Business Analytics Capstone

The Wharton School of the University of Pennsylvania

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Project Explanation

In my capstone project at Wharton School, I tackled a major challenge for GoYaFace, Inc. (GYF): ad-blocking technology, which poses a big threat to their revenue from ads. My job was to create and lead a strategy that would keep GYF's advertising effective, even as more users turned to ad blockers.

I dived into why people use ad blockers and how it impacts GYF. With a strong focus on business analytics, I strived to uncover and solve this complex challenge. The strategy was all about innovating with new ad formats that were less irritating and making sure ads matched what users were interested in. This approach aimed to make ads something GYF's audience wouldn't want to block, while still delivering value to advertisers.

However, I wanted the strategy to stay relevant past the ad-block challenge. Thus, I created a system for ongoing strategy testing and refining based on real feedback. This setup ensures that GYF can quickly adapt, keeping both users and advertisers satisfied moving forward.

This project not only sharpened my skills in solving complex problems through data and analytics but also deepened my ability to craft strategies that balance business needs, customer preferences, and the ever-changing tech environment. I'm ready to bring these skills to tackle digital strategy challenges in any dynamic business setting.

Project Abstract

In response to the growing challenge of ad-blocking technology and its impact on digital advertising revenue, this project devises a comprehensive strategy for GoYaFace, Inc. (GYF), a

leading digital content provider. Through careful analysis, using business analytics methodologies, the project aims to identify key factors driving the use of ad-blockers and their implications on GYF's advertising model. Emphasizing innovation, the strategy proposes the development of non-intrusive ad formats and the improvement of ad relevance to make user engagement and satisfaction better. A core component of the outlined approach involves establishing a feedback loop for continuous improvement, allowing for repeated testing and refinement of advertising tactics. This adaptive strategic framework ensures GYF's advertising strategy remains agile and responsive to both market trends and consumer preferences. The project not only addresses the immediate challenge of ad-blocking but also sets an example for dynamic, data-driven strategy creation in the digital advertising industry, highlighting the importance of user-centric approaches in sustaining advertising revenue streams.

Project Structure

GoYaFace (GYF) Company Profile

The following is the company profile description of an imaginary company called GoYaFace, which is given in the Business Analytics Specialization course series by the Wharton School of the University of Pennsylvania:

"GoYaFace, Inc. (GYF) was incorporated in 2000 and today is a large digital search engine, email/messaging, and internet content company. GYF focuses on three core business units: GYF Search, GYF Mail & Chat, and GYF Digital Media. GYF Search is an internet search platform similar to those offered by Google and Microsoft (Bing). GYF Mail & Chat offers email and chat services similar to Gmail and Gchat. GYF Digital Media includes several subject-matter specific content destinations, including GYF News, GYF Sports, GYF Business, GYF Style, and GYF Technology. These sites provide original content and interactive features like fantasy football; for example, GYF Sports is comparable to Yahoo Sports. GYF has users all over the world and its three core business are offered free of charge to end users.

A major portion of GYF's revenue comes from selling advertising to other companies who place ads on GYF's digital services. Originally, this ad-selling business focused on the use of GYF's digital services and properties at traditional desktops, but recently it has significantly transitioned to mobile advertising as smartphones and other handheld wireless devices have proliferated. Last year, mobile advertising sales accounted for 70% of GYF's total digital advertising revenue.

GYF's advertising sales program for its search engine and mail/messaging platforms resembles Google's "Adwords" program (more information here https://www.google.com/adwords/), while its advertising program for its Digital Media content such as news, sports, etc. resembles YouTube's advertising program (more information here https://www.youtube.com/yt/advertise/index.html). GYF users see advertisements as part of

their experience on GYF sites and services across devices, as well as some third-party apps and affiliated sites.

GYF competes with Yahoo, Google, Microsoft, and Facebook. You should assume that adblocking poses similar issues for GYF as it does for these companies.

Subject to the above, GYF's business model most closely resembles Yahoo's business model as it existed in 2015 and early 2016. If you believe you need to know something specific about GYF's business and it is not explicit or implicit in the above, feel free to assume that that aspect of GYF's business resembles the corollary at Yahoo."

Defining the Problem Faced by GYF

The central challenge confronting GYF is the escalating use of ad-blocking technology, which poses a significant threat to its main revenue stream: advertising income. This difficulty not only undermines GYF's ability to effectively present advertisements to its audience but also wears down the perceived value of its advertising market among potential business partners. The complications of this issue are manifold: potential decline in ad sales, reduced advertisement rates, and growing reluctance among companies to invest in GYF's advertising opportunities fearing their messages may not reach the intended demographic customer base.

