Nottingham University Business School MSc Programmes

Module: New Product/Service Development and Management

Coursework: Group Project (50% of final grade)

Date Completed: 5 April, 2011

'RealD Talk' and 'RealD Tab': Regaining Nokia's Competitive Advantage Through Disruptive Innovation

Researched and Written by

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Description of Assignment: In this assignment we were asked to develop two related product concepts for the company of our choice using recognized product innovation theory and concepts.

My Role: For this group assignment, I coordinated the creation of the final report, and was mainly responsible for the work on Section 3, Concept Development. I also played a big part in creating Section 2, Idea Generation and Screening.

Instructor Feedback: "Well done, an excellent assignment, which shows a good understanding of theory and practice. The report is well presented and covers all the areas specified. You have demonstrated a sound understanding of the company and marketplace. There is perhaps too much background detail that could have gone into the appendices. However, you have utilised this information in your ideation process and have shown the results of your ideation process. Good use of theory, e.g. Cooper (2008) in your screening process. In particular, section 3 is extremely well done, e.g. textual description and visual prototypes. Good conclusions that also highlight limitations. (Final Grade: A)

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0. Introduction

In recent years, the Finnish phone maker Nokia has been heavily criticized for its lack of innovation and dwindling profits, or what Parker *et al*. (2011) refers to as "Nokia's malaise." Nokia can hence be seen as not having adapted adequately. This report seeks to bring Nokia back on track through the new product and service development (NPD) process.

> **The Importance of Innovation**
> In a constantly changing business environment, companies need to adapt to stay competitive (Baker & Hart, 1999). Innovation is vital in bringing about this adaptation. Specifically, innovation is often referred to as finding new ways of addressing current issues. It is commonly seen as involving external innovation such as new product or service development, as well as internal innovation such as new and improved organizational process development (McDonough et al., 2008).

0.1. Purpose

This report documents the innovation process our team undertook to develop two product concepts for Nokia: the *RealD Talk* and *RealD Tab*, a smart phone and tablet PC which promise to disrupt the mobile communication market by introducing 3D, holographic video capabilities in mainstream devices. The broader purpose of this report is to illustrate the theoretical and practical issues surrounding the product innovation process. In meeting these two objectives, the main text of this report is written as a first-hand narrative account, while light-blue 'speech bubbles' throughout the report guide the reader by providing a theoretical context.

0.2. Methodology

The RealD Talk and RealD Tab concepts were developed through innovation process that took place over several weeks. Our four-step model was inspired by the existing innovation frameworks–particularly Goffin and Mitchell's (2010) Pentathlon framework and Cooper's (2008) Stage Gate® methodology (see Exhibit 1).

