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A strategy for the Customer Brand Engagement (CBE) – A data product by Axians

User Engagement and Onboarding – the case of "Stayaway Covid"

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Abstract

The present project proposes a strategy to be followed within the product development and management of Axians's future Customer Brand Engagement (CBE) data product, supported by a market and legal context.

It provides a review of the market trends in motion within the customer data and customer experience fields, as well as a data regulation benchmark that covers the international scene. Furthermore, it suggests a tailor-made three-step product framework to be adopted by the product teams in order to future-proof it. Then, it recommends actions to enhance the product by ensuring user engagement with an app that would add a new relevant data source to the model based on a user study. Finally, it presents an overview and state of art of the technology available to deliver and execute the remaining data sources the product will model and provide insights from.

1. Company and Problem Overview

1.1 Axians

Axians is a company belonging to the VINCI Energies group with a strong local presence in 23 countries. It is specialized in assisting companies optimizing the information technologies challenges faced by them and accelerating their digital transformation processes, contributing to successful business outcomes. Axians's innovative solutions may be implemented on site or made available as a service.

The company's portfolio includes the areas of cloud services, infrastructure software development, cyber security, artificial intelligence, energy sustainability, IoT and intelligent services, among several others. Improving the lives of people and businesses through a deeply human and personal relationship with clients is Axians' promise. Furthermore, the company's mission statements comprise supporting its customers on their digital journeys, providing a comprehensive portfolio of solutions to meet a wide range of needs and delivering innovative projects through agile teams, market knowledge and customized solutions. Empowerment, entrepreneurship, responsibility, solidarity and trust are Axians' values, which are aligned with VINCI Energies' DNA.

1.2. Problem Framing

The challenge presented by Axians to the group was, in short, to evaluate the context and recommend a strategy for a new potential product, based on the need to evolve the physical space experience into a multipurpose space, with custom-made services, easy access and an omnichannel experience, across every sector.

The company aims to productize the access to and the modelling of non-personal data from physic and online spaces users, in order to sell it to brands who wish to optimize and enhance their customer engagement and experience. The vision for that product is to become a platform with a global measurement system (which measures and presents the engagement of those users to a brand within those spaces), and it is currently under development.

The main goals would be to create long-lasting relationships, incite the feeling of belonging, and help to close the gap between customers and brands, during the customer experience.

2. Methodology

The customer data and customer experience market was analysed in order to assess if it was moving favourably to welcome a data product like CBE. Some key trends were identified and grasped to provide a succinct landscape of relevant ones. Afterward, a selection and characterization of different legal approaches across the international economic powers - EU, USA, China and the rest of the world - to data collection, management and employment were briefly described.

2.1. Futureproofing a digital product - How to develop and manage products

The following step was to put together a framework that would futureproof the CBE. As a first step, the main concepts upon which the project relies were concretely defined: product, digital products, data products, product development, product management, customer experience and customer engagement. The purpose of this theoretical background was to highlight the importance of these concepts within the project's context, as well as to align all stakeholders around the topics before grasping them into a framework.

Following that, the main frameworks to develop and manage products were presented: Waterfall, Agile, Lean Startup and Design Thinking methodologies. Based on the most relevant features of those, three sequential steps were put forward as the suggested framework to be pursued by the CBE product team.

It starts with the Problem-Solution Fit - the process to validate the existence and relevance of the problem-solution addressed. In the interest of preliminary validating the main underlying problem-solution assumptions, ensuring the need for succeeding steps,

these were listed as hypotheses and tested by 23 customers and 10 brand experts interviews.

The second step is the Product-Market Fit. The match-making process between customers' needs and profile with the product characteristics, in which the business model assumptions are also turned into hypotheses, tested and validated.

The third and last step is the Product-Strategy Fit, which consists in building and outlining a set of recommended elements of the CBE product that, put together, create a personalized strategy to guide the product operations.

2.2. User Engagement and onboarding - the case of "STAYAWAY Covid and how it relates to physical spaces"

Developing a mobile application in the interest of increasing data sources to the model will highly increase the value of the final product, nevertheless, it will present several challenges to Axians. Almost intrinsic to all, lies the issue of user engagement.

To begin the chapter, relevant definitions and frameworks are analyzed to understand the importance of user engagement and how it enables companies to create long-lasting relationships with customers. Moreover, a measurement system is proposed.

Secondly, the four dimensions of the project (behavioural mapping, user comfort and carbon footprint, sentiment analysis and user experience) are explored within the scope of the application, i.e. how can pairing different types of data with the users' profiles influence customer engagement.

The case of STAYAWAY Covid is, then, studied as an example of bringing digital into the physical experience and engaging users.

Finally, the insights that thrived from conducting a survey about user engagement and people's experiences with STAYAWAY are shared and used to draw conclusions and recommendations to Axians.

2.3. Overview of innovative solutions: technology state of the art

In the first part of the document, a brief introduction to the main technological devices and processes used is presented to the reader. Here, the different approaches to Real Time Positioning Systems (that locate the user across buildings) are presented together with different software that enables Behavioral Mapping. Three different companies are evaluated with one business case each, pointing out useful features that Axians can implement in their own product.

The business cases were selected among others to better fit the future goals of Axians across different time frames. Cisco's partnership with the San Jose State University is intended to be a guide for Nova SBE's pilot.

