Results of Parsimonious Model:

|  |  |  |  |
| --- | --- | --- | --- |
| Criterion | DIC | pD | LL |
| Proposed Model | 9.47E+11 | 4.56E+11 | -2.45E+11 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Platform Result |  |  |  |  |
|  | mean | ste | 2.5% | 97.5% |
| M0 (Market Size) | 0.68371 | 0.00000 | 0.68371 | 0.68371 |
| p | 0.00003 | 0.00000 | 0.00003 | 0.00003 |
| q | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Add-ons Created | 0.08330 | 0.00000 | 0.08330 | 0.08330 |
| Chrome | -0.00011 | 0.00000 | -0.00011 | -0.00011 |
| IE | -0.00032 | 0.00000 | -0.00032 | -0.00032 |
| Total # AMO contribution | 0.00001 | 0.00000 | 0.00001 | 0.00001 |
| Total # Nom. in AMO queue | -0.00003 | 0.00000 | -0.00003 | -0.00003 |
| vp | 0.01264 | 0.00316 | 0.00834 | 0.01838 |
| wp | 0.11635 | 0.00735 | 0.10381 | 0.12790 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Add-ons |  |  |  |  |  |  |  | |
|  |  |  |  |  | Individual Add-ons | | | |
|  | mean | ste | 2.5% | 97.5% | Pos. Effects | Neg. Effects | | Total addons |
| alpha | 0.0133 | 0.0018 | 0.0168 | 0.0097 | 52 | 0 | | 52 |
| p0 (unobserved) | 0.0086 | 0.0016 | 0.0118 | 0.0055 | 22 | 7 | | 29 |
| p1(Addon-Vrsn.) | 0.0048 | 0.0012 | 0.0071 | 0.0026 | 3 | 3 | | 6 |
| P2(Ffx-Vrsn.) | 0.0041 | 0.0010 | 0.0060 | 0.0021 | 4 | 3 | | 7 |
| q0 (unobserved) | 0.0055 | 0.0013 | 0.0080 | 0.0030 | 10 | 3 | | 13 |
| q1(Rat-Var.) | 0.0118 | 0.0019 | 0.0155 | 0.0082 | 10 | 2 | | 12 |
| q2(Obs. Lrn.) | 0.0052 | 0.0016 | 0.0084 | 0.0021 | 4 | 3 | | 7 |
| q3(ST-AVG) | 0.0021 | 0.0012 | 0.0045 | -0.0003 | 5 | 4 | | 9 |
| churn | 0.0159 | 0.0020 | 0.0197 | 0.0120 | 52 | 0 | | 52 |
| V | 0.0002 | 0.0000 | 0.0002 | 0.0002 | 52 | 0 | | 52 |
| W | 0.0002 | 0.0000 | 0.0003 | 0.0002 | 52 | 0 | | 52 |

