

CS5760 - Human Computer Interaction & Usability Testing
Spring 2023

User-Centered Product Planning

Ketan Patil

1. Introduction	3
2. Topic, Methodology, and Implementation	4
2.1. Product Management	4
2.2. Product Roadmap	6
2.3. User-centered design	8
2.4. User Research & Experience	10
2.5. Planning Tools	12
2.6. Use Case 1	13
2.7. Adoption of AI/ML	14
2.8. Use case 2	18
3. Discussion	20
3.1. Method criticism	20
4. Future Work	21
6. References	21

In this research study, the goal is to create a method for User-Centered Product Planning that can be utilized by Product Managers in product-focused companies. To accomplish this, interviews were conducted with experts in Product Management, Product Design, and UX. The study revealed that there is a widespread understanding among these professionals that the emphasis of product development planning should be shifted from features to the user experience. Through a review of industry leaders' writings and a use case analysis, the research demonstrates the importance of prioritizing user experience in product development. The methodology employed in this study is transferable to other product-based businesses across various industries, and the results can be a starting point for further adaptation and refinement of the approach.

1. Introduction

As technology continues to advance at a rapid pace, it is imperative for companies to provide the most optimal user experience. In today's world, customer needs are constantly changing, and the level of competition among businesses is increasing, making it essential for companies to stay ahead of the game. To accomplish this, it is crucial for businesses to put users at the center of their product development process, and this requires the integration of user-centered methodologies into their workflow. However, simply executing user tests and research during particular product design stages is not enough to ensure success. Rather, user-centered methodologies should be deeply embedded in the company's processes to ensure that the end product is aligned with customer needs and preferences. Companies must focus on providing a seamless user experience, which can only be achieved through continuous collaboration with cross-functional teams, frequent user testing, and regular feedback gathering. By adopting a user-centered approach, businesses can stay ahead of the curve and meet customer expectations, ultimately leading to their success.

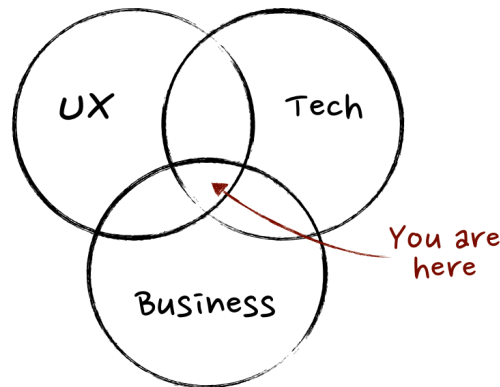
In the early stages of product development, product planning plays a vital role in defining the direction of the project. Historically, product planning has been feature-centric, meaning that the main focus was on building new features. However, this approach is no longer effective in the long term, and research has shown that understanding the user and their needs, solving problems, and creating a long-term vision that shifts the focus from features to experience and product goals are more effective. Furthermore, product planning becomes even more challenging when multiple products share resources and work toward a larger goal. This paper will delve into how product managers in product-based companies can adopt a user-centered product planning approach, and how AI and Machine Learning(ML) can be utilized to enhance this process. With the ever-evolving landscape of technology and user needs, product managers must integrate user-centered methodologies into their product planning process and make it a core part of their company's workflow. By leveraging AI and ML, product managers can gather user insights more efficiently, analyze data in a more meaningful way, and make data-driven decisions to develop products that meet the needs of their users.

2. Topic, Methodology, and Implementation

The study establishes the theoretical framework that contextualizes the research. The terms "Product Management," "Product Roadmap," "User-centered design," "User research and Experience," "Product Planning," "Artificial Intelligence (AI)," and "Machine Learning(ML)" are defined to ensure clarity of language. Moreover, the section also delves deep into these terms and associated methodologies and implementation.

2.1. Product Management

Managing the complete product life cycle from the beginning to the end is referred to as Product Management. It involves conducting thorough market research, recognizing customers' requirements and challenges, forming product plans, developing product roadmaps, collaborating with cross-functional teams, and guaranteeing that the final product meets the target market's demands.



The roles and responsibilities of a product manager include the following:

- Conducting market research to identify user needs and market trends.
- Defining product vision, strategy, and roadmap.
- The process of working together with teams from different departments, including engineering, design, and marketing, to guarantee the success of product development and release.
- Communicating the product roadmap and vision to stakeholders and team members.
- Analyzing product metrics and user feedback to inform product decisions and improvements.
- Ensuring that the final product meets user needs and aligns with the overall product strategy.
- Led product launches and post-launch activities, including marketing and sales enablement.

What else should product managers consider?

Know the high-level product strategy: Understanding the overall product strategy is crucial when presenting a roadmap. It is important to identify how the new implementations and features will benefit the target audience and prospects.

Stakeholders: It is crucial to establish a positive and effective rapport with important stakeholders and comprehending their goals, issues, and timelines are fundamental. Coordinating the product roadmap with their requirements can foster credibility and guarantee the seamless implementation of the project.

Evaluate resources: It is vital to evaluate resources to prevent project delays. The product manager should have an understanding of the company's capacity and anticipate objections from departments when presenting the roadmap. Clearly communicating resource needs and emphasizing trade-offs can help the plan fit into the available resources.

Tools: The roadmap for a product should have the ability to adapt and change quickly as needed, be customized to the specific needs of the project, and be capable of being adjusted in real time. Visualizations such as categorization, themes, or stages can be used to make the roadmap more easily understood. The choice of visualization method should be based on the audience to whom it will be presented, to ensure the message is conveyed effectively.

Personalization: Color-coding tasks can help organize and personalize the roadmap, and filtering tasks can hide unrelated tasks.

Collaboration: Effective collaboration is crucial to enable all members of the organization to modify and keep track of the progress. Cloud-based product management tools can play a significant role in fostering collaboration and managing feature requests.

Avoid technical debt: Technical debt can arise when product managers and development teams prioritize fast delivery over code quality. To avoid technical debt, it's crucial to take a value-based approach to product roadmaps and prioritize strategic planning. Testing the product at each stage and resolving issues before they become embedded can help enhance the product's quality.

Look for a product roadmap template: Free product roadmap templates are available online to help create high-level overviews of all features and explain the strategic rationale.

Prepare for questions: Preparing for questions and pushback is essential. Strategically responding to questions about cost, value, timeline accuracy, and risks can help the presentation go smoothly.

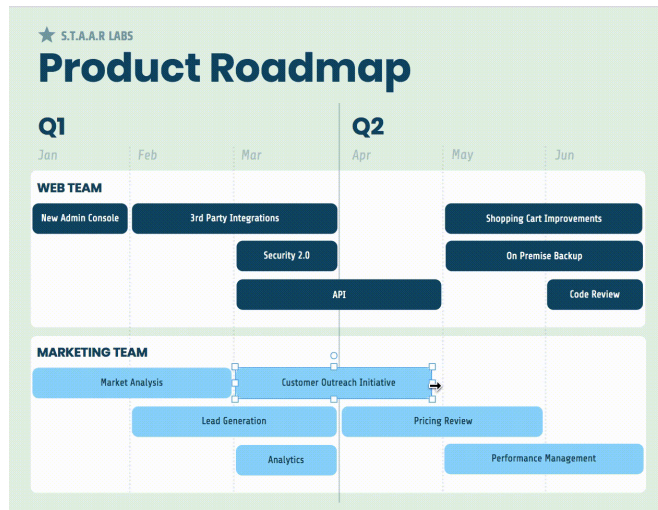
A Product Manager is typically involved in User-Centered Product Planning in several ways, including

- Conducting user research to gain insights into user needs, behaviors, and preferences.
- Identifying and defining user personas to ensure that product design and development align with user needs.
- Creating user stories and user flows to guide product development and ensure a user-centered approach.