Exhibit 1: Innovation Pentathlon and Stage-Gate Frameworks
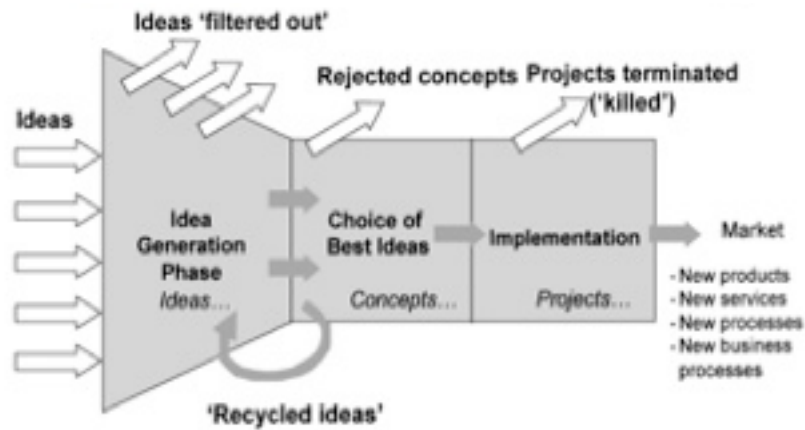
Goffin & Mitchell's Innovation Pentathlon (2010: 17)
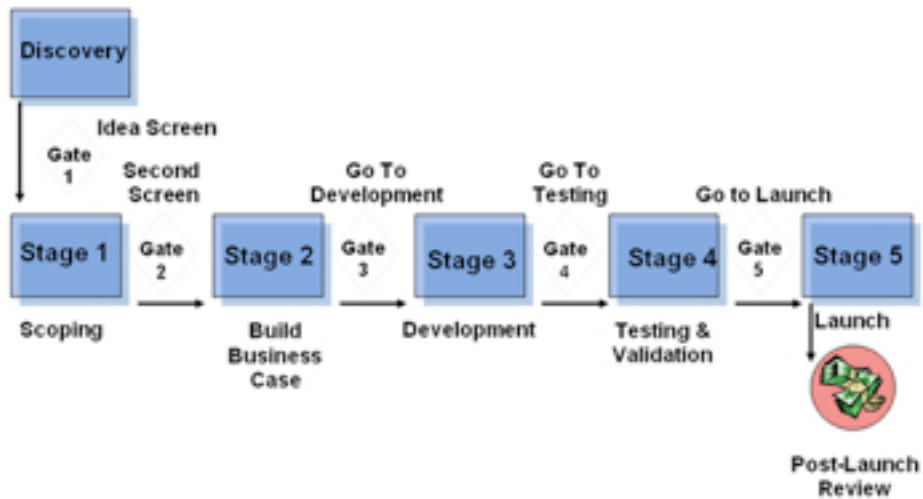
Cooper's Stage Gate Process (2008: 215)

Our innovation model includes the following stages, around which we've organized this report: (1) Innovation Strategy; (2) Idea Generation and Screening; (3) Concept Development and Testing; and (4) Evaluation and Reflection (see Exhibit 2).

Exhibit 2: Our Product Innovation Process

1	2	3	4
Innovation Strategy	Idea Generation & Screening	Concept Development	Evaluation & Reflection
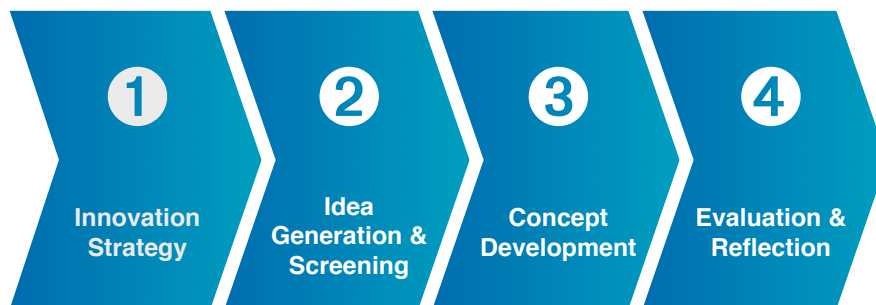
1. Innovation Strategy
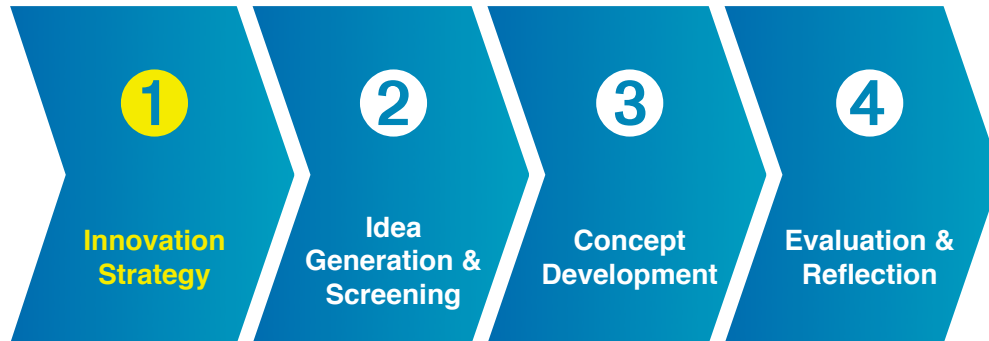
Since the development of the innovation strategy provides an essential foundation that guides the entire product development process, our team focused a great deal of effort on this aspect from the very beginning. We conducted an internal and external environmental analysis,

> Innovation strategy represents the starting point in the new product or service development process. It clarifies fundamental decisions such as whether to pursue incremental or radical innovation, and what target markets and product categories to focus on. Which approach to adopt naturally depends on the current as well as anticipated market and consumer trends (Goffin & Mitchell, 2010).