Aruba and Inpixon, with their experiences in events and retailing, shape broader potential use cases Axians can implement and appeal to players in different industries.

Later on, the second macro section of the work focuses on Sentiment Analysis and companies offering Machine Learning as a service. Among these, Awario was analysed as the Sentiment Analysis Industry Benchmark revealing the weaknesses of available Brand Awareness platforms.

This last need drove the research towards Customer Data Platforms pointing out a broader set of tasks that Sentiment Analysis can carry out and which ones Axians should implement to develop a more effective tool.

Finally, the text presents a run-down of all the features that should be implemented in the Dashboard that Brands will be interacting with as well as different ways to segment the customers in their datasets.

3. Market Context

The major market trend found during this research was: data is dominating everything and customer analytics are at the center. McKinsey (2017) clearly states that internal and external data should be used by companies to back up each product decision. Furthermore, it should be used to drive action across the whole organization, as that is the key to satisfying customers who are increasingly demanding. Through understanding each customer's segment behavior and quantifying its economic value, decisive drivers and feedback, customer data becomes an invaluable business asset that will foster sustainable growth and success (McKinsey, 2016). This breaks down into various sub-trends that are particularly significant to the project.

3.1. Trend I: Identifying and understanding the customer's journey to optimize it

Shifting from an individual touchpoint analysis to assess the entire customer experience, end-to-end, with all its touchpoints, is vital and urgent for businesses' success. Failing to do it might mean failing to accomplish a positive overall experience with the brand (McKinsey, 2016). In an interview with Forbes, Rajat Mishra, who is a Senior Vice President and General Manager of CX Product Management at Cisco, affirms that thinking in terms of customer experience is the solution to combat all the existential risks companies will face in the future. This is achieved by anticipating and responding to the needs of the customer at different steps in the lifecycle, as well as by moving from reactive to proactive and preemptive support (Gibbons, 2019).

3.2. Trend II: Social listening as a revolutionary source of customer insights

Monitoring and analyzing a brand's mentions, conversations and feedback on social media channels, websites or search engines is a unique opportunity to access customers' views directly (Amaresan, 2018). It allows brands to identify pain points and their root-causes, to find new opportunities, but also to track competitors. It is predicted that making use of big data technologies and advanced analytical tools such as natural language processing (NLP), complex event processing (CEP) or deep learning to obtain deep market intelligence from these sources will only increase in the years to come (PwC, 2019).

3.3. Trend III: Innovative, customer-centric and personalized products and solutions

According to PwC (2019), customer-focused product development, tailoring products to customers' requirements and addressing real needs with real value, grounded on customer data, is progressively the rule for digitally advanced companies. Moreover, around 41% of all surveyed companies are already optimizing processes to ensure better designed and validated new products by using AI-based analytical tools to support strategic decisions. These companies are also expecting to expand their share of personalized products by 26%, as they understand how it will enhance both loyalty and profitability of each customer (PwC, 2019).

It is possible to conclude that the market trends in motion are privileging the release of a product like the CBE and could play an important role, now and in the near future, in the adoption of the proposed solution.

4. Policy and regulations context

4.1. European Union

Data is perceived by legislators and decision-makers at the European Union level as an essential asset for economic growth, competitiveness, innovation, job creation and societal progress. Furthermore, data collected online and exploited by technologies such as Internet of Things (IoT), Artificial Intelligence or big data analytics tools are seen as key drivers of those. It is predicted that by 2025, the value of the data economy within the 28 countries will reach €1054 billion (a 12% growth from 2020). As such, the EU has been deploying strong policy efforts in order to legally frame the data economy in the member states. The new digital strategy of the European Commission is an illustration of that. It is grounded on pillars like the European Data Strategy which was launched in February 2020 and privileges the European people and values in technology development (European Commission, 2020).

This strategy aims at creating a single market for data-based services and business models, that ensures Europe's global competitiveness and data sovereignty. That market will secure a free flow of data that respects the European privacy, data protection and competition rules while also making it fair, practical and clear to use data. It intends to increase the overall data availability in the European economy and society, while controlling those who generate the data (European Commission, 2020).

The regulation in place empowers Europeans to stay in control of their data - through the EU Charter of Fundamental Rights, EU citizens have the right to protection of their personal data. Moreover, the General Data Protection Regulation (GDPR) was an essential step to strengthen such rights in the digital age. It guarantees the highest level of protection of privacy to individuals with regard to the processing of personal data and on the free movement of that data. Also, it simplified the *modus operandi* for companies

and public bodies and eliminated fragmentations across the 28 countries (European Commission, 2020).

4.2. United States

Commonly, US privacy policies and regulations require pre-collection acknowledgements to be provided. These should inform about the company's collection, usage and disclosure practices and the choices customers have regarding their personal data. Only when consented by individuals, companies will be able to treat information.

States impose a wide variety of specific requirements. Some are particularly constraining in the student and employee privacy areas, for instance, several have enacted employee social media privacy laws.

The state of California, one of the strictest in terms of collecting and processing data, has created the California Consumer Privacy Act (CCPA), a law that permits consumers to have increased control over the information companies gather about them. Under the CCPA, consumers have four fundamental rights. The right to know, to delete and to opt-out of the sale of their personal information and to non-discrimination for enjoying their CCPA rights (State of California Department of Justice, 2020).

Concerning transfers of data between countries, there are no restrictions applied to the United States with the exception of governments' data (Data Protection Laws of the World, 2020).

