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Articles

Credible Online Reviews of Skincare Products on Brand Equity and Its Impact on Purchase Intention

Sugih Arijanto Mukti, Vita Niedya Pangesti   Pages: 1-11

PDF

Worker-Machine Relationship Based Strategy for Sustainable Management in A Machine Shop

Shiela Mhay R Dalisay, Arnie Lyn D Alagos, Charmine Sheena R Saflor, Klint Allen A Marinas, Yung-Tsan Jou   Pages: 166-175

PDF

Implementation of Six Sigma Philosophy and 6s Principles on Bag Making Warehouse at PT. X

Luke Pratama Adiguna, Jani Rahardjo   Pages: 176-183

PDF

Marketing a Webinar: Lesson Learnt from a Real Experiment

Tamara Regina, Joyceline Maria, Feliciya Yanson, Nova Sepadyati, Karina Agustin, Hanijanto Soewandi
PDF   Pages: 184-193

Assessment of Managerial Innovation in Company X Using Fuzzy AHP

Roland YH Sitonga, Marla Setiawati, Theodorus Gratianus   Pages: 194-205

PDF

Knowledge Management for Thai SMEs Exporting Thai Local Products from Thailand to China during COVID-19

Jiabao Wu, Jirawit Yanchinda   Pages: 206-217

PDF

A Proposal on How to Use Software Reliability Growth Model to Build Confidence in Dashboard Testing

👥 Alexander Christian, Christopher Wibowo, Indriati Bisono, Hanijanto Soewandi   Pages: 218-230

📄 PDF

📊 Article Metrics: Abstract Views 143 times, PDF Downloaded 90 times

Two-Stage Memory Allocation using AHP & Knapsack at PT Berca Hardayaperkasa

👥 Khanis Satya, Indriati N Bisono, Hanijanto Soewandi   Pages: 231-241

📄 PDF

📊 Article Metrics: Abstract Views 177 times, PDF Downloaded 81 times

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Marketing a Webinar: Lesson Learnt from a Real Experiment

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Abstract

Implementing an email campaign can powerfully and positively influence customers' attitudes about the content of the email used as promotional media. However, email marketing efforts may not reach their full potential without evaluating their marketing strategy. This paper discusses the real-world experience of the email marketing strategy of the webinar that we managed by applying email marketing strategy evaluation combined with mathematical diffusion models to increase the number of registrations. After starting with a digital external campaign for our webinar event, we monitor and predict using Bass, von Bertalanffy, Gompertz, and Logistic. While the mathematical diffusion models show that our webinar reached a plateau very early, it could become an alarm for the management team to react and make another internal digital campaign to boost our webinar participants. Interestingly, we also encountered a procrastination phenomenon since this was a free webinar. Finally, using Zoom registration, MySQL database, and R, we analyzed how effective the digital email campaign was in getting registrants daily.

Keywords: *email campaign, Bass, von Bertalanffy, Gompertz, Logistic*

INTRODUCTION

Currently, email marketing is considered a medium of contact for businesses looking to cut promotional expenses, communicate with the potential target, and increase profits. (Fariborzi & Zahedifard, 2012). Nowadays, managing webinars for undergraduate university students is a task that cannot be avoided. Therefore, email was used to broadcast information about many events. Therefore, in the last webinar series held by our department in odd semester 2021/2022, the webinar marketing team tried to use various knowledge and apply them to the next webinar, presented by a senior Amazon AWS Quick Sight Data/Visualization Engineer about Natural Language Query (NLQ) – a scorching topic these days. Even though it was an exciting topic with great examples, the team faced quite a big challenge. First, take a look at the attendance of our webinar series in Table 1 below; the number of participants is decreasing. Various factors cause the decrease from lack of knowledge about the event to participants' fatigue.

Table 1. Trend of webinar participants in odd semester 2021/2022

Date	Topic	Registrants
09/03/2021	Artificial Intelligence for Public Policy: Myths, Challenges, and Resolutions	898
09/17/2021	Mapping out Your Technology Career	686
10/01/2021	Spatial Data Science	741
11/05/2021	Product Retrospectives from a Decade in Media & Technology	497
11/12/2021	Practical Data Science in Industry	368

Date	Topic	Registrants
11/27/2021	NLQ Solution with AWS Services - Data Analytics on the Olympics	???