Furthermore, the increase in ad-blocking software usage, especially on mobile platforms – a critical revenue source for GYF – worsens the challenge. This trend may not only reflect a dissatisfaction with the current state of digital advertising but also signal deeper concerns related to user experience, privacy, and a desire for an uncluttered browsing environment. Addressing these underlying issues is imperative for GYF to effectively navigate the ad-blocking dilemma.

Moreover, the situation presents an opportunity for GYF to innovate and transform its advertising strategy to align more closely with user expectations and preferences. By doing so, GYF can enhance the advertising experience, potentially gaining a competitive edge in the market. This approach necessitates a comprehensive understanding of the motivations behind ad-blocking, as well as a commitment to developing advertising solutions that are both effective for advertisers and acceptable to users.

In essence, GYF's challenge extends beyond merely countering the rise of ad-blocking technology. It involves a strategic repositioning towards a more user-centric advertising model that respects audience preferences while at the same time ensuring the viability of ad-supported content. Success in this undertaking will require a refined understanding of the digital

advertising landscape, an openness to innovate, and a dedication to fostering a balanced ecosystem where the interests of users, advertisers, and content providers are harmoniously aligned.

I decided to go with a mix of exploratory, descriptive, and causal research strategies given the fact that the ad-blocking challenge faced by GYF is multifaceted. GYF needs to uncover the underlying motivations for ad-blocking with exploratory research, and then quantify those motivations with descriptive research to figure out how common and impactful they are. Lastly, the company needs to test possible solutions that can harmonize advertisers' goals with user preferences, which is part of causal research. I believe that such an approach will enable GYF to create targeted strategies that focus on solving the root causes of ad-blocking. Further, it helps with the alignment of advertising practices with user preferences, which consequently creates a more sustainable and effective advertising ecosystem.

Customer Analytics Research Methods to Explore the Problem Space

To understand and address the issue of ad-blocking's impact on GYF, I chose to employ a structured approach including exploratory, descriptive, and causal research. This research set-up aims to investigate the underlying reasons behind the use of ad-blocking technology by users and its consequential effects on the digital advertising landscape. By engaging with both the advertisers and the end-users, I believe this research strategy facilitates a comprehensive analysis, preparing the company for informed decision-making and continuous strategic planning in tackling the ad-blocking challenge.

Exploratory Research

The initial exploratory phase involves diving into the motivations behind the use of ad-blocking software among GYF's users and understanding the advertising market's changing dynamics. This stage is crucial for identifying the core issues and opportunities for innovation in digital advertising.

Tools for Exploratory Research:

- **Focus Groups and In-Depth Interviews:**
  This tool helps to engage with both users and advertisers to explore their attitudes towards digital advertising and ad-blocking. This will reveal personal motivations, frustrations, and expectations from digital advertising.
- **Market Research Online Communities (MROCs):**
  MROCs utilize online platforms to gather ongoing qualitative feedback from users and advertisers, tracking evolving attitudes towards ad-blocking and advertising effectiveness over time. This tool is a great addition to the previously mentioned focus groups and in-depth interviews.
- **Industry Analysis:**
  Industry analysis explores current trends, strategies, and responses to ad-blocking within the digital advertising sector (for example strategies done by Google or Yahoo). This analysis can provide a broader context for GYF's strategy, highlighting successful practices and potential areas for innovation.

Descriptive Research

With a clearer understanding of the motivations for ad-blocking, the next step is to quantify the impact of those motivations on GYF’s digital advertising market. Furthermore, descriptive research tries to identify patterns in user behaviour and advertiser responses. This phase aims to provide a detailed picture of the current state, which then should be used to guide future strategic decisions.

Tools for Descriptive Research:

- **Surveys (Traditional and Mobile):**
  Surveys should be conducted to gather data on ad-blocking behaviour across different user segments. This includes assessing the frequency of ad-blocker usage and identifying the types of users who are most likely to employ ad-blocking technology.
- **Social Media and Mobile Data Analytics:**
  Analysing social media conversations and mobile usage data can help to gain insights into public sentiment towards advertising and ad-blocking. In addition, social media and mobile data analysis can track behavioural differences in ad engagement across

devices. GYF should be especially interested in mobile device engagement since it makes up a big portion of its revenue.

- **Ad Performance Analytics:**
  With this tool, GYF can measure the visibility and engagement of ads across the company's platforms to directly quantify the impact of ad-blocking.

