

# **Commercialization of an interactive story universe *hello X***

*Commercial potential of a participatory media product in Science  
Communication*

**Marina Borovaya**

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# Foreword

The process of writing this thesis has been quite a journey, which would be difficult to navigate without help of several people.

I would like to thank my supervisor Dagfinn Sætra for sharing his knowledge and providing me with helpful advice throughout the process. I also wish to express my gratitude to professor Lene Foss for her encouragement and supportive guidance.

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## Abstract

This thesis explores the commercial potential of an interactive story universe *hello X*, developed by Ice-9, a Tromsø based media company which specialises in using fiction narratives in participatory workshops and live events, interactive games, museum exhibitions and more traditional audio-visual productions. It uses creative co-production concept to generate rich media content, intended to nurture debate on large-scale socio-economic issues. The main focus of the thesis is on developing a viable commercialisation strategy for *hello X*, through analysing its innovative potential and market opportunities and particularly its potential in science communication. The introductory chapter of the thesis provides the discussion on the importance of the topic, outlines the structure of the thesis along with the choice of theoretical frameworks, research design and methodology. The innovation study explores the innovative potential of *hello X* regarding its use in science communication. The market study follows the customer discovery model to identify the customer need and on that basis, provides the strategic customer segmentation and positioning, followed by environmental analysis PESTEL. The final chapter of this thesis is a business plan, which proposes a strategy based on the insights from innovation and market studies.

Key words: commercialization, innovation, science communication, transmedia, interactive

# Table of Contents

Abstract .....	3
1 Introduction .....	7
1.1 The Importance of the topic.....	9
1.2 Research question .....	12
1.3 Choice of theoretical Frameworks .....	13
1.3.1 Innovation study.....	13
1.3.2 Market study.....	16
1.3.3 Business plan.....	18
1.4 Research design and Methodology .....	18
1.5 Limitations.....	20
1.6 Conclusion .....	20
2 Innovation Study .....	22
2.1 Introduction .....	22
2.2 Technological description of <i>hello X</i> .....	22
2.3 Value visions .....	24
2.3.1 Customer utility.....	24
2.3.2 Business utility .....	25
2.3.3 Value for society .....	25
2.4 Innovation analysis .....	26
2.4.1 Product System Innovation .....	26
2.4.2 Process innovation.....	28
2.4.3 Network Innovation.....	30
2.5 Conclusion .....	33
3 Market Study .....	35
3.1 Introduction .....	35
3.2 Customer discovery model. Hypotheses and validation.....	36
3.2.1 Actual user hypothesis .....	36
3.2.2 Actual user hypotheses validation.....	37
3.2.3 Influencers hypoteses and validation .....	38
3.2.4 Economic buyer.....	39
3.2.5 Economic buyer hypothesis validation .....	40
3.2.6 Recommenders hypotheses and validation. ....	41
3.2.7 Decision maker hypothesis and validation .....	41
3.2.8 Influencers hypothesis and validation .....	42

3.3	Product and need. Hypotheses and validation .....	42
3.3.1	Product hypotheses .....	42
3.3.2	Product Insights .....	44
3.3.3	Problem/need hypotheses .....	44
3.3.4	Position on a problem recognition scale .....	45
3.4	Strategic market analysis .....	47
3.4.1	Segmentation .....	47
3.4.2	Positioning .....	47
3.4.3	Market type .....	48
3.4.4	Go to market strategy .....	49
3.4.5	Competition hypotheses and insights .....	49
3.4.6	PESTEL-Analysis .....	53
3.5	Conclusion .....	54
4	Business plan .....	56
4.1	Executive Summary .....	56
4.2	Business Idea and Business Model .....	57
4.2.1	Business Idea .....	57
4.2.2	Vision .....	57
4.2.3	Mission .....	57
4.2.4	Profit model .....	57
4.3	Solution. hello X interactive story universe .....	58
4.4	Market .....	59
4.4.1	Science communication .....	59
4.4.2	Customer .....	59
4.4.3	Competitors .....	60
4.5	Go to Market .....	61
4.6	Team .....	62
4.7	Economic overview .....	63
4.8	Status .....	63
4.9	Milestones .....	64
4.10	Risks .....	65
4.11	Conclusion .....	65
	References .....	66
	Appendix 1 .....	68

## List of Tables

Table 1. Interviewees .....	19
Table 2 Actual user hypotheses and validation.....	38
Table 3 Influencers hypotheses and validation .....	39
Table 4 Economic buyer hypotheses and validation.....	41
Table 5 Recommenders.....	41
Table 6 Decision maker hypotheses and validation.....	42
Table 7 Product features.....	43
Table 8 Product insights.....	44
Table 9 Customer problem/need hypotheses .....	45
Table 10 Position on a problem recognition scale .....	45
Table 11 Customer problems/needs .....	47
Table 12 Market type .....	49
Table 13 Competition hypotheses .....	50
Table 14 Direct competitors to hello X in relation to actual users.....	50
Table 15 Direct competitors in relation to science museums .....	51
Table 16 Direct competitors in relation to research institutes.....	52

## List of Figures

Figure 1 Map of innovation space (Bessant et al., 2014, p. 1287).....	15
Figure 2 Product model.....	23
Figure 3 Innovation types.....	26
Figure 4 User integration into value chain.....	30
Figure 5 Value chain .....	40
Figure 6 Product model.....	58
Figure 7 Value chains.....	60

# 1 Introduction

Scientific research is revealing complex truths about the impact of human activity on the planet. It is increasingly important that science, particularly in the areas of climate change and human impact, fairly communicates the risks and uncertainty to policy makers and the public. Other issues related to food security, AI, human enhancement, privacy and more also contribute to rising public concerns. To maintain its positive role, science must take into consideration society's changing concerns and needs. In order to ensure that current research, that is publicly funded, reflects the best interests of the society, two-way communication between scientific community and the public needs to be established.

Communication between science and society is a challenging process, which requires a set of skills and capacity that communication departments of research institutes and research projects often do not have. The reason for that is that public communication is not given enough priority, in contrast to communication with stakeholders and other scientists (Claessens, 2014). The most common form of public communication is a press release, which on the one hand, contributes to increased interest and awareness among stakeholders, funders and general public, but, on the other hand, consistently lacks context (Carver, 2014). Even though a purpose of press release is communication, without framing it into a broader context and addressing various aspects of the research, like moral or economical, a press release alone is hardly enough to generate engagement.

Various creative professionals and media development specialists are able to produce media products that integrate science content and generate public engagement. For instance, television sitcom *The Big Bang Theory*, featuring a wide range of scientific content from physics and neuroscience, has been a top-ranking television show, according to Nielsen Media Research. While this sitcom has been co-produced with Warner Brothers, what contributed to its commercial success, smaller creative firms often struggle to commercialise their products. Films, series, books and other products in media industry fall into a category of 'symbolic goods', products, communicating symbolic meaning, which is perceived by a consumer (Bilton, 1999). The fact that the value of symbolic goods is a subject to consumer's interpretation, makes commercialization of such products a challenging process.

Media industry has overcome a drastic change in the past decade. With the wide spread of free online social content, media companies had to respond by adopting the model where they

provide content across various platforms and open up to various commercial deals (Clark, 2015). Because vast amount of content is available to users online free of charge, the revenue streams for media companies are have to be generated through sponsorship and ad sales.

This thesis explores the commercial potential of a participatory media product, developed by Ice-9. Ice-9 is a Tromsø based media company which specialises in using fiction narratives in participatory workshops and live events, interactive games, museum exhibitions and more traditional audio-visual productions. Being a cross breed between art production and media company, Ice-9 is leveraging technology, art, and virtual media platforms for co-creation, experiential design, dissemination of knowledge, and interaction of ideas. It uses creative co-production concepts to generate rich media content, intended to nurture debate on large-scale issues, like climate change and pollution, and to convey complex ideas from the world of scientific research to a broad public.

Ice-9's current project, *hello X* integrates different formats (workshops, podcasts and films, interactive sculptures and digital story experiences) to create a crowdsourced interactive fiction universe around X, who stands for an unknown young woman living in the Arctic in 2068. This setup, where a character of the story lives in the future Arctic, allows to illustrate impacts of human activity and implication of current environmental research in the area. As project progresses, new storylines will emerge and new characters will populate the future universe, which audience can engage with both online, through podcasts, films and hello X discussion forum and offline, through live events and interactive exhibition in museums and public spaces. The main focus of the thesis is on developing a viable commercialisation strategy for *hello X*, through analysing its innovative potential and market opportunities.

This chapter outlines the structure of the thesis, consisting of four interrelated chapters, introduction, innovation study, market study and the business plan. The rest of the introduction starts with describing the importance of the topic, and a section where the central research question and related to it research sub questions are presented. The part explaining the choice of theoretical frameworks includes three sections, which provide theoretical background for each chapter, innovation study, market study and business plan accordingly. The subsequent section presents the research design and research methods used, indicating that the thesis is a case study based on qualitative data collection through interviews, combined with the analysis of secondary data. The next section discusses the limitations of the thesis, and is followed by a conclusion.



## 1.1 The Importance of the topic

*“Science is not finished until it’s communicated”*

Sir Mark Walport (Mar et al., 2016)

The complexity and the scope of environmental issues that we are currently facing requires coordinated global response. Some may say that it is the government, who should introduce new regulations, however, it can do little without the radical involvement of the population. In the perfect world, when scientists generate knowledge which has a potential to benefit society, they communicate it to the public, which responds by generating appropriate policies and influencing the government to enforce regulations. It has positive impact and strengthens the authority of science and the government. Unfortunately, this is not how things unfold in reality, because the communication between scientists, society and the government has never been that simple.

The concept of science communication has many layers. It involves communication within scientific community, between scientific community and the media, between scientific community and the public, between media and the public, between scientific community and the government and between government and the public (Jucan and Jucan, 2014).

Communication within the scientific community traditionally takes form of publications in scientific journals. It works for scientists, both in terms of sharing and developing knowledge, but also in terms of recognition and reward. While communication between scientists is well established and regulated, communication between scientific community and the public is more fluid and can take different forms. It goes through various channels, including traditional journalism, online communication platforms, museums and live events during festivals and conferences.

Despite this diversity of options, communicating science to the public is still a challenge. On the one hand, it is recognised that scientists are responsible for communicating their findings to the public, however, it is unfair to expect them to be effective communicators, as there is very little focus on communication with non-scientists in their professional training (Graziano, 2016). In addition to it, there is almost no incentives for scientists to take on this

challenge, as they don't receive credit for it in the scientific community in the same way they do for publications in scientific journals.

In Norway, this issue of the lack of incentives gradually becomes recognised on an agency level, which is a positive change. Last year Norwegian Research Council made NOK 60 million available for research projects on sustainable societal development. It was mentioned explicitly in the program description, that project with clear public outreach goals and a detailed plan, will be given priority (Forskningsråd, 2017). Introduction of rewards, however, contributes to the fact that expectations about the science communication are rising. From the perspective of environmental issues, the urgency and the scope of challenges we are facing, turns these rising expectations into demand. At the same time, considering the lack of communication skills within scientific communities, it is difficult to meet these expectations even of institutional level, when communication departments focus mainly on press releases, which is clearly not sufficient to engage modern audiences. Effective communication implies long-term public engagement, which is difficult to sustain. Research institutes struggle to stay up to date with rapidly changing medial culture. Integrating the emerging media trends into science communication in order to create and maintain public engagement requires a set of skills that research institutes do not normally have.

Creative professionals use their skills to generate narrative content that can be deeply engaging for the audience experiencing it. A maturing body of work indicates that the arts can deeply engage people by focusing on the affective domain of learning (i.e., engagement, attitude, or emotion) rather than on cognitive domain (i.e. understanding, comprehension or application) which is often emphasized in science education (Lesen et al., 2016, p. 657). Another work highlighted benefits of community-based approach to communicating science through arts, which initiated a positive change in community behaviour, encouraging action on environmental issues and stimulating engagement (Evans, 2014). The arts ability to generate engagement, by affecting audience on emotion level, makes it a great tool for communicating complex issues that are normally difficult to relate to. From the business perspective, however, those in the creative industry, who could take on this challenge, mainly freelance artists and small creative businesses, have 'limited access to capital investment and to distribution in the mainstream markets' (Evans, 2014, p. 26).

On the one hand, there is a need in the market that can be fulfilled by the creatives, but the loose social structures they operate in makes it difficult to sustain a venture for an extended

period of time. Therefore, there is a need for developing a new structure that would connect research institutions, creative professionals and digital development specialists (experience designers, web developers), who build functional infrastructures for the content provided by creative professionals and distributors (museums and festivals) into a functional network.

This thesis explores the challenge of creating a viable business on producing narrative media based on scientific research. It is built on a real case of commercialization of an interactive story universe *hello X*, a brainchild of an Oscar nominated documentary film maker and co-founder of Ice-9 Christine Cynn. For the past decade, she has been working on developing new ways of documenting human imagination. She combined fiction and documentary to recreate experiences and events from the past to draw the public attention to political violence and arm trade, issues explored in the films “The act of killing” and “Shooting ourselves”. The innovative concept behind “The Act of Killing” is also a driving force behind Ice-9’s interactive story universe *hello X*. Combining fiction, cutting edge research and new technology *hello X* aims to communicate complex matters such as climate change and pollution in an interactive way, from a perspective of a future person living in the Arctic in 2068.

For Ice-9 imagination is the key asset, stories the currency of exchange, and the driver is our common desire for present and future prosperity in the face of unprecedented collective challenges. Key innovations include creative co-production of knowledge and the development of new platforms, formats and spaces where numerous stakeholders can develop inclusive, collaborative responses to long-term and complex challenges like climate change and pollution (Cynn et al., 2017).

Since broad engagement across sectors and among diverse stakeholders is a requirement, the means of creating such a community and new productive feedback channels must be incremental, to engage stakeholders 'where they are', while the underlying goal is radical (Cynn et al., 2017). As complex social and environmental issues blur the boundary between science, society and politics, it is vital to build trust and establish collaborative relationship between science, government and society.

## 1.2 Research question

The goal of this thesis is to support Ice-9 in the commercialisation process of its interactive story universe *hello X*, by proposing an appropriate business strategy. It is important to formulate the research questions in a way that will guide the research in the direction that is aligned with the identified goal.