Second, managing a webinar is like managing a Bruno Mars concert. First, a date for the event is set, and then the planning and other activities have to happen with a specific due date. The team that manages the event needs to react quickly based on the data, not just intuition. In our case, we had two weeks prior to the due date – our webinar event planning started on 11/13/2021. A perfect Agile Software Project Management model with a two-week sprint – a similar practice for research had been reported (Hidalgo, 2019).

Third, we decided to apply what our classes have taught and set aside some Goals (G) for ourselves:
- G1: The last webinar of the semester should attract more participants than the previous webinars.
- G2: We will try to practice some (Email) digital campaigns to see how many people responded to attend a free webinar.
- G3: People say that "data is the new oil," so we will try to build our data warehouse to better analyze the progress and future.

Along with the goals, we also have our curiosity to get answers to the following Research Questions (RQ):
- RQ1: Can email (digital) campaigns be used to attract an audience from both outside the affiliation as well as from inside the affiliation community (faculties and students from other departments)?
- RQ2: Can we predict the potential audiences who will attend our free webinar event and do some actions to influence it to attract more audience?

The rest of our paper is organized as follows. We will review some literature and conceptual models next and outline what we have done. After that, we presented our results and discussion, and we closed our paper with a conclusion and further recommendation.

LITERATURE REVIEW

E-mail marketing is a form of direct marketing that uses e-mail to communicate commercial or fund-raising messages to an audience. Therefore, every e-mail sent to a potential customer could be e-mail marketing (Fariborzi & Zahedifard, 2012). Venu Gopal, Saumendra, & Vishnu (2012) argued that email marketing could effectively reach a target audience designed to win new rather than retain customers. However, email marketing efforts may not reach their full potential unless we invest some effort in evaluating the email marketing strategy. Jamalzadeh, Behravan, & Masoudi (2012) argued that email advertising improves a cost-effective, direct, and reciprocal means for businesses, overcoming the limit of time and geographical barriers. Their study provided empirical evidence and discussed the advertising email that influences customers' attitudes about an email-based advertisement which strongly and positively affects customers' perspectives.

In addition to doing an email campaign, we also researched how other researchers have done previously on similar event management. For example, a recent study by Lartey (2020) discusses the importance of implementing diffusion models in forecasting future trends and the penetration rate of the recent innovation of gigabit Internet product over-fibre-to-home brownfield deployment. While achieving tangible results can be signs of great success, the model is also crucial for marketing and companies to achieve specific goals. We referred our readers to this original

Marketing a Webinar: Lesson Learnt from a Real Experiment
Tamara Regina, Joyceline Maria, Feliciya Yanson, Nova Sepadyati, Karina Agustin, and Hanijanto Soewandi

paper as we had similar reasoning in our webinar. We believe this could be pivotal in shaping future innovations in our email marketing strategy.

Another study, done by Sudtasan & Mitomo (2017), utilized the same diffusion models to forecast the growth of broadband markets in Thailand. The demand growth for broadband technologies has been changing rapidly. Forecasting diffusion models is crucial for policymakers and service providers to identify optimal parameters and adjust to these unprecedented changes. With accurate models for prediction, it is essential to forecast the possible number of maximum broadband users, just like our case for finding the total potential registrants in our webinar.

In one of several Mathematics classes about differential equations, we learned about the Bass Diffusion model – popularized by Bass & Frank, 1969. It consists of a differential equation describing how new products are adopted in a population. The model's basic premise is that users can be classified as innovators or imitators. The speed and timing of adoption depend on the degree of innovation and imitation among users. Registering (or attending) for a webinar event, like the one we managed, is very similar to buying a new product (Bass & Frank, 2004).

NLQ is a hot subject, but perhaps it is relatively new. Therefore, we expect that there will be two groups of people – a set of people who are willing to try a new webinar topic (& register) and another set of people who need some convincing to register. Therefore, we believe this model could be one of the appropriate models to use. Mathematically speaking, the Bass model can be written as:

$$\frac{dN(t)}{dt} = p + \frac{q}{m}N(t)m - N(t), \quad N_0 = 0 \tag{1}$$

Where: $N(t)$ is the number of registrants at time t, p is the coefficient of innovation, q is the coefficient of imitation, and m is the ultimate market potential.
The solution to the above differential equation is actually given by:

$$N_t = m\frac{1 - e^{-p+qt}}{1 + \frac{q}{p}e^{-p+qt}} \tag{2}$$

To estimate/predict how our number of registrants progresses in the future (in particular, to predict m = our maximum number of registrants), we found out that we need to use non-linear least squares (NLS). Luckily, there are two R packages that we can find to do the job, namely: diffusion and DIMORA.