Causal Research

The final phase focuses on identifying effective strategies that can mitigate the impact of ad-blocking, fostering a more user-friendly advertising experience, and potentially reversing the ad-blocking trend among GYF's user base.

Tools for Causal Research:

- **Experimental designs (A/B Testing):**
  A/B Testing with different ad formats, placements, and user incentives can help determine what approaches reduce ad-blocking behaviour and improve user engagement with ads most effectively. Also, A/B Testing should be fairly straightforward to implement for GYF, making it a powerful tool offering empirical evidence on causal relationships.
- **Pricing Analysis:**
  Pricing analysis helps in evaluating how different ad pricing models affect advertiser demand (i.e. the advertisers' willingness to pay) considering the reduced ad visibility caused by ad-blocking. Thus, with the help of a pricing analysis, GYF can evaluate the perceived value of its advertising offering. Consequently, the company can make an informed decision about the optimal pricing strategy, which will be a reflection of the current ad-block advertising market.
- **Predictive Modelling:**
  This tool can use data analytics to forecast the potential impact of various advertising strategies on ad-blocking rates and user engagement, enabling GYF to make data-driven decisions.

GYF Strategy to Address Adblockers with Continuous Learning and Adaptation

Strategy Overview

This GYF company strategy is set up in a seven-step format and addresses ad-blocking challenges while also incorporating a dynamic framework for continuous learning and adaptation. Furthermore, the strategy is grounded in the exploratory, descriptive, and causal research from the previous Customer Analytics Research Methods section and strongly emphasises innovation, user engagement, and adaptive pricing models. Lastly, this GYF strategy is reinforced via a structured process for regular review, hypothesis generation, testing, and agile strategic adjustments to ensure the company's advertising model remains resilient and aligned with evolving market demands and user preferences.

Step 1: Setup of Strategic Teams and Tools

1. **Establishment of a Strategic Insights Team:**
   To begin with, a dedicated team tasked with the continuous analysis of data collected through research must be formed. In addition, this team is to monitor market trends, user behaviour, and advancements in digital advertising.
2. **Development of a Market Intelligence Dashboard:**
   Creation of a real-time dashboard to consolidate data from research tools, market reports, and analytics for at-a-glance insights on key metrics and trends.
3. **Launch of an Innovation Incubator:**
   Set up an incubator within GYF to explore and prototype next-generation advertising solutions, thus leveraging emerging technologies.

Step 2: Research and Understanding

1. **Exploratory Research:**
   Utilization of focus groups, MROCs, and in-depth interviews to explore user and advertiser perceptions towards ads and ad-blocking, with the Strategic Insights Team putting together findings.

2. **Descriptive Research:**
   Deployment of surveys, social media, and mobile data analytics to quantify ad-blocking behaviours in order to identify emerging patterns in user engagement and advertiser responses.
3. **Causal Research for Experimentation:**
   Planning and later execution of A/B testing based on hypotheses generated from the exploratory and descriptive research phases to find effective ad strategies. How exactly the execution is to be conducted is explored and explained in Step 4: Rapid Experimentation and Implementation.

Step 3: Quarterly Strategic Review and Hypothesis Generation

1. **Organization of Quarterly Review Meetings:**
   Key stakeholders from marketing, product development, data analytics, and customer service should be gathered for strategic review sessions to discuss research insights, market trends, and the performance of implemented strategies.
2. **Hypotheses Generation:**
   Based on the quarterly reviews, hypotheses regarding strategic adjustments, new ad formats, pricing models, or user incentives should be generated. This is done to address emerging challenges or exploit new opportunities.

Step 4: Rapid Experimentation and Implementation

1. **Design Experimentation Plans:**
   Design a plan for rapid experimentation using A/B testing and other causal research tools for each generated hypothesis. Experimentation will be prioritized based on potential impact and feasibility. This part is an extension of Step 2: Causal Research for Experimentation.
2. **Implement and Scale Successful Strategies:**
   The results from the experiments will be used to decide which new strategies to implement or scale. Here, it is important to ensure strategies do not upset user experiences or advertiser relationships.

Step 5: Feedback Loop and Agile Optimization

1. **Integration of Feedback Mechanisms:**
   Capture real-time responses from users and advertisers regarding changes, using this feedback to inform the next cycle of hypothesis generation.
2. **Adaptation of Agile Methodologies:**
   Ensure GYF can change its course quickly in response to new insights or market changes, enabling fast strategic adjustments without being hindered by prolonged decision-making processes. This can be achieved by utilising the agile methodology: Requirements → Design →Develop → Test → Deploy → Review →Launch OR Re-start with the Design step.