The central research question should be initiating the exploration of the particular concept, therefore it is recommended that it begins with *what* or *how*. In order to narrow down the focus and guide the research into specific direction, research sub questions are used.

The central research question this thesis aims to answer is:

*How can we assess the commercial viability of an interactive story universe hello X, developed by media production company Ice-9, through analysing its innovative potential and its market opportunities?*

This research questions can be divided into parts, forming three research sub questions. Each of these sub questions is answered in a respective chapter of the thesis.

The first chapter, Innovation study, answers the research sub question: *What constitutes the innovative potential of hello X what implications does it have for Ice-9?* It provides the innovation analysis of *hello X* and discusses the implications that identified innovation types have for the company.

The next chapter of the thesis, Market study, answers the sub question: *How can we assess the market opportunities for hello X?* Taking the customer utilities defined in the innovation study as a starting point, Market study provides the analysis of market opportunities, in terms of who are the potential customers for *hello X* and what are their needs.

Combining the insights from Innovation study and Market study, the business plan outlines the business strategy for *hello X* by answering the sub question: *What is the business strategy for successful commercialisation of hello X?*

## **1.3 Choice of theoretical Frameworks**

### **1.3.1 Innovation study**

The first and second generations of innovation models view innovation as a linear process, which is either technological or market related (Tidd and Bessant, 2013). The more interactive and dynamic view on a subject matter is reflected in the innovation literature from 2000s and onwards (Garcia and Calantone, 2002, Tidd et al., 1997). The interactive approach to innovation emerged in opposition to the ‘traditional linear model of innovation “pushed through” by science or “pulled along” by the market’. It implies that innovation is an interactive process appearing between firms at the inter-organisational level, as well as between firms and the wider institutional environment (Vermeulen and Paier, 2017, p. 41). Innovation cannot be separated from the context where it occurs.

Garcia and Calantone (2002, p. 110) pointed out that the following definition of innovation best captures the essence of the term: “Innovation is an iterative process initiated by the perception of a new market and/or new service opportunity for a technology- based invention which leads to development, production, and marketing tasks striving for the commercial success of the invention”. Even though the concept of invention is central to this definition, the process perspective and link to market opportunity and commercial success create a larger context for the use of the term. This view is supported by Keeley et al. (2013, p. 24), who define innovation as “the Creation of a Viable New Offering”, specifying its financial sustainability and emphasizing that ‘innovation’ is not an ‘invention’ and is not limited to products and services.

Theoretical framework “The Ten Types of Innovation” reflects more than 25 years of innovation research conducted by Doblin, a consulting firm founded by Jay Doblin and Larry Keeley in 1981. Doblin was one of the first to apply social sciences and strategic design to solving business problems (Doblin, 2018). The framework emerged from the inductive method, where 2000 successful innovations were analysed in search for patterns. The research resulted in defining the ten types of innovation related to different aspects of the venture.

While the vast amount of innovation literature views product as a centre of innovation process (Song and Montoya - Weiss, 1998, Cooper and Kleinschmidt, 1987), The Ten Types of Innovation framework is designed around the whole user experience, rather than just product. Even though product or service is often central to the innovation process, it can be argued that this approach is limiting the innovation analysis, as it does not include innovations that are

not directly related to the product. Some innovations influence activities and models around the product, often without affecting the product or service itself. These activities and models include a process of creating the product, marketing strategy, profit model, internal structure of a firm and network around it, which can be considered innovative, if they cause technological or market discontinuity on micro or macro level, or both. In order to include these into analysis, Keeley et al. (2013) put user experience, not the product, in the centre of innovation process, and include surrounding it structures and models.

Keeley et al. (2013) distinguish ten types of innovation, which can be discovered by examining the project or a firm from three different perspectives, Configuration, Offering and Experience. Configuration refers to the way in which the firm is constructed and includes innovations in Profit Model, Network, Structure and Process. Offering is constituted by two types of innovation that relate to the product or service directly – Product Performance and Product System. The last category combines innovations for which customer experience is central - Service, Channel, Brand and Customer Engagement. Considering the participatory nature of hello X, and variety of products within it, applying these different perspectives allows to break the project down into units that can be analysed more thoroughly.

Innovativeness can be perceived as ‘a measure of the potential discontinuity a product or service causes in the marketing and/or technological process’ (Garcia and Calantone, 2002, p. 113). Highly innovative products tend to have superficial existing markets and knowledge bases, in contrast with low innovative products. In the innovation literature, they are often categorized as ‘radical’ and ‘incremental’. Garcia and Calantone (2002) concluded that in order to be labelled radical, innovation need to be causing marketing and technological discontinuity on both macro and micro level. Incremental innovation, in turn, occurs only on a micro level and causes discontinuity either in the market or in terms of technology, but not both. According to Garcia and Calantone (2002, p.120), the way of categorizing innovation only as ‘radical or ‘incremental’ is too simplistic, therefore, they establish a third category of ‘really new’ innovations. They suggest a method for classifying innovation, which can be used as a common ground for both researchers and practitioners:

Radical innovations are innovations that cause marketing and technological discontinuities on both a macro and micro level. Incremental innovations occur only at a micro level and cause either a marketing or technological discontinuity but not both. Really new innovations cover the combinations in between these two extremes (Garcia and Calantone, 2002, p.120).



According to this logic, ‘radical’ innovations makes 12,5 %, really new – 50% and ‘incremental’ – 37,5% of all innovations (Garcia and Calantone, 2002, p.120).

From the perspective of a firm, incremental innovation is associated with low risk and established knowledge bases, while radical innovation involves greater risks and has shallow knowledge bases (Bessant et al., 2014p. 1284). Radical innovation is more challenging to the firm, not only because of the scarcity of knowledge, but also due to the lack of established management practices. The following framework, proposed by Bessant et al. (2014) explores the challenge of radical innovation for firms in terms of their framing of the environment and management routines employed to deal with innovation (see figure 1).

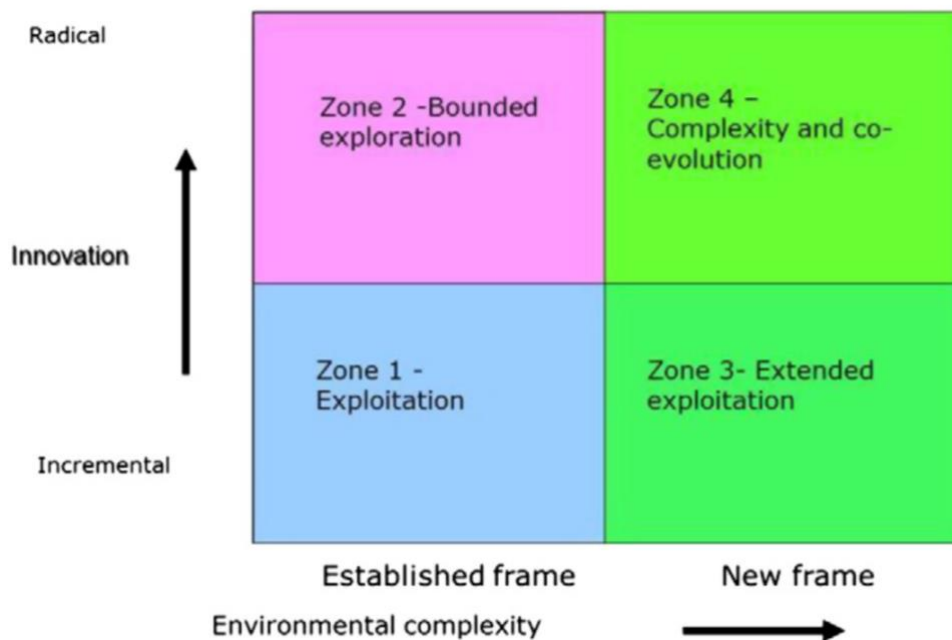


Figure 1 Map of innovation space (Bessant et al., 2014, p. 1287)

Position of the company within the innovation space determines the set of management routines the firm needs to establish around search, selection and implementation, which are key elements of innovation. Bessant et al. (2014) conclude that radical innovation requires organizations to have established set of management routines, but at the same time to be able to experiment with alternative routines for search, selection and implementation under different conditions. Moreover, organisation need to develop their dynamic capability, which is the ability to switch between these two sets of routines, as conditions change (Bessant et al., 2014).

Looking at this framework through the methodological lens of Garcia and Calantone (2002), zone 1 can be immediately classified as incremental innovation and zone 4 is radical. It can be argued that innovations in the second and third zones can be classified as really new innovations. Zone 2 is characterized by bounded exploration, which implies that the innovation is 'radical', but is within the established frame, therefore it is not fully radical, as it cannot be causing discontinuity on both technological and market levels and still be within the established frame. Zone 3 represents 'incremental' innovations outside the established frame. This means that it causes some discontinuity, either market or technological, on a macro level and therefore, cannot be classified as incremental. Being in between zone 1 and zone 4, these innovations can be considered 'really new'.

Summarizing the ideas presented above, innovation can be of a certain type, based on where in the company's ecosystem it appears, for example business model, product itself or its distribution. It can also be classified as radical, incremental or really new, depending on the discontinuity it creates in technological and/or marketing process on a macro and/or micro level. Each class has certain managerial implications for the firm, in terms of routines around search selection and implementation, which are different for incremental and radical innovations. Moving out of established frames, requires development of dynamic capability, which allows to switch between two different set of routines.

### **1.3.2 Market study**

Having in mind that the purpose of this thesis is to support Ice-9 in the commercialisation process of *hello X*, the market study was designed with a focus on defining the customers and identifying their needs. The framework used for this purpose "The Four Steps to Epiphany" introduces a Customer Discovery model. The model is built upon four steps: Customer Discovery, Customer Validation, Customer Creation and Company Building (Blank, 2013). This Market study followed only the first two steps, which represent an iterative process of searching for the right set of customers and the market that reacts positively to the product. The next two steps Customer Creation and Company Building are related to the execution process, which goes beyond the scope of this thesis.

It is crucial that the process of Customer Discovery is conducted in parallel with the product development process. According to Blank (2013), most start-ups fail because they base their

product development on assumptions about the customers and their needs. They concentrate all their activities on a first customer ship date, expecting that the product they put so much effort into will find its customers. After the launch, they realise that the assumptions made about the customer need were wrong, but it is too late. The first two steps of Customer discovery model are designed in a way that allows to avoid this catastrophic scenario. By first stating hypotheses about the customer, need and the market and then, substantiating these by the primary data, first phase of customer discovery model allows to arrive on a set of customers that react positively to the product, because it can solve their need.

Effectiveness of strategic analysis depends on the proper definition of the market, which, in turn, stems from approach to analysis employed. There are two distinct approaches to market analysis, characterized with two different objectives: top-down and bottom-up approach (Day, 1981). Considering that the objective of this study is to provide insights into customer problems and needs, the bottom-up approach to market analysis is the most appropriate. From the bottom-up perspective, the markets are “shifting patterns of customer requirements and needs which can be served in many ways” (Day, 1981, p. 288). The insights about customer needs obtained through interviews with customers and users, following Customer Discovery model, create a foundation for customer segmentation process. Then, value propositions can be formulated for each customer segment.

PESTEL analysis provides the broad overview of the environmental factors, which influence the performance of the company. These environmental influences are divided into six main categories: political, economic, social, technological, environmental and legal. Political influences highlight the role of governmental policies; economic influences stem from macro-economic factors, such as growth and exchange rates; social influences reflect changes in culture and demographics, technological influences highlight the changes in the technological environment; environmental factors consider the influence of environmental issues; the overview of legal factors includes the legislation constrains and changes in the law, that might affect company's performance (Johnson, 2017).

To summarize, Customer Discovery model allows to obtain insights about customer needs. Following the first two steps of this model results in the set customer needs, which create a basis for segmentation process and positioning. In addition to it, PESTEL provides the analysis of environmental factors, which need to be taken into consideration.

### **1.3.3 Business plan**

Business plan is a document that tells a story of a business, starting from opportunity or need in the market to providing a detailed plan of how this opportunity will be explored to create and capture value (Bygrave et al., 2010). The structure of a business plan depends on its purpose and the audience it is written for. One of the most common situations when business plan is needed is when business is seeking money from investors. In order to decide whether to invest in the business or not, investors would want to know if the solution is solving a real need in the market, the size and maturity of the market, profit model, whether there is sufficient competence in the team and whether the amount of finance being sought would be enough to cover all the requirements and reasonable contingencies, the status of the business, critical milestones, risks and the exit strategy that shows when they would be able to get their money back. Business plan written for investors needs to be concrete, concise and cover all the points mentioned above.

Although, the usefulness of business plan in actual business operations has been questioned (Karlsson and Honig, 2009), the process of writing it is beneficial for entrepreneurs, as it allows them to get a clear picture of the business. It summarises all the aspects of the venture, such as product, resources, marketing strategy, financial overview and next steps, and allows to quickly communicate the essence of the business to the outside actors. It can as well deepen other team members understanding of the venture, making sure that everyone is on the same page, which is important for a team to function well.

The business plan presented in this thesis serves as a summary of insights from the innovation study and the market study, suggesting the strategy for successful commercialisation of *hello X*. It has been designed, having in mind the application of *hello X* in science communication.

## **1.4 Research design and Methodology**

Research design determines a framework for data collection and analysis (Bryman and Bell, 2015). Depending on whether the research focuses on contemporary or past events, whether it requires control of behavioural events, and what is the goal of research, one can choose an appropriate research design. This section presents the research design and research method used in this thesis.

The goal of the thesis is formulated in the research question which guides the research, by determining the research design and the data collection process. To explore the research question of this thesis, semi-structured and unstructured interviews were conducted with 8

industry representatives and 1 potential user (see table 1). The reason for choosing this form of data collection is that it allows to explore the different aspects of customer problem or need, which would be difficult with the set of specific questions. Semi-structured interviewing allows the researcher to maintain an open mind about what she wants to know about, so that theories and concepts can emerge out of the data (Bryman and Bell, 2015). To avoid inaccuracy due to poor recall, the majority of the interviews (6 out of 9) were audio-recorded and transcribed, what allowed for more thorough analysis of data. The interviews from the representatives of the same customer group were compared in order to identify patterns in the data.