Furthermore, when we researched the proper model(s) used, we came across a group of S-curve (Sigmoid functions) that can also be used. Therefore, we chose the von Bertalanffy, Logistics & Gompertz growth models among many of those models. We chose these four models because of the following:
They all have the same number of parameters to estimate, i.e., three parameters.
Their parameters have a reasonable interpretation of other subjects, e.g., fishery, and we can quickly see how it relates to the number of webinar registrants over time.

All of them are available in a single R package: fish methods.

The typical von Bertalanffy, Gompertz, & Logistic growth model are represented by the following equations (3), (4), and (5) respectively:

$$N_t = m_1 - e^{-K_t - t_0} \tag{3}$$

$$N_t = me^{-be^{-ct}} \tag{4}$$

$$N_t = \frac{m}{1 + \frac{m - N_0}{N_0}e^{-rt}} \tag{5}$$

RSF Conference Series: Business, Management, and Social Sciences, Vol.2 (1), 184-193

Marketing a Webinar: Lesson Learnt from a Real Experiment
Tamara Regina, Joyceline Maria, Feliciya Yanson, Nova Sepadyati, Karina Agustin, and Hanijanto Soewandi

There are quite some similarities between these 4 Sigmoid functions. For example, notice that the numerator of the Bass equation in (2) is very similar to the von Bertalanffy function in (3). Similarly, denominators of the Bass equation in (2) and the Logistic growth model in (5) are very similar.

METHODOLOGY

Unlike predicting the market potential of a new product, the maximum number of registrants has a cut-off time, which is the event date of the webinar (in our case, it is already scheduled for Nov 27, 2021). Figure 1 below illustrates three different situations that may happen.
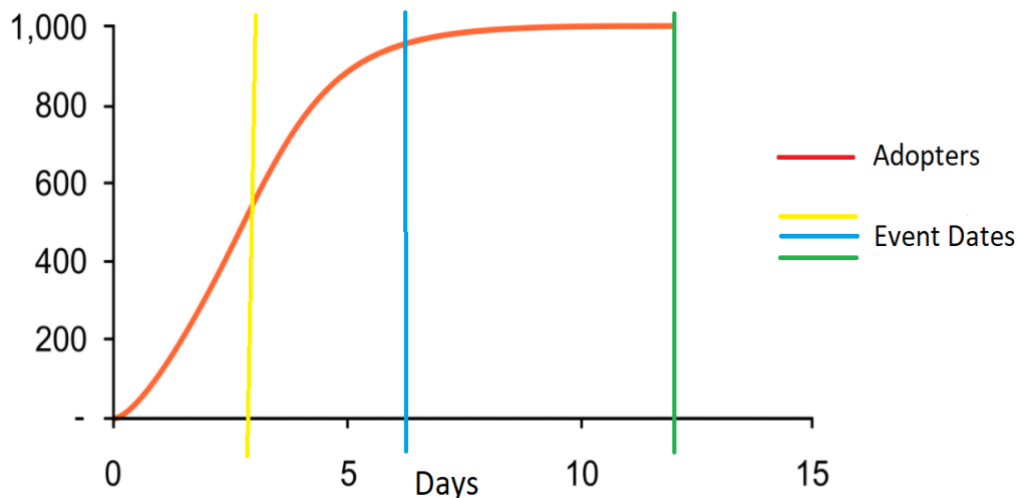

Figure 1. Several event dates with respect to registration progress

1. The situation with the yellow event date webinar happens when people are still registering, but our event has already come,
2. Blue event date situation happens when everyone from our market potential is almost done registering and the webinar event has already come, and
3. Finally, the green event date situation happens when the webinar event happens after all market potential has already registered.