Further, marketing communications (such as telemarketing, email marketing or text message marketing) are also regulated extensively. For example, sending marketing texts to individuals demand their expressed written approval and the text content must be carefully audited for rigorous compliance with legal requirements (Data Protection Laws of the World, 2020).

The enforcement of privacy laws and rules is carried by the Federal Trade Commission (FTC), state attorneys general or industry specific regulators, but individuals may also bring their rights of action (and class actions) for certain violations (Data Protection Laws of the World, 2020).

4.3. China

China missed data regulation and privacy protection law for a long time. While the concept of privacy protection gained traction in the US and the EU bearing national regulations, China lagged behind getting to present days with no real law protecting the citizens' privacy.

The phenomenon sparking change was the fourth Industrial Revolution and the collection of personal data on the internet. Data Breaches affect now 85% of Chinese consumers costing the Chinese economy 13 Billion dollars every year. Because of these reasons, China looked abroad for privacy regulations, with the US and EU being the most prominent examples of privacy legislations.

China first implemented an approach very similar to the US, with narrower use cases destined to specific industries. Nowadays, and until 2025, the government is converging with the EU's approach. China is drafting a comprehensive code called PIPL, Personal Data Protection Law. The government intends to have a regulation that sits, in terms of strictness, between the EU and the US (Emanuel Pernot, 2020).

The first draft, published in October 2020, enforced citizens' right to privacy with private companies (but not with the government) while also balancing it with their geopolitical and strategic stances (New America, 2020). Nevertheless, China granted vast protection from data controllers. Companies can only collect personal data related to the

purposes clearly stated to the individual, even though there is only need for a light implicit consent from users.

The government also enforced a soft Data Minimization that, unlike the US, limits data processing to the only purpose stated during the collection. Sensitive data are defined (in the 2018 Specification on Cybersecurity laws) in an even broader way than EU, including data that "if disclosed can endanger the safety of persons or property".

In China's effort to regulate the Data Market, some peculiarities are not drawn either from the US or the EU. Concerning Data Localization and Cross Border Transfers, China established the principle of Cyberspace sovereignty which enforces the subordination of data spaces to the country's values meaning that the government can exert control over Internet architecture content and data flows. In this last regard, Chinese cybersecurity laws allow personal data transfer to other countries only after a security assessment. (Emanuel Pernot, 2020)

4.4. Rest of the world

Countries around the world are approaching data regulation differently. To this day, national governments have enacted more than 1800 privacy laws around the globe. For the sake of clarity, we are giving general insights about them. Data protection laws are conceived either through sectoral laws (with the US as the most prominent country) focusing on specific industries, or omnibus laws. The latter is a corpus of laws billed to protect privacy across all industries (PwC, 2019). This principle has been adopted by most of the countries, including the EU, Canada and Australia among others (Endpoint Protector, 2020). China and India are sitting between the two approaches with different bills addressing either specific industries or focusing on consumers' rights for privacy.

The third principle that governments are considering when shaping these laws is national security: with some countries (such as India, Russia and China) requesting private companies to store their data within the national territory while discouraging (or blocking altogether) cross border transfer of data sets (PwC, 2019). This decision is determined by strategic stances and tariff regulations enforced in other sectors to limit foreign competition.

Private Companies are adapting to these changes and 52% of tech, media and telecom respondents rank data regulation policies as one of three most impactful laws to their businesses (PwC, 2020). In addition to regulation compliance, privacy is also becoming a business differentiator (FocalPoint, 2019). 72% of Americans value control over personal data and are pushing companies to shift from traditional processes (aimed at avoiding regulatory risk) to ethical data stewardship fostering digital transformation within the organization (PwC, 2019).

5. Definitions and Existing Frameworks

The interaction between humans and machines has increasingly gained relevance over the past decades. Indeed, society is more than ever highly connected, and technologies and devices are fully integrated in everyday lives. User engagement (UE) is a crucial concept and has become the ultimate goal for companies, now allocating tremendous efforts in designing websites and online applications. Successful technologies are not just meant to be used but rather interacted and engaged with (Marchionini G, Lalmas M, O'brien H et all, 2014).

Academic researchers from various fields have attempted to define user engagement, yet a universally accepted one is still to be acknowledged. In an attempt of bridging different theories, O'Brien referred to the term as the element of the user experience that leads the actor to increase its desire to use the online application for a long period of time and recurrently, induced by its cognitive, temporal, affective and behavioral involvement (O'Brien, 2016). Furthermore, the following aspects account for the attributed-based approach, which has been followed by Academia in order to outline the guidelines and measurement tools to the complex concept of user engagement:

- Interactivity: the feel of being "drawn in" and having fun.
- Perceived User Control: the extent to which a person can achieve growth potential.
- Pleasure: positive emotions experienced.
- Sensory Appeal: captivates different senses.
- Variety/ Novelty: curiosity and interest in the interactive task.
- Aesthetic Appeal: the attractiveness and visual appeal of the interface.
- Focused Attention: feeling absorbed in the interaction and losing track of time.
- Challenge: investment of effort.

- Endurability: the success of the interaction and users' willingness to recommend.
- Feedback: information communicated to users regarding their performance.