- Collaborating with designers and engineers to develop user-friendly and intuitive product features and interfaces.
- Conducting user testing to validate product design and inform improvements before the launch.
- Analyzing user feedback and usage metrics post-launch to inform product iterations and improvements.

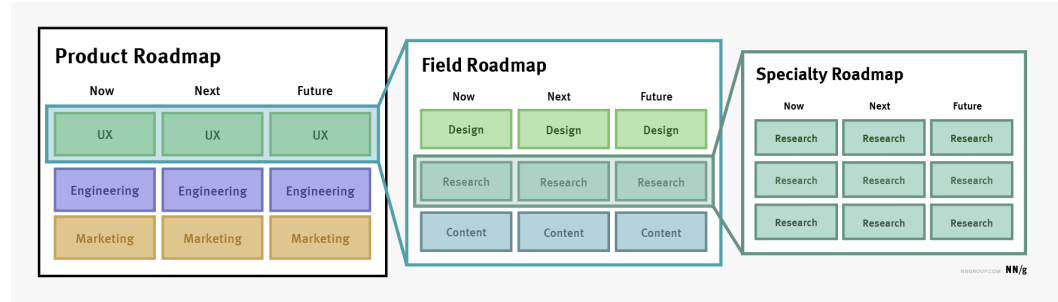
2.2. Product Roadmap

A roadmap is a guiding document that outlines a team's upcoming tasks and challenges to tackle. Rather than simply tracking feature releases, it provides a unified vision and set of priorities for the team to work towards. Specifically, a product roadmap offers an overview of a product's goals, direction, priorities, and progress, providing a comprehensive view of the development process and ensuring alignment among key stakeholders.



Teams can generate three categories of roadmaps, considering their objectives, situation, and audience:

1. **Product roadmaps** are a visual representation of the upcoming challenges to be tackled by different teams, including design, research, development, marketing, support, and UX.
2. **Field roadmaps** specifically focus on issues that need to be addressed by the UX team.
3. **Specialty roadmaps** are a type of Field roadmap that concentrates solely on addressing issues within a particular UX domain.



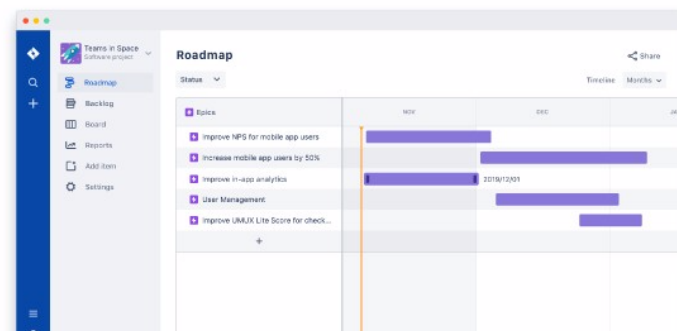
Specific Roadmaps:

There are several types of specific roadmaps, including

1. **Goal-oriented:** Roadmaps, which group information around specific goals.
2. **Theme-oriented:** Roadmaps categorize features by themes such as usability, speed, or engagement.
3. **Feature-based:** Roadmaps that make use of features as focus points and provide associated tasks.
4. **Strategy-based:** Roadmaps that provide a high-level outline of the product.
5. **Release roadmap:** When presenting release roadmaps, the primary audience is customers, and the focus is on the timeline for the rollout of new features and when they can be expected to be available.

Product Roadmaps Include Product, UX, and Engineering:

Product roadmaps are the broadest and most comprehensive type of roadmap, requiring collaboration across multiple departments and capturing a strategic vision across the entire product.



Ownership:

Product managers are primarily responsible for creating and owning the product roadmap. They take the lead in driving the road-mapping process and work closely with domain leads to define and prioritize initiatives. Domain leads may

assist with prioritization based on user impact, while a UX lead might sometimes step into the product manager role.

Benefits:

The process of creating product roadmaps involves collaborative efforts from product management and cross-functional leads, which helps facilitate essential discussions, such as required tradeoffs, and establishes shared responsibility for the vision. To ensure everyone across the organization has a clear understanding of the product's strategic vision, it's crucial to create a shared mental model through the product roadmap. This roadmap is a visual representation of future efforts that anyone can quickly glance at and comprehend.

Furthermore, by including all issues, not just those related to UX, product roadmaps help break down department silos and establish a broader picture. This approach helps everyone see how their work connects with that of other departments and communicates dependencies, relationships, and the role their work plays in the overall vision.

Having a shared product roadmap across an organization has several benefits that contribute to product development success. When everyone has access to the roadmap, it creates a sense of shared ownership and provides a clear understanding of what is happening and when leading to stakeholder involvement and investment.

Prioritization becomes more effective as teams focus on tasks that contribute to key milestones and deliverables, and this reduces the burden on team members as they are held accountable and can concentrate on critical tasks. Moreover, presenting the pipeline of tasks, time and cost for each task, and the benefits of new features can help secure more budget for development. Improved coordination between departments allows for the organization of cross-departmental product management, which leverages relevant products and services that are released simultaneously, resulting in better sales upselling and cross-selling.

Keeping customers informed about new features and development stages through transparent product roadmaps is crucial for developing trust and confidence. With a comprehensive view of the product roadmap, team members can concentrate on the most crucial tasks, avoid scope and feature creep, and make more strategic decisions that contribute to the long-term success of the product. By working collaboratively and having clear communication, team members can make the most of their skills and expertise, while also ensuring that they are all working towards the same objectives.

Additionally, cross-departmental collaboration can help to identify any potential issues early on, making it easier to address them before they become bigger problems. Overall, effective coordination and transparency can lead to a more successful product development process and increase the chances of achieving desired outcomes.

Challenges:

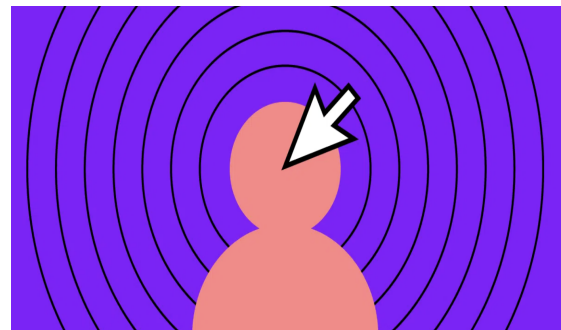
Effective collaboration is crucial in creating a product roadmap that aligns with the product vision. Nevertheless, this can be challenging as various departments may have divergent objectives driven by their success metrics, leading to conflicts when prioritizing problems. Besides, political factors inevitably play a role in product roadmapping, with stakeholders and clients requiring involvement in the process. Deciding who has the authority to create, contribute, and change the roadmap can be influenced by political factors, adding complexity and time constraints to the collaborative process. Despite these challenges, balancing political dynamics is worth the effort as it fosters a shared vision that everyone can support.