The blue event date is the best scenario for the marketing campaign since the webinar event happened when almost all market potential had registered. On the other hand, the yellow event date represents a situation in which we did not do enough marketing campaign at the beginning to attract potential participants. In contrast, the green event date represents a situation where we did not make a second effort while there is enough time to increase our market potential. Intuitively, to avoid the "yellow event date" situation, we decided to start our first campaign very early (as soon as our event was posted). Similarly, suppose we detected that there is still enough time while our first campaign effort had reached almost all of its market potential (i.e., the situation with "green event date"), the following strategy was preparing a second campaign to attract more participants. Essentially, we are hoping that given time box constraints, we want the number of registrants to be like two S-curve stacks, one at the top of another, i.e., our registrants' overtime should follow the picture as in Figure 2 below.
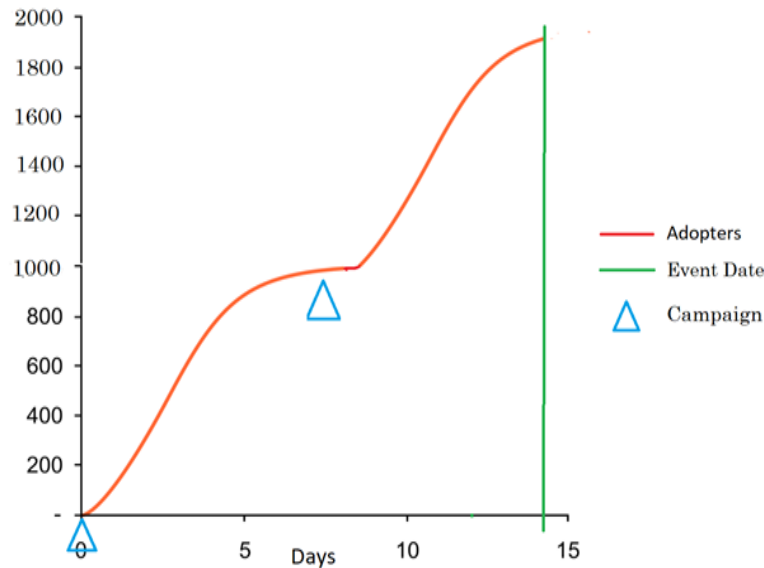
Figure 2. The marketing strategy with two campaigns

The mathematical models (Bass, von Bertalanffy, Gompertz, & Logistic) of our webinar registrants for the second campaign will be adjusted to become the following four equations:

$$N_t = m \frac{1 - e^{-p+qt}}{1 + \frac{q}{p} e^{-p+qt}} + d \tag{6}$$

$$N_t = m \left(1 - e^{-K_t - t_0}\right) + d \tag{7}$$

$$N_t = m e^{-b e^{-ct}} + d \tag{8}$$

$$N_t = \frac{m}{1 + \frac{m - N_0}{N_0} e^{-rt}} + d \tag{9}$$

Where: d is the cumulative number of already registered participants at the beginning of the second campaign. Note that we do not estimate the parameter d since it can be obtained simply by calculating the cumulative registrants prior to the beginning of the second campaign.

The first campaign effort was similar to those in the literature review but with a less sophisticated approach due to limited time and knowledge. None of us know how to use those email campaign systems. We applied the concept of "data is the new (crude) oil" – a term that Clive Humby popularized (the founder of Dunnhumby), according to Arthur (2013) and Palmer (2006). First, we collect data from previous webinar events (the registration spreadsheet/CSV data from the Zoom account). Then, we combine all of those CSV files into a MySQL database, and by using SQL, we can easily unionize those files and get a list of distinct names & email addresses. We decided to create two sets of campaigns:

- 1st Campaign: We tried to reach out to people outside of our affiliation.

- 2nd Campaign: We tried to reach out to students, faculty, or staff of our affiliation.

We gained 3011 separate emails from the first campaign, and from the second campaign, we gained 4260.

Marketing a Webinar: Lesson Learnt from a Real Experiment
Tamara Regina, Joyceline Maria, Feliciya Yanson, Nova Sepadyati, Karina Agustin, and Hanijanto Soewandi

FINDINGS AND DISCUSSION

After sending our first email campaign to 3011 separate emails, we observed our daily registration growth. The results of our first campaign in 5 days can be seen in Table 2.