1.1. Environmental Analysis

At first, in accordance with Goffin and Mitchell (2010: 93), we analyzed market as well as consumer trends. At the same time, we used Sawhney *et al.*'s (2006) "innovation radar" to identify on Nokia's innovation performance compared to its main competitors, i.e. Google, Apple, and Research in Motion (RIM). Based on this analysis we seek to develop an innovation strategy that best addresses the needs of Nokia's internal and external environments.

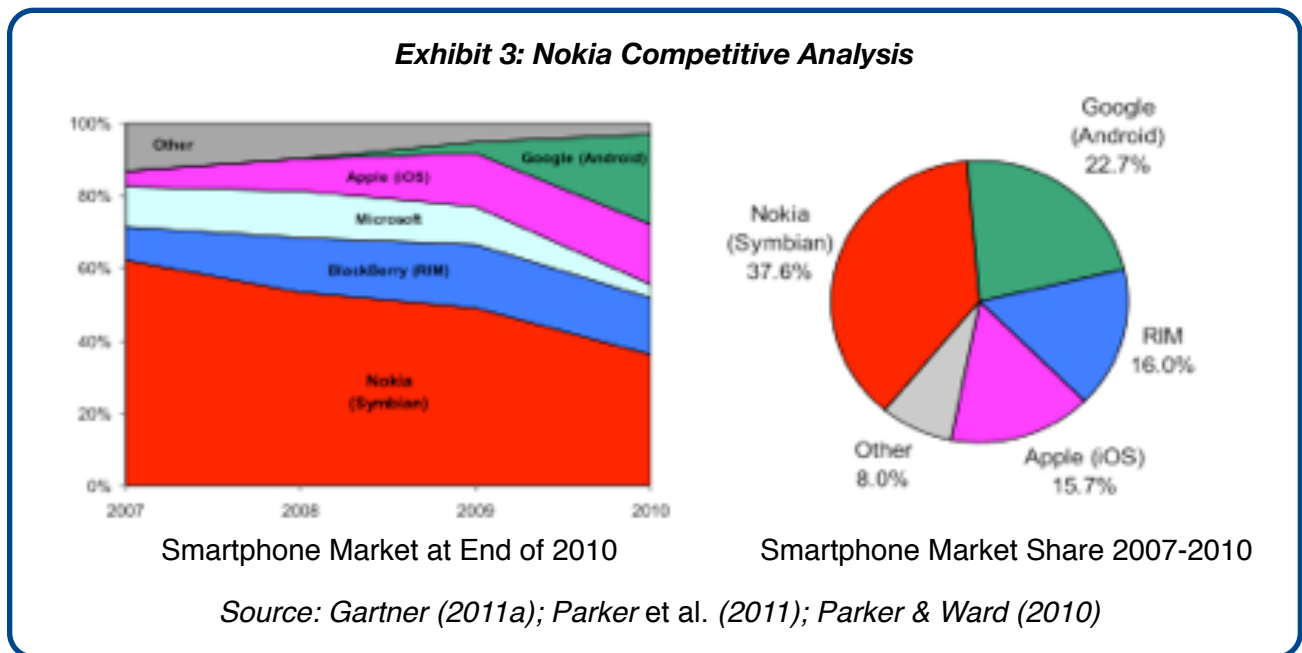### 1.1.1. External Environmental Analysis

The mobile devices market can be divided into two main categories: (1) 'traditional' mobile devices; and (2) the 'smart' mobile devices segment. Traditional mobile devices mostly refer to mobile phones with very basic functions, mainly voice communication and text messaging (Nokia, 2009). On the other hand, smart mobile devices typically use operating systems that can run third-party software and applications, such as email, internet, navigation, as well as a variety of multimedia features such as an mp3 player, camera, video recorder, mobile TV, etc. (Nokia, 2009; Hamblen, 2009). The smart-devices category includes both mobile phones (aka 'smart phones'), as well as various types of mobile PCs, including 'netbooks', laptop computers and the increasingly popular touch-screen tablet PC.