2.3. User-Centered Design

Developing products that offer the best user experience requires a user-centered design approach. This involves taking into consideration the user's feedback, preferences, and needs. By doing so, organizations can create customized products that cater to each user's unique experience. This approach provides valuable insights for product development teams, leading to better customer service and satisfaction.

User-Centered Design(UCD)?

UCD is a design process that prioritizes the user throughout the design process. It involves a close collaboration between designers, product developers, and users to create products or services that meet each user's needs, preferences, and feedback. The process of UCD begins with



identifying user needs and preferences, then developing a design or product to meet those needs. The design is continually tested and refined with user feedback, making sure it remains current and relevant to the user's evolving needs.

How User-Centered Design improves products and services?

User-Centered Design ensures that products are designed with each user's individual needs and preferences in mind. By considering users' diverse needs

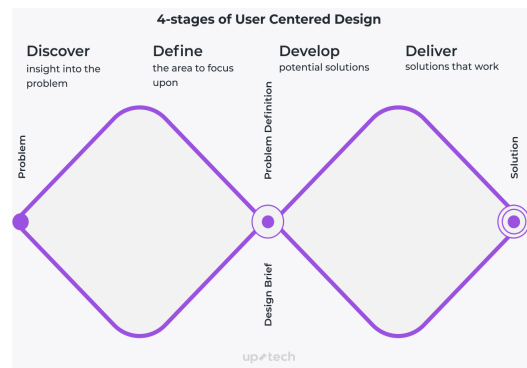
and accessibility requirements, product developers can make sure their products are inclusive and accessible to everyone. This not only enhances the user experience but also guarantees that everyone can access the same level of service. In addition, UCD creates products that are intuitive and easy to use, which enhances user satisfaction and loyalty.

User-Centered Design in action

The iPod is a well-known example of UCD in action. The device was designed to be simple, intuitive, and easy to use, with accessibility features for users with disabilities. Its sleek and modern design was visually appealing, and its durable construction ensured reliability and longevity for the user.

How to implement User-Centered Design?

Implementing UCD requires careful planning, collaboration, and communication among designers, product developers, and users. This begins with gathering feedback from users through various methods, followed by the creation of a product that meets the user's needs. User testing and feedback should continue



throughout the development process to ensure that any issues or concerns are addressed. UCD is an iterative process that requires the continuous involvement of users, designers, and product developers.

The future of UCD

UCD will remain a crucial aspect of product development as companies aim to offer the best possible user experience. Advancements in technology will provide designers and product developers with new tools to customize products to each user's needs. Companies will need to continue gathering feedback from users to ensure their products meet their evolving needs. In the future, UCD will be even more critical, requiring companies to focus on understanding the user's preferences and needs, ensuring that their products cater to each user's unique experience.

2.4. User Research & Experience

Exploring the users' needs and preferences is a powerful tool to discover new ideas and opportunities for innovation and growth. User research can also reveal issues with pricing models, identify confusing features, or provide valuable feedback on the user experience, messaging, and other critical touchpoints. As a product manager, it is crucial to keep up with customers' expectations and

continuous user research helps you achieve that goal. Ongoing research also uncovers opportunities for A/B testing that can improve the product even further.



As a product manager, it is important to tailor your approach to user research according to the different stages of your product's development. A product roadmap is a fluid document that reflects your progress and evolves over time. Therefore, it is essential to use a range of research methods during each stage of the process.

The *ideation* phase is the initial stage where product managers validate customer feedback to establish product goals and identify essential features. To create a Minimum Viable Product (MVP), it is crucial to identify potential customers' pain points and needs.

Detailed customer interviews and open-ended questions are effective ways for product teams to obtain feedback that informs their product strategy. These insights help you understand your customer's requirements and expectations and identify what aspects of your product work well and what don't.

During the initial development phase, customer testing is valuable in identifying problem areas in your product. By observing customers complete tasks in real-time, product teams can pinpoint where users encounter issues. A/B testing is also useful at this stage to compare different product versions and evaluate their effectiveness based on a single variable.

During the ongoing improvement phase, online feedback from customers is critical in tracking their satisfaction. Metrics such as Net Promoter Score (NPS) and CSAT surveys can help product teams track both positive and negative experiences. It's important to engage with customers consistently, respond to feedback, and make data-driven decisions to build a successful product roadmap.

To begin gathering customer feedback, it is important to establish specific goals and objectives. Identify the areas that require focus and determine which aspects you want to learn from customers. Afterward, choose the appropriate feedback

tools that best suit your needs, and consider the most highly rated product feedback tools for the current year. Gathering feedback from customers is just the initial step; the next critical step is to analyze information, identify patterns, and take action based on the insights gained. Dashboards can be useful in consolidating feedback data in one place and identifying patterns and causes. Text analytics can provide further insights into the sentiment behind trending feedback topics. Utilizing these insights can aid in optimizing your website or application, promoting customer loyalty, and increasing conversions. A well-planned action management process can also help in engaging customers who are at risk and guide them toward a positive experience.

Once you have established your feedback goals, create surveys that include both quantitative and qualitative feedback. Determine how to deploy your surveys (passive or active) and where to place them on your website or app. Decide on the metrics (Net Promoter Score, CSAT, CES) and other question types you will use in the survey. Using a mix of quantitative and qualitative feedback is beneficial. Metrics allow you to continuously monitor progress, while open-ended questions provide insights into negative feedback and sentiment.

How are product roadmaps and user experience related?

The genesis of a good digital experience lies in the product roadmap, which outlines the key requirements for creating a product strategy. It serves as the blueprint for designing an exceptional user experience, from understanding the target audience to conducting user research to identify their pain points and needs. Crafting an outstanding user experience begins with understanding the user's needs and preferences. This entails a thorough investigation of their persona, their journey, and their experience to gain insights into their goals, tasks, and challenges.

While a product roadmap is instrumental in setting realistic expectations and guiding the development process, it's not a guarantee of a seamless digital experience. Achieving that requires an unwavering commitment to understanding users' needs, collaborating with stakeholders, iterating upon prototypes and wireframes, and being willing to adapt when necessary. The beauty of UX design is that it's a continuous feedback loop, always evolving and improving based on user feedback and changing market trends. Unlike a static roadmap, UX design demands a flexible, adaptable approach that allows for constant learning and improvement.

How do product roadmaps affect user experience?

Product roadmaps are critical for determining the features that make an app easy to use and navigate. Developers and designers follow them to ensure that their

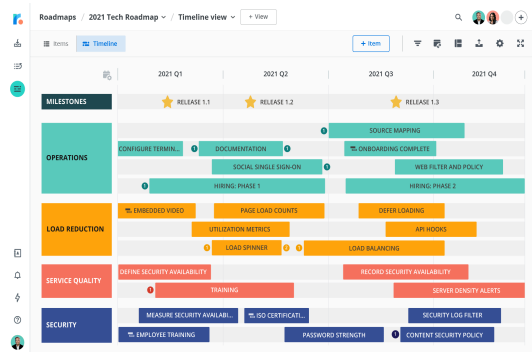
product meets the target audience's needs. As the market evolves and new technologies emerge, the roadmap can be adjusted to incorporate new features and capabilities.