Table 2. The result of our 1st email campaign after 5 days

Date	Registrants from PCU	Registrants from non-PCU	Total	3011 Email Campaign #1	4260 Email Campaign #2	Registrants from Campaign #1	Registrants from Campaign #2
11/15/2021	98	12	110	8		7.27%	
11/16/2021	98	31	129	12		9.30%	
11/17/2021	46	8	54	1		1.85%	
11/18/2021	40	4	44	1		2.27%	
11/19/2021	14	2	16	0		0.00%	
Total	296	57	353	22	0	6.23%	0.00%

One can see that our first email campaign failed badly to attract people from non-PCU to register for our webinar event. We can only get 22 people to register, only 0.73% of 3011 emails that we have sent (or just 6.23% from 353 people registered already by 11/19/2021). Furthermore, running our Mathematical model for the above five days of data produce the following prediction results of maximum market potential for our registrations between 350 – 373 (see Table 6). Notice that by the end of 11/19/2021, we were able to attract 353 people to register, which is over 98% (= 353/359.75) of the average market potential predictions.

Table 3. The prediction of market potential for first email campaign by various mathematical models

Mathematical Model	M1 = Market Potential	R Package to Use
Bass	358	Diffusion
von Bertalanffy	373	Fishmethods
Logistic	350	Fishmethods
Gompertz	358	nls with Ssgompertz
Average	359.75	

In Figure 3 below, we showed in the picture the prediction based on data from 11/15/2021 – 11/19/2021 and the overall number of registrants over time, and our decision to run the second campaign on 11/20/2021 (day 6). As we have explained previously, we decided to go after our internal affiliation (students, staff, or faculties) for the second campaign by sending out a massive 4260 emails. We know for sure that the affiliation Gmail Server will not block email campaigns from the same organization, and as expected, we have higher success rate, as shown in Table 4.

Marketing a Webinar: Lesson Learnt from a Real Experiment
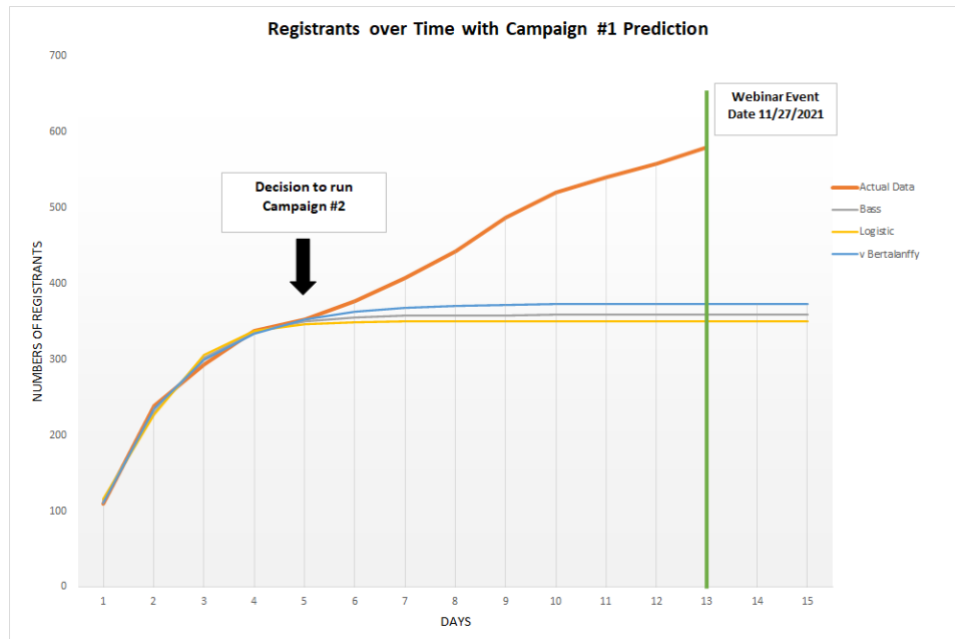Tamara Regina, Joyceline Maria, Feliciya Yanson, Nova Sepadyati, Karina Agustin, and Hanijanto Soewandi