Step 6: Stakeholder Communication and Engagement

1. **Engagement with Internal and External Stakeholders:**
   Regularly updates for both internal teams and external partners (advertisers, content providers) on ongoing research findings and strategic shifts will build trust and foster collaboration.
2. **Ask for User Feedback:**
   More effort in user engagement through surveys or community platforms should be made to assess their perception of ad changes and gather suggestions for improvements. More effort in the collection of user feedback will strengthen the feedback loop established in Step 5.

Step 7: Future-Proofing GYF's Strategy

1. **Organization of Scenario Planning Workshops:**
   A regular visualization of potential future scenarios within the digital advertising market, including emerging technologies and shifts in consumer attitudes, will aid in the development of contingency strategies.
2. **Iteration and Innovation within the Innovation Incubator:**
   The established innovation incubator (see Step 1.3) will be used to continuously develop and test new advertising technologies and approaches that may redefine user engagement and ad effectiveness (e.g. VR, AR, Blockchain, etc.)

3. **Utilization of the Market Intelligence Dashboard:**
   The set-up dashboard (see Step 1.2) will be used for real-time strategic responses. Additionally, it will inform the Strategic Insights Team about its ongoing analysis.

Implementation Timeline

1. **Short-Term (0-6 Months):**
   Establish teams and tools, kick-off all research phases, and hold the first quarterly strategic review.
2. **Mid-Term (6-12 Months):**
   Conduct rapid experimentation cycles based on initial hypotheses and begin implementing successful strategies.
3. **Long-Term (1 Year+):**
   Establish a cycle of continuous learning, adaptation, and innovation, ensuring GYF's advertising model remains resilient and aligned with market demands and user preferences.

Using People Analytics Methods to Hire a Leader to Implement Your Strategy

In the quest to enhance the leadership team at GoYaFace with a new Senior Associate Director for Digital Advertising Strategy, the selection process boiled down to two promising candidates: Carrie and Peggy. Below is breakdown of key evaluation metrics for each potential hire given by The Wharton School:

Metric	Carrie Candidate	Peggy Candidate
Background/Experience	In 2008, Carrie graduated from a Top 10 undergraduate institution in the United States with a degree in Communications and a 3.5 GPA. She then worked for a software company in the marketing department for three years before returning to school to earn her MBA, also at a highly	In 2008, Peggy graduated from a Top 50 undergraduate institution in the United States with a degree in Organizational Leadership and a 3.8 GPA. She then moved to Silicon Valley and worked for a series of digital content startups, such as a site that aggregated news content. In

	ranked school. For the past several years, she has been a Senior Digital Marketing Manager at a large bank; she has dealt extensively with mobile advertising on the ad-buying side, but has little experience on the ad-selling side.	her most recent role at a larger digital media company, which is under many of the same pressures as GYF, she was a Digital Content Manager. As part of her role she specifically focused on the issues posed by adblockers and other technologies that disrupt the traditional delivery of online advertising.
Work samples	Carrie provided excellent work samples; her work product is polished and shows a knack for creative problem solving.	Peggy provided good work samples that showed a mindset for organization and efficiency. Her samples were less dynamic than Carrie's.
Cognitive ability tests	Carrie scored 90% on the cognitive ability test that GYF gives to all management-level applicants.	Peggy scored 75% on the same test.
Structured interview	Carrie performed well in her structured interview. Her answers were clear and engaging, though not always directly responsive.	Peggy performed very well in her interview. Not only did she demonstrate a deep knowledge of the digital advertising landscape, she exhibited a personality that will fit well with the other members of the DATA Team.
Job knowledge test	Carrie struggled on the job knowledge test. Although she has a strong grounding in general marketing strategy, she didn't show a strong understanding of GYF's business model.	Peggy excelled in the job knowledge test, showing a strong familiarity with the kinds of tasks she would be assigned in her new position.
Integrity test	Carrie and Peggy achieved the same high score on GYF's integrity test.	Carrie and Peggy achieved the same high score on GYF's integrity test.
Personality test	In her personality test, Carrie scored highly on things like being goal-oriented, hard-driving, and creative.	In her personality test, Peggy scored highly on things like being detail-oriented, open minded, and able to work as part of a team.
References	Carrie received excellent feedback from references.	Peggy received solid feedback from her references, though one mentioned that Peggy could

		sometime be “too focused on the short term rather than the long term.”