6. Measurement and Key Performance Indicators

The most common ways to evaluate the latter are self-report, direct-observation, neuro-physiological signal processing and web analytics methods. An efficient understanding of UE and its measurement combines all four dimensions and is able to interpret the outcomes as to consciously act upon them (O'Brien, H., & Cairns, P., 2016). Self-report Methods: surveys, questionaries, polls and interviews are self-report methods. Traditionally, respondents are asked questions and answer according to their feelings, opinions and beliefs. These studies provide relevant data that could not be collected otherwise, nevertheless, they present limitations. Validity may be a significant one since people tend to exaggerate, under report, make mistakes and, at times, lie.

Direct Observation Methods: the evaluator examines the subject's behavior in his or her usual environment.

Neuro-physiological Signal Processing Methods: emotions and thoughts are often reflected by involuntary body responses, such as the heart rate, temperature, brain waves or muscle spasms. On one hand, this data is objective and provides valuable insights normally not perceived by conscious awareness. On the other, operationalizing and isolating psychological constructs may be challenging and its measurement can present significant costs when performed on a large scale.

Web Analytics Methods: the direct web traffic, the click-through rate and the conversion rate are some examples of web analytics metrics, which translate the user's online behavior, meaningful patterns and relationships in a clear and objective manner.

Nonetheless, there seems to be some complications related to the existing tools and techniques that struggle to identify unique visitors (distinct individuals visiting a page or multiple pages on the website). Web analytics data should, as a result, be considered as an approximation of reality (Ferrini, A. & Mohr, Jakki., 2008).

7. The integration of Digital in the Physical Experience

Bringing digital into the physical space will provide shops, offices, hotels, airports, train stations and shopping malls, to mention a few, with the ideal set for data collection, analysis, and machine responses, capable of real-time adapting to the end-users' preferences.

Axians' dashboard product will provide companies with data that concerns aspects like the user's behavior, comfort and carbon footprint, emotions, and overall experience. In order to enrich data sources, Axians is considering developing an app product to be used by consumers, reason why focusing on how to optimize their engagement with the app becomes so relevant.

a. Behavioral Mapping

As it will be explored more in-depth in chapter 3, behavioral mapping is a direct observation method that examines people's behavior in a specified place and time, i.e. routes, density, frequency, dwell times, activities, and duration of visit, through a wireless connection.

Pairing this data with the user's profile will generate tremendous possibilities for their engagement. Companies will be able to provide personalized experiences, recommendations and location-based offers to different individuals, for instance, through notifications on their devices.

b. User Comfort and Carbon Footprint

There are several benefits associated with adjusting infrastructure management to the users' comfort (temperature and humidity levels satisfaction) and carbon footprint (energy, water and air conditioning consumption) of the areas occupied by them.

User comfort has a significant impact on satisfaction, trust, commitment and, thereby, engagement in service relationships. Consumers tend to spend more time where they feel the most comfortable in (Spake DF, Beatty SE, Brockman BK, Crutchfield TN, 2003). In regard to measurement, the level of comfort and preferences can either be thrived from self-reported methods or using deep learning of social media activity, as we will explore in following sections.

Monitoring the carbon footprint in real-time will permit managers and building owners to minimize costs, increase the sustainability of spaces, efficiently allocate maintenance resources, and anticipate changes of use.

c. Sentiment Analysis

Consumers are constantly expressing themselves and, increasingly, via social media and websites. Hence, understanding their emotions, opinions, feelings, likes and dislikes towards the brand, adjusting to those, is key to successfully engage them. As explained in previous chapters, sentiment analysis combines all the techniques aimed at mining the data retrieved from social media platforms and actively shared in institutional websites.

d. User Experience

User experience (UX) may be defined as the *"person's perceptions and responses resulting from the use and/or anticipated use of a product, system or service"* (ISO,

2009). A positive experience leads to a higher engagement whereas a negative one may prompt disengagement.

According to Peter Morville's honeycomb's model, seven main factors describe UX (Peter Morville, 2004):

- Useful: this an aspect of the product or service seen from the eyes of the beholder, i.e. does not only concern practical benefits but also others, such as fun or aesthetic appeal.
- Usable: users are able to effectively and efficiently achieve end objectives when using the product or service.
- Findable: products and services must be easy to find.
- Credible: relates to the trustworthiness perceived by end users.
- Desirable: desirability is conveyed in design (branding, image, identity, aesthetics and emotional design).
- Accessible: the product or service is capable of providing an experience accessible by users from a full range of ability.
- Valuable: the product or service delivers value to the business and to the user.

Gaining insights about the distinct user profiles and tailoring their UX is crucial to increase usefulness, usability, and valuableness.

8. Case Study: STAYAWAY Covid App

STAYAWAY Covid is a mobile application that aims to identify potential exposures to people infected with Covid-19 and reduce the spread of its pandemic. It was developed by the Institute of Systems and Computers Engineering, Technology and Science (Inesc Tec) and financed with Portuguese public funds.

The need for a detailed study of the STAYAWAY Covid app in this project lies in the similarities it shares with the way Axians intends to communicate and interact with users and extract insights via the app.

The STAYAWAY Covid app indicates the presence of its user's health status to all nearby devices using random identifiers but without disclosing personal information. The information shared between devices allows STAYAWAY Covid to know the mobile phones one has been close to, how close and for how long (contacts within 2 meters and for more than 15 minutes are considered as highly risky). It notifies the user when he/she has been exposed to an infected one.