Figure 3. Registrants progress over time with campaign #1 prediction

Table 4. Result of second email campaign between 11/20/2021 – 11/26/2021

Date	Registrants from PCU	Registrants from non-PCU	Total	3011 Email Campaign #1	4260 Email Campaign #2 (start on 11/20/2021)	Registrants from Campaign #1	Registrants from Campaign #2
11/20/2021	20	4	24	2	13	8.33%	54.17%
11/21/2021	28	2	30	1	25	3.33%	83.33%
11/22/2021	28	8	36	0	27	0.00%	75.00%
11/23/2021	42	2	44	1	33	2.27%	75.00%
11/24/2021	29	4	33	3	23	9.09%	69.70%
11/25/2021	17	3	20	1	14	5.00%	70.00%
11/26/2021	15	3	18	0	13	0.00%	72.22%
Total	179	26	205	8	148	3.90%	72.20%

Similarly, when we run our Mathematical model, we have the following results in Table 5. It should be reported that the actual number of registrants by the end of the webinar event is precisely 580 (when we set up Zoom meeting registration, we allow people to register until the time of the event, i.e., until 11/27/2021 09:30 am WIB). This is clear proof that it is possible to forecast registrants of a webinar event accurately. It should be noted carefully that the market potential for the 2nd Email Campaign is an asymptotic value (as the time approaches infinity), since the webinar event happens on a particular date.

Marketing a Webinar: Lesson Learnt from a Real Experiment
Tamara Regina, Joyceline Maria, Feliciya Yanson, Nova Sepadyati, Karina Agustin, and Hanijanto Soewandi

Table 5. The prediction of market potential for second email campaign by various Mathematical models

Mathematical Model	m2 = Market Potential	d	m2 + d	R Package to Use
Bass	224	353	577	Dimora
Bass	224	353	577	diffusion
von Bertalanffy	409	353	762	fishmethods
Logistic	213	353	566	fishmethods
Gompertz	237	353	590	fishmethods
Gompertz	237	353	590	nls with SSgompertz
Average	257.33	353	610.33	
Average without von Bertalanffy mode	227	353	580	

Furthermore, it is also interesting to observe that in Table 6 below (this data was collected after the webinar event had finished), we still have 22 people registered on 11/27/2021, i.e., the date of the webinar event. However, surprisingly the number (registered people) goes up from the previous day (18 people). We may explain this unusual phenomenon as random nature. However, we can also argue that this is because humans tend to procrastinate, especially for a free webinar event like us. Overall, this procrastination phenomenon offsets the asymptotic nature of market potential, as we have observed.

Table 6. Complete progress of our email campaign until the date of the webinar event

Date	Registrants from PCU	Registrants from non-PCU	Total	Email Campaign #1	Email Campaign #2 (start on 11/20/2021)	Registrants from Campaign #1	Registrants from Campaign #2
11/15/2021	98	12	110	8		7.27%	
11/16/2021	98	31	129	12		9.30%	
11/17/2021	46	8	54	1		1.85%	
11/18/2021	40	4	44	1		2.27%	
11/19/2021	14	2	16	0		0.00%	
11/20/2021	20	4	24	2	13	8.33%	54.17%
11/21/2021	28	2	30	1	25	3.33%	83.33%
11/22/2021	28	8	36	0	27	0.00%	75.00%
11/23/2021	42	2	44	1	33	2.27%	75.00%
11/24/2021	29	4	33	3	23	9.09%	69.70%
11/25/2021	17	3	20	1	14	5.00%	70.00%
11/26/2021	15	3	18	0	13	0.00%	72.22%
11/27/2021	18	4	22	1	14	4.55%	63.64%
Total	493	87	580	31	162	5.34%	27.93%

We should also point out that the prediction of the von Bertalanffy model is not wrong at all. For example, if we predict for 11/27/2021 (day eight on Campaign 2), the model predicts that there

RSF Conference Series: Business, Management, and Social Sciences, Vol.2 (1), 184-193