My Progression to an Informed Hiring Decision:

I calculated the total weighted scores for Peggy and Carrie to make my decision of who to hire. I used correlation values for different performance predictors (see below) and the candidates' scores in those categories. Since the candidate scores were not available in a numeric format, I first had to turn the evaluation of each candidate’s category into a number between 0 and 1. Zero means bad and 1 means excellent. I’d like to bring to attention that each predictor's correlation value indicates its importance or predictive power in determining job performance. After I had all the numbers, I weighted the candidates' scores in each category by the given correlation values to compute an overall score, which should reflect their potential job performance at GYF. Here’s the breakdown:

Correlation Values for Performance Predictors:

- Work Samples: 0.54
- Cognitive Ability Test: 0.51
- Structured Interviews: 0.51
- Job Knowledge Tests: 0.41
- Integrity Tests: 0.48
- Personality Test (Conscientiousness): 0.31
- Reference Checks: 0.26

Candidates' Scores:

Carrie Candidate:

- Work Samples: 1 (Excellent)
- Cognitive Ability Test: 0.9 (90%)
- Structured Interviews: 0.8 (Performed well)
- Job Knowledge Tests: 0.5 (Struggled)
- Integrity Tests: 1 (High score)

- Personality Test: 1 (Goal-oriented, hard-driving, creative)
- Reference Checks: 1 (Excellent feedback)

Peggy Prospect:

- Work Samples: 0.8 (Good)
- Cognitive Ability Test: 0.75 (75%)
- Structured Interviews: 1 (Performed very well)
- Job Knowledge Tests: 1 (Excelled)
- Integrity Tests: 1 (High score)
- Personality Test: 1 (Detail-oriented, open-minded, team player)
- Reference Checks: 0.8 (Solid feedback)

Here's how I Calculated the Total Weighted Scores for each Candidate:

For each candidate, we multiply their score in each category by the correlation value for that predictor and then sum all the weighted scores to get a total score that reflects their potential job performance.

For example, Carrie's weighted score for Work Samples would be:
$1 \times 0.54 = 0.54$
and for the Cognitive Ability Test, it would be:
$0.9 \times 0.51 = 0.459$
Adding these weighted scores across all predictors gives us the total weighted score for Carrie.

In the same manner, we calculate Peggy's weighted scores for each predictor and sum them to get her total weighted score.

Results:

- **Carrie Candidate's Total Weighted Score: 2.662**
- **Peggy Prospect's Total Weighted Score: 2.733**

Peggy's score is slightly higher than Carrie's, indicating that based on the weighted importance of each performance predictor, Peggy is more likely to perform well in the role of Senior Associate Director for Digital Advertising Strategy at GYF.

GYF Effects and Measurement Metrics

To measure the impact and success of GYF's strategy, I established a series of strategic effects and corresponding measurement metrics, mirroring the seven-step strategy framework (see *GYF Strategy to Address Adblockers with Continuous Learning and Adaptation*). This approach ensures that each phase of the strategy is not only actionable but also measurable, allowing for continuous improvement and adaptation. After all, things you cannot measure are hard to manage. Below is a summary of the key effects and measurements used to assess the strategy's effectiveness across its lifecycle, from initial research and strategy formulation to implementation and long-term sustainability.

Effects

The strategic effects are set up in accordance to my seven-step strategy. Thus, effects relating to the strategy step 1 are also found here under step 1.

Step 1: Strategic Teams and Tools

- **Effects:** Establishment of a Strategic Insights Team and development of a real-time Market Intelligence Dashboard.

Step 2: Research and Understanding

- **Effects:** Gaining a deep understanding of user and advertiser perceptions towards ads and ad-blocking.

Step 3: Quarterly Strategic Review and Hypothesis Generation

- **Effects:** Regular strategic review meetings lead to the generation of new hypotheses for addressing ad-block challenges.

Step 4: Rapid Experimentation and Implementation

- **Effects:** Implementation of new ad formats, pricing models, and user incentives based on experimentation.

Step 5: Feedback Loop and Agile Optimization

- **Effects:** Real-time responses from users and advertisers continuously inform and refine strategic decisions.

Step 6: Stakeholder Communication and Engagement

- **Effects:** Enhanced stakeholder trust and collaboration through regular updates and feedback mechanisms.

Step 7: Future-Proofing GYF's Strategy

- **Effects:** Continuous development of new advertising technologies and approaches to stay ahead of market demands and consumer preferences.

Measurements

The strategic measurements are set up in accordance with my seven steps. Thus, measurements relating to the strategy step 1 are also found here under step 1.

Step 1: Strategic Teams and Tools

- **Measurement:** Tracking the number of insights generated that lead to actionable strategies and the frequency of dashboard utilization in decision-making processes.