*Table 1. Interviewees*

<b>Interviewee title</b>	<b>Company</b>	<b>Type of interview</b>	<b>Focus</b>
Climate Change student	University of Copenhagen	Semi-structured	User need, contacts
CEO	Pukka travels	Semi-structured	Profile of environmentally conscious tourist
Head of Sales	Polaria	Semi-structured	Polaria's needs and challenges
Communication Leader	The Nansen Legacy	Semi-structured	The Nansen Legacy outreach goals and communication plan
Administrative Director	Nordnorsk Vitensenter	Semi-structured	Science centre's challenges and needs
Head of Exhibitions	Nordnorsk Vitensenter	Unstructured	Science centre's challenges and needs in terms of exhibits
Administrative Director	Vitenparken Ås	Semi-structured	Science centre's challenges and needs
Communication advisor	NIBIO	Semi-structured	NIBIO's outreach goals and strategy
Leader of Cultural unit	Arendal Kommune	Unstructured	Arendal Municipality needs, Vitensenter Sørlandet

In addition to the interviews with industry professionals and potential users, primary data was collected through internal meetings at Ice-9, as well as meetings with business consultant and advisors from various funding institutions (Sparebank Kulturnæringsstiftelsen, Kulturråd).

A wide range of secondary data used in this research includes books, research papers, industry reports, internal documents of Ice-9, including various grant applications, project descriptions, meeting notes and budgets.

## **1.5 Limitations**

This thesis is based on a real case of a company which has started the production, but is still in the development phase. Ice-9 is experimenting with different formats and develops prototypes for several projects simultaneously, using the ‘portfolio’ method. The choice of projects to take on is often determined by the funding opportunities available. Despite the diversity of options, Ice-9 often does not receive the full amount of funds, what slows down the production process. The need to raise additional money often involves new partnerships, which influence the product. All factors mentioned above create a turbulent environment around the company, what makes creating a strategy for such firm a challenging process, due to constantly shifting focus. One of the limitations of this thesis is that it, even though, the science communication is a central theme and research institutions are considered the first market of choice, the more extensive market research has been done, in fact, in relation to museums and science centres. This happened because, at the moment of planning the market study, exploring the opportunities in the museum market was a priority. Due to denied funding for an exhibition and a new partnership opportunity with the Nansen Legacy project, the focus shifted from museums to research institutions, but the time constrains did not allow to fully explore that market.

## **1.6 Conclusion**

The purpose of this thesis is to support Ice-9 in the process of commercialization of hello X. The main research was designed to answer the following research question:

*How can we assess the commercial viability of an interactive story universe hello X, developed by media production company Ice-9, through analysing its innovative potential and its market opportunities?*



The innovation study was conducted with the purpose of discovering the innovative potential of *hello X* regarding its use in science communication. The analysis of the innovation types concluded that the innovative potential is based on the process of product creation, which introduces productive feedback channels between stakeholders, including research institutions, local government, small creative businesses, distributors and the public. Connecting these stakeholders into functional network not only contributes to the creation of the unique offering, but also has value for each member of the network. This collaborative process results in a system of products that are interrelated and together constitute a complex entity that have all aspects of transmedia offering. Even though, this innovation is not radical in terms of technology, its framing of the environment in terms of science communication market allows to categorise it as a really new innovation. This identification alone, however, does not guarantee the commercial success of the project. The customer utility with science communication is based on the assumption that there is a need for new type of communication service in the market. This assumption has been empirically tested further in the market study, conducted to identify market opportunities for *hello X*. The research of the market based on the qualitative data collection confirmed the assumption about the customer need, allowing to conclude that there is a potential market for science communication services, however, the existing market is not well developed, due to the recent shift in the governmental policies with regard to science communication, which gradually being recognised on the agency level (the financial incentives for research projects to provide a public outreach plan). The analysis of the environmental factors PESTEL resulted in an overview of external factors that might affect the project in the foreseeable future and the overall conclusion is that the environment seems to have positive impact on Ice-9's performance.

## 2 Innovation Study

### 2.1 Introduction

This chapter provides innovation analysis of *hello X*, a project developed by a media production company Ice-9. *hello X* is a main unit of analysis in this thesis. The research sub question that is being answered in this chapter is *What constitutes the innovative potential of hello X and what implications does it have for Ice-9?* Innovation analysis of the case will uncover *what* is innovative and *how* does it affect the company, explaining what challenges and opportunities does it creates for the company. To identify *what* is innovative, a framework “The Ten Types of Innovation” is applied. It allows to explore the case from various perspectives (venture, product and user experience) and break it down into smaller units of analysis (Keeley et al., 2013). After the innovation types has been identified, the opportunities and challenges associated with these types are discussed. The opportunities arise from the degree of innovativeness, which is evaluated using the methodology of Garcia and Calantone (2002). The challenges are viewed from the perspective of a firm,

The first section provides an overview and discussion of selected frameworks and the theoretical background for this study. The two following sections are inspired by ‘the packaging approach’ to idea evaluation. This approach involves ‘determining and communicating attributes around an idea relevant to various stakeholders as well as to society at large’ (Alänge and Lundqvist, 2014). It starts with the technological description of the project, which is followed by the value visions, explaining the utilities for the customer, business and society. Customer utilities are further being explored in more detail in the Market Study. In the next section, three innovation types within *hello X* are identified, using the framework “The Ten Types of Innovation” (Keeley et al., 2013) Each of the identified types is then analysed and discussed further in the study against the backdrop of selected innovation literature (Garcia and Calantone, 2002, Bessant et al., 2014, Vermeulen and Paier, 2017, Gholampour Rad, 2017, Davis, 2013).

### 2.2 Technological description of *hello X*

Ice-9 is a Tromsø based media company which specialises in using fiction narratives in participatory workshops and live events, interactive games, museum exhibitions and more traditional audio-visual productions.

Ice-9’s current project *hello X* integrates different formats (workshops, broadcasts, interactive sculptures and games) to create a crowdsourced interactive fiction universe around X, who stands for an unknown young woman living in the Arctic in 2068. As several personas and storylines emerge from Ice-9's co-production laboratory, these characters will be given new names. While the story universe retains unity around the unknown 'X', the process can produce indefinite numbers of new characters. Lives of these characters are being collectively imagined by scientists, artists and the public. The two distinct characteristics of *hello X* universe are interactivity and participation. The interactive elements (games, interactive sculptures) designed to collect inputs from users, empowering them to become co-creators of the story universe. Participation stems from *hello X* community-based approach and involves interdisciplinary integration (natural science, social science, visual art, literature, gaming) for more effective communication of knowledge.

*hello X* universe is a complex project, which can be viewed as the combination of elements in three categories (Gatherings, Broadcasts and Spaces) and processes of content creation. To illustrate the relationship between these elements, the following product model has been developed (see figure 2).

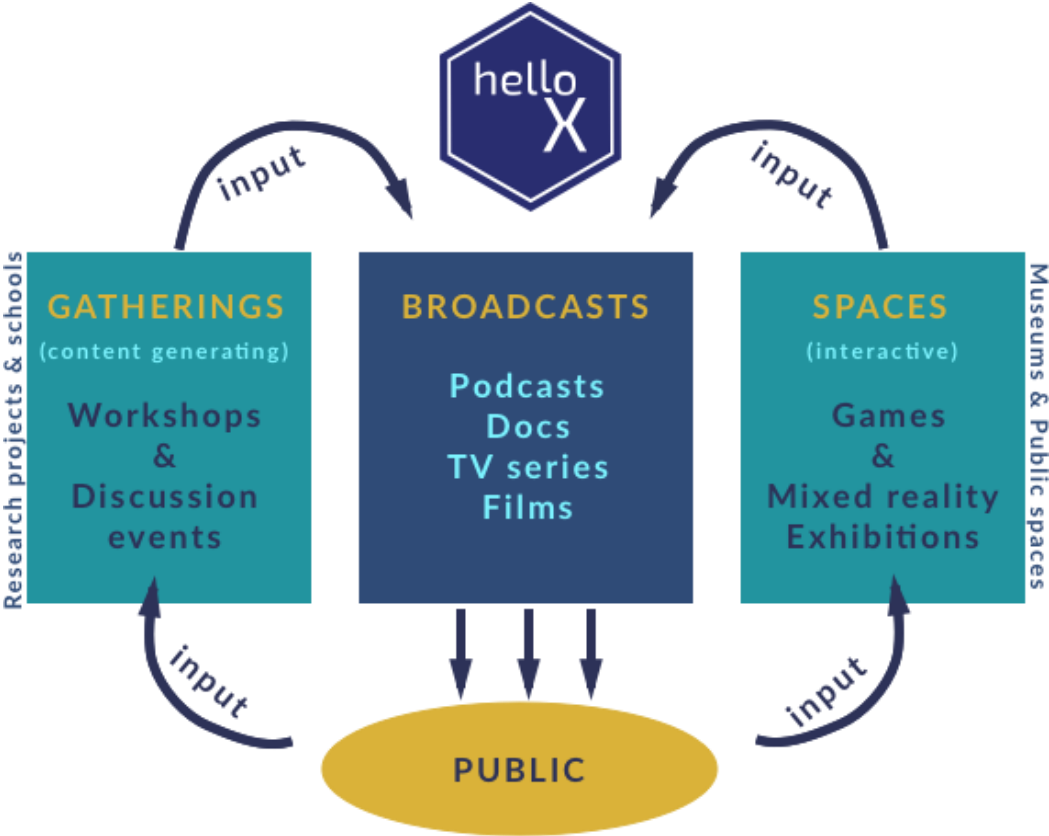


Figure 2 Product model

The purpose of Gatherings is to generate high-value content through activities where trained facilitators engage with a limited number of participants within a limited time period (between 30-180 minutes). These activities facilitate interaction with specific user groups (scientists, children, selected discussion participants). The range of activities includes workshops with scientists, educational workshops with youth and discussion events. Spaces include virtual spaces (games, interactive story experiences) and physical exhibitions in museums and public spaces. These elements enable auto-regulated interactions with a larger number of participants and audience members (game users, exhibition visitors and public art observers) over an open-ended number of months or years. All elements within Spaces are designed to collect inputs from users, which are then incorporated into Broadcasts and used to develop new interactive elements. The primary role of spaces is to grow a lively community which engages with *hello X* storyverse content over sustained periods of time. Broadcasts contain inputs from both scientists and general public, featuring documentary and fiction combined to create a continuous narrative and stimulate engagement.

## **2.3 Value visions**

Value visions communicate the overall potential of the idea. At the same time, it is important to be concrete at this stage and focus on a particular situation of use when describing utilities (Alänge and Lundqvist, 2014). The range of messages that can be communicated through *hello X* is wide, from pure commercial lines to complex philosophical ideas. The value visions, presented below has been generated in relation to the use of *hello X* particularly as a science communication tool. The subsequent sections describe its customer utility, business utility and value for society at large. These utilities, however, are not intended to provide the complete evaluation of the idea. At this stage, they indicate the overall potential of the idea and create a foundation for a market study.

### **2.3.1 Customer utility**

Stakeholders across sectors have overlapping needs in relation to science communication. Research institutes are dependent on public funds; therefore, in order to secure financial support, they need to rise and sustain their public image. Recently, the Norwegian Research Council has strengthened the requirements for public outreach. Individual scientists and research projects are now obliged to include a public outreach plan into their grant applications. This creates an opportunity for Ice-9 to propose various communication

packages to the research projects and institutes, which can include featuring in *hello X* Broadcasts, developing research-based exhibitions in the museums and organising live discussion events at the museums of other venues. Museums and science centres often collaborate with research institutes, playing a role of intermediary between research community and the public. By exhibiting content inspired by the latest research, museums become more relevant to the public, while research institutions and research projects meet communication requirements from Norwegian Research Council. In this way, every new partner adds value to the network and to the products and services developed.

### **2.3.2 Business utility**

Ice-9 plans to continuously develop new content for *hello X*. To develop new products, the company is collaborating with various artists (writers, dramaturgs, visual artists, web developers). By establishing long-term partnerships with research institutions, and developing products that increase turnover (touring exhibitions, performances and workshops), Ice-9 can develop continuous income streams for artists in the network.

### **2.3.3 Value for society**

Mass media have a huge influence on the way we feel, think and make decisions. However, when it comes to addressing global issues, this powerful tool is not utilized to its full potential. Even though the information about climate change, pollution and other consequences of human actions is widely available in the media, the audience often finds it difficult to relate to it. These issues being seen as somewhat abstract and impossible to deal with on an individual level launch psychological defense mechanisms that cause people to shut down (Stoknes, 2015). The way society thinks of environmental issues needs to be changed.

*hello X* uses the power of stories to nurture participation and debate on higher level issues such as sustainable development, climate change, food security, data security, artificial intelligence, and human enhancement. It attempts to generate global response, by inviting participants to collectively imagine the life of a fictional character, X, who's reality, and our future, is largely determined by our habits and choices we make today. Particularly, this approach can be useful for climate science communication, as it can foster the understanding of the outcomes of the climate change. Through community-based approach and the use of fiction narratives, it attempts to communicate complex issues in a way that attracts modern audiences and encourages participation and action.

## 2.4 Innovation analysis

The following sections provide the innovation analysis of hello X, which is divided into two phases. First phase aims to identify *what* is innovative in the case of hello X, distinguishing particular types of innovation, while the subsequent phase provides in-depths analysis of each type, including the *challenges* and *opportunities* associated with it.

Using “The Ten Types of Innovation” framework one can identify the following types of innovation within the case company: Network innovation, Product System Innovation and Process innovation (see Figure 3).



Figure 3 Innovation types

This innovation types are analysed and discussed in the following sections. Product system refers to the three integrated categories of products within hello X universe. To analyse this system, transmedia product theory developed by Davis (2013) has been applied. The process innovation is examined by analysing the methodology developed by the founder and through the lens of existing literature on science communication (Jucan and Jucan, 2014, Lesen et al., 2016). To determine whether it is incremental innovation or radical, methodology from Garcia and Calantone (2002) has been used. The network innovation is explored from the perspective of regional development, expressed in Vermeulen and Paier (2017) and (Ling et al., 2015).

### 2.4.1 Product System Innovation

According to Keeley et al. (2013, p. 59), ‘Product System innovations are rooted in how individual products and services connect or bundle together to create a robust and scalable system’. This section provides the analysis of different elements of *hello X* (see Figure 2).