Smart Phone Market

More competition and less product differentiation in the traditional mobile phones segment has lead to declining average selling prices as well as decreasing profitability as consumers seek more advanced devices (Nokia, 2009: 13). Accordingly, the smartphone segment is growing exponentially, offering the highest profitability across the mobile phone market (Ward,

2010). In 2010, the global smartphone market increased by 72% and had an estimated size of around $120 billion (Gartner, 2011a; Parker & Ward, 2011). In Q4 2010, more than 52% of global smartphone sales were accounted for by Western Europe and North America (Gartner, 2011a).

Although Nokia holds a large share of the smart phone market, it is quickly losing ground to its more innovative competitors. As at end 2010, Nokia with its Symbian operating system (OS) had a market share of 37.6%, followed by Google's Android OS with a market share of 22.7%. Android grew 888.8% in 2010 and is run by a multitude of phone makers such as HTC, Samsung, and Motorola (Gartner, 2011a). Android phones are among the most competitively priced on the market, with some selling for as little as $50 (Parker *et al*, 2011). Research In Motion (RIM) and Apple accounted for 16% and 15.7% of the smartphone market, respectively. Although Nokia was still market leader as of end 2010 it had lost more than 20% since 2007 (Parker & Ward, 2011; Gartner, 2011a) (see Exhibit 3).

Exhibit 3: Nokia Competitive Analysis

Smartphone Market at End of 2010   Smartphone Market Share 2007-2010

Source: Gartner (2011a); Parker et al. *(2011); Parker & Ward (2010)*

Mobile PC Market

According to Gartner (2011b), tablets are becoming increasingly popular, whereas ordinary mobile PCs, i.e. netbooks and notebooks, are experiencing lower popularity accordingly (see figure 1.3). Gartner (2010) forecasts tablet PC sales to almost triple to 54.8 million units in 2011 and to reach 208 million units by 2014. The tablet PC segment is dominated by Apple's iPad. As at end 2010, sales of the iPad amounted to $9.5 billion, capturing a market share of 90% (Apple, 2011). A variety of tablets have entered the market since then, i.e. Samsung Galaxy tab (Android), Toshiba (Android), HP Slate 500 tablet (Microsoft Windows 7) and Dell Streak (Android), accounting for the majority of the remaining 10% in 2010 (Agnello, 2010). A growing number of companies are working to grow and maintain their share in this lucrative market through both incremental and radical innovation. For example, Apple recently launched its new iPad 2, LG recently launched its new tablet PC recently, which is the first tablet that offers a 3D camera (Catanzariti, 2011), and RIM is expected to launch its tablet "BlackBerry PlayBook" during 2011 (BlackBerry, 2011).

Nokia has not yet launched a tablet, however, it is in the process of doing so according to Reuters news (Prodhan, 2011). Since touch-screen tablets promise to dominate the mobile PC market in the years to come, it is clear that Nokia must accelerate product innovation in this area. But given the iPad's unceasing dominance and the growing number of companies vying for a piece of the market, it is clear that Nokia must come up with a tablet that is extremely innovative in order to have any hope of competing in this area.

Consumer Behavior Trends

Contrary to traditional mobile devices, smart devices, i.e. tablets and smart phones, are increasingly popular with consumers. This demand is driven by the advanced markets where people have more disposable income and a need to be constantly connected to the web everywhere they are (Gartner, 2011b; Nokia, 2009). Increasingly business people rely on smart devices for fast and convenient web communication. Moreover, a 2010 study conducted by Luth Research revealed that consumers are increasingly using mobile phones for purchase transactions (Webster, 2011). Another factor which has driven demand is the increase in network speed which has made smart devices more usable (Gartner, 2011b). The rate of innovation in smart devices is high and incremental innovations are hence quickly obsolete.