The following aspects are how product roadmaps affect user experience:

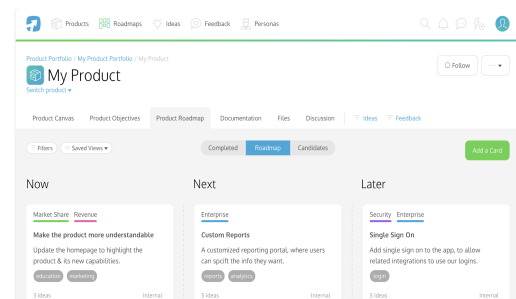
1. **Increases user engagement rate:** A product roadmap can increase user engagement rates by providing users with updates that keep the app fresh and relevant. Even if users are coming from a competing platform, they are likely to try a new app if there's a compelling reason to do so.
2. **Increases user retention rate:** By incorporating new features and functionality at regular intervals, a product roadmap can improve user retention rates. Users will appreciate an app that is constantly evolving and adapting to their needs.
3. **Saves money by providing a better service than the competitor:** By providing users with superior service to that of their competitors, a product roadmap can save money by increasing user satisfaction and reducing churn. Offering unique features or capabilities can give app developers a competitive advantage over their rivals.

2.5. Planning Tools

2.5.1. **Roadmunk** is a product roadmap creation tool designed to prioritize customer input. It provides pre-made templates or allows users to create their roadmap from scratch. A unique feature of Roadmunk is the capability to collect and incorporate customer feedback into the roadmap, enabling teams to build new features based on user requirements. The tool also offers integration with other development management tools, such as Azure and Jira. Though it allows adding long-term milestones, the focus is primarily on short-term goals and feature development. Furthermore, Roadmunk can synchronize roadmaps from different products in the company.

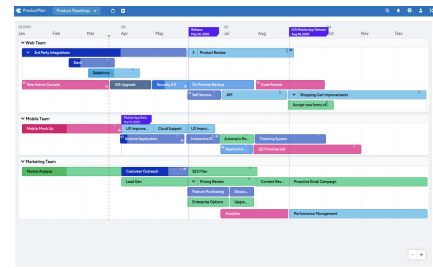


2.5.2. **Prodpad** is a product management tool that is available for a fee, and it is designed to cater to the needs of product managers as well as product teams. Tool prioritizes

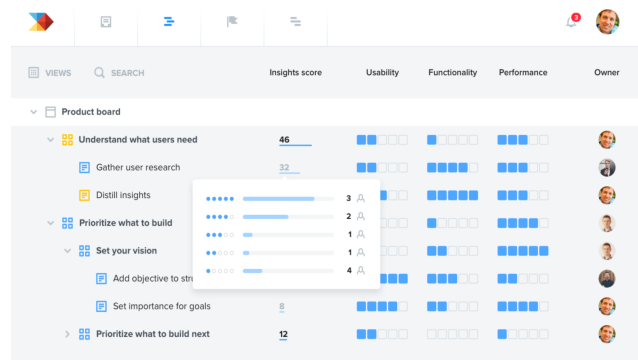


ideas and feature development to address problems. It presents a comprehensive overview of the product, including roadmaps, goals, and features that need to be built. The features are grouped into three categories, "Now," "Next," and "Later," instead of being assigned specific timelines. Proddpad also provides a backlog view to arrange incoming ideas and a feedback view to collect user input.

2.5.3. **Productplan** is a subscription-based road-mapping tool with simple functionality. The software provides a variety of templates for different types of roadmaps, such as UX, multi-product, or software roadmaps. However, there is no integration of all templates into a single roadmap. The tool emphasizes short-term goals, with most templates covering a period of 6 to 12 months.



2.5.4. **Productboard** is a tool designed to help PMs understand customer needs and prioritize feature development. Users can prioritize based on features, user feedback, or objectives. The software offers multiple



roadmap templates that allow for customization, with multiple swim lanes for cross-product planning. Productboard has different subscription packages offering different levels of functionality, including a simple roadmap in the essentials package, the ability to incorporate user feedback in the pro package, and the ability to input strategic data and set objectives in the scale package.

2.6. Use Case 1



In the current virtual environment, Zoom has become the primary channel for gathering customer feedback. However, the challenge for Endgame(client) was to extract valuable insights from these meetings and share them with the team. Although notes were taken during the calls, they were often insufficient in capturing the context and crucial moments that would help the team understand their customers and market. Additionally, in a traditional text-based note-taking approach, crucial information can easily be lost or limited to one person's desk or inbox, making it challenging to share or act upon the information beyond the call.

Endgame needed an effective way to capture and share customer feedback during their product development process, and they found a solution in Grain(tool). With Grain, Endgame could annotate their meetings with video clips that capture the moment and notes, allowing them to share knowledge and insights with the rest of the team easily. They created a public Slack channel and Notion database called "grain-highlights" where customer-facing teams share feedback and insights from their calls with the rest of the company. The engineering team listens to this feedback and creates pull requests without having to watch hour-long recordings or join meetings.

The customer's perspective exposed through the feedback empowers the team to solve problems and act on user ideas. Before using Grain, Endgame struggled to validate its roadmap and prioritize features. The go-to-market team would spend hours summarizing their notes and thoughts into a report after walking customers through mockups and wireframes. However, these reports did not capture actual customer feedback, only the interviewer's takeaway. With Grain, the go-to-market team clips highlights of key moments and feedback from users during the call. The highlights are then grouped thematically and stitched together to form a narrative directly from the customer. This "Grain story" is shared with the relevant teams, such as product and engineering, or even the entire company via Slack or Notion.

Although Zoom is useful for facilitating customer feedback, Endgame needed an efficient way to capture and share the most important moments beyond the call.

With Grain, anyone at Endgame can bring customer perspectives into the development cycle, thereby helping the engineering team build a better product roadmap based on actual customer feedback.

2.7. Adoption of AI/ML

Introduction

To enhance personalization, NLP, and search customization, Machine Learning (ML) can prove to be a valuable tool. This section provides insights into what ML is, how it can solve complex problems, and how it can be integrated into product roadmaps. Additionally, this section explains the circumstances where ML may not be the most appropriate solution. The methods for taking ML from idea to implementation, such as data preprocessing, model building, and deployment, are briefly described. Unfortunately, these topics are not covered in depth in this section.

AI, ML, and Deep Learning:

AI, or Artificial Intelligence, refers to the development of systems capable of doing tasks that would ordinarily require human intelligence, such as computer vision, natural language recognition, decision-making, and translation of language. Machine Learning is an area of AI that deals with creating algorithms that enable computers to learn and improve their performance based on experience. ML systems can analyze data, recognize patterns, and make predictions or decisions without the need for explicit programming. Deep Learning is an ML method that draws inspiration from the anatomy and operation of the human brain. It entails teaching neural networks, which are made up of interconnected layers of nodes, to recognize patterns and execute tasks including image and audio recognition, natural language processing, and autonomous driving. Deep learning has enabled substantial breakthroughs in artificial intelligence.