Ice-9’s products and services associated with *hello X* are interrelated and together they constitute a whole, the *hello X* universe, which can be defined as a ‘transmedia’ offering. “‘Transmedia’ refers to a story world that occurs on multiple platforms where each component makes a “distinct and valuable contribution to the whole” (Davis, 2013, p. 175).



In addition to being thematically related, Broadcasts, Gatherings and Spaces are intertwined in a way that they complement each other, while appearing on separate platforms. Together, these three categories constitute a Product System, or rather, a Solution System, which makes communicating science messages to modern audiences more effective.

Looking at these three categories, Spaces, Gatherings and Broadcasts, one can analyse the relationship between them. On the one hand, Gatherings, which include workshops with scientists and discussion events, contribute to a content generation for Broadcasts. The material gathered during workshops with scientists and highlights from the discussion events are used directly in *hello X* podcast, where they are framed into a larger context, which is the future. In addition to it, Gatherings also contribute to the network expansion, attracting new partners and recruiting ‘superusers’ – people that feel inspired by the project and will actively contribute stories to the universe. They can do it through the story generator on the WRITE page on [helloX.me](http://helloX.me), and through the discussion forum on READ/DISCUSS page. Conversely, certain elements within Spaces can be used in Gatherings, like games, apps and VR experiences can be utilized at festivals and conferences.

*hello X* spaces aim to nurture spontaneous auto-regulated interaction between participants (resembling the evolution of a biological ecosystem). Interactive elements in Spaces are designed to engage participants of different ages and prior experience. Newcomers are likely to absorb and generate simpler content with lower 'mash-up' potential, and interactive design will aim to 'hook' newcomers with fun, easy, and short activities.

The direct user involvement in the process of product creation, makes user engagement essential for the product development. As Davis (2013) suggests, “the key challenge in transmedia product design therefore must be to accommodate natural variation in the degree of audience engagement throughout the extended property.” Additional layers of engagement will be designed for more experienced participants (or 'superusers'), who are likely to be both willing and able to process and generate more complex content.

Broadcasts expand community’s outreach by being distributed through various content providing platforms like Apple Podcasts, Soundcloud, YouTube, Vimeo, as well social media channels including Facebook and Instagram and [helloX.me](http://helloX.me) website, which is a digital hub of the *hello X* universe. The variety of formats within Broadcast category (podcasts, micro-docs, short docs, TV series and feature films) allows to experiment with length and complexity of message and distribution platforms, thus addressing different audience with highly targeted content to maintain engagement.

### 2.4.2 Process innovation

This complex relationship between elements places *hello X* into category of “authentic transmedia practices that create experiential immersive novelty across media and are not defined primarily by commercial content-extension tactics such as branding, merchandising, franchising, repackaging, repositioning, versioning or recycling of media products” (Hardy & Kerrigan at Davis, 2013, p. 178).

In the case of *hello X* it can be argued that Product System innovation implies Process innovation. *hello X* universe is a complex system that cannot be separated from the process of its creation. Development of such a product, requires establishing new methodology and capabilities. The founder of Ice-9, Christine Cynn, captured the emerging need, saying that ‘integration of new information and communication technology is vital to the development of story-building communities’ (Cynn et al., 2017). Ice-9 introduces processes through which creative professionals shape and ‘re-mix’ a stream of inputs from clients (research projects), to address the needs of their target audiences. This re-mixed stream of inputs is designed in a way that encourages participation, enabling the audience to respond through interactive elements. Distribution of new content is optimized to invite further contributions from both new and experienced participants, completing the cycle (Cynn et al., 2017). Ice-9 is developing processes and structures which are new to the industry and can be considered innovative.

Applying this concept to science communication is not new (Evans, 2014, Lesen et al., 2016), however, by connecting the research community with network of artists, *hello X* is introducing a structure, which is new to the industry and causes discontinuity in the market. This idea is explored further in the section describing network innovation. The creative co-production concept, while not entirely new, is still not widely employed and in an early, dynamic stage of development. It can be argued that, when applied to science communication, it causes technological discontinuity, at least on a micro level. These two aspects allow to conclude, based on the methodology developed in Garcia and Calantone (2002), that *hello X* process falls into a category of really new innovations. It is building on the existing knowledge and practice, but applying it to a new frame conditions. This type of innovation, which is outside of the existing cognitive frame is characterised by ‘extended exploitation’ (Bessant et al., 2014).

Position in this part of innovation space (incremental, but in a conditions of a new frame) requires implementing new management routines. According to Bessant et al. (2014), routines around search tools should include prototyping and working with fringe users. The product model (see figure 2) illustrates, that these aspects (prototyping and incorporating users inputs) are inherent to *hello X* development process. The user inputs are used to develop new broadcasts and interactive elements, contributing to a continuous process of product development. Fringe users represent the category of users whose requirements and usage patterns are outside of what is considered by inventors to be a normal use. Interactive elements of *hello X* are design to address a variety of usages, from basic level (choice between a few options or simple open question) to advanced (possibility of creating completely new storylines). In varying degrees, new products incorporate all user inputs, however, the inputs from advanced users, who in this case can be considered fringe users, have a greater impact on product development. Therefore, the process innovation in the case of *hello X* eliminates the challenge associated with search.

The challenge of implementation requires involving specific groups and building ‘satellite’ structures (Bessant et al., 2014). In Ice-9, the product development is based on the iterative process led by two independent groups, science team and creative team. The third, not official team, consists of fringe users who also influence product development.

In addition to challenges related to search and implementation, firm needs to address a challenge of selection. This challenge can be interpreted as a need for new evaluation strategies, because the traditional techniques like stage gate and portfolio, designed for established business model frames cannot be applied to new frame conditions (Bessant et al., 2014). Stage gate review implies evaluating each stage of development according to previously defined criteria, which in the zone of ‘extended exploitation’ is problematic. The problem arises from the fact the development can be nonlinear, which makes it difficult to define the criteria of passing to the next stage. The ‘portfolio’ approach often used by creative businesses is based on developing a range of products, anticipating that at least one of them will turn out to be successful and generate economic returns. This approach resembles natural evolution of biological system and can take a long time. Therefore, in is important to introduce parallel evaluation strategies at least at the early stage.

‘Knowledge-based circular economy’ is the term used by the founder to describe the processes of content creation. Users’ contributions flow back into production cycle where

they influence the story development and inspire creation of new artworks (Cynn et al., 2017). In this way, users, depending of their interest, can be empowered co-creators, passive broadcast consumers or something in-between these two extremes (Jöckel et al., 2008) User inputs are integrated into value chain, where online users are those, who contribute to the story creation online, and physical users are exhibition visitors, who contribute to the story through the use of interactive elements (See Figure 3).

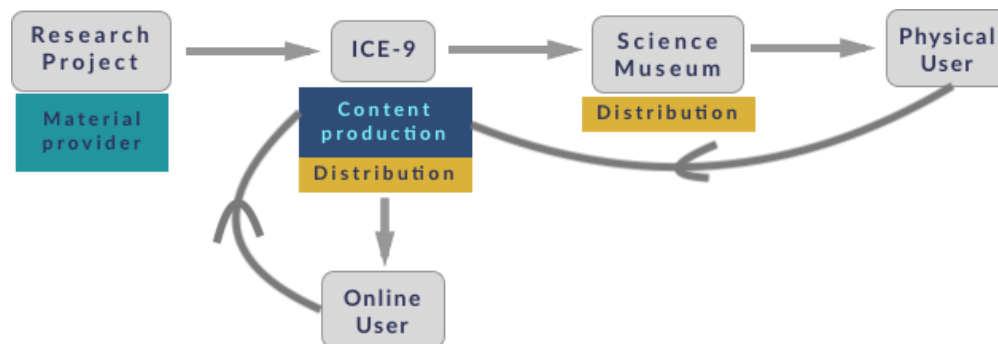


Figure 4 User integration into value chain

Recent study suggests that participatory, community-based approach to science communication is more effective, comparing to traditional models where knowledge is transmitted directly from experts to the public. Effective science communication implies a two-way process, where scientists, apart from presenting their findings, take into consideration the needs and concerns of the public (Jucan and Jucan, 2014). It has also been proven to create meaningful change in community behaviour, by amplifying engagement and encouraging action, particularly, on environmental issues (Lesen et al., 2016). These findings indicate a great potential of the process in the field of science communication.

### 2.4.3 Network Innovation

In order to enhance innovation performance, organisations need to constantly expand their knowledge base (Ling et al., 2015). Organisational knowledge can be conceptualised as knowledge stocks, which represent internal knowledge assets in the firm and knowledge flows, which are external knowledge streams (Vermeulen and Paier, 2017). Since, the internal accumulation of knowledge is often not available to SME's, due to their limited capacity, the way to archive innovation would be associated with strengthening external knowledge flows. This process is largely dependent on a network around the organisation. In the regional context, the socio-economic environment and institutional setting are factors that have a huge impact on innovation of local firms (Ling et al., 2015). These firms interact with various stakeholders and constitute the regional system of innovation. On a macro level, the regional

system of innovation consists of strategic alliances and regional cluster networks (Bort et al., 2014), which have a special role in development of creative industries:

“In the specific context of creative industries, the constitutions of these networked clusters and the identification of intermediary agents that promote collaboration, social interaction, association and trust is essential to affirm creative industries as a driving force for cultural, social and economic transformation of the regions” (Ling et al., 2015, p. 173 ).

Network Innovation in relation to Ice-9, can be viewed as a process of building new infrastructures for development and distribution of media products and services, which contribute to dissemination of knowledge. Five main types of stakeholders include research institutes, creative professionals, digital development specialists, museums and festivals, and local/regional governments. Research institutes generate scientific knowledge, which, if used in a meaningful way, can contribute to solving the most important issues of our time, climate change and pollution. In the process of knowledge production, research institutes are dependent on public funds; therefore, in order to secure their financial support, they need to rise and sustain their public image by communicating with the public.

Creative professionals (artists, designers, writers, performers) use their skills to synthesize, enrich, and shape narrative content into formats for greatest emotional engagement with participants. Creatives are mostly freelancers operating in loose social networks. These networks often have hubs around established venues, festivals or publications which range from those managed by paid professional producers/curators to those cooperatively managed by artists who often volunteer their time and resources. Digital development specialists (experience designers, front-end and back-end developers, and others with specialty skill sets, for instance, in 3D animation) build functional digital infrastructure and implement creative designs in digital formats with rich media content provided by creative professionals. Digital development specialists networks include both freelancers and professional organisations in a range of sizes, with a distinctly more profit-motivated culture. Museums and festivals specialise in marketing and distributing content to the public, and have a sustained need for up-to-date content and formats that reflect a rapidly changing public expectations for innovation and integration of popular new digital culture. Governments provide public services and are accountable to their citizens and local companies and institutes. They require a sustained engagement plan for dissemination of information and also for assessing the mood, stresses, and changing demands of their constituents.

Connecting these stakeholders into dynamic network will contribute to better outreach for research institutions and governmental programs, boosting public engagement, what will eventually produce greater social impact. In addition to it, it will develop more solid structures within creative industry, providing artists with access to new audiences and sources of income. Creating discontinuity in the market, in terms of involving actors that otherwise do not interact, places *hello X* into zone 3 of innovation space, characterised as ‘involving rearrangements and reconfigurations around existing models but widening the frame’ (Bessant et al., 2014). It does not include radical new technology, but applies existing concepts (participatory art) to serving an underdeveloped market (science communication services).

“Each firm’s value network, encompassing its respective suppliers, complementors, rivals, and customers, overlap and become intertwined to generate multiple value propositions that may be complementary or substitutive. Such situations are especially likely in systemic industries forged around multi-sided platforms” (Gholampour Rad, 2017, p. 5).

On the basis of *hello X*, Ice-9 aims to develop a platform, that would connect museums and visitors, including schools, local governments and citizens, research communities and audiences. In addition to creating value for the members of the network, Ice-9 contributes to collaborative regional development by connecting stakeholders and facilitating knowledge exchange. The key point here is that every new partner adds value to the network and to the products and services that are developed.

A recent study shows, that even a simple solution like discussion forum can serve as a medium for sharing knowledge and examining innovation challenges and practices within the city region (Ling et al., 2015). This discussion forum was initiated by the Creative and Digital Industries Sector Group (CDIS) as a space for expressing ideas and concerns related to the development agenda of the local enterprise partnership. Participants of the forum collectively expressed the need for creating an infrastructure for inter-organisational learning. As a part of this infrastructure, they have proposed the establishment of networking events with the emphasis on inter-organisational knowledge transfer (Ling & Martins 2015). The importance of inter-organisational learning has been earlier expressed by Propris (2002), who pointed out that innovation arises from cultivating regional communities of practice.

The concept of connecting stakeholders through a platform, can contribute to inter-organisational learning and more sustainable development of the region. A lot of current research in the polar region is concerned with the human impact on the environment. Due to climate change, the areas around the north pole, which historically has been covered with ice, are gradually becoming available for both exploration and exploitation. At this moment, creating a dialog between research communities and industry practitioners is vital, in order to make industry practices in these areas more sustainable. Some of Ice-9's Gatherings (workshops and discussion events) can potentially evolve into publicly open networking events, where various industry practitioners will be invited to discuss their policies and make collective decisions.

The deep unifying element of this new network (or configuration of networks) is a universal need to respond to potentially existential threats (environmental, economic, and social) confronting humanity. The demands of such problems on all stakeholders is rising and will continue to require sustained dynamic engagement for generations. By moving outside of the established frame and initiating incremental improvements on different levels, the project has a potential of bringing up radical changes which can ultimately balance the extensive implications of human activity and combat environmental crisis.