STAYAWAY Covid collects data from devices, not directly from users, preserving the anonymity of the user. It collects health data (date, duration, and estimated distance of contact; date of first symptoms, or test date for asymptomatic individuals) and the IP address directly from users.

Withal, STAYAWAY Covid fell short to its promises and failed to engage users. By mid-October, there had been 1.4 million app downloads yet only 116 individuals had updated their health status to "infected" (SAPO, 2020) when, in fact, 2000 were being infected every day in Portugal, at the time.

9. Research: surveying users to understand engagement

a. Motivations and Hypothesis

The main aim of conducting a survey was to scrutinize the engagement of users to a brand within the physical and digital space while analyzing different aspects. Hence, we have divided 27 questions (which can be found in Appendix 1) into 4 groups: "User

Engagement", "STAYAWAY Covid", "User Comfort and Carbon Footprint" and "Demographics".

In the first group ("User Engagement") we wanted to understand the degree to which users were willing to share personal information in exchange for perceived value and under which circumstances they would do so.

Our hypothesis were:

- Users are not willing to share their personal data unless they receive something in return.
- Users engage more and are more willing to share their personal data with private brands rather than governmental ones.
- Users engage more and are more willing to share their personal data with brands that have a social impact.
- Users prefer to engage directly and proactively with a brand rather than through automatic collections of their data.

The purpose of the second group ("STAYAWAY Covid") was to identify the reasons behind STAYAWAY Covid's failure. Our hypothesis were:

- Most STAYAWAY Covid's users do not frequently use the app.
- Non-users are so because they do not agree with its privacy policy.
- Most people have an incorrect perception on the type of data exploited by the app.

In the third group ("User Comfort and Carbon Footprint") we explored the needs for a product like the one Axians's app product. Our hypothesis were:

- Individuals perceive value in such type of product and would be willing to download it.
- Individuals would be willing to share personal data.

Finally, group 4 (“Demographics”) tested the quality of our sample age, gender, and nationality diversity wise.

b. Survey Insights

From the 20th November to the 3rd December of 2020 the survey was conducted via Qualtrics, to which 113 individuals responded. With a mean of 25.39, the ages were comprehended between 21 and 55 years old. 40.38% were male, 57.69% were female and 1.92% preferred not to reveal their gender. Moreover, nationalities included Portuguese (74%), Italian (22%), Polish (2%) and Cuban (2%).

44.23% in our study referred to themselves as “extremely receptive” towards new technologies whereas 53.85% stated they were “somewhat receptive” and 1.92% said “somewhat skeptical” better described their attitude towards new technologies.

From the first group of questions (User Engagement), we have learnt that the majority of people would be willing to share their feelings and opinions about a product or service (96.33%).

When asked to distribute 100 points over 11 different motivations to share those feelings and opinions, the best ranked drivers were “If I am contributing with value to society” (with a mean of 17.57), “If I get something I value in return” (with a mean of 16.65) and “If it is a brand that I love” (with a mean of 15.32). On the other hand, “If I dislike the brand and had a bad experience with it”, “If it is a public product or service” and “If it is a private product or service” did not seem to drive people to share those feelings and opinions, which present the correspondent means of 8.2, 5.9 and 3.72.

The individuals who preferred to get something in return where then presented with a question asking for the rewards they would value the most. Discounts (18.75%), having other products or services from that brand for free (15.91%), having products or

services from their favorite brands for free (13.64%) and having credits to spend in products or services from several brands of their choice (13.07%) were the most appreciated ones.

In regard to under which circumstances to share feelings and opinions, individuals mostly chose to answer some questions immediately after the purchase (in a physical or online store) (20.83%), answer one question every week, received through a notification on their mobile phone (20.00%) and answer as many questions as they wished whenever they could (15.00%). Not actively sharing anything but allowing access to social media activity was only selected by 0.83% and not actively sharing anything but allowing for the wireless connectivity to collect data concerning behavior, routes and dwell times was only selected by 5.83%. Nevertheless, the latter stated that not wasting time (32.26%) and being anonymous (25.81%) were the facts in the basis of that preference.

The remaining 3.67% who would not be willing to share their feelings and opinions, justified their decision with “I don't have the patience” (33.33%), “I don’t have the time” (16.67%), “I wouldn't get anything in return” (16.67%) “I don't have anything to say” (16.67%) and “I don't like to share my feelings and opinions with an entity I don't trust” (16.67%). No factors seemed to change their decision.

Finally, the three most elected characteristics a brand should have in order to be worth it for individuals to actively share their feelings and opinions about products and services were trustworthy (24.32%), sustainable (16.22%) and socially impactful (16.22%). *Au contraire*, being young, low-cost, or fun would not make a brand worth of sharing feelings and opinions with, as only 5.95%, 5.95% and 4.86% chose such qualities.

In the second group of questions, the mobile application STAYAWAY Covid was briefly introduced and its main features, explained. Then, individuals were asked whether

they were users of this app and, depending on their answer, they would be displayed different following questions.

Of the 32.73% who answered “Yes”, 41.18% read the terms and conditions prior to using the app. 35.29% use the app every day, 25.53% every week, 25.53% every month and 17.65% stated they never used it. 0% used it multiple times a day. Subsequently, users were asked to rank the app on a scale of 1 to 5 on five aspects (where 1 corresponded to “very bad” and 5, “very good”). User friendliness was the top quality of the app, with a mean classification of 4, followed by the design with a mean of 3.35, reliability with a mean of 3.25, efficiency with a mean of 3.06 and, lastly, the engagement with a mean of 2.71.