1.1.2. Internal Environmental Analysis

In order to guide our innovation strategy, we conducted an innovation audit to enhance our understanding of Nokia's strengths and weaknesses relative to its main competitors (Google, Apple and RIM). Sawhney *et al.*'s (2006) innovation radar depicts twelve dimensions along which a company can innovate. In particular, this framework allows a company to "construct a strategic approach to innovation" (Sawhney *et al.*, 2006: 81).

Exhibit 4: Innovation Audit Results
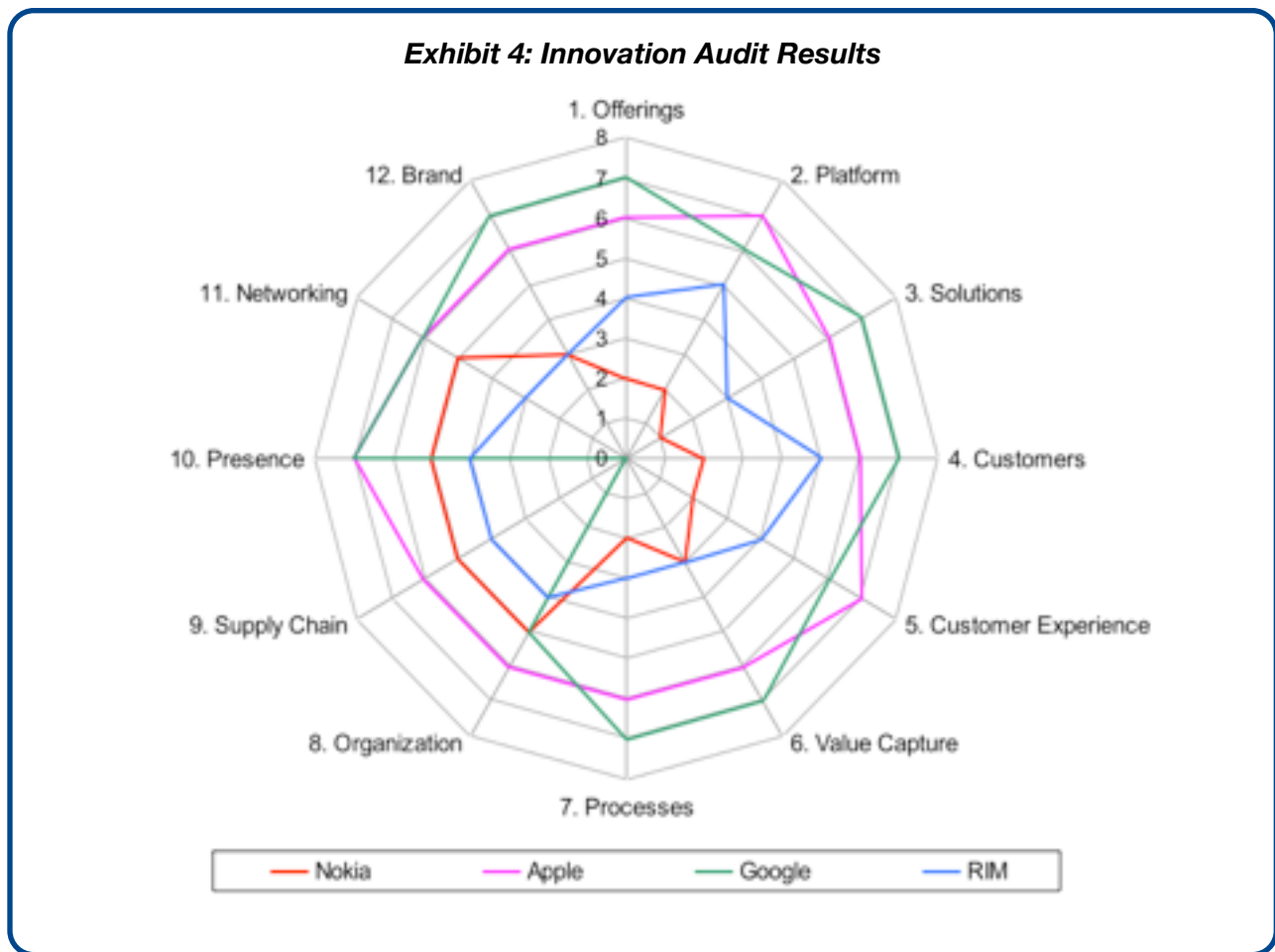
Looking at the innovation radar above, Nokia has a weak profile compared to Google and Apple in particular. It falls particularly short on innovation along all of the dimensions within the offerings and customers categories relative to its main competitors. Accordingly, Nokia could stand to gain a more competitive position by innovating along dimensions such as platform, solutions, customers, customers experience and value capture (for a full explanation of scores and dimensions see Appendix 1).
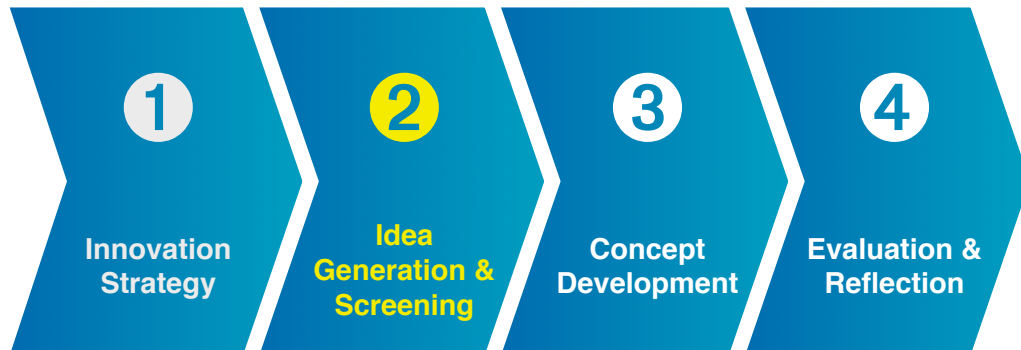
1.2. Nokia's Innovation Strategy

