offered a 30-day free trial. However, neither incumbent offered a free version with limited capacity. eSig's team believed that a large segment of the market needed electronic signature capabilities only a few times per year; a free offering could capture this segment. If enough free users upgraded to premium subscriptions, eSig could offset the cost of acquiring and supporting a large free user base.

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In line with the freemium strategy, eSig's target market was intentionally broad, and included anyone with a need to sign documents, for example, real estate agents, lawyers, salespeople, small business owners, and government officials. There were two versions of eSig: eSig Free and eSig Pro. eSig Free allowed up to three signatures per month, with no limit during the first month after registration. eSig Pro cost \$10 per month and allowed an unlimited number of signatures.

Dalton's analysis showed similar retention rates and margins, over time, for user cohorts acquired through different marketing methods. eSig's overall gross margin was 79%. The annual retention rate for Pro users was projected to be 87%. Activated eSig Free users had a projected 55% annual retention rate, with retention measured as any use of the Free product over the prior three months.

eSig User Experience

To register to use eSig, users navigated to an eSig landing page with a signup form asking for their name and email address. Once they submitted this information, users were in the "created" user state. After submitting the form, new users received an email with an embedded activation link. They clicked on the link to confirm their email address and activate their account. Once users clicked on the activation link AND sent at least one document using eSig, users were in the "activated" user state. If, after their first month, users surpassed the maximum 3 signatures per month, they were prompted to upgrade to the Pro version of eSig for \$10 per month. Users who upgraded to the Pro version were in the "activated-upgraded" user state.

Board Meeting

Every month, Dalton sent eSig cofounder/CEO Tanya Tsai a spreadsheet that collected eSig user acquisition data from a number of sources, along with his analyses of the data. The sheet had many tabs, three of which are described in the **Appendix A**.

After Tsai reviewed Dalton's spreadsheet, she sent him the following email:

To: Wayne Dalton
From: Tanya Tsai
Date: November 7, 2015
Subject: Analysis for board meeting

At the upcoming board meeting, we'll be discussing our growth plan for Q1. To get ready for the meeting, I need your input on a bunch of questions:

1. For each major marketing medium — direct traffic, email, organic search, and paid ads — how have conversion rates from accounts created to paid upgrades been trending? What are your hypotheses about factors behind conversion rate trends?
2. What might explain changes in the number of accounts created via direct traffic over time? In accounts created via organic search?
3. Does eSig benefit from virality? What is your estimate of the viral coefficient for a Free account? What can we do to increase virality?
4. Have our investments in paid marketing been yielding a good return?
5. Our contractors have produced a steady stream of 1-2 blog posts per week over the past year at a total cost of \$5,000. Was this a good investment?

6. What's your current estimate for the lifetime value of an eSig Pro customer? What's the most we should spend on paid marketing to acquire a Pro customer?
7. How confident are you that we can profitably triple our account base in 2016?
8. What additional research, analysis, and experiments do you plan to do over the coming weeks to boost confidence in our growth projections?

It'd be great if you get me this input ASAP. I know it'll take you more time to complete the Q1 projections we'll present to the board. As a first step, I'd like you to structure your projection in two parts:

1. Generate a baseline projection that shows the number of Pro customers we'll have on March 31, 2016 if we cease all paid marketing on December 1.
2. One of our board members thinks we should start fundraising again at the end of Q1, and thinks that the more Pro customers we have when we start, the more we'll boost our valuation. To give the board a feel for what we could do if we follow this strategy, I'd like a plan from you that maximizes the number of Pro customers we'll have as of 3/31/16, assuming we spend exactly \$1 million on paid marketing between now and the end of Q1. Show me how you'd allocate the \$1 million, by marketing method and by month. Don't worry for now about whether the marketing investments have a positive NPV—I'll sort out with the board whether we want to try to boost valuation with a negative NPV growth strategy.

As he worked on Tsai's request, Dalton realized that he needed to exercise care when comparing upgrade rates and customer acquisition costs for cohorts acquired at different points in time, since free-to-paid conversion occurred over a span of many months. Dalton sent a memo to Tsai explaining the issue and proposing an approach for extrapolating the long-term performance of recent cohorts based on conversion rates for more mature cohorts. [See **Appendix B** for Dalton's memo.]