Step 2: Research and Understanding

- **Measurement:**
    - For exploratory research: Qualitative assessment of user and advertiser sentiment trends over time.
    - For descriptive research: Quantify changes in ad-blocking behaviour and engagement metrics pre- and post-strategy implementation.

- For causal research: Success rate of A/B tests conducted to validate hypotheses about ad effectiveness.

Step 3: Quarterly Strategic Review and Hypothesis Generation

- **Measurement:** The number of new strategies or adjustments proposed and implemented as a result of these meetings.

Step 4: Rapid Experimentation and Implementation

- **Measurement:**
  - Increase in ad engagement and decrease in ad-blocker usage as a direct result of new strategies.
  - Advertiser feedback on the effectiveness and attractiveness of new pricing models.

Step 5: Feedback Loop and Agile Optimization

- **Measurement:**
  - Speed and effectiveness of strategy adjustments based on feedback.
  - User satisfaction scores and advertiser return on investment before and after adjustments.

Step 6: Stakeholder Communication and Engagement

- **Measurement:**
  - Engagement rates on surveys and feedback platforms.
  - Qualitative feedback from internal and external stakeholders on strategic communication effectiveness.

Step 7: Future-Proofing GYF's Strategy

- **Measurement:**
  - Number of innovative projects initiated within the Innovation Incubator.
  - Success estimations for new technologies based on user engagement and advertiser adoption rates.

Implementation Timeline Evaluation

- **Short-Term (0-6 Months):**
  Assessing the setup of teams and initial research efforts through the number of insights generated and applied.

- **Mid-Term (6-12 Months):**
  Effectiveness evaluation of experimentation cycles and of initial strategy implementations through engagement metrics and feedback.

- **Long-Term (1 Year+):**
  Measuring the sustainability and adaptability of the advertising model through continuous learning key performance indicators, innovation outcomes, and market alignment measures.

Using Operations Analytics Methods to Understand the Allocation of Scarce Resources in Pursuing Strategy

In addressing the challenge of adblocking, the allocation of limited resources within the DATA team at GYF is crucial for executing a strategic response effectively. To clarify, the DATA team is in charge of setting up, researching, and then helping to implement the strategy at GYF. The below scenario required the construction of a resource allocation and optimization model, based on operations analytics concepts, to determine the optimal distribution of a $65,000 training budget across various training programs. The objective was to maximize productivity returns while sticking with specific managerial constraints regarding hard and soft skills training, ensuring the most efficient use of resources in fostering the team's capabilities to tackle the adblocking issue.

1. The following is the given information

Productivity rates for different training programs:

	Hard Skills	**Soft Skills**
Internal	0.2	0.6
External	0.7	0.4

Constraints in non-algebraic form:

- The total training budget available is $65,000
- The Hard Skills training program must achieve at least $20,000 in the total net productivity increase
- The Soft Skills training program must achieve at least $12,000 in the total net productivity increase
- The Internal program should achieve at least 60% of the net productivity increase realized for the External program

The assumption is that all these figures are “deterministic” – known, and non-random.

2. Algebraic Expression of Relationships

Decision Variables:

- *x1* will be the amount spent on Hard Skills/Internal training.
- *x2* will be the amount spent on Hard Skills/External training.
- *x3* will be the amount spent on Soft Skills/Internal training.
- *x4* will be the amount spent on Soft Skills/External training.

Objective Function:

Maximized total productivity return = 0.2*x1 + 0.7*x2 + 0.6*x3 + 0.4*x4

Constraints:

1. Budget Constraint:
   x1 + x2 + x3 + x4 <= 65,000

2. Hard Skills Productivity Increase:
   0.2*x1 + 0.7*x2 >= 20,000

3. Soft Skills Productivity Increase:
   0.6*x3 + 0.4*x4 >= 12,000

4. Internal vs. External Productivity Increase:
   0.2*x1 + 0.6*x3 >= 0.6 (0.7*x2 + 0.4*x4)

3. Setting Up the Excel Model with Solver

I used the WPS Office - Spreadsheet software to set up my model and then solve it with Solver. Here's a step-by-step process on how I solved the task:

1. Define the objective function in the "Total Net Productivity Increase" field

2. Set up the constraints in the following fields:
   Total Spending Budget, Productivity Increase in Hard, Productivity Increase in Soft, Productivity Increase Internal vs External (60%)

   The "External (60%)" field comes from the Internal vs External Productivity Increase Constraint, i.e. 0.2*x1 + 0.6*x3 >= 0.6 (0.7*x2 + 0.4*x4)