Considering the highly lucrative and fast-growing nature of the smart devices market, Nokia's main objective is to (re)gain competitiveness in smart device segments. Taking into account consumer and market trends, as well as Nokia's relative strengths and weaknesses, the following innovation strategy has been developed in order to achieve this objective.

Nokia plans to make considerable investments in the next-generation disruptive technologies (as opposed to incremental innovation), related to the smart devices world. In particular, product or service innovation will be made along dimensions like "platform", "solutions", "customers", "customers experience" and "value capture". Moreover, Nokia believes strengthening its position along the ´networking` dimension would bring fresh perspectives, increasing the likelihood of radical innovation. In other words, instead of the traditional practice of viewing other companies simply as competition--confining innovation to an isolated practice undertaken by an in-house research and development department--Nokia would like to adopt a more col-

laborative approach known as co-opetition. Researchers have largely overlooked co-opetition in NPD, however it represents a viable solution in product generation (Bonel *et al*., 2008). This is because "companies, once viewed as autonomous entities competing for profits against each other, now find themselves increasingly embedded in networks of social, professional, and exchange relationships" (Gulati *et al*., 2000: 203). As the corporate culture and the DNAs of the companies are hard to match, failure rates are becoming increasingly higher. In order to avoid this, and attain a high return on investment for all of its alliances, Nokia will follow "52 critical factors that you can measure when making an alliance" (Nokia, 2011). Cross-sector alliance is the one used by the company, which gives access to new technology and provides the company with innovative data mining capabilities. Similarly, Nokia considers co-creation involving customers as part of its innovation strategy (another form of open innovation) to further enhance the possibility of innovation (e.g. von Hippel, 1986; Kristensson *et al.,* 2004). The collaborative relationship management has a multidimensional perspective. Nokia involves all stakeholders in their decision-making process, from their customers and internal departments, as well as, external collaborators and suppliers.

2. Idea Generation and Screening

Guided by the innovation strategy detailed in the previous section, we moved on to phase two of our innovation process: idea generation and screening. The first half of this phase (ideation) involved drawing inspiration from various primary and secondary sources, including potential customers and industry thought leaders, culminating with a team brainstorming session that captured 12 ideas for product and product features Nokia might pursue. The second half (idea screening) involved evaluating and paring down of these ideas based on pre-determined criteria. We concluded this phase with a single idea around which we eventually develop two product concepts.