67.27% of our sample stated they were not STAYAWAY Covid users yet. 43.24% did not see any value in using the app, 24.32% did not know about its existence and 24.32% did not agree with its privacy policy.

Concerning the likeliness of becoming users, 5.41% said they would for sure become, 32.43% probably would, 51.35% probably will not and 10.81% for sure will not.

Overall, individuals who answered the survey rated the value proposed by STAYAWAY Covid with a mean value of 6.46, in a scale of 0 to 10, where 0 corresponded to "no value" and 10 to "extremely valuable". As to the type of information collected by STAYAWAY Covid, 30.28% of individuals think that it extracts the proximity and duration contact (to an infected individuals), 23.24% the geographic location, 22.54% the date of infection, 11.97% the IP address, 8.45% demographic information (such as age and gender) and 2.82% the social media activity.

Question 23 clarifies the type of data collected by STAYAWAY Covid (date, duration, and estimated distance of contact date of first symptoms and the IP address).

Given this, and considering a scale of 0 to 10, where 0 means "not intrusive" and 10 "extremely intrusive", our sample found the data collection by the app with a mean value of 5.06.

In the third set of questions, the idea of a mobile application designed around the user's activity to increase comfort, efficiency and sustainability of spaces was presented. In a scale of 0 to 10, where 0 referred "no value" and 10 "extremely valuable", our sample saw a mean value of 5.86 in such service. 7.55% would be extremely willing to download that app and 56.60% would be somewhat willing, presenting as reasons "I could have a personalized experience" (32.54%), "I would contribute to a more efficient system" (27.84%) and "I would be helping the planet" (11.24%). 35.85% would not be willing to do it: 27.78% did not see any value in it, 27.78% thought it would invade their privacy and 16.67% did not have enough motivation.

In relation to the type of data individuals would be the most prone to share, preferences on temperature, air conditioning, lighting, and others were elected by 26.67%, geographic location by 23.33% and demographic information (such as age and gender) by 20.83%. Only 11.67% were willing to share their name, 10% their IP address and 4.17% their social media activity.

Lastly, to the open question of "which other factors would increase your comfort in public spaces?", people in our sample gave several different answers. Music volume and genres, occupancy rates and seats availability, smells and perfumes, and humidity were among the most common ones.

10. Case Study: Modatta App

Modatta is a mobile app that works as a marketplace of personal data, i.e. companies pay users for their data. On one hand, users are provided with an additional revenue

stream and, on the other, companies are provided with valuable insights of their interest. It may be interesting for Axians to analyze Modatta's business model and operations as an example of what features to include in its Customer App product.

There are three main features in Modatta's platform: 1) Users create and maintain a profile with personal data and main interests (manually and through social media connectivity); 2) Companies can target user profiles by placing bids and the end users who accept those will share specific information, read a text, go to an URL, answer a particular question, amongst others; 3) Users are able to query companies for tailored offers.

11. Conclusions and Recommendations

From the work produced in this dissertation and the insights found, some conclusions may be drawn and recommended to Axians. They will be categorized into the same four components of the project: behavioral mapping, user comfort and carbon footprint, sentiment analysis and user experience.

a. Behavioral Mapping

We have found that users are likely to share their location and that the collection of this type of data has no influence on their engagement, i.e. respondents did not find geographic location data collection intrusive.

Thus, Axians will be able to pair information regarding user routes, density, frequency, dwell times, activities, and duration of visit, through a wireless connection with users' profiles.

b. User Comfort and Carbon Footprint

As previously stated, in our study, users were predisposed to sharing their preferences on temperature, air conditioning and lighting, which validates the relevance of a product like Axians's. Nevertheless, they affirmed other factors played a relevant role in their comfort in public spaces.

Respectively, we recommend Axians to consider integrating music volume and genre, occupancy rates and seats availability, smells and perfumes, and humidity as variables for the user comfort and carbon footprint.

c. Sentiment Analysis

Sentiment Analysis brings extremely valuable findings that no other source seems to provide, and, in general, people in our sample were open to actively sharing their feelings and opinions about products and services. As previously mentioned, in exchange, they were interested in possibly contributing to society, receiving discounts and products from brands they loved. Our recommendation to Axians regarding sentiment analysis is the incorporation of a gamification system in the mobile application. Gamification is the integration of game-like features in non-game contexts, and a strategy that is proved to boost engagement (Looyestyn J. et al, 2017). Accordingly, users will be able to earn points and spend them.

In order to earn points, users must:

- Share personal data: when they download the app, users create their profile and, the more personal information (such as name, age, gender, nationality, profession) is added to their profile, the more points they will receive.
- Answer specific questions: after creating their profile, users must select the brands to which they could answer questions about and choose how often they would do

it (multiple times a day, every day, every week or every month). Every time they answer a question, they receive a pre-established number of points. Examples of these questions are: *"Would you return to this store?"* and *"Rank your overall experience with this brand/store in a scale of 1 to 10 (where 1 means you had a terrible experience and 10 you had the best possible one)"*.

- Connecting the app to social media platforms: users who allow the app access to their social media activity are rewarded with points. The app will not automatically post anything in the users place but will have access to the data present on those platforms.
- Recommend a store to a friend: users can also recommend a store to a friend which will grant them more points.