Cross-sectional analysis:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | mean | variance | 2.50% | 97.50% |
| alpha | Intercept | 0.013 | 0.007 | 0.002 | 0.025 |
|  | contribute | 0.009 | 0.016 | -0.019 | 0.035 |
|  | meet developer | -0.003 | 0.020 | -0.036 | 0.031 |
|  | free | -0.004 | 0.034 | -0.061 | 0.051 |
|  | restricted license | 0.005 | 0.027 | -0.039 | 0.048 |
|  | Mozilla license | -0.003 | 0.045 | -0.077 | 0.070 |
| p0 | intercept | 0.013 | 0.007 | 0.002 | 0.024 |
|  | contribute | 0.009 | 0.017 | -0.019 | 0.036 |
|  | meet developer | -0.002 | 0.021 | -0.037 | 0.031 |
|  | free license | -0.004 | 0.034 | -0.059 | 0.052 |
|  | restricted license | 0.005 | 0.026 | -0.038 | 0.049 |
|  | Mozilla license | -0.001 | 0.044 | -0.075 | 0.071 |
| p1 | intercept | 0.008 | 0.007 | -0.003 | 0.020 |
|  | contribute | -0.002 | 0.016 | -0.029 | 0.025 |
|  | meet developer | 0.007 | 0.021 | -0.027 | 0.041 |
|  | free license | -0.015 | 0.035 | -0.074 | 0.042 |
|  | restricted license | -0.006 | 0.027 | -0.050 | 0.039 |
|  | Mozilla license | 0.005 | 0.046 | -0.069 | 0.080 |
| p3 | intercept | 0.005 | 0.007 | -0.007 | 0.017 |
|  | contribute | -0.002 | 0.017 | -0.030 | 0.026 |
|  | meet developer | 0.004 | 0.022 | -0.032 | 0.039 |
|  | free license | -0.010 | 0.035 | -0.068 | 0.049 |
|  | restricted license | -0.003 | 0.028 | -0.048 | 0.043 |
|  | Mozilla license | 0.012 | 0.046 | -0.065 | 0.087 |
| q0 | Intercept | 0.013 | 0.007 | 0.002 | 0.025 |
|  | free license | -0.004 | 0.034 | -0.059 | 0.053 |
|  | restricted license | 0.005 | 0.027 | -0.039 | 0.050 |
|  | Mozilla license | -0.002 | 0.046 | -0.078 | 0.075 |
|  | contribute | 0.005 | 0.029 | -0.042 | 0.052 |
|  | meet the developer | -0.002 | 0.020 | -0.035 | 0.032 |
|  | contribution amount | 0.001 | 0.004 | -0.005 | 0.007 |
| q1 | Intercept | 0.009 | 0.007 | -0.003 | 0.020 |
|  | free license | -0.015 | 0.035 | -0.072 | 0.042 |
|  | restricted license | -0.005 | 0.028 | -0.051 | 0.040 |
|  | Mozilla license | 0.005 | 0.046 | -0.070 | 0.081 |
|  | contribute | -0.002 | 0.028 | -0.049 | 0.046 |
|  | meet the developer | 0.007 | 0.021 | -0.027 | 0.042 |
|  | contribution amount | 0.000 | 0.004 | -0.006 | 0.006 |
| q2 | Intercept | 0.005 | 0.007 | -0.007 | 0.017 |
|  | free license | -0.011 | 0.036 | -0.070 | 0.047 |
|  | restricted license | -0.004 | 0.028 | -0.050 | 0.042 |
|  | Mozilla license | 0.012 | 0.048 | -0.069 | 0.090 |
|  | contribute | -0.003 | 0.030 | -0.052 | 0.046 |
|  | meet the developer | 0.004 | 0.022 | -0.032 | 0.039 |
|  | contribution amount | 0.000 | 0.004 | -0.006 | 0.006 |
| q3 | Intercept | 0.004 | 0.007 | -0.008 | 0.016 |
|  | free license | -0.004 | 0.037 | -0.064 | 0.058 |
|  | restricted license | -0.003 | 0.029 | -0.050 | 0.044 |
|  | Mozilla license | -0.009 | 0.048 | -0.087 | 0.069 |
|  | contribute | 0.000 | 0.029 | -0.048 | 0.048 |
|  | meet the developer | 0.000 | 0.021 | -0.035 | 0.035 |
|  | contribution amount | 0.000 | 0.004 | -0.006 | 0.006 |
| delta | Intercept | 0.013 | 0.007 | 0.002 | 0.025 |
|  | contribute | 0.008 | 0.016 | -0.018 | 0.035 |
|  | meet the developer | -0.003 | 0.020 | -0.036 | 0.031 |
|  | free license | -0.004 | 0.034 | -0.060 | 0.053 |
|  | restricted license | 0.005 | 0.027 | -0.039 | 0.049 |
|  | Mozilla license | -0.003 | 0.045 | -0.077 | 0.073 |
| variances | eta1 | 0.002 | 0.001 | 0.002 | 0.003 |
|  | eta2 | 0.002 | 0.001 | 0.002 | 0.003 |
|  | eta3 | 0.002 | 0.001 | 0.002 | 0.003 |
|  | eta4 | 0.002 | 0.001 | 0.002 | 0.003 |
|  | eta5 | 0.003 | 0.001 | 0.002 | 0.004 |
|  | eta6 | 0.003 | 0.001 | 0.002 | 0.004 |
|  | eta7 | 0.003 | 0.001 | 0.002 | 0.004 |
|  | eta8 | 0.003 | 0.001 | 0.002 | 0.004 |
|  | eta9 | 0.002 | 0.001 | 0.002 | 0.003 |