Is a Machine Learning-based solution the right approach?

ML can be used effectively for a range of problems including those that require personalization, classification, ranking, clustering, regression, and anomaly detection. It is important to choose the right algorithm for the specific problem you are trying to solve.

The following criterias are necessary for ML to be the right approach for a particular business problem

One ideal application of ML is to solve complex problems that cannot be solved using predefined human rules or heuristics. A perfect example of this is search engines that require multiple ranking phases to ensure efficiency, making ML a great fit for such applications. Moreover, ML can be advantageous for companies where the rules and conditions change regularly, and immediate adaptation is necessary for success. For example, in a search product, if a new album is

released, the algorithm needs to adjust promptly to stay current, and ML can facilitate achieving this goal.

If your problem is expected to scale to thousands of users in a short time frame, such as an online retail platform that needs to offer personalized experiences, then ML is a viable use case. The problem needs to be solved promptly and effectively to keep up with customer expectations. ML is particularly useful when personalization is necessary at scale, especially when it is impractical to create individual solutions for each user. In such cases, it's advisable to use ML to establish the rules that govern the solution.

In the context of online retail, ML can be an effective means of achieving a specific goal. The purpose of utilizing an ML model in this setting is to provide product recommendations that ultimately lead to a sale. For instance, when a user searches for a product such as a "shirt," the search results should be prioritized to display the shirts that are most likely to result in a purchase. By using ML to optimize product recommendations, online retailers can increase their chances of making a sale and ultimately improve their bottom line. This approach allows retailers to better understand their customer's preferences and purchasing behavior, enabling them to make more informed decisions about how to market and sell their products. Additionally, it can enhance the overall user experience, as customers are more likely to find and purchase products that are relevant and appealing to them. Overall, by utilizing ML to optimize product recommendations, online retailers can improve their sales and better meet the needs and preferences of their customers, resulting in greater success and competitiveness in the marketplace.

ML can be a valuable tool for achieving business success, particularly in situations where a high level of precision is acceptable rather than complete accuracy. For instance, recommendation systems can still be useful even if users do not always follow the suggested items. This is because the system can learn from the lack of sales and improve its recommendations in the future, resulting in a more satisfactory user experience. By accepting a certain level of imprecision, businesses can still benefit from the insights and advantages offered by machine learning. This approach allows organizations to prioritize the most important aspects of their business and focus their resources on the most critical areas. Additionally, it enables them to develop more effective solutions that are better suited to the needs and preferences of their users, resulting in improved customer satisfaction and loyalty. Overall, by recognizing the benefits of ML and accepting a certain level of imprecision, businesses can gain valuable insights and improve their operations in a way that enhances the user experience and drives long-term success.

Problems where ML-based solutions are not required:

There are several use cases where an ML-based approach may not be necessary to solve problems. Here are a few examples:

1. **Simple rule-based systems:** When there are specific rules in place to address a problem, there may not be a need to use a Machine Learning approach to solve it. An example of this is the use of predefined rules in spam filters for email, which can effectively identify and eliminate unwanted messages.
2. **Limited data availability:** ML models require a large amount of data to train, and if there is limited data available, it may not be feasible to use an ML-based approach. For example, in fraud detection for a new business with limited transaction data, a rule-based approach may be more appropriate than an ML-based approach.
3. **Computationally expensive tasks:** ML-based approaches require significant computational resources, and if the problem is computationally expensive, a rule-based approach may be more practical. For example, if an application needs to identify if a photo contains a particular object, a rule-based approach that searches for specific colors or shapes may be faster and more efficient than an ML-based approach.
4. **User experience:** In some cases, a rule-based approach can provide a better user experience than an ML-based approach. For example, the Gmail feature that reminds users to attach files when the word "attachment" appears in the email is a simple rule-based system that provides a helpful user experience without the need for an ML-based approach.

In summary, while ML is a powerful tool for solving complex problems, there are instances where a rule-based approach may be more practical or efficient.

What do I need to succeed?

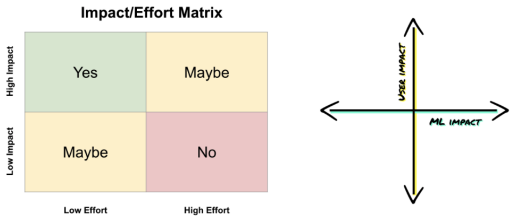
To ensure the success of an ML project, several factors should be considered, such as having a clearly defined business problem. To ensure a successful ML project, it's important to have a clear idea of the project's objective from the outset since it is an experimental process. Additionally, having a proficient team that includes both Data Science, Analytics, and Engineering experts is vital to collect data that is impartial, comprehensive, pertinent, up-to-date, and respects user privacy and security. It's important to evaluate the potential risks and benefits of the project and determine whether the model requires frequent updates in production. If frequent updates are required, then an ML-based solution may not be practical, and a heuristic-based approach may be more appropriate. To train linear models, it's necessary to have thousands of data rows, and for neural networks, hundreds of thousands of data rows are needed. Hence, obtaining the correct amount of data is crucial, and the data needs to display clear patterns, represent the segment and time period in question, be of high quality, and be unbiased.

To integrate ML into an organization's roadmap, it's crucial to follow these general steps, although the details may vary depending on the project and company. Prior to implementing an ML-based solution, it's important to avoid the common mistake of not understanding the business need. It's essential to identify and address significant problems that can be solved using ML, and it's necessary to ensure alignment among stakeholders on the business need to prevent developing an expensive and powerful system that doesn't benefit the business or customers.

Once the business needs have been identified, it is necessary to document the hypothesis for each problem. The hypothesis statement must include various components such as the desired outcomes, success metrics, testing changes, model output, predictors, and targets. For example, in the case of improving search rankings with ML, we can use a model that scores each product and predicts the product that a customer will ultimately purchase based on various factors such as recently viewed products, previous purchases, and frequently bought-together products. To achieve accurate results, the hypothesis must be well-defined.

It is important to establish success metrics based on the problem hypothesis. A common understanding of success measures is critical for stakeholders to determine what success entails, such as specific performance metrics to achieve, new business opportunities to explore, and increased customer satisfaction. It is advantageous for the team to concentrate on showing the business advantages of the ML project when success can be quantified in actual targets.

At the onset of defining a roadmap, it's essential to create a team that comprises UX/UI professionals, data scientists, and ML experts to assess potential projects. One useful method for evaluating potential projects and determining whether they are suitable



for a machine learning-based solution is by creating a 2x2 matrix. This matrix can be used to assess the level of effort and impact required for each project. By using this matrix, it is possible to prioritize projects that have a high impact and a manageable level of effort. When evaluating projects, it is important to focus on those that will have the most significant impact. By prioritizing high-impact projects, you can ensure that your resources are being used effectively and that you are addressing the most critical business needs. Additionally, by selecting projects with a manageable level of effort, you can avoid overcommitting your team and ensure that projects are completed on time and within budget. Overall, by utilizing a 2x2 matrix to assess potential projects, you can effectively prioritize

and focus on those that will have the greatest impact and are most suitable for an ML-based solution.