"Developing new and valuable ideas is an important activity if a company expects to succeed in product development since innovation begins with creative ideas" (Kristensson, 2004: 5).
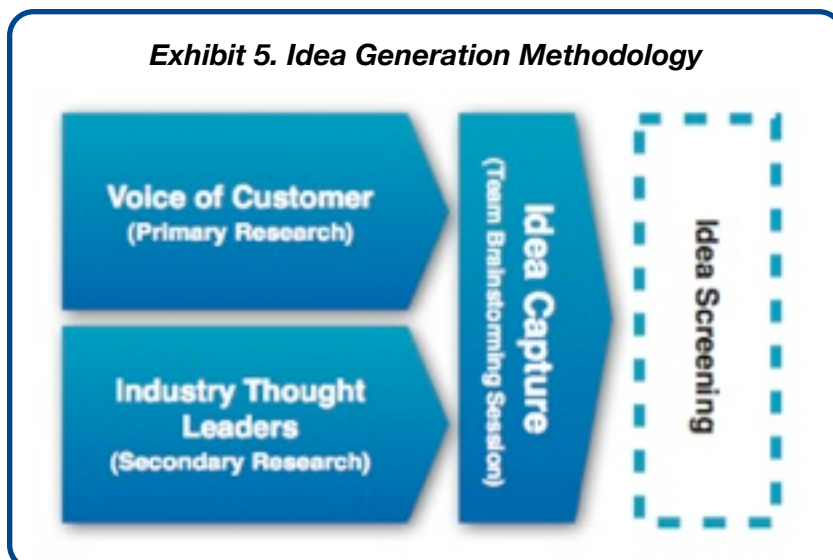
2.1. Idea Generation

In order to generate ideas for new products, we adopted three main approaches: (1) primary data collection, or 'voice of customer' research; secondary research of industry thought leaders; and (3) team brainstorming sessions. The following sections describe these approaches and their results in more detail.

Exhibit 5. Idea Generation Methodology

2.1.1 Voice of Customer Research

In an effort to be develop products that are highly responsive to market needs, we incorporated a variety of 'Voice of Customer' (VoC) research techniques into our ideation process, including a focus group, semi-structured interviews, and an online questionnaire, each of which are described below:

According to Thomke and Von Hippel "[p]roduct development is often difficult because the 'need' information (what the customer wants) resides with the customer and the 'solution' information (how to satisfy those needs) lies with the manufacturer" (2002: 76). Therefore involvement of potential customers in the idea generation process can increase the viability of a new product by providing insight into any problems they face or opportunities they see for improvement. This approach is often referred to as 'Voice of Customer' (VoC) research (e.g. Cooper & Dreher, 2010).

- **Focus Group** - Each team member invited one or two friends to attend an hour-long session for the purpose of identifying customer needs in the mobile device market. Participants were given guidelines as to the objective of the session and what was expected of them. Participants were asked for their opinions and ideas on what they product they would like to see developed in the smart device market. Open-ended questions were developed in advance to be asked to the different participants such as 'what is your dream phone', 'how do you use your phone', and 'how do you wish you could use your phone'. Several ideas were obtained from these sessions and discussions took place to further shape these developments. Due to time constraints, preparation and execution of this exercise was more casual than the 'best practices' may suggest, but our findings were valuable nonetheless. As compensation we provided the participants with free refreshments.

- **Semi-Structured Interviews -** Using the same talking points developed for the focus group section, each team member conducted casual interviews with friends and colleagues in the early weeks of the project. We continued these interviews as our product concepts evolved, adapting our questions accordingly. For example, once we decided to focus on 3D technology, we asked users whether they would consider using a 3D video chat device, how they might use it, and what sorts of value and benefits they might derive. Like the focus group, interviewees were recruited via convenience sampling as opposed to a more representative sample of potential Nokia customers. However, these conversations still provided us with valuable insights and influenced the process a great deal.