Then, after gathering a considerable amount of points, they would be able to spend those in:

- Contributions to non-profit organizations under their name: vouchers of 5€, 10€ and 20€ would be available for exchange of points (the higher the donation, the higher the number of points required for the exchange). Users could choose the organization from a list with partner institutions. Once the donation is done, the user receives an e-mail attesting for the transaction and thanking him/her.
- Discounts in stores of their choice: the user decides the store and the percentage of the discount and the app will generate a code that he/she will present at the store (the higher the discount percentage, the higher the value of points required).
- Selected products and services: the user may also exchange his/her points for products and services from a predefined range of brands. Those products and services are defined by the brands and may be store merchandise, samples of products, products of past seasons, among others.

d. User Experience

In all, the recommendations presented in the previous sections will improve UX since they will allow Axians to learn more about the distinct profiles of users and tailor offerings and suggestions.

Managers can create different campaigns and geofence areas to trigger actions based on predefined rules such as multichannel engagement through SMS, email or Push Notification. Such campaigns would leverage the interest gauged from the most active members with personalized offers and pricing adjusted on past demand. A virtual assistant should be included in the smartphone app as well: a chatbot that operates across different touchpoints. The text-based agent helps the user navigate around the shop listing the available coupons and if there any special events planned for the day to maximize the time spent by the visitors in the premises. The same agent would operate on the online shop of the brand connecting to the backend services to manage help requests and collect customers' feedback on products through Sentiment Analysis.

We believe, this way, Axians will be able to develop a usable, useful, findable, accessible, credible, valuable and desirable experience to its users and will, most likely, succeed in the marketplace.

12. Appendixes

a. Appendix 1 – Survey Questions

Group 1: Informed Consent

NOTE: You need to be over 18 years old to participate in this research.

The purpose of this questionnaire is to examine the engagement of users to a brand within the physical and digital space.

You need to complete this study on a computer (laptop or desktop) or phone. It should take you 5-10 minutes.

Investigators: Sara Aguiar, Valerio Pagano and Vera Rocha (Nova School of Business and Economics)

You may withdraw from this research at any time with no penalty and you may skip questions you do not wish to answer.

Anonymity: Your name and email will never be paired with your data. Results may include summary data, but you will never be identified. Your data is completely anonymous and will not be shared with third parties. There are no right or wrong answers when we ask about your personal thoughts and feelings: we are interested in your authentic opinion. Your answers will never be judged.

If you have any questions about this research session, and/or you want to know the final results, you may contact Sara Aguiar (33441@novasbe.pt), Valerio Pagano (38707@novasbe.pt) or Vera Rocha (24235@novasbe.pt).

Thank you for taking the time to respond to these questions.

Group 2: User Engagement

Question 1 [Multiple Choice; Single Entry]: Would you be willing to share your feelings and opinions about a product or service?

- Yes
- No

Question 2 [Constant Sum]: What would make you share those feelings and opinions? Please distribute 100 points over the following:

- If I get something I value in return
- If it is anonymous
- If I get a personalized experience
- If I am contributing with value to society
- If it is a brand that I love
- If I dislike the brand and had a bad experience with it
- If I am contributing to the creation of products and services that better fulfill my needs
- If I am contributing to the creation of products and services that better fulfill the needs of all consumers
- If it is a public product or service
- If it is a private product or service
- Other (please specify)

Question 3 [Multiple Choice; Multiple Entry]: Why not?

- I don't have the time
- I don't have the patience
- I wouldn't get anything in return

- I don't have anything to say
- I don't like to share my feelings and opinions with an entity I don't trust
- I don't know what my data will be used for
- I don't trust products or services from the government
- I don't trust products or services from private entities
- Other (please specify)

Question 4 [Multiple Choice; Multiple Answer]: Which of the following factors would change your decision?

- Getting something I value in return
- If it is anonymous
- If I get a personalized experience
- If I am contributing with value to society
- If it is a brand that I love
- If I dislike the brand and had a bad experience with it
- If I am contributing to the creation of products and services that better fulfill my needs
- If I am contributing to the creation of products and services that better fulfill the needs of all consumers
- If it is a public product or service
- If it is a private product or service
- Other (please specify)

Question 5 [Multiple Choice; Multiple Entry]: You have selected "Getting something I value in return". Please indicate which of the following rewards you would value:

- Discounts

- Have other products or services from that brand for free
- Have products or services from other Portuguese brands for free
- Have products or services from sustainable brands
- Have products or services from my favorite brands
- Have credits to spend in products or services from several brands of my choice
- Donations under my name to institutions of my choice
- Workshops or courses that help me to attain personal objectives
- Other (please specify)

Question 6 [Multiple Choice; Multiple Entry]: Under which conditions would you prefer to do it?

- Answer one question every day, received through a notification on your mobile phone
- Answer one question every week, received through a notification on your mobile phone
- Answer as many questions as you wish whenever you can
- Answer some questions immediately after the purchase (in a physical or online store)
- Write a public review
- Write a review via chatbot
- Through emojis that express those feelings and opinions
- Not actively sharing anything but allowing access to my social media activity
- Not actively sharing anything but allowing for the wireless connectivity to collect data regarding my behavior, routes and dwell times
- Other (please specify)

Question 7 [Multiple Choice; Single Entry]: You preferred not to actively share anything but instead provide some indirect feedback. Which of the following reasons is in the basis of that preference?