## **2.5 Conclusion**

This innovation study was conducted for the use of *hello X* in science communication. The chapter begins with indicating the overall potential of the project, by presenting its value visions, focusing on customer, business and societal utilities, which are analysed in more detailed in the market study. During the first phase of the innovation analysis, three types of innovation has been identified with relation to *hello X*: Product System, Process and Network innovation. After the more in-depth analysis of Products System and Process, it has been concluded that *hello X* belongs to a category of really new innovations. In addition, application of the concept to science communication market, places the innovation outside of the established frame, due to potential discontinuity it creates in the market. The maturing body of work indicates the great potential for the use of participatory fiction narratives in science communication. However, the complete evaluation of this idea, requires substantiating the assumptions made about the need in the market. Therefore, the market study needs to empirically test the hypotheses about the need that research institutes have

with regard to communication. The position of *hello X* in the 'extended exploitation' zone of innovation space brings up the challenge associated with the process of selection. The implication of this position for ice-9 involves establishment of new evaluation strategies, that would reflect new conditions of the extended frame. In-depth analysis of the network innovation surfaced the potential to improve organisational learning and contribute to a more sustainable development of the region, by integration of the key stakeholders into functional network.



## 3 Market Study

### 3.1 Introduction

This chapter is a market study for a crowdsourced multimedia story universe *hello X*, a project which is currently being developed by a media production company Ice-9. It provides analysis of the customers, product, market and competitors using Steve Blank's framework "The Four Steps to the Epiphany" (Blank, 2013). The research question that is being answered in this chapter is "How can we assess *hello X*'s market potential?".

As it has previously been shown in the Innovation study, *hello x* is a complex solution system that through workshops and discussion events collects inputs from scientists, children and the public to create broadcasts (podcasts, documentaries, TV series and feature films) and interactive elements (exhibitions, games, public art). The interactive elements allow users to create stories and make decisions that influence the life of the main character, X, a young woman living in the Arctic in 2068. These user inputs, then, flow back into production cycle, where they are re-shaped and developed by a team of creative professionals and presented to the public in a variety of different formats such as broadcasts, mixed reality exhibitions, augmented reality games and live events.

The focus of this chapter is on defining who are the customers and what are their needs. The approach employed is a process of Customer Discovery, which evaluates the Product/Market fit, by testing if the product solves problems and needs of the customers (Blank, 2013). It is a dynamic iterative process that involves stating hypothesis and validating them using first-hand insights into customer problems and needs. Steve Blank's framework "The Four Steps to the Epiphany" framework has been chosen due to its customer centred approach, which has been gaining attention of scholars in the marketing literature from the 70s and onwards (Day, 1981, Wind and Cardozo, 1974).

This chapter has a following structure: in the first section, the customer hypotheses, including actual users, influencers, economic buyers, recommenders, and decision makers are developed and then validated by primary data. The next section presents product hypothesis and Product insights derived from interviews with potential customers and users. The subsequent section provides the strategic market analysis, which includes customer segmentation, competition analysis based on a market type, positioning and environmental analysis PESTEL.

## **3.2 Customer discovery model. Hypotheses and validation**

The following sections describe the process of customer discovery. First, it requires developing hypotheses about the customer the customers are. In the social sector, among others, the concept of customer is manifold. The customer is not always the user, and the one who makes the purchasing decision can be either customer, user or the third person (Blank and Dorf, 2012, Gelobter et al., 2015). The following sections will explore different dimensions of the customer concept, such as actual users, influencers, economic buyers, recommenders and decision makers. After the hypotheses about the each type of customer are made, they can be empirically tested. The dynamic nature of customer needs and preferences makes it inappropriate to only use secondary data for hypotheses validation. Qualitative data collection is an essential step in evaluating hypotheses developed. Each hypothesis section is followed by a validation. In order to obtain first-hand insights into customer problems and needs, the interviews with potential customers and users has been conducted. The interview subjects have been chosen according to the customer hypotheses developed in the following sections. The average interview time was 40 minutes. In addition to primary data collection and analysis, secondary data from printed and electronic sources has been used.

### **3.2.1 Actual user hypothesis**

The day-to-day users of the product can be divided into two categories: online users and physical users. Online users are online audiences who listen to the hello X podcast, contribute to the story through the story generator, watch micro-docs, short films and other broadcasts. These audiences, however, are not the ones whose budget is paying for the product. The stand-alone digital products are available to the users free of charge on the hellox.me website and through various content providers (iTunes, You Tube, Vimeo etc.).

The range of online users is wide. The common characteristics are that they are English speakers and frequent technology users. The age range starts from 13 to 66. The lower end of the range is determined by the complexity of content (too complex for children under 13), while the upper end is determined by a statistics on share of internet use by age (medianorway, 2017). The fact that they use podcasts as a media of choice tells about them that they are living busy lives, since podcasting allows listeners to multi-task and leaves them with feeling of being productive. Another assumption is that they are intellectually curious and search for information on the topics of their interest.

The main pain point of these online users is that they are affected by the information about environmental change and pollution. Pain points indicate users' core concerns, interests and emergent needs for products, therefore identifying groups of customers with similar pain points is instrumental in conducting accurate market segmentation and positioning (Wang et al., 2016). This information affects users differently, for some, it initiates response in a form of actions, while for others it contributes to the feeling of helplessness and leads to denial. The first group recognizes the environmental problems we are facing and takes actions to initiate positive change at any level, from responsible consumption and utilization to being engaged in environmental organizations. This group includes environmental students, scientists, environmental activists, journalists and bloggers drawing attention to climate change, pollution and other environmental issues. Even though the awareness of the environmental problems in the society is raising, many people find it difficult to relate to them and choose to live in denial (Stoknes, 2015). Therefore, there is a much larger group of people, who are feeling overwhelmed by the complexity of environmental change and do not know what they can do about it.

Online users living in the Arctic and tourists visiting the Arctic constitute a special segment of users who have a potential of participating in the project by visiting exhibitions and events and become physical users. Physical users are tied to the location of the museum exhibition, festival or other event. If the first Mixed Reality exhibition will take place at Polaria science museum in Tromsø, the potential physical users will be Tromsø citizens and tourists visiting the town.

### **3.2.2 Actual user hypotheses validation**

To evaluate the hypotheses made about actual users, the interview with a potential user has been conducted. It had a form of unstructured interview with the aim of gaining a deeper understanding of a problem interviewee faces and his attempts to deal with it. The subject of the first interview is an English Climate Change student at the University of Copenhagen. He has been identified through his article in a local magazine NORK. The article describes his personal struggle in face of environmental issues and his attempts to deal with it through a process of writing a book. "As a climate change student, I too have found this notion particularly hard to deal with and it seems to have manifested itself in some sort of existential crisis. It's like at some point you realize that everything is infinitesimally and ridiculously complex and you wonder how you fit into it all. What does it mean? What I am doing?" (Black, 2017, p. 28).

The interview revealed the user’s need for relevant information provided from credible sources. Interviewee expressed interest in the *hello X* project and suggested that some of the Climate Change students at the university of Copenhagen would be likely to participate in the project. He also mentioned that he followed a free online course called Denial 101x, that gave him a good insight to why people don’t engage with the climate change debate and some strategies to dealing with it. He also shared a few contacts of his friends, climate change activists, who might be interested in contributing to the *hello X* project (see Table 2). To gain knowledge about potential physical users, a face-to-face semi-structured interview with the CEO of a local tourism company “Pukka Travels” has been conducted. Pukka travels is both a tour operator and an agency that is targeting environmentally conscious tourists, by offering products such as Ocean clean-up tours and Arctic cooking class. The interviewee described their average customer as a couple from Singapore, around 35 years, well-educated, financially stable, experienced travellers, looking for meaningful context, where they can contribute.

The hypotheses made about actual users and validation gained through the interviews and the secondary data research are presented in the tables below.

*Table 2 Actual user hypotheses and validation*

<b>Actual user hypothesis</b>	<b>Hypothesis validation</b>
English speakers, podcast listeners, students, scientists, activists, tourists visiting the Arctic and people who feel overwhelmed by the complexity of environmental issues	Climate change students, environmentally conscious tourists visiting the Arctic

**3.2.3 Influencers hypotheses and validation**

Influencers are individuals and companies who can influence customer decisions in terms of choosing the product for purchase or use (Blank, 2013). In the media industry, there are media outlets, mainly online magazines, that cover emerging trends in digital culture and recommend podcasts, games and films to their readers. The most relevant in this case are Popular Science, Medium, Buzz Feed, Esquire, Digital Trends, Wired and Vice. The Norwegian online magazine forskning.no is focused on communicating science to the public.

Bloggers and particularly YouTube vloggers are huge influencers in contemporary media culture. There is a broad category of life-style bloggers focusing on minimalism (as the opposite to consumerism), green-living, sustainability and veganism. Many of them have adopted zero waste philosophy. Some of the climate change activists that were mentioned by the interviewee, studying in Copenhagen, also have a big following and can be considered influencers. In Norway, there are not that many bloggers focusing on sustainability and green living. There has been identified two written blogs: Grønare Kvardag (Bergen), Grønne hensikter (Oslo) and one YouTube channel Grønne Jenter.

Another type of influencers includes content providing platforms, that connect creators with audiences through user interface. For instance, Apple Podcasts is currently a leading podcast providing platform, with more than 1 billion subscribers (Schmitz et al., 2015). Popular video content platforms are YouTube and Vimeo.

*Table 3 Influencers hypotheses and validation*

<b>Influencers hypothesis</b>	<b>Hypothesis validation</b>
Magazines	Popular Science, Forskning, Medium, Buzz Feed, Esquire, Digital Trends, Wired, Vice
Bloggers	Grønare Kvardag (Bergen), Grønne hensikter (Oslo), YouTube channel Grønne Jenter
Activists	Henry Evans (communicating climate change to children), Jens Friis Lund (professor and activist)
Content providers	iTunes, You Tube, Vimeo, Gaia

### **3.2.4 Economic buyer**

This section provides assumptions made about economic buyers. Economic buyer is a person, or institution, who can approve or reject the budget for purchase (Blank, 2013). To find out who is an economic buyer, one can look at the value chain (see Figure 2).

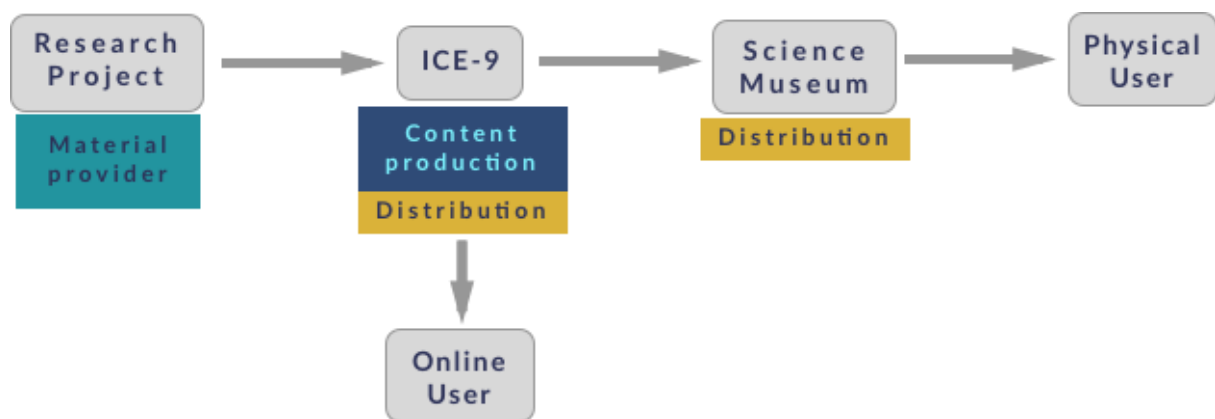


Figure 5 Value chain

Research project is an economic buyer, because its budget is paying for the product (hello X Broadcasts, Gatherings and Spaces). However, it also can be considered a partner, since it is contributing to the value creation by providing research data and scientists' time and participation. In fact, building a partner relationship with research projects is highly beneficial for Ice-9, because it gives a potential for a long-term collaboration. Another partner in the value chain is science museum, which adds value by distributing content (Mixed reality Exhibitions). Because the museum will be earning money on exhibitions, it can fully or partly finance them, thus also becoming the economic buyer. Considering the scope of the product (high cost of exhibition production), one can assume that economic buyer would be person on top of the organization, both in case of the museum and research institutions.

### 3.2.5 Economic buyer hypothesis validation

Ice-9 has established collaboration with FRAM High North Research Centre for Climate and the Environment. Five of its flagship projects are current partners of Ice-9, who finance the production of *hello X* podcast, which features interviews with scientists working on these projects. These five flagship projects are: (1) Sea Ice in the Arctic Ocean, (2) Climate Change on Terrestrial Ecosystems, Landscapes, and Indigenous Peoples, (3) Climate Change on Sea & Coastal Ecology, (4) Hazardous Substances- Effects on Ecosystems & Human Health and (5) Environmental Impact of Industrial Development in the North. Another partner of Ice-9 is Polaria science museum, which is an associate partner of FRAM.

Ice-9 is currently developing a collaboration with the new research project The Nansen Legacy, led by the UiT. It will provide one scientist each month, who will participate in *hello*

X podcast. Ice-9 is in dialog with Kystbarometret, a project led FRAM, with focus on sustainable coastal development.

Other potential partners include Nordnorsk Vitensenteret and Vitenparken in Ås and NIBIO Norwegian Institute of Bioeconomy Research. These institutions have been visited and the interview with their representatives has been conducted. The outcomes of these interviews are presented in the following sections. The summary of economic buyer hypotheses and validation is in the table 3.

*Table 4 Economic buyer hypotheses and validation*

<b>Economic buyer/title</b>	<b>Title</b>
Science museum/Administrative director	Polaria, Nordnorsk Vitensenter, Vitenparken
Research institution/Director	FRAM Flagships, The Nansen Legacy, NIBIO, Kystbarometret

### **3.2.6 Recommenders hypotheses and validation.**

Recommenders are those who influence product purchase decisions. They have a stake in a product, and have an actual power to „make or break the sale” (Blank, 2013, p. 142). The assumption was that in the science museum, the role of recommender would have a leader of exhibition department. In the research institution, this role would have a communication leader. Through collection and analysis of primary data, these hypotheses have been approved. The summary of recommenders for each type of economic buyer is presented in the table 5.

*Table 5 Recommenders*

<b>Economic buyer</b>	<b>Recommenders</b>
Science museum	Leader of exhibition department
Research institution/project	Communication leader, advisor

### **3.2.7 Decision maker hypothesis and validation.**

For each of the assumed categories of economic buyers, the concept of a decision maker can apply. Decision maker is a person or institution that has an ultimate say in making the

transaction happen (Blank, 2013). The possible decision makers for both types of economic buyers are funding institutions. This hypothesis has been verified by primary data. It has been found that science museums are funded by the governmental organisations (GO) and private sponsors (PS). The outcomes are presented in Table 6.