It's crucial to assess the data requirements of the team and ensure that the necessary data is available when considering ML projects. As these models are complex and require a significant amount of data, it can take a lot of time to develop and test them before they are ready for production. When you lack sufficient data for a successful ML solution but foresee the need for one in the future, launching a basic MVP with straightforward heuristics might be a better option. Establishing baseline data for the product is an excellent opportunity in this scenario. Designing the system with metric instrumentation in mind, A/B testing the current system against the ML model, and ensuring that the system receives the data you want is also necessary.

There are several recommended approaches for maintaining high-quality, standardized data. *Peter Skomoroch, a presenter at the Strata Data Conference*, recently offered some helpful suggestions. Among these recommendations are strategies for guiding user input, such as using auto-suggest fields, validating user inputs and emails, and collecting user tags, votes, and ratings. Additionally, it is important to track impressions, queries, and clicks, as well as to keep session logs and disambiguate and annotate entities to ensure accuracy. Once you have collected enough data, it is advisable to develop and conduct A/B testing to compare the ML model against the heuristic-based approach. This approach allows you to evaluate the performance of the ML model and ensure that it is delivering the desired results. By following these recommended approaches, you can ensure that your data is standardized, high-quality, and effective for developing and training your ML model.

In every ML project, there are inherent risks and challenges that you should anticipate and handle proactively to stay on track. One of the potential risks is the presence of bias that can impact the accuracy and effectiveness of your model. To address this issue, you should allow your model to measure and identify these biases, and then take the necessary steps to mitigate them.

It's also essential to be aware that even small changes to the user interface may result in significant changes to the underlying ML algorithms, which can affect the overall performance of your model. It is crucial to be cautious and thoughtful when making changes to a system to avoid any unforeseen problems that may arise. One way to do this is by carefully assessing the potential impact of any proposed changes before implementing them. Testing the proposed changes through A/B testing can help to determine how effective the changes will be, and this can be supplemented with user feedback to ensure that the changes meet the needs of the intended audience. Additionally, asking for excessive user data without offering visible benefits can result in users losing interest in your product.

Therefore, providing value to users as soon as possible before requesting additional data is crucial. Lastly, when personal data is involved, security and privacy concerns should be prioritized. It's recommended to seek guidance from legal, safety, and security teams in this regard.

Deploying an ML model is not a one-time event. It is vital to prepare for the need for continuous adjustments and improvements as the model operates in the real world. In fact, studies indicate that the majority of the work required for a ML model's success happens after its initial deployment. The post-deployment work includes enhancing the model's accuracy and effectiveness, as well as incorporating new signals and features that arise as more data is gathered and insights are gained. The model's developers must be proactive in keeping up with these changes, as doing so will ensure that the model remains effective and relevant over time. Failing to make necessary adjustments could result in a model that becomes outdated and less useful, or even obsolete. Thus, ongoing iteration and improvement are essential for an ML model's long-term success.

Conclusion:

ML has become increasingly popular as a solution for different tasks, including ranking, anomaly detection, and recommendation systems. However, due to the experimental nature of ML and the substantial amount of time required for its development, it is crucial to define clear goals and criteria for success. Product managers must manage stakeholders' expectations, prioritize tasks, and choose the relevant data for the model. Data quality and reliability are also essential factors to consider, such as data completeness, relevance, bias, and user privacy and security. Additionally, a ML model requires constant iteration and monitoring to achieve its full potential, such as fine-tuning the model, adjusting parameters, and updating the training data to improve its performance. Therefore, it's crucial to plan for the long term, allocate resources appropriately, and prioritize tasks to ensure a successful outcome.

2.8. Use case 2

Over the last few years, AI has been gaining more attention, but it was not until the public launch of ChatGPT by OpenAI in November of last year that AI took center stage. ChatGPT is a tool that uses neural networks to generate language and its popularity has been skyrocketing. It has become so pervasive in social media and tech news that people are now asking themselves if AI will take over their jobs. Its practical applications have been expanding as well, from writing academic papers, offering salary negotiation advice, and generating unique content ideas, to writing music and code. Others are also putting it to the test, as seen by the question of whether ChatGPT could pass the law exam. Furthermore, tools like GPTZero have been created to determine whether writing is human-generated or machine-generated.

ChatGPT for Product Managers:

Before you ever contemplate incorporating AI into your project, you should first specify your specific desired objectives using human intelligence.

1. What is the broader context into which your roadmap fits (e.g., problem space, the mission of the company, product vision, product strategy, market position)?
2. What are your limits (e.g., time, resources, regulatory restraints)?
3. How does your organization define success? (i.e. Revenue, Customers, Engagement)

How will you fare in the following five risk categories (first named by Marty Cagan - The Four Major Risks):

1. **Value** is determined by whether buyers will purchase it or whether users will choose to use it.
2. **Viability** of this solution for the various parts of our business.
3. **Usability** refers to whether or not users can find out how to use it.
4. **Feasibility** is whether our engineers can construct what we require given the time, skills, and technology available.

After you've appropriately established your roadmap, experimenting with AI in these ways may assist with figuring out what and how to collect, organize, and prioritize information to help your team get from where you are now to where you want to be.

AI for Roadmapping

Competitive Landscaping, Trends, and Market Research: Assume you want to better grasp the broad landscape in a specific problem space as a foundation for your roadmap. ChatGPT can supplement and contribute to the work you can accomplish individually and as a team to acquire a more complete picture of the situation.

PA i'm thinking of developing a new product in food delivery space. i'd like to understand what the current trends are in this space, what is working and what is not working, what the general trends are and whether are not this is a good space to invest in building with my team now

The food delivery industry has experienced significant growth in recent years, driven largely by changes in consumer behavior and advancements in technology. Here are some current trends in the food delivery space:

1. Increased demand for healthier options: Consumers are becoming more health-conscious and are seeking out healthier food options. Many food delivery companies are now offering healthier menu options to cater to this trend.
2. Contactless delivery: With the COVID-19 pandemic, there has been a shift towards contactless delivery to minimize human interaction. Many food delivery companies have adopted this approach, and it is likely to continue even after the pandemic.
3. Technology advancements: Technology has played a significant role in the growth of the food delivery industry, and it continues to be a driving force. Companies are using AI and machine learning to improve their operations and customer experience.
4. Ghost kitchens: Ghost kitchens, also known as cloud kitchens, are commercial kitchens that are solely dedicated to preparing food for delivery. This trend has been gaining popularity as it allows food delivery companies to operate without the overhead costs of running a traditional restaurant.
5. Subscription-based models: Subscription-based models, where customers pay a monthly fee for unlimited deliveries, are becoming more common. This approach helps to build customer loyalty and provides a predictable revenue stream for food delivery companies.
6. Sustainability: Consumers are increasingly concerned about the environmental impact of food delivery. Food delivery companies are exploring ways to reduce waste and promote sustainability, such as using eco-friendly packaging and partnering with sustainable food suppliers.




In terms of what is working and what is not working, it largely depends on the specific market and target audience. However, some common challenges for food delivery companies include high competition, low profit margins, and logistical difficulties.

Overall, the food delivery space is still a good space to invest in, given the continued growth and evolving trends. However, it is essential to have a unique value proposition, a clear target audience, and a solid business model to succeed in this competitive industry.