Marketing a Webinar: Lesson Learnt from a Real Experiment
Tamara Regina, Joyceline Maria, Feliciya Yanson, Nova Sepadyati, Karina Agustin, and Hanijanto Soewandi

will be 583.69 registrants. Recall that we used the asymptotic value of the market potential in the other models, which happened when the time went to infinity. Overall, the prediction for the registrants can be seen in Figure 4.
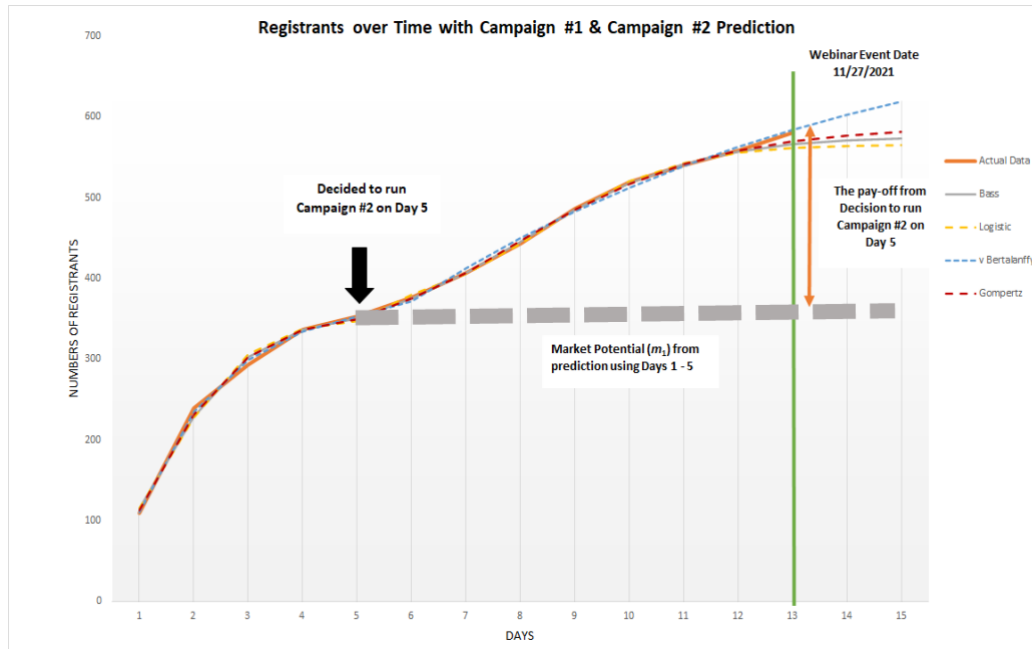

Figure 4. Prediction using 2 models vs actual

Unfortunately, we made one of the most significant "rookie" mistakes to send email reminders to those registrants (the first hypothesis). We learned this fact after the event was over. We discovered this heart-breaking fact when we downloaded our participants' report from Zoom. Out of 580 registrants, we only managed to get 330 participants – we lost 250 registrants (43.10%).

CONCLUSION AND FURTHER RESEARCH

In this paper, we reported our lesson learned on managing a webinar event. We have demonstrated that we can accomplish some of our goals to acquire more registrants than the previous two webinars. However, we also fall short during the day of the event. This will lead to our next project to find out the reason. Sending more engaging content and avoiding spam filters would be an essential subject to learn about for a free webinar event to be considered by people. We can answer all our research questions as well. Unfortunately, we still failed to attract participants from outside our organization. However, we managed to get the attention of our colleagues within the affiliation and predict the market potential accurately with the mathematic diffusion model.

Here are some more suggestions for the future webinar:
- Now that we have established our first "Enterprise" Data Warehouse, we can segment our audience and send a more targeted campaign. For example, we knew that we had more success with the Faculty of Business & Economics and the Faculty of Art & Design.
- Learn to use a free but proper email campaign tool to avoid being filtered as spam mail.
- Friends & family campaign (or referral bonus) – to use the budget to create a competition among registrants to bring their friends and family to attend the webinar. Here is a sample

RSF Conference Series: Business, Management, and Social Sciences, Vol.2 (1), 184-193

Marketing a Webinar: Lesson Learnt from a Real Experiment
Tamara Regina, Joyceline Maria, Feliciya Yanson, Nova Sepadyati, Karina Agustin, and Hanijanto Soewandi

from Citibank: https://www.hustlermoneyblog.com/citibank-referral-review/comment-page-1/

- Build a web scraper to collect more emails from other organizations via more official ways (e.g., Facebook Graph API, LinkedIn API, etc.).
- Use WhatsApp for Business to distribute more personal invitations to a more targeted audience.
- Build a more appropriate Data Warehouse and automation to grow the webinar series.
- Collaborate more officially with student organizations from other universities within Surabaya, Indonesia, and around the world.

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