Table 6 Decision maker hypotheses and validation

<b>Economic buyer</b>	<b>Decision maker hypothesis</b>	<b>Validation</b>
Science museum	Funding institution	GO: Kommune, Fylke, Climate and Environment department, Ministry of Education, Ministry of Agriculture.  PS: Statoil, Tekna, Troms Kraft, Remiks, Sweco, Sparebank, Gjensidigestiftelsen
Research institution	Funding institution	Norwegian Research Council

### **3.2.8 Influencers hypothesis and validation**

The assumption was that there are conferences and networks that influence purchasing decisions for both science museums and research institutes. This hypothesis has been verified through primary data. The Nordnorsk Vitensenter and Polaria are part of tourism network Visit Tromsø. Nordnorsk Vitensenter and Vitenparken are part of Norwegian network of Science Centers, Nordic network of Science Centres NSCF, and European Network of Science Centers ECSITE. The latter has annual conference ECSITE with the module „Business bistro”, where science centre representatives can find out about new solutions for exhibitions and educational programs. When it comes to the Research Institutes, there is The National Science Week in Norway (Forskningsdagene), which is an event that is happening all over the country every year to make science and research available to the public.

## **3.3 Product and need. Hypotheses and validation**

### **3.3.1 Product hypotheses**

*hello X* is a complex solution for communication with modern audiences. It is a fictional universe that exists in a variety of formats: podcasts, films, games, mixed reality exhibitions in museums and public spaces, workshops and live events. This section provides a product hypothesis, because the project has just been launched and is in constant development.



The project focuses on the future of the Arctic, viewing it through the lens of a fiction character, a young woman named X, who lives in a coastal arctic town in 2068. Combining fiction, cutting edge research and new technology *hello X* aims to communicate complex matters such as climate change and pollution in an interactive manner to a wide range of audience. The features that make this way of communication new and compelling are gathered in the table below (see Table 7).

Table 7 Product features

Fiction	Dealing with real issues and facts might be overwhelming for some audiences. Particularly, when it comes to issues related to climate change and pollution, presenting statistics and facts about consequences of our actions will most likely cause the audience to shut down or go into denial. The framework of fiction can serve as a safe space to nurture discussion and encourage participation at all levels.
Research based	The research data weaved into the narrative adds legitimacy to the project and anchors the stories to the real world. As the project unfolds, the new research results can be added into it, what creates an opportunity for a long-term collaboration with research projects and institutions.
Crowdsourcing	The modern digital audiences are not the passive consumers, they are active producers of digital content, as well as they are critics (through social media) and patrons (through crowdfunding platforms). Engaging audience into story generation potentially leads to creation a product that is unique, inclusive and already has a group of ambassadors (the most active contributors), that are essential in order to more any product forward into the market.
Interactivity	The user participation is encouraged. The user inputs are processed and used to improve or create new products. The use of augmented reality in the exhibitions contributes to the creation of the entirely unique experiences that will lead to recurring visits.
Continuity	On-going release of content (podcast episodes, micro-docs and short films) allows to gradually build trust and communicate to the audience this appealing concept of being part of the community, where they can contribute, just by using their imagination. Story generator, AR game and new content create a potential for long-term user engagement.

The website *hellox.me* is the digital hub of the *hello X* universe, which links together all the individual products, activities and events. The stand-alone products are *hello X* podcast, online story generator, Augmented Reality game for museums and city streets and Mixed Reality Exhibition in the museums and public places (physical objects and digital layers). The activities and events include school workshops and public discussions.

**3.3.2 Product Insights**

This market study is focusing on customer discovery, and the main goal of it is to discover who are the customers and what needs do they have. With this in mind, the presentation of the product has not been included in the interviews with potential customers. The reason for that is that presenting the solution to customers during the first contact will lead the conversation to discussing product features and because of that, some aspects of the customer problem or need could be overlooked. Therefore, this chapter doesn't include the product hypothesis validation, however, some valuable insights into the product has been obtained during the interview process.

The insights into the solution features, obtained through the interviews with potential customers and users are gathered in the table 8.

*Table 8 Product insights*

Actual users	Credible information, making complex issues personal
Science museums	Interactive, open-ended, science content presented in a language that is easy to understand, use of art, stories, taking advantage of food trends, creating solutions that go beyond the walls of the museum, use of technology, enabling users to learn on their own
Research institutes	Use of formats that are relevant for the public (podcasts, short videos), Possibility to get feedback from the audience

**3.3.3 Problem/need hypotheses**

This section provides hypotheses about problems and needs that different customers have. Through the interviews with the customers, the following problems and needs has been identified (see Table 9).

Table 9 Customer problem/need hypotheses

Customer	Problem or need
Actual user	Being overwhelmed by information about environmental climate change and pollution, need for credible information
Science museum. Polaria	Communicate research based knowledge using language that is available to the public, be technologically updated and available online
Science museum. Vitenparken	Attracting new visitors besides schools, getting access to larger grants, expanding into markets outside Ås (Oslo)
Research project. The Nansen Legacy	Public image, Science outreach, engage younger audiences, inspire students and kids to become researchers
Research institution. NIBIO	Reach broader public through social media channels

### 3.3.4 Position on a problem recognition scale

Each customer can be positioned on a problem recognition scale, depending on how big is the problems or need and how urgent the customer needs to solve it. The position on a problem recognition scale varies from the latent to active need. Each customer can be positioned somewhere in between two extremes, one is “having no problem or need” and the other is “having a vision”, which means that customer understands that there is a need and can envision what the solution could be. To understand where on the problem recognition scale the customer stands, one can try to understand how the day in a customer’s life looks like. In case of organizational customer, it means gaining understanding of what are the daily tasks of the economic buyer, if there are any requirements/goals set from above. If the organization is large, it can be beneficial to create the organizational map and understand the influences that different members in organization have (Blank, 2013). The position of potential customers on a problem recognition scale is presented in the Table 10.

Table 10 Position on a problem recognition scale

Polaria	Has a vision
Vitenparken Ås	Has a vision
Nordnorsk Vitensenteret	Latent need
Nansen Legacy	Has a vision

NIBIO	Active need
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Polaria, as it has been stated by the interviewee, aims to be a national centre for communication of Climate and Environment. To be able to do it, that it needs a separate department of Science Communication. The leader of this department should have competence within science, to be able to communicate with scientists from partner institutions and “translate” their findings to a language that is suitable for public. Interviewee mentioned that Polaria is trying to get subsidies from the government, to finance new Science Communication department.

Vitenparken aims to create an environment, based on digital solutions, which will create opportunities for kids and visitors of different age groups and different personalities to engage in science. The team has developed an app for the visitors to go around the park and learn about plants by solving different challenges. The founder mentioned during the interview, that he has a vision of developing an app further and placing interactive sculptures around the park. Even though, Vitenparken has its own team of designers and app developers, there is a potential for collaboration with Ice-9 on interactive sculptures.

The mission of the Nordnorsk Vitensenter, as it has been stated by its administrative director during the interview, is to increase the number of students on STEM (science, technology, engineering, and mathematics) programs. They mainly target schools, but still have some activities for family visitors and tourists.

As a new research project, The Nansen Legacy needs to fulfil the communication requirements of Norwegian Research Council, especially when it comes to communicating research to the public. The interviewee mentioned that their previous application returned with a requirement to strengthen public outreach. Their new communication plan involves a website featuring interactive virtual tour on a new icebreaker research vessel, Kronprins Haakon, game for kids and an escape room experience. It indicates that the Nansen Legacy has a vision of how to solve the communication problem, however, they do not have all the resources to support this vision, and that is an opportunity for Ice-9.

Another interviewee, which is a communication advisor at NIBIO, highlighted the importance of their external communication: “It is very important to show the public what we are doing and make ourselves visible to the politicians and the government”. During the interview, it has

been found that the communications takes form of written news stories that are distributed through various publications. NIBIO is active on social media platforms (Facebook, Twitter). The interviewee also mentioned the need to reach the broader public, by increasing the following on these platforms. They started to experiment with short video production for social media, but their capacity in that area is limited.

### 3.4 Strategic market analysis

#### 3.4.1 Segmentation

Customer segmentation is a process of dividing the market into customer groups that have similar needs or similar patterns of behaviour (Day, 1981). To form actionable segments, these groups should be identifiable and different from each other on the aspects that are strategically meaningful (Kotler et al., 2001). In the process of following Customer Discovery model, three distinct customer groups emerged from the customer hypotheses: Actual users, Science museums, Research institutions. These three groups form actionable market segments, because they are characterized by different needs. (Table 11).

Table 11 Customer problems/needs

Actual users	Problem of being overwhelmed by environmental issues, need for relevant information from credible sources
Science museum	Need for more visitors besides schools, new engaging tools for communicating science
Research institute	Public image, need to engage younger audiences, inspire students to become researchers

By addressing these needs, value propositions for each segment can be formulated. Targeting these segments will require differentiated marketing strategy and designing separate offers for each segment.

#### 3.4.2 Positioning

There are various approaches to product positioning, based on product attributes (for technical products), benefits offered, usage occasions, product origin, other brands and even competitors (Kotler et al., 2001) One way to formulate value proposition is to present offered benefits that correspond with customer problem or need. In this section value propositions for

previously defined segments (actual users, science museums and research institutions) are formulated.

For actual users of the product, the value proposition can be described as follows:

*Hello X offers interactive tools to collectively create hope for the future together with the team of scientists, artists and a community of people worldwide.*

In the case of science centres, value proposition could be described in the following statement:

*Hello X offers an interactive learning environment, based on fiction universe, which has a range of digital products and a community of followers online.*

In case of Research Institutions, *hello X offers a two-way communication solution, based on fiction universe, which has a community of followers online.*

### **3.4.3 Market type**

Evaluation of customer needs and degree to which customer understands its needs depends on the market type. There are four possible market types: (I) new product in a new market, (II) new product in an existing market, (III) new product attempting to re-segment existing market through low-cost strategy and (IV) new product attempting to re-segment existing market through niche strategy (Blank, 2013). This subchapter provides assumptions about market type in relation to each customer and how these markets are structured.

In relation to museums, Ice-9 aims to re-segment existing market, by bringing a new product, a fiction based, interactive solution to communicating science and create a niche for it. The assumption is that this market is driven by companies, which produce exhibits and independent artists, that provide films and other artworks to the museums.

When it comes to research institutions the situation is different. The existing solution to public outreach include simple websites, reports and booklets with mainly written content produced by research institutions and scientists themselves. Looking at these existing solutions, one can assume that there is a potential new market for a product that will resolve the problem of communicating science to the public.

In relation to actual users *hello X* is a new product in existing market. This market is driven by independent content producers and media production companies.

Table 12 Market type

Customer	Market type
Science museum	IV – New product in existing market (niche)
Research institution	I – New product in new market
Actual users	II – New product in existing market

### 3.4.4 Go to market strategy

This section provides insights into marketing strategy for previously defined segments and market types.

Establishing strategic partnership with local research institutions and developing a high quality digital products will contribute to a promotion of *hello X* on a B2B basis. At the same time, the promotion on B2C basis need to be done in parallel, because the developed audience is seen by institutional partners and clients as a valuable asset. The influencers in relation to actual users, identified in the process of Customer Discovery, particularly bloggers and activists who have a big following can be used to reach their audiences. Having a strong social media presence can attract more users to digital products, while discussion events and exhibitions can develop an audience offline. Exhibitions can significantly increase brand outreach, but they are very expensive to produce. Finding a right partner within science museum market segment is a strategic step that Ice-9 should consider. Because in relation to science museum, *hello X* is in a market type II, there are plenty of competitors that compete with *hello X* for the customers, however, the aspects like active need for new identity and similar to *hello X* thematic focus can play a significant role in finding the right partner and re-segmenting existing market.

### 3.4.5 Competition hypotheses and insights

Assumptions about the market type, made in previous subchapter have direct impact on the competition hypotheses. In relation to Actual users, *hello X* is in the Market type II, which poses that there are direct competitors to the product, with which *hello X* competes on performance.

When targeting science museums, *hello X* is in a Market type IV, which poses that there are direct competitors to the product, however, solutions they provide don't solve the same problem or need.

In relation to research institutions, *hello X* is in a new market of science communication services. The advantage of this position is that there none or very few direct competitors to the product. The risk associated with it is market adoption.

Table 13 Competition hypotheses

Customer (economic buyer)	Direct competitors	Indirect competitors
Actual users	Existing incumbents	Own solutions
Research institution	-	Own solutions
Science museum	Existing incumbents	Own solutions

The following sections provide insights into direct competitors in relation to actual users and science museums. Competition in relation to research institutions is not being looked into, assuming that it is an emergent market and there are no direct competitors. The final section brings to the light intersegmental competitors, that has been identified though secondary data collection.

**3.4.5.1 Competition for actual users**

When it comes to actual users, there are competitors to each standalone product (podcast, documentary, TV series, feature film, game). Since the first launched product for actual users is podcast, current competitors to *hello X* are other podcasts focusing on future, environment and science (see Table 14).

Table 14 Direct competitors to *hello X* in relation to actual users

Podcast title	Publishing houser/podcaster	Relevance
Earth Wise	NPR	Changing environment
Terrestrial	NPR	stories of people making personal choices in the face of environmental change
Climate Cast	NPR	Latest research on Climate Change
Blue Dot	NPR	Interviews with guests from worldwide scientific communities



Radio Lab	WNYC	Mixing science culture and technology
Flash Forward	Rose Eveleth	Possible and not so possible future scenarios
Science Friday	Science Friday Inc.	Making science fun

### 3.4.5.2 Competition in relation to science museums

Direct competitors to *hello X* in relation to the museums has been identified through interviews with potential customers (Table 7). Some of them (Science Projects, Hüttinger, Bruns) are large companies that design, produce and sell interactive exhibits, both mechanical and multimedia, for museums and science centres. Puffer Fish specialises on spherical display systems and produces software and content for them. Flip is a Tromsø based company, working with graphic design and moving image.