Appendix A

User Data. The tab labeled “User Data” illustrated all users created between 2/1/15 and 11/18/15. The rows in the sheet represent users created on the same day via the same Medium and Source that ended up in the same user state. For example, on 4/12/15, there were 2 users that found eSig via a Medium of Paid and a Source of Facebook that ended up activating their accounts 1 day later and upgrading their accounts 67 days later. This user cohort is represented in row 36,004 of the User Data Sheet.

1. Column A, labeled “create_month”, showed the month the user account was created.
2. Column B, labeled “create_day”, showed the day the user account was created.
3. Column C, labeled “source”, represented different points of origin for each medium.
4. Column D, labeled “medium”, showed the marketing method through which the users originated. Mediums include Paid, Referral, Organic, etc.
5. Column E, labeled “days_until_activated”, showed the number of days between the date the user created an eSig account and the date the user activated the account.
6. Column F, labeled “days_until_upgraded”, showed the number of days between the date the user created an eSig account and the date the user upgraded to eSig Pro.
7. Column G, labeled “end-status”, showed the user’s state as of 11/18/15. End-status did NOT reflect attrition in the case of Pro users who had terminated their subscriptions; these former users were still included in total users counts for “2-activated-upgraded” cohorts. Likewise, inactive Free users were still included in total users counts for “1-activated” cohorts. A separate eSig system tracked user retention, and Dalton had not yet integrated that system’s output into the data and analyses presented in his Excel sheet.
8. Column H, labeled “count”, showed the number of users in the cohort.

Conv by Month. The tab labeled “Conv by Month” presented a pivot table summarizing, from 2/1/15 through 11/18/15, the number of users acquired during each month as well as user states for these cohorts.

1. Column B, labeled as “0-create”, showed the number of users acquired in a given month that signed up to eSig but never activated their account.
2. Column C, labeled as “1-activated”, showed the number of users acquired in a given month that had activated their account but had not upgraded to the Pro plan as of 11/18/15.
3. Column D, labeled as “2-activated-upgraded”, showed the number of users acquired in a given month that had activated their account and had upgraded to the Pro plan as of 11/18/15.
4. Column E, labeled as “Grand Total”, showed the total number of users created in each month. Column E is the sum of Columns B through D.

Cost Data. The tab labeled “Cost Data” presented the daily spend and results for each paid marketing campaign between 2/1/15 and 10/25/15. A “campaign” was defined as the use of a specific paid marketing source on a given day. The end-dates for “Cost Data” (10/25) and “User Data” (11/18)

differed because Dalton had exported the respective data from different sources; lags in receiving marketing spend figures from some ad networks delayed the availability of data for recent campaigns. Dalton noted the need to take care when examining results for November derived from “User Data” and for October using “Cost Data,” respectively.

1. Column A, labeled “Date”, showed the day of the campaign.
2. Column B, labeled “Impressions”, showed the number of times that ads associated with the campaign were viewed.
3. Column C, labeled “Clicks”, showed the number of times the ads associated with the campaign were clicked upon, sending the visitor to eSig’s site.
4. Column D, labeled “Spend”, showed the total dollars spent on a given campaign.
5. Column E, labeled “Created Users”, showed the number of eSig users created from the campaign; account creation always occurred on the same day as the campaign
6. Column F, labeled “Activated Users”, showed the number of eSig users created through the campaign who eventually activated accounts.
7. Column G, labeled “CTR”, showed the click through rate for the campaign, calculated by dividing clicks by impressions.
8. Column H, labeled “CPC”, showed the cost per click for the campaign, calculated by dividing spend by clicks.
9. Column I, labeled “CPM”, showed the cost per thousand impressions for the campaign, calculated by dividing spend by the number of thousands of impressions.
10. Column J, labeled “CVR”, showed the conversion rate of clicks to users created, calculated by dividing users created by clicks.
11. Column K, labeled “AVR”, showed the conversion rate of users created to activated users, calculated by dividing activated users by users created.
12. Column L, labeled “CPCU”, showed the cost per created user, calculated by dividing spend by created users.
13. Column M, labeled as “CPAU”, showed the cost per activated user, calculated by dividing spend by activated users.
14. Column N, labeled “Source”, showed the channel through which the marketing campaign was executed.
15. Column O, labeled “Day of Week”, showed the day of the week on which the marketing campaign was executed.
16. Column P, labeled “Month”, showed the month in which the marketing campaign was executed.
17. Column Q, labeled as “Year”, showed the year in which the marketing campaign was executed.