Idea Generation: ChatGPT can help produce ideas, prompts, and suggestions that you might not have thought of on your own or with your team.

Task Prioritization and Forecasting: Assume you're working on version 1.0 of a new product that will be the first to market and you're not sure how to prioritize the work required. You can submit relevant information to ChatGPT, such as your issue area, what you're trying to accomplish, your resources, your deadline, and any other known limitations, to get feedback on how to prioritize your roadmap.

PA I'm developing a roadmap need to organize the work my team will be focused on over the next 3 years. The team is comprised of 2 full-stack developers, 1 quality assurance lead and 1 design lead. We are building an AI tool that can take any given food image, and tell on which food delivery app it is priced the lowest. What basic pieces would we need to consider in order to do this, and in what priority?

 Developing an AI tool that can identify the lowest-priced food delivery app based on an image of a food item is a complex project that requires careful planning and execution. Here are some basic pieces that you and your team may need to consider in order to build this tool, prioritized by importance:  

1. Data collection and labeling: To train your AI model, you will need a large dataset of food images and their corresponding prices across various food delivery apps. You will need to collect and label this data accurately, which can be time-consuming and require human expertise.
2. AI model development: Once you have collected the data, you will need to develop an AI model that can accurately identify the food item in the image and its corresponding prices across different delivery apps. This will require expertise in machine learning, computer vision, and natural language processing.
3. Algorithm development: After building the AI model, you will need to develop algorithms that can analyze the data and identify the lowest-priced food delivery app for a given food item. This will require expertise in data analytics and algorithm development.
4. User interface development: You will need to develop a user interface that allows users to upload images of food items and receive information on the lowest-priced delivery app. This will require expertise in user experience design and frontend development.
5. Quality assurance and testing: Throughout the development process, you will need to conduct rigorous quality assurance and testing to ensure that your tool is accurate and reliable. This will require expertise in testing and quality assurance.
6. Deployment and maintenance: Once your tool is ready, you will need to deploy it to a production environment and maintain it to ensure that it continues to function correctly. This will require expertise in DevOps and software maintenance.

It is important to note that the priority of these pieces may depend on the specific requirements and constraints of your project. For example, if you do not have access to a large dataset, data collection and labeling may be a higher priority than AI model development. Similarly, if you have strict timelines, you may need to prioritize user interface development to ensure that you can launch your tool on time.

Conducting SWOT Analysis: Assume you want to ensure that your roadmap incorporates your existing strengths, weaknesses, opportunities, and threats. You may utilize ChatGPT as a starting point to outline what to think about in each category.

PA My team is considering building a this app and gear it towards Gen-Z that works on both iOS and Android. We want to prioritize easy comparison of food items, and exceptional user experience so that it's simple to use as our unique value proposition.

We'd like to initially launch in the U.S. and then expand to India, Canada and Europe. Can you conduct a basic SWOT analysis to assess strengths, weaknesses, opportunities, and threats to help us better plan for this launch (and how we build the product in the first place)?

 Certainly, here's a basic SWOT analysis for your proposed food delivery app:  

Strengths:

- * Unique value proposition of providing easy comparison of food items and exceptional user experience
- * Targeting the growing Gen-Z market, which is highly tech-savvy and receptive to innovative products
- * Planned expansion to multiple countries, which can provide a larger user base and revenue potential
- * Flexibility to work on both iOS and Android platforms, which can increase accessibility for potential users

Weaknesses:

- * Competition from existing food delivery apps in the market, which may make it difficult to stand out initially
- * Potential challenges in obtaining accurate pricing data for all food delivery apps in each geographic region
- * Limited resources and team size, which may make it difficult to effectively launch and expand the app

Opportunities:

- * Growing demand for food delivery services, especially due to the pandemic and changes in consumer behavior
- * Potential for partnerships with food delivery apps to provide more accurate pricing data and increase revenue streams
- * Opportunities for further innovation and expansion, such as incorporating sustainability and eco-friendly options

Threats:

- * Fluctuations in the global economy or changes in consumer behavior, which may affect the demand for food delivery services
- * Regulatory and legal challenges, especially when expanding to multiple countries with different regulations
- * Security risks and potential data breaches, which can negatively impact user trust and reputation

Based on this analysis, it's clear that there are both opportunities and challenges for launching and expanding your food delivery app. To mitigate some of the challenges and capitalize on the opportunities, you may want to consider conducting market research and user testing to better understand your target audience and competition, building strong partnerships with food delivery apps and other relevant stakeholders, and prioritizing user data privacy and security in your product design.

Identifying Dependencies: Assume you wish to identify and assess dependencies as part of your roadmap planning. You could chat with your engineering and design teams directly, as well as use ChatGPT as input, to assist you to understand exactly what you need to be thinking about and why across your product, platform, distribution channels, and so on.

PA

My team is currently updating the architecture of our platform to make it more flexible, enable more data to be stored, and to add several features which we cannot currently support - we have a basic web app that is ready, the app stores user data in databases, links to Snowflake to store data, Stripe for subscription payment processing, Zapier for automations, Salesforce as our CRM, Convertkit for email marketing, Typeform for customer feedback, Google Translate to provide localized messaging, Amplitude for analytics, Google Ads for marketing, and more. What are the basic dependencies we should be aware of as we update the platform?



It sounds like your platform has a wide range of dependencies and integrations, which can make updating the architecture a complex process. Here are some basic dependencies you should be aware of as you update the platform:

1. **Data storage:** Your platform likely depends on various databases to store user data, and you may need to ensure that the updated architecture is compatible with these databases. Additionally, if you plan to store more data, you may need to consider upgrading your storage infrastructure.
2. **Payment processing:** If your platform uses Stripe for subscription payment processing, you may need to ensure that the updated architecture is compatible with Stripe's API and that any necessary credentials are updated.
3. **Integrations:** Your platform likely depends on several third-party integrations, such as Zapier, Salesforce, Convertkit, Typeform, and Google Translate. You may need to ensure that these integrations continue to function correctly after the architecture update, and that any necessary API keys or authentication credentials are updated.
4. **Analytics:** If your platform uses Amplitude for analytics, you may need to ensure that the updated architecture is compatible with Amplitude's API and that any necessary credentials are updated.
5. **Marketing:** If your platform uses Google Ads for marketing, you may need to ensure that the updated architecture is compatible with Google Ads' API and that any necessary credentials are updated.
6. **Security:** As you update the platform, you may need to ensure that any necessary security protocols are in place to protect user data and prevent potential vulnerabilities.

It's important to note that the specific dependencies and priorities may vary depending on your platform's unique requirements and constraints. You may want to consult with your team and any relevant stakeholders to ensure that the updated architecture meets all necessary dependencies and requirements.

Communicating and Updating Your Roadmap: Assume you're about to present your roadmap to a group of stakeholders in order to obtain feedback and input to improve it. You can utilize ChatGPT to get ideas on how to structure this to communicate effectively based on your aims.