Table 15 Direct competitors in relation to science museums

Competitor	Description	Concept	Exhibit fabrication	Design	Mechanical	Multimedia content	Local
Flip (NO)	Visual communication, graphic design, film	+	-	+	-	+	+
Science projects (UK)	Design and production of mechanical and multimedia exhibits, installation, graphic design, project management	+	+	+	+	+	-
Puffer fish (UK)	Spherical display systems, software and content	+	+	+	-	+	-

Hüttinger (DE)	Exhibit concept & design, engineering, software, fabrication, project management	+	+	+	+	+	-
Bruns (NL)	Exhibits fabrication, software	-	+	-	+	+	-

### 3.4.5.3 Competition in relation to research institutions

In relation to research institutions, *hello X* is a new product in an emerging market of science communication. This means that there are very few direct competitors in this market.

However, there are media production companies that compete with Ice-9 by providing solutions to research institutes. These are mainly local film production and design companies. The identified competitors are gathered in the table below (Table 15).

Table 16 Direct competitors in relation to research institutes

Competitor	Description	Film	Animation	Design	Web development	Game development	Local
Flip	Visual communication, graphic design, film	+	-	+	-	-	+
Plus Point	Web development, game development, social media consultancy	-	+	+	+	+	+
Fabelfjord	Commission film, creative consultancy, book production	-	+	-	-	-	+
Ocean Imaging (AU)	Underwater video shooting, scientific blog posts for social media	+	-	-	-	-	-

#### **3.4.5.4 Cross Market Competition**

Considering that *hello X* is a solution system that finds itself in three different markets simultaneously, it is not sufficient to look at the competitors in each of the markets. Cross market competitors need to be included in the analysis. Cross market competitors are organisations that operate in two or more of the markets. This section will present two examples of cross market competitors for *hello X*.

One of the identified examples is a project, called “Imagined Futures” has a very similar concept to *hello X*. Imagined Futures is Los-Angeles based collective ‘focused on designing, promoting and discussing the future’ (TheImaginedFutures, 2017). They produce products in two categories – Events and Galleries. Events are live shows featuring science experts and storytellers imagining the future (One night to save the world, Science speed dating). Galleries is a concept of an immersive built environment planned for Los Angeles, where users will be able to create and then experience the future (TheImaginedFutures, 2017).

Considering the location of the project and its site-specific focus, it does not compete with *hello X* in any of the markets. It can, however, serve as an inspiration, and, considering the similarity in the concept, can become a partner for possible future collaborations in the US.

#### **3.4.6 PESTEL-Analysis**

The environment in which the organisation is in, creates both opportunities and threats. It is important that entrepreneurs track and analyse changes in the environment and to be able to take advantage of these and avoid losses (Johnson, 2017). Macro-environment is a combination of external elements and forces that are outside of the company’s control, but have an impact on its performance. The following section presents the analysis of macro-environment based on a framework PESTEL.

PEST analysis represents a systematic examination of the Political, Economic, Social, and Technological factors in the macro environment (Kotler et al., 2001). The extended version of it, PESTEL, includes also Environmental and Legal factors.

Changes in the **political** environment regulating the amount of support that institutions in public sector receive from the government will have an effect on company’s performance, since many of current and potential clients of Ice-9 are public institutions that rely on subsidiaries from the government. The political environment in Norway seems to continue to

encourage research and practices contributing to sustainable development. Jumping to **economic** factors, The Norwegian Research Council is planning an increase of NOK 210 million for research to help to achieve sustainable solutions in society and the business sector (Aadland, 2016). EU expresses ‘support of Social Media ecosystem community building between different Social Media actors such as developers, designers, users of all ages, artists, entrepreneurs, researchers, at European and national level, also linking to important international initiatives’ (European Commission, 2018, p. 60). The emergent market of science communication may lead to the creation of new job opportunities on the intersection of media and science.

On a **social** level, the awareness of environmental issues is rising, as well as public interest in science is increasing. Both factors are favourable to the development of *hello X*.

At the same time, rapidly changing **technological** environment requires embracing new technology like Augmented reality and VR. Production of content for these technologies will require strong network of partners with access to competences and technology. With regard to **legal** factors, an upcoming change in the regulations of General Data Protection will affect the way *hello X* is engaging users and builds relationships with clients. eMarketer predicts a shift in the use of social media platforms among young people, stating that Facebook will lose about 2 mln users under 25 by the end of 2018 (eMarketer, 2018). Moreover, a recent scandal regarding sharing personal data led 1 out of 10 Americans to delete their accounts (Milanesi, 2018). A combination of social, technological and legal factors may eventually result in emergence of new social platform, which is an opportunity for *hello X*.

**Environmental** issues such as climate change, air and water pollution gain more attention in the media. This global awareness is contributing to a global response, however, more needs to be done to convert this awareness into action. *hello X* has a potential of playing important role in that by bridging the gap between scientists, who study what can be done to combat the environmental issues, and the public, who will initiate the change.

### 3.5 Conclusion

In this chapter, the analysis of the customer, market and competition for Ice-9’s project *hello X* has been conducted. The research question answered in this chapter is “How can we assess *hello X*’s market potential?”. The main focus of this analysis was on the customer discovery, based on the Steve Blank’s framework “The Four Steps to the Epiphany”. The process involved stating the hypotheses in relation to customer and market, and evaluating them in

through interviews with potential customers and users. This process has proven itself to be highly beneficial for gaining market knowledge and customer understanding. During this process it has been confirmed that there is a need for science communication tools. Therefore, there is a potential for *hello X* to create value for research community and the public by providing interactive solutions for communicating science. These interactive solutions can be distributed online and through science centres, thus creating additional value for them. Customer segmentation is conducted in relation to customer needs, which have been empirically identified. This segmentation allows to formulate meaningful value propositions for each segment, which is a part of successful marketing strategy.

The environmental analysis, based on the PESTEL, reveals several factors that can positively impact the performance of *hello X* in the future. Political factors like the increase in funding for research projects contributing to sustainable development is contributing to the increase of the buying power of economic buyers. Recent EU initiative expresses support for social media community building, creating links between social media actors and international initiatives. The cultural change in the use of social media can be seen as an opportunity of creating a new type of social media platform, which can connect various stakeholders and the public and in this way create value.

## 4 Business plan

### 4.1 Executive Summary

With the increase of public investment in research, the expectations about science communication from the public are rising. Because communication departments in research institutions do not prioritise communication with the public and often lack skills required to generate effective communication, there is a need for a new structure that would connect scientists and media development specialists, who can integrate science content into various media products, which, presented to the public, can foster understanding of science and the implications it has on the future.

Various studies indicate that participatory community-based approach to science communication has greater and more lasting effect, comparing to traditional ways of communicating. Ice-9 is a media production company that specialises in using fiction narratives in audio-visual productions, interactive exhibitions and live events. Their current project *hello X* is an interactive story universe on the future of the Arctic, developed with the inputs from scientists at FRAM Centre for Research on the High North and the Environment and the UiT the Arctic University of Norway. *hello X* is an interactive story universe revolving around one fictional character, X, who is a young woman living in the future Arctic in 2068. Her story can be experienced online, in form of *hello X* podcast (launched), short documentaries (in production) and feature film (coming soon), and in public space, in form of interactive exhibitions, AR games and live events (performances and discussion events). It provides a long-term solution for communication with modern audiences, where science content is integrated into fiction narrative and presented to the public in a form of broadcasts and interactive elements in museums and public spaces.

The market for science communication services in Europe includes hundreds of research institutions, which have thousands of research projects each year. More than 20 Norwegian research institutions are conducting research related to sustainable development of society. Norwegian Research Council requires that all their projects have clear communication goals and activity plans. This increasing demand creates an opportunity for Ice-9 to propose various communication packages, that include featuring scientific data across different products of *hello X* universe. Four of FRAM flagship projects has supported *hello X* in the last two years. The wide network of institutions involved, including the recent agreement with the Nansen Legacy project, makes *hello X* a promising tool for science communication.

## **4.2 Business Idea and Business Model**

### **4.2.1 Business Idea**

The requirements for science communication and public outreach from the Research Council has recently been strengthened. Research projects need to present an outreach plan, including channels and platforms they are planning to use, as part of their grant application. The main channel of communication is publications in scientific journals. The audience reached through these publications is limited and specialized. In attempts to diversify the audience, research institutes produce news articles and simple websites with mainly written content, which is not attractive enough for the modern audiences. Because the communication departments often lack skills required to produce engaging media content, research institutions struggle to stay up to date with rapidly changing media culture and fail to reach young audiences.

*Ice-9 offers a long term two-way communication solution, based on fiction universe hello X, which includes a range of digital products and a community of followers online. Science content is integrated in the story of X, who is a main character of the universe, a young woman living in the Arctic in 50 years from now. The variety of formats reflects the recent trends in media culture and includes podcast, microdocumentaries, TV series, Augmented Reality games and interactive exhibitions in the museums and public spaces.*

### **4.2.2 Vision**

Ice-9 aims to be a leader in science communication by constantly developing innovative products and services that merge the social and environmental issues of today with the interactive communication culture of tomorrow, link science to art, and combine the power of public imagination with an age-old love for stories.

### **4.2.3 Mission**

Ice-9's mission is to create communities within an interactive story universe that links together multiple stakeholders and the public, in a dynamic, knowledge-based circular economy to engage them in a 'purposeful play' focused on the future.

### **4.2.4 Profit model**

Research projects will be charged 100 000 NOK on a yearly basis for their data and their scientists to be featured on *hello X* podcast, short films and in other elements of *hello X* universe. Activities included in this price are following. Research of publications and databases, engagement with researchers - 30 000 NOK. Production of one podcast episode or one micro documentary based on research project inputs - 30 000 NOK. Integration of content

into other elements of hello X universe (youth workshops, public art, website, social media, live events - 30 000 NOK. In addition to it there is an administration fee of 10 000 NOK.

Yearly budget for 12 podcasts and 4 micro documentaries is 800 000 NOK. In order to break even, Ice-9 need to engage at least 8 research projects, however, there is a potential of involving up to 16 projects or institutions, what would make 100% profit on cost. Currently, five flagship projects of FRAM Centre for Research on the High North and the Environment are interested in *hello X*. Three of them has supported the project with full amount, before the first episode of the podcast was launched. It means that the price is realistic and there is a potential for increase if the podcast becomes popular.

### 4.3 Solution. hello X interactive story universe

*hello X* integrates different formats (workshops, broadcasts, interactive sculptures and games) to create a crowdsourced interactive fiction universe around one fictional character, X, who is a young woman living in the Arctic in 2068. The life of this future person is being collectively imagined by scientists, artists and the public. The following product model illustrates the relationship between different elements of *hello X* universe (see figure 1).

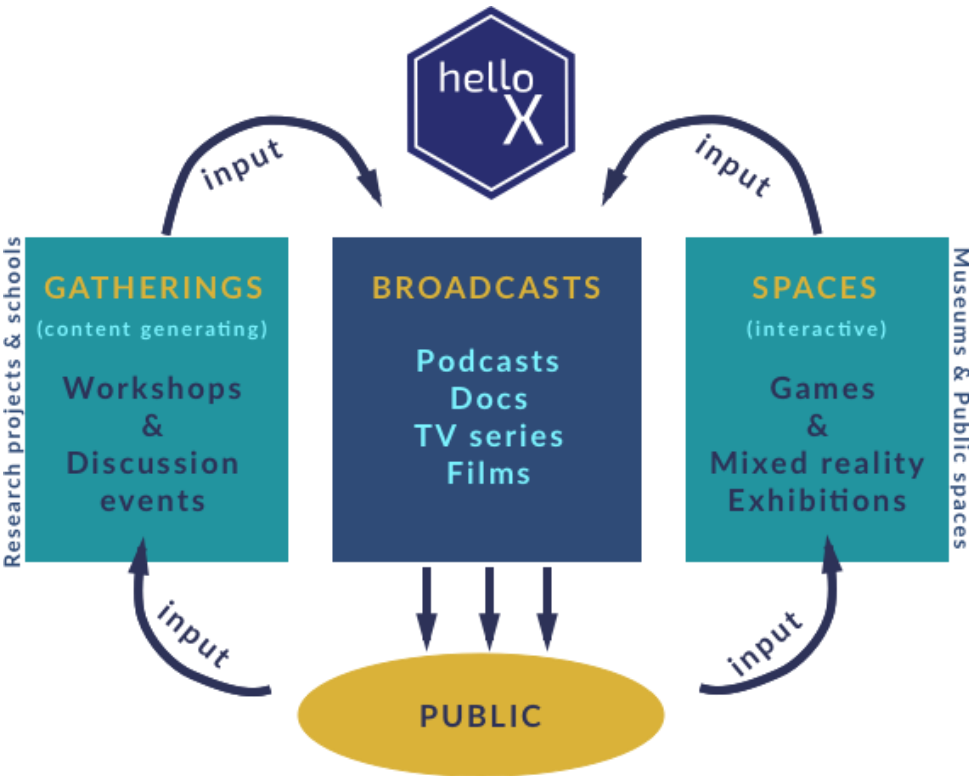


Figure 6 Product model



The purpose of Gatherings is to generate content. This category includes activities, which facilitate interaction with specific user groups (children, scientists, selected discussion participants). These activities involve educational workshops with youth, workshops with scientists and discussion events. Spaces include virtual spaces (games, interactive story experiences) and physical exhibitions in museums and public spaces. These elements enable interaction with broader public (game users, exhibition visitors and public art observers). All elements within Spaces are designed to collect inputs from users, which are then incorporated into Broadcasts and used to develop new interactive elements. Broadcasts (Podcasts, Docs, TV series and films) contain inputs from both scientists and general public, featuring documentary and fiction combined to create a continuous narrative and stimulate engagement.

## **4.4 Market**

### **4.4.1 Science communication**

Target market for *hello X* includes research institutions the main goal of which is to produce knowledge that contributes to sustainable societal development. This includes first and foremost institutions working with Climate and Environment, but also Agriculture, Aquaculture and Food, considering that these areas of human activity have tremendous impact on the environment. In Norway there are 21 institutions conducting research within these areas (see appendix 1). Because the institutions are directly involved in the process of *hello X* content creation, it makes sense to begin with ones, which are geographically close. 12 institutions that have offices in Tromsø include: Akvaplan-niva/NIVA, CICERO, Havforskningsinstituttet, NGU, NIKU, NILU, NINA, Nofima, Norges miljø- og biovitenskapelige universitet, NORUT, NIBIO, Norsk Polarinstitut, SINTEF. Last year Norwegian Research Council made NOK 60 million available for research projects on societal development that follows environmental needs. It was mentioned explicitly in the program description, that project with clear public outreach goals and a plan will be given priority (Forskningsråd, 2017). Clearly, the expectations for public outreach in Norway are rising and that creates an opportunity for Ice-9 to develop a market for science communication services.