Source: Company documents.

Appendix B

To: Tanya Tsai
From: Wayne Dalton
Date: November 9, 2015
Subject: Projecting long-term performance based on recent results

In response to your email, I've been analyzing trends in free-to-paid conversion rates and CAC for our marketing channels. As I've mentioned before, we need to exercise care when we compare performance across cohorts, because older cohorts have had more time to upgrade.

For example, the \$896 CAC for upgrades from our September paid marketing activation cohort (see spreadsheet tab 11, CAC by Source by Month, cell K84), which has had only two months to upgrade, isn't apples-to-apples comparable to the \$230 CAC for upgrades from our February paid marketing activation cohort (cell K77), which has had nine months to upgrade. Seven months from now, the CAC for the September cohort should be much lower. But will it be low enough to show a good ROI for our September paid marketing campaigns? It'd be great to be able to predict long-term performance based on *early* results, so that we can make course corrections without having to wait several months for data.

Below, I'll propose how we can do that. First, note that for each major marketing medium, upgrades always peak during the second month after activation, then decline in a regular pattern (see spreadsheet tab 6, Cohort Analysis by Medium, column D). For example, the table below shows the number of upgrades, month by month, for paid marketing cohorts that were activated from February through September.

Month	1	2	3	4	5	6	7	8	9
Feb-15	11	222	86	65	48	28	27	15	17
Mar-15	29	219	86	64	43	30	19	20	
Apr-15	43	201	109	59	40	25	29		
May-15	91	199	95	62	24	44			
Jun-15	54	176	91	51	30				
Jul-15	46	192	65	50					
Aug-15	26	119	58						
Sep-15	14	104							

The next table expresses these figures as a percentage of the relevant cohort's month 2 upgrades. Note that for any given column, there is a fairly high degree of consistency in the percentages across the cohorts. For example, for month 4, all cohorts' percentages cluster around the 29% average.

Month	1	2	3	4	5	6	7	8	9
Feb-15	5%	100%	39%	29%	22%	13%	12%	7%	8%
Mar-15	13%	100%	39%	29%	20%	14%	9%	9%	
Apr-15	21%	100%	54%	29%	20%	12%	14%		
May-15	46%	100%	48%	31%	12%	22%			
Jun-15	31%	100%	52%	29%	17%				
Jul-15	24%	100%	34%	26%					
Aug-15	22%	100%	49%						
Sep-15	13%	100%							
Average	22%	100%	45%	29%	18%	15%	12%	8%	8%

This consistency in focal month upgrades as a percentage of month 2 upgrades holds true for our other major marketing mediums, as shown in spreadsheet tab 14, Aging Patterns.

If we assume that recent cohorts follow patterns similar to those for their more mature counterparts, then we can use the relevant averages to project future upgrades. The table below does this for our paid marketing cohorts, projecting future upgrades by multiplying a given cohort's actual month 2 upgrades by the averages derived in the last row of the table above. The resulting projections are in bold type in the table below; actual figures are not bolded.

Month	1	2	3	4	5	6	7	8	9	Cumulative
Feb-15	11	222	86	65	48	28	27	15	17	519
Mar-15	29	219	86	64	43	30	19	20	17	527
Apr-15	43	201	109	59	40	25	29	16	15	537
May-15	91	199	95	62	24	44	23	16	15	569
Jun-15	54	176	91	51	30	27	21	14	13	477
Jul-15	46	192	65	50	35	29	23	15	15	469
Aug-15	26	119	58	35	21	18	14	9	9	310
Sep-15	14	104	47	30	19	16	12	8	8	258

So, returning to my question about February vs. September CACs, we can now make an apples-to-apples comparison. In spreadsheet tab 11, the September cohort's \$896 CAC is based on 143 actual upgrades to date: the 118 shown in the table above for months 1 and 2, plus another 15 upgrades so far in November. (November's actual upgrades to date are omitted from the first table above to avoid distorting the second table's averages.) Looking forward, we can project that the September cohort will have 258 upgrades by the end of its month 9, May 2016. This yields a projected \$497 CAC for the September cohort once it matures a full nine months—a big reduction compared to the current \$896 figure, but still twice the \$230 CAC for the February 2015 cohort.

Source: Company documents.