PA My team is currently updating the architecture of our platform to make it more flexible, enable more data to be stored, and to add several features which we cannot currently support - we have a basic web app that is ready, the app stores user data in databases, links to Snowflake to store data, Stripe for subscription payment processing, Zapier for automations, Salesforce as our CRM, Convertkit for email marketing, Typeform for customer feedback, Google Translate to provide localized messaging, Amplitude for analytics, Google Ads for marketing, and more. What are the basic dependencies we should be aware of as we update the platform?

It sounds like your platform has a wide range of dependencies and integrations, which can make updating the architecture a complex process. Here are some basic dependencies you should be aware of as you update the platform:

1. Data storage: Your platform likely depends on various databases to store user data, and you may need to ensure that the updated architecture is compatible with these databases. Additionally, if you plan to store more data, you may need to consider upgrading your storage infrastructure.
2. Payment processing: If your platform uses Stripe for subscription payment processing, you may need to ensure that the updated architecture is compatible with Stripe's API and that any necessary credentials are updated.
3. Integrations: Your platform likely depends on several third-party integrations, such as Zapier, Salesforce, Convertkit, Typeform, and Google Translate. You may need to ensure that these integrations continue to function correctly after the architecture update, and that any necessary API keys or authentication credentials are updated.
4. Analytics: If your platform uses Amplitude for analytics, you may need to ensure that the updated architecture is compatible with Amplitude's API and that any necessary credentials are updated.
5. Marketing: If your platform uses Google Ads for marketing, you may need to ensure that the updated architecture is compatible with Google Ads' API and that any necessary credentials are updated.
6. Security: As you update the platform, you may need to ensure that any necessary security protocols are in place to protect user data and prevent potential vulnerabilities.

It's important to note that the specific dependencies and priorities may vary depending on your platform's unique requirements and constraints. You may want to consult with your team and any relevant stakeholders to ensure that the updated architecture meets all necessary dependencies and requirements.

What are the dangers of using AI to help product teams plan roadmaps?

As we have seen in many areas of AI, the list of problems is extensive. We, humans, are frequently blind to the bias that is embedded in AI algorithms (as demonstrated in the powerful documentary Coded Bias), which can substantially affect outcomes and real-world ramifications.

3. Discussion

3.1. Method criticism

While user-centered product planning has gained traction in recent years as a means of creating more successful products, it is not without its critics. One criticism of user-centered product planning is that it can lead to a narrow focus on meeting the needs of a specific user group while neglecting the needs of other potential users. Additionally, some critics argue that it can lead to a lack of innovation and creativity in product design, as designers may be hesitant to

explore new ideas that do not align with the needs of the target user group. Another criticism is that it can be time-consuming and costly, as it requires extensive user research and testing throughout the product development process. Finally, some critics argue that it can result in a lack of flexibility in product design, as it may be difficult to make changes to the product once it has been designed to meet the specific needs of the target user group.

4. Future Work

User Research: AI and ML can be used to analyze large amounts of data collected from user feedback, surveys, and online interactions. This can help to identify patterns and trends in user behavior and preferences, allowing product teams to make more informed decisions about what features and functionality to prioritize.

Personalization: AI and ML can help to create more personalized user experiences by analyzing user data and behavior to offer customized product recommendations and content.

Predictive Analytics: AI and ML can be used to make accurate predictions about user behavior, such as which products are most likely to be popular or which features will be most used. This can help product teams to better plan their product roadmap and prioritize features based on user needs.

Natural Language Processing: AI and ML can be used to analyze user feedback and sentiment in natural language, allowing product teams to understand how users feel about their products and make improvements based on this feedback.

A/B Testing: AI and ML can be used to automate A/B testing, allowing product teams to test multiple versions of a product feature at once and quickly identify the most effective version.

Product Recommendations: AI and ML can be used to analyze user behavior and make product recommendations to users based on their preferences and past interactions with the product. This can help to increase user engagement and satisfaction with the product.

Fraud Detection: AI and ML can be used to detect fraudulent user behavior, such as fake accounts or suspicious transactions. This can help to improve the overall security of the product and protect users from potential harm.

Voice Assistants: AI and ML can be used to create voice assistants that can interact with users and provide them with information or assistance related to the product. This can help to improve the overall user experience and make the product more accessible to a wider range of users.

5. References

1. Ahamed, R. (2023, January 19). *How Endgame Builds a Customer-Centric Product Roadmap Using Grain*. Grain. Retrieved March 7, 2023, from <https://grain.com/blog/build-better-roadmap-using-grain>
2. CERVONE, B. (2022). Integrating User Centred Product Planning Approaches in MultiProduct Tech Companies. *Degree Project in Computer Science and Engineering, specialising in ICT Innovation (Human Computer Interaction and Design)*, 1(2022), 29. <https://www.diva-portal.org/smash/get/diva2:1697894/FULLTEXT01.pdf>
3. Domashenko, D. (n.d.). *How To Build A Product With User-Centered Design Approach*. Uptech. Retrieved March 7, 2023, from <https://www.uptech.team/blog/user-centered-design>
4. Gibbons, S. (2020, November 1). *3 Types of Roadmaps in UX and Product Design*. Nielsen Norman Group. Retrieved March 7, 2023, from <https://www.nngroup.com/articles/roadmap-types/>
5. *The Importance of User-Centered Design in Product Development*. (2023, January 30). NextLeap. Retrieved March 7, 2023, from <https://nextleap.app/blog/the-importance-of-user-centered-design-in-product-development/>
6. *Product roadmap: How it affects user experience*. (n.d.). Trymata digital experience hub. Retrieved March 7, 2023, from <https://learn.trymata.com/product-roadmap-and-user-experience>
7. *Product Roadmaps: Everything You Need to Know*. (n.d.). Qualtrics. Retrieved March 7, 2023, from <https://www.qualtrics.com/uk/experience-management/product/product-roadmaps/>

8. Terai, K. (2019, November 11). *When and How to Add Machine Learning to a Product Roadmap*. New Tech Northwest. Retrieved March 7, 2023, from <https://www.newtechnorthwest.com/when-and-how-to-add-machine-learning-to-a-product-roadmap/>
9. von Flüe, A. (2021, June 23). *Improve your Product Roadmap with User Research 23 Jun 2021*. Mopinion. Retrieved March 7, 2023, from <https://mopinion.com/improve-your-product-roadmap-with-user-research/>
10. *Why roadmaps suck and how to make them user centered*. (2019, August 23). Medium. Retrieved March 7, 2023, from <https://medium.com/@flokanzler/why-roadmaps-suck-and-how-to-make-them-user-centered-5828d1d10ee0>
11. *Why User Research Is Critical for a Product Roadmap and MVP*. (2022, May 23). Detroit Labs. Retrieved March 7, 2023, from <https://www.detroitlabs.com/blog/why-user-research-is-critical-for-a-product-roadmap-and-mvp/>
12. Zane, L. (2023, January 31). *6 Ways to Leverage AI in Roadmap Planning*. Airfocus. Retrieved March 7, 2023, from <https://airfocus.com/blog/6-ways-ai-in-roadmap-planning/>
13. Breuer, H., Wolze, Z., Umbach, E. (2013). User-Centered Soft Innovation in Established Business Fields. In: Marcus, A. (eds) Design, User Experience, and Usability. Web, Mobile, and Product Design. DUXU 2013. Lecture Notes in Computer Science, vol 8015. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-39253-5_1