### **4.4.2 Customer**

The ideal first customers are three remaining FRAM flagships, since they are familiar with the project and three out of six have already supported *hello X* (*Effects of climate change on sea and coastal ecology in the north – 50 000 NOK*, *Sea ice in the Arctic Ocean, Technology and Governance 100 000 NOK*, *Effects of climate change on terrestrial ecosystems*,

*landscapes, society and indigenous peoples – 100 000 NOK*). Next customer, who Ice-9 is in dialog with is the Nansen Legacy (85mln euro research project on future of the Barents Sea, with 10 institutions, led by UiT). Other potential customers include other research institutions in the Arctic (Tromsø, Northern Norway, Finland, Greenland, Sweden, Alaska and Canada).

Since *hello X* include both digital (broadcasts, games) and tangible elements (exhibitions), there are two complementary value chains (see figure 2)

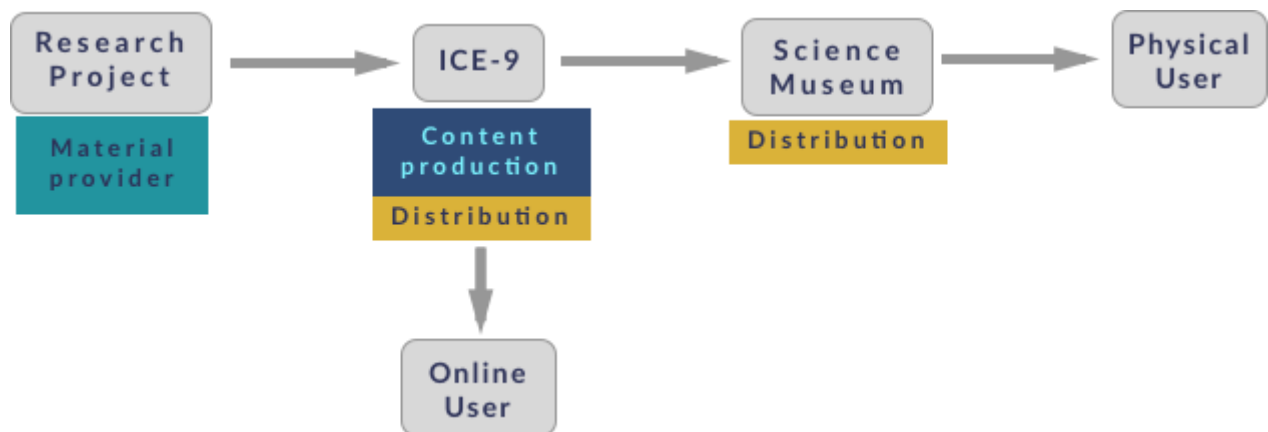


Figure 7 Value chains

Digital elements are produced and distributed by Ice-9. Interactive exhibitions are co-produced and distributed in collaboration with science museums, creating value for them. Polaria science museum is raising funds for production of interactive exhibition *hello X*. Value proposition for science museums is formulated as follows:

*Hello X offers an interactive learning environment, based on a fiction universe, which has a range of digital products and a community of followers online.*

Value proposition for end users:

*Hello X offers interactive tools to collectively create hope for the future together with the team of scientists, artists and a community of people worldwide.*

#### 4.4.3 Competitors

There is very few companies which specialize in providing science communication services to research institutions, however, there are some companies that produce multimedia content for commercial purposes including outreach projects for research institutions among

others. In Tromsø there are: Flip (design), Fabelfjord (animation and film) and Plus Point (web and game development). Australian company Ocean Imaging specializes on underwater photography and has a team of divers, photographers and environmental scientists. The reason why it's included as a competitor is that this August they are joining a sailing vessel in the Arctic in order to research and communicate local environmental stories, shoot a documentary and material for educational videos. There is a potential for collaboration with them to produce high quality underwater films.

Indirect competition consists of research institutions own solutions (websites, news articles, exhibitions), however, their attractiveness of this content for the public is not very high.

In the next 3-5 years new competitors might emerge, but, considering that building relationship with research institutions takes time and effort, Ice-9 has an advantage of being in this market early.

#### **4.5 Go to Market**

*hello X* has a range of digital products online, however, the end users are not the ones whose budget is paying for the product. In order to finance production of digital products and create profit, promotion needs to be done on both B2B and B2C basis, because having a large audience online will help to sell the concept to institutional customers. Establishing strategic partnerships with research projects or institutions like FRAM is vital, because having such partners can increase chances of getting grants to finance other products, like exhibitions and games, and they can provide financing at the early stage of development.

*hello X* interactive exhibitions in museums and public spaces can provide tremendous exposure to the brand and engage new users, but they are very expensive to produce and difficult to sell without a prototype. The analysis of the museum market revealed that all science centres in Norway have a network of big commercial partners, who can finance exhibitions with bigger budget (1.6 mln NOK), however, to actually sell the product to them, would require them to have an active need for a new content. The position on a problem recognition scale for different museum varies. For instance, Polaria has an active need, but, being a private organisation, it does not have the support that public science centres have.

Live events are another great offline marketing tool. Ice-9 has bought the licence and the equipment for a mobile talk show concept that can be used at festivals, conferences and during other events. It can both provide exposure and generate revenue. Price per event (including planning, transport, set up, filming, uploading) is 15 000 NOK.

## **4.6 Team**

*Creative director & co-founder* Christine Cynn, combined fiction and documentary to create the groundbreaking film *The Act of Killing*, winner of over 70 international awards and nominated for an Oscar. The innovative concept at the heart of *The Act of Killing* is also the driving force behind Ice-9's new interactive story universe. A Harvard graduate in Social Anthropology, Cynn has 20 years experience as a film director and producer, writer and teacher. Christine Cynn is executive director of the award-winning film 'Ambulance' by Mohamed Jabaly.

*Visuals & Installations, Co-founder* Valentin Manz has worked as a professional artist and art educator for 15 years . Manz has been a fellow at Urban Glass in Brooklyn (2005) and the Creative Glass Center of America (2007 & 2013), and shown his work in Munich, London, and New York. He studied stage design at the Slade and Central St. Martin's College of Art in London, and graduated from Goldsmiths as an art psychotherapist.

Christine and Valentin have collaborated on numerous interactive installations incorporating audience participation, large-scale sculptural environments and multichannel video installations (earthNOWbeing 2011; Bread Head with Campbell Works 2011).

*Podcast Producer, Youth Program Leader* Anneli Stiberg graduated from Visual Cultural Studies (visual anthropology), UIT, in 2012. Since her graduation, she has taken part in an exchange program, "SCREEN - connecting youth through film", where she spent three months in Kenya working with youth and film. She has also been involved in smaller film projects and at a children school in Tromsø. She is a junior producer for the film "Ambulance" (director: Mohamed Jabaly. Producer: Jabfilm).

*Marketing, Finance & Market Research* Marina Borovaya is currently finishing her Master's in Business Creation and Entrepreneurship. She holds a Bachelor's degree in Journalism from University of Wroclaw (Poland) and a Bachelor's degree in Technology from Moscow Power Engineering institute (Russia). Her current interest is commercial viability of artistic practices.

*Science Communication* Ann Eileen Lennert leader of the science team and environmental anthropologist, who took part in The Arctic Sustainability Lab, Arven etter Nansen, Kystbarometeret, CONNECT, Global connectedness and changing resource use systems in the Arctic, Storymaps, Sustainable development and management through co-Production of knowledge and education, BuSK, Building shared knowledge in the Northern Periphery, POP Greenland, sampling the pesticide pollution of the Greenlandic icesheet.

Creative team includes storygroup leader and director Leo Kay, storygroup advisor and novelist Sigbjorn Skåden, writers Carl Sealeaf and Toni-Dee Paul, web developer Furkle Industries, Digital experience designer Ismet Bachtiar, artist duo KEELERTORNERO, Record label NOT APPLICABLE, composers Coda to Coda, musicians Metatag and Theta, performance artist Liv Hanne Haugen, dramaturg Tale Næss.

#### **4.7 Economic overview**

Currently, Ice-9 is dependent on grants for development of its products and services. With the support from FRAM flagships (250 000 NOK), Kulturråd (250 000) and own investment, Ice-9 is developing the first season of *hello X* podcast. With the previous support from KORO (Kunst i Offentlig Rom), Ice-9 started pre-production of AR game. This year, company received additional support from KORO in the amount of 300 000 NOK, however, to have a complete budget for AR game, Ice-9 need to raise additional 550 000 NOK. Tromsø Kommune granted Ice-9 additional support in form of 20 000 NOK.

For commercialisation of existing products and development of competences within the company, Ice-9 has received support from Innovation Norway 560 000 NOK. Sparebank Kulturnæringsstiftelsen (100 000 NOK) and Fritt Ord (50 000 NOK) have financed *hello X* audience building campaign.

#### **4.8 Status**

In the end of April, Ice-9 has launched *hello X* podcast and website (featuring text-based story game). Production of new podcast episodes continues. A microdocumentary about Plastic waste clean-up project by Nordic Ocean Watch is currently in production. Ice-9 has received a grant of 300 000 NOK from KORO (Kunst I Offentlige Rom) for production of AR game and interactive sculptures in central Tromsø. Tromsø Kommune has also received an extensive funding from KORO developing a public park at Prostnest and several other projects within urban development. Ice-9 is in dialogue with Tromsø commune about

combining *hello X* AR game with one of their projects. With support from Sparebank Kulturnæringsstiftelsen Ice-9 purchased the equipment for pop up talk show from a London based collective The People Speak. The concept for a series of live discussion events is being developed.

## 4.9 Milestones

2016: X2066 (former *hello X*) prototype exhibition at Polaria science museum, Tromsø as part of Insomnia festival, with contributions of researchers at UNIS, Arctos UiT, IMR, and NP, among other institutions.

2017: Research, recruitment, residency in New Ålesund, youth workshop in Longyearbyen kunsthallen/NNKM, closed content-generation workshops with scientists, podcast production, SMAK2068 cooking contest featuring scientist talks (with Polaria, SMAK, and Akvaplan-niva) and short film production for projection on Stortorget and social media (1000+ views), *hello X* storygroup content production, youth workshop development for 2018

2018:

- youth workshops *hello X* for DKS Aust Agder and DKS Tromsø
- *Launch of hello X podcast and website* with events at Nordnorsk Kunstmuseum and Polaria during Vårscenefest 2018 (with partial support from Sparebank Nordnorge, Fritt Ord, Kulturråd), with marketing consultation from Visit Northern Norway,
- *hello X microdocumentaries* on Plastic waste cleanup project by Nordic Ocean Watch (in production), Ny Ålesund family Sunday, Arctic sea birds
- *Continue hello X storygroup content production* with novelist Sigbjørn Skåden, dramaturg Tale Næss, and director Leo Kay (partial support from Tromsø Kommune)
- *School workshops* for classes 6-9 in Tromsø, Longyearbyen, Barentsburg, and Aust-Agder (with partial support from DKS. Further applications pending for Finnmark, Nordland, and other areas for autumn 2018).
- *Develop longterm hello X online youth network* connecting groups in Tromsø, Longyearbyen, Barentsburg, and several other potential locations.

2019:

- *Continue hello X podcast production* with FRAM Flagships, Nansen Legacy and new partners

- *Participatory live events*: using story content generated by online participants and professional writers to serve as the basis of a new genre of participatory live events where performers and musicians engage the audience in improvised play with text, movement and music (Silence Festival (northern Finland), Riddu Riddu, and other festivals)
- *Development of Augmented Reality puzzle box*: Prototype for an interactive story app that works with small or large sculptured ‘puzzle boxes’. Participants will use a new mobile AR app to answer questions and collect clues in a story in order to open real and virtual doors and reach the end of the story (granted partial support from Kunst i Offentlig Rom, Nansen Legacy pending)
- *X2068 tour of Arctic Russia* with presentations and meetings with scientists, artists, and general public in St. Petersburg, Petrazavodsk, Murmansk, and Arkhangelsk

2020:

- *Develop plan for presentation to potential media partners BBC / NRK* ‘Natural History of the Future’ a new concept for IMAX and TV-series that combines nature footage (with help from science institute partners) and fiction stories created through *hello X* story universe

#### **4.10 Risks**

There is a certain risk associated with the fact that some projects received only partial funding. The difficulties in getting additional support can lead to delays in delivery schedule. As long as clients and financiers are informed about the changes, it should not affect future collaboration and funding opportunities.

#### **4.11 Conclusion**

This chapter provided the development strategy for *hello X* based on the findings from innovation study and market study, thus answering the research sub question *What is the business strategy for successful commercialisation of hello X?* This business plan represents an overview of various aspects of the venture (product, team, financials) and its environment (customers, market, competitors) and can serve as a roadmap for company development.

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## Appendix 1

1. CICERO Senter for klimaforskning
2. Nansen senter for miljø og fjernmåling
3. Norsk institutt for by- og regionforskning (NIBR)
4. Norsk institutt for kulturminneforskning (NIKU)
5. Norsk institutt for luftforskning (NILU)
6. Norsk institutt for naturforskning (NINA)
7. Norsk institutt for vannforskning (NIVA)
8. Transportøkonomisk institutt (TØI)
9. Bioforsk
10. Nofima AS
11. Norsk institutt for landbruksøkonomisk forskning (NILF)
12. Norsk institutt for skog og landskap
13. Norsk senter for bygdeforskning (Bygdeforskning)
14. SINTEF Fiskeri og havbruk AS
15. Veterinærinstituttet
16. Havforskningsinstituttet
17. Norges miljø- og biovitenskapelige universitet
18. NORUT
19. NIBIO – Norsk institutt for bioøkonomi
20. Norsk Polarinstitutt
21. UNIS – Universitetscenteret på Svalbard