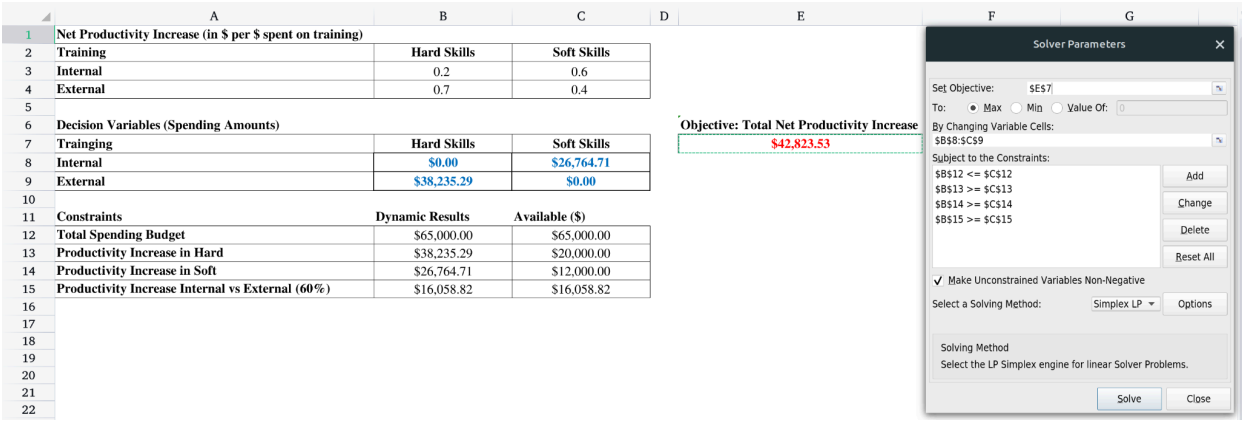
   Furthermore, I created two columns, *Dynamic Results* and *Available ($)*. The *Dynamic Results* column includes calculated values, while the *Available ($)* column contains raw constraint numbers except for the last row "Productivity Increase Internal vs External (60%)" where the constraint is set to be dynamic (, i.e. 60%).

3. Use Solver to set the objective. Decide on maximizing the objective. Choose the changing variable cells. Set the constraints. Lastly, click solve.

4. The Solution

The best possible net productivity increase with the given constraints can be achieved by spending $38,235.29 on *External Hard Skills* and $26,764.71 on *Internal Soft Skills*. As a result, we get a total net productivity increase of $42,823.53

5. Screenshot of my Excel Sheet



	A	B	C	D	E
1	**Net Productivity Increase (in $ per $ spent on training)**				
2	**Training**	**Hard Skills**	**Soft Skills**		
3	**Internal**	0.2	0.6		
4	**External**	0.7	0.4		
5					
6	**Decision Variables (Spending Amounts)**				**Objective: Total Net Productivity Increase**
7	**Trainging**	**Hard Skills**	**Soft Skills**		$42,823.53
8	**Internal**	$0.00	$26,764.71		
9	**External**	$38,235.29	$0.00		
10					
11	**Constraints**	**Dynamic Results**	**Available ($)**		
12	**Total Spending Budget**	$65,000.00	$65,000.00		
13	**Productivity Increase in Hard**	$38,235.29	$20,000.00		
14	**Productivity Increase in Soft**	$26,764.71	$12,000.00		
15	**Productivity Increase Internal vs External (60%)**	$16,058.82	$16,058.82		
16					
17					
18					
19					
20					
21					
22					

Using Accounting Analytics Methods to Measure the Key Drivers of the Proposed Strategy

The following section is an attempt to ground the GYF strategy deepert in accounting analytics. This approach is centered on identifying and measuring the key drivers anticipated to influence GYF's financial performance directly. Here is one example of how this could look like: a change in ad placement (A), affects the likelihood of customers clicking the ad (B), thus increasing or decreasing revenue from ads (C). However, causal linkages are not always obvious and almost always experiments have to be conducted to figure out whether a relationship between variables is causal or only a correlation. There might be variables called "lurking variables" that have not been actively considered in a study, but which nevertheless can affect causal relationships. Therefore, the following section is to be seen only as the first step towards a causal business model, since many causal assumptions that are set might not actually hold in practice, thus needing revision.

Through a more detailed examination of hypotheses and causal linkages, I believe this causal business model can help GYF to look deeper into those aspects of the previously

created strategy that directly translate to things like revenue or profit. In essence, the below causal business model highlights the importance of enhancing user experience and adapting pricing models to reduce ad-blocker usage and attract more advertisers, thereby improving GYF's overall financial health.