- I wouldn't have to waste time
- I wouldn't have to install a mobile app
- It would be more genuine
- I wouldn't have to be politically correct
- It would be anonymous
- Other (please specify)

Question 8 [Multiple Choice; Multiple Entry]: In your opinion, which characteristics should a brand have in order to be worth it for you to actively share your feelings and opinions about its products and services?

- Low-cost
- Luxury/ Premium
- Young
- Well-established
- Trustworthy
- Modern
- Fun
- Sustainable
- Socially Impactful
- Other (please specify)

Group 3: STAYAWAY Covid Case Study

In order to move forward in the questionnaire, you need to know more about the app STAYAWAY Covid

STAYAWAY Covid is a mobile application that aims to identify potential exposures to people infected with Covid-19 and reduce the spread of its pandemic. It was developed by the Institute of Systems and Computers Engineering, Technology and Science (Inesc Tec) and financed with Portuguese public funds.

The app indicates the presence of its user's health status to all nearby devices using random identifiers but without disclosing personal information. The information shared between devices allows STAYAWAY Covid to know the mobile phones one has been close to, how close and for how long (contacts within 2 meters and for more than 15 minutes are considered as highly risky). It notifies the user when he/she has been exposed to an infected one.

Up until recently, STAYAWAY Covid usage was completely voluntary and the Portuguese response to it was rather positive. Nevertheless, several institutions have raised their concern on transparency and the citizens' privacy.

Question 9 [Multiple Choice; Single Entry]: Are you a user of STAYAWAY COVID already?

- Yes
- No

Question 10 [Multiple Choice; Single Entry]: Did you read the terms and conditions carefully prior to using it?

- Yes

- No

Question 11 [Multiple Choice; Single Entry]: How frequently do you use it?

- Multiple times a day
- Everyday
- Every week
- Every month
- Never

Question 12 [Matrix Table]: Please evaluate the app on the following aspects considering a scale of 1 to 5, where 1 means "very bad" and 5 means "very good":

	1	2	3	4	5
Efficiency					
User Friendliness					
Reliability					
Design					
Engagement					

Question 13 [Multiple Choice; Single Entry]: Why not?

- Did not know about its existence.
- Do not see any value in using it.
- I do not agree with its privacy policy.
- I do not care if I get the corona virus.
- Other (please specify)

Question 14 [Multiple Choice; Single Entry]: How likely are you to become a user?

- For sure will become
- Probably will become
- Probably won’t become
- For sure won’t become

Question 15 [Slider]: How much value do you see in this service? Considering a scale of 0 to 10, where 0 means "no value" and 10 "extremely valuable".

Question 16 [Multiple Choice; Multiple Entry]: What type of data do you reckon STAYAWAY Covid exploits?

- Geographic Location
- Proximity and duration contact (to an infected individual)
- Demographic information (such as age and gender)
- IP address
- Social media activity
- Date of infection
- Other (please specify)

Question 17 [Slider]: STAYAWAY Covid collects data from devices, not directly from users, which allows it to preserve the anonymity of the user. Even knowing this, please assume that it collects health data (date, duration, and estimated distance of contact; date of first symptoms, or test date for asymptomatic individuals) and the IP address directly from users.

How violating/intrusive would you find this data collection? Considering a scale of 0 to 10, where 0 means "not intrusive" and 10 "extremely intrusive".

Group 4: User Comfort and Carbon Footprint

Question 18 [Slider]: Now imagine, if a building's space (such as an airport) was designed around your activity to increase your comfort through a mobile application, and, hence, turning it more efficient and environmentally friendlier.

The app would be implemented to track and predict your movement and trigger the changes to your preferences before you enter the room – for instance air conditioning and electricity are adapted and, when you leave, they are shut down.

How much value do you see in this service? Considering a scale of 0 to 10, where 0 means "no value" and 10 "extremely valuable.

Question 19 [Multiple Choice; Single Entry]: How willing would you be to install this app?

- Extremely willing
- Somewhat willing
- Not willing

Question 20 [Multiple Choice; Single Entry]: Why?

- I could have a personalized experience
- I would contribute to a more efficient system
- I would contribute with value to society
- It would increase my comfort
- I would be helping the planet
- Other (please specify)

Question 21 [Multiple Choice; Single Entry]: Why not?

- I don't see any value in it
- I think it invades my privacy

- I don't have enough motivation
- I don't have enough information about it
- Other (please specify)

Question 22 [Multiple Choice; Multiple Entry]: What type of personal data would you be willing to provide to use this app?

- Geographic Location
- Demographic information (such as age and gender)
- IP address
- Social media activity
- Name
- Preferences on temperature, AC, lighting, and others
- Other (please specify)

Question 23 [Text Entry]: Besides lightning and temperature, which other factors would increase your comfort in public spaces?

Question 24 [Multiple Choice; Single Entry]: What best describes your attitude towards new technologies?

- I am extremely receptive
- I am somewhat receptive
- I am somewhat skeptical
- I am extremely skeptical

Group 5: Demographics

Question 25 [Text Entry]: How old are you?

Question 26 [Multiple Choice; Single Entry]: To which gender do you most identify?

- Female
- Male
- Other
- I prefer not to say

Question 27 [Text Entry]: What is your nationality?

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