Literature summary of open source from case studies:

* Case Studies of HBR summary about Firefox Context

I read the first one which is published in Journal of Information Technology Teaching cases (2011), Lessons learned from the development and marketing of Mozilla Firefox, and here are my takes:

(1) As you said Firefox has been successful in competing with the default application of Microsoft operating system (IE). It has a fantastic growth rate. Within 100 days it got 10 million users, and 10% of market share from this dominant player.

(2) They emphasize their power in their community and engagement with that community (this community as they say is sel-organized and independent)

(3) They have limited resources, but this community power creates efficiency, cost saving, innovativeness and productivity in their business (I think we are capturing this through discussion about AMO, Add-ons, product reviews, because product reviewers according to terminology of this paper are Bug reporters and massive users, Add-on developers are patch submitters, and AMO is core group)

(4) Licensing is important according to this paper (GNU, GPL that restrict derivatives removing any commercial incentive)

(5) They mentioned that they want sustainable community that must co-evolve with the platform, and we are capturing this through observational learning. (in page 87 of the case they mentioned that they put # of downloads to not only help users, but most importantly to give incentive for developers, through social approval)

(6) Sustainability of this community seems to be very important with them, and to do so they need to provide correct signal for end users as well. They mentioned that most OSS projects are suitable for technical users, but they are successful to create application for mom and pop (non-technocal users), and this means they need to provide enough guidance for those audiances, and both observational learning and product rating is important in that sense

(7) They mentioned important rules they have:

1- "We want it to be small"

2- "Let's not keep too many cooks"

3- "All patches are not created equal"

4- "All users are not created equal"

This all suggests that they have hierarchical structures that they talk about, AMO, Add-on developers and reviwers, and they want to sustain this, and it is possible through a good performance appraisal system, which here is measured in terms of rating, observational learning, and most importantly the relevance factor and churn. I think in this framework churn that we are capturing is very relevant to this sustainability goal and this hierarchical structure that they are seeking.

(8) At page 81 of the case it is mentioned that it is not all about hobbyist participants, as voluntary contributions tends to decrease over time, so the incentive that you mentioned before is very important based on this, and if we find it insignificant, we just rejected their theory.

(9) "Browser war" story was really interesting. I saw that in Bloomberg TV last year. The way Microsoft bit Netscape, but from that ash a phoenix raised and that is why they brand Firefox.

(10) They lack resource for advertising and marketing, and their community is the tool for them, so our discussion about sustainable community through observational learning, rating, churn and relevance is important.

(11) On page 81 it is mentioned that browsers are highly substitutable, so breath of the use and perceived ease of use of the challenger product is important. They are getting this through add-ons. Security functionality and ad-block was one of the important features mentioned in page 82 of the case, and we have ad-block add-on in our study.

(12) Public relation also was their powerful tool, but public relation is two-sided sword, so they wanted to use the power of community for that, and to do so they need churn, relevance, OL, star rating that we are studying. AMO is community coordinator in the terminology of this case study. They said they thank a successful contributor in public, and this creates incentive for those contributors, so our measures can help them to better manage this appraisal process.

(13) In page 87 of the case they mentioned that referral is very important portion of their open source context, and we again re capturing it with observational learning and product rating.