Hypotheses and Causal Linkages

Hypothesis 1: Enhancing User Experience Lowers Ad-Blocker Usage

- **Causal Chain:**
  Leveraging AI for ad customization to improve relevance (A) → Decreases users' willingness to use ad-blockers (B) → Increases ad visibility and engagement, improving financial performance (C)

- **Key Drivers and Measurements:**
  - **User Engagement Metrics**
    Utilizing analytics to monitor user interaction with customized ads, tracking engagement rates, feedback, and ad-blocker use trends over time
  - **Ad-Block Usage Rates**
    Implementing detection mechanisms for ad-blocker usage, and analysing trends before as well as after introducing AI-driven customization

Hypothesis 2: Adaptive Pricing Attracts More Advertisers

- **Causal Chain:**
  Introducing engagement-based pricing models (A) → Attracts advertisers by offering better ROI and transparency (B) → Leads to increased advertising diversity and revenue (C)

- **Key Drivers and Measurements:**
  - **Advertiser Adoption and ROI:**
    Track the introduction of new pricing models and measure campaign ROI through analytics and advertiser surveys.

- **Pricing Model Competitiveness:**
  Conduct market research to evaluate the attractiveness of GYF's pricing models against industry standards.

Verifying the Linkages

- **Tailored A/B Testing and Machine Learning:**
  Combining comprehensive A/B testing with machine learning predictions to empirically test the impact of ad customization and pricing models. While doing this, strategies should stay effective and scalable.

- **Stakeholder Feedback Loops:**
  Integrating continuous, structured feedback mechanisms from both users and advertisers to gather qualitative insights. This can help to improve quantitative data analysis.

- **Longitudinal Analysis:**
  Employing long-term studies to understand the sustained effects of strategic changes, providing insights into adjustments needed to maintain or enhance effectiveness.

Further Potential Improvements that can be Linked to Hypothesis 1 and 2

- **Virtual Reality (VR) Ad Experiences:**
  Investigating VR's potential to offer immersive ad experiences, potentially setting a new benchmark for user engagement and ad delivery beyond traditional ad models.

- **Blockchain for Enhanced Transparency:**
  Utilization of blockchain technology to create a transparent, trust-based system for ad delivery verification, which could be appealing to advertisers by offering proof of user engagement and ad visibility.

- **Collaborative AI Ad Workshops:**
  Facilitating workshops with advertisers to co-develop AI-driven and customized ad campaigns, fostering innovation and alignment with user expectations.

Causal Business Model – Implementation Overview

- **Short-Term (0-6 Months):**
  Establish foundational teams and tools, initiate comprehensive research phases, including AI and blockchain explorations, and hold the first strategic review to refine hypotheses.

- **Mid-Term (6-12 Months):**
  Conduct and analyse results from A/B testing, deploy successful ad customization and pricing strategies, and develop prototypes for VR ad experiences.

- **Long-Term (1 Year+):**
  Implement a continuous learning cycle, adapt strategies based on feedback and analytics, and scale successful innovations, ensuring GYF's advertising model remains at the cutting edge of industry trends and user preferences.

Conclusion

In this capstone project at the Wharton School, I devised a forward-looking strategy for GoYaFace, Inc. (GYF) to navigate the challenges posed by ad-blocking technology. The strategy, deeply rooted in business analytics, successfully crafts a pathway for GYF to enhance its advertising efficacy amidst the growing use of ad blockers. Through innovative ad formats and a keen focus on ad relevance, the project aimed to realign GYF's advertising approach with user expectations, thereby reducing the incentives for the use of ad-blocking software while at the same time securing advertisement revenue streams.

A critical component of this strategy was the implementation of a dynamic system for strategy testing and refinement, driven by continuous feedback. This, I believe, will not only allow GYF to maintain relevance in the volatile digital advertising market but also position it as a leader in adaptive, user-centric marketing strategies.

Furthermore, the project was pivotal in presenting the role of data-driven insights in modern business strategy. Employing a combination of exploratory, descriptive, and causal research, it provided GYF with a robust framework for decision-making, ensuring agility and responsiveness to both market trends and consumer behaviour.

In conclusion, this capstone project delivered a comprehensive and sustainable solution to the ad-blocking challenge, highlighting the value of integrating business analytics into strategic planning. It shows by example how innovative, data-driven strategies can enhance user engagement, advertiser satisfaction, and business outcomes in the digital age. The insights and methodologies developed through this project offer a blueprint for tackling similar challenges across the digital advertising landscape and beyond, emphasizing continuous innovation and adaptation.