(14) They mentioned that local languages, together with community helped them to reach international market, and we have couple of translation add-ons in our data. In addition this internationalization creates problem of various tastes, and product rating and its variance captures this high variation, and we have it in the model.

(15) Finally they mentioned in page 88 of the case that they wanted to create feeling of ownership through this community, and this allowing add-on development, allowing to write rating, and allowing to be part of AMO is part of this.

* Mozilla : scaling through a community of volunteers
  + Transparency is a key in developing the software, completely different from isolated environment of coders (p4)
  + The goal was to develop stand-alone browser that is great, as they think financial incentive of IE and Netscape does not look for that (Great Browser) => p4
  + Toolbar search that is now using Google generates considerable revenue (first it was directed to Yahoo)
  + Public benefit => they are tax exempt
  + The community sustainablity is closely related to transparency (p6) => in our case it is OL, RT, and churn and relevance data may also help if it is publicized
  + Deep testing is unique aspect of online community => first as the code was complext this was main contribution of the community
  + Testing is usually very costly, as they needed to test the product over various platforms and under different conditions (p7)
  + This various types of users who test the product together with transparency, and no financial incentive created high quality tested product (export of quality assurance)
  + The main challenge for them is organizing community, and they refer to their environment as a "chaordic system" combining aspects of both chaos and order (great environment for innovation)
  + On page 7 their CEO says: you try to get it going in a direction, and you try to make sure it doesn't go too far off track. Then you take the good or bad as it goes and you try to limit the negative and improve the positive. I think you can only get consistently good outcomes in a movement by creating good leaders in that movement all the way around and creating a way to be self-replenishing.
  + [My text:]Ladership is important in their context, and that is why rating and observational learning is important, as they say the society really doesn't like your add-on, so it is not like a dictatorship rejection of an idea by a manager.
  + Mozilla was based on a set of idea, as expressed in its manifesto. Lilly referred to this as the "poetry" that drove the organization -- "keep[ing] the internet open and free by supporting choice, innovation, and opportunity online" Poetry meant that "everyone should hack, everyone should do what they want, everyone should change the web". However pragmatics are related to trademark rights and laws, and that is why this hierarchical structure exists. These two are conflicting but they try to manage their coexistance. (p8)
  + On page 9 of the case: Lilly saw all participants in the effort as "citizens" of the Mozilla community, regardless of whether theya re employees or volunteers. He linkend this citizenthisp to country. => it is referring to this community
  + On page 10: yet some organization was required, so that contributions could be effectively incorporated and woven together and the passionate contributors in this community were prevented from degenerating into disagreements, bickerings, and chaos.
  + They use a bug tracking system, Bugzilla, to report bugs and assign int to people to fix.
  + On the Bugzilla there are strong set of etiquette rules to maintain a cooperative environment which include: "no pointless comments", meaning that people should not post unless they were adding useful new information--"Voting", or agreeing with previous comments, did not add new information to the discussion and thus was not allowed. Another rule was "no personal abuse"-- Bugzilla was to be used to enable anyone to observe and contribute to the development process, and abusive conduct was not helpful or welcome. (p11)
  + They try to not reject participation to maintain the community, so unlike IE and Netscape that had no incentive to allow different languages for every local, they allowed it, and the community crated this different language versions. This lowered their barrier to entry (p12)
  + They key part of their marketing is to allow for people's opinion (WOM), and they state that you must start off with something that people are passionate about. It's surprising that it's piece of software. I've been in other things involved in political activism and things like that, and I never really thought I've seen this kind of enthusiasm about a piece of software, but it's thre. It turns out that when you look at the Web, it's a billion people online all looking through this window that you made, and thy're going to have opinion about it, Dotzler. (p15)
  + On page18 they mention importance of new add-ons indirectly by saying that as the IE's monopoly is removed in EU, then savvy users who want for example social game will step in (we have game as part of our add-ons). They mention that they have different requests, and they need to address these new requirements to spread Firefox.