- **Online Questionnaire -** Lastly, we created an online questionnaire which team members distributed to friends, family and colleagues through Facebook and email. In order to encourage a higher response rate, we limited the survey to ten questions: six consumer behavior questions, two demographic questions, and two optional questions where respondents had the option to provide more in-depth comments and insights. Due to time constraints, our response rate was rather low (16 surveys were completed). However, we found the findings of the questionnaire quite useful, mainly for anecdotal purposes. For example, a few respondents took the time to provide detailed answers to the 'optional' question: 'If your could design your 'dream' phone or other mobile device, what would it be like?', which we found extremely insightful.

2.1.2. Industry Thought Leaders and Lead Users

While our VoC tactics captured the sentiments of average consumers, we used a second ideation approach to study the views of more influential stakeholders--industry thought leaders and lead users. Unlike our VoC research, this exercise involved secondary rather than primary data collection. Again, this process was somewhat informal, mainly done through simple Google searches for terms such 'Nokia innovation', 'the future of mobile phones', 'smart device trends', etc., we came across a variety of news articles, blogs and websites that offered insight into where the mobile communication market may be headed. A selection of these resources are described in Exhibit 6.

Exhibit 6: Industry Thought Leader Research Techniques

The sources we found useful for secondary thought-leader and lead-user research tended to fall into a few general categories:

- **Industry Reports and Projections** - We found a great deal of blog articles and news editorials speculating about the future of the mobile device industry, such as Temple (2011)'s article on the future of tablet PC technology.

- **Nokia Watchdogs** - We also found a third-party few blogs and websites dedicated solely to reporting on and discussing Nokia's activities (i.e. www.nokiainnovation.com), which were run by dedicated fans and followers of the brand--the epitome of lead users.

- **Fictional product concepts** - Perhaps the most inspirational types of thought leader research we uncovered were user-generated ideas for product concepts, frequently found on design blogs. We came across many highly creative, somewhat 'wacky' ideas , such as Seth (2009)'s blog post about a see-through glass-like phone that mimics the day's weather (image below).

(Image source: Seth, 2009)

2.1.3. Team Brainstorming and Idea Capture Session

Finally, we concluded our ideation process with a three-hour idea-capture session, where we used the insights gained through our VoC and thought leader research to come up with as many product ideas as possible. In the weeks leading up the session, team members agreed to carry around pocket-sized notebooks to write record down product ideas whenever inspiration struck. We also agreed up on certain methods and ground rules before the session began. In the first half of the session team members would first take turns explaining an idea, which were captured on post-it notes. The rest of the team could follow up with clarifying questions, but were strictly forbidden to offer opinions on the idea's merits, which might discourage creativity. The second half of the session was far less structured. We went back through the ideas we had captured, discussing the merits and potential of each, refining some, while deleting others that were too outlandish or unoriginal. Unlike our other ideation tactics, this process required us to rely primarily on our instincts and opinions, as opposed to outside research.

2.1.4. Ideation Results

The final product of the ideation method described above was a list of 12 ideas, captured in Exhibit 7 below:

Exhibit 7: Our Product Ideas

The different sessions produced the following ideas for products and product features in the mobile device industry:

- **3D Hologram Device** - This device could project anything from maps, mail, games and people into 3D Holographic Image.
- **Global Phone**: Phone that allows you to have phone numbers in multiple countries
- **Portable Printing Device** - Ideally this device would be incorporated into another device from which the printing job would be sent.
- **Wrist phone** - The idea behind this is to have a phone which consumers can wear around their wrists.
- **Music Phone** - A phone that is optimized for downloading and listening to music. It would have high storage capacity and an excellent speaker system.
- **Subscription Phone** - A mobile phone sold as a service rather than a product, (This is a trend in sustainable product design because it requires companies to take responsibility for their products throughout the entire supply chain.)
- **Phone/Tablet Hybrid** - A phone that can slide or unfold into a tablet.
- **'Green' phone -** Phone with built - in environmental impact tracker
- **Jumbo Tablet** - Extra-large tablet PC Ideal for watching movies or running applications that require a larger workspace.
- **"Best Friend" Phone -** Phone with a simulated personality capable of forming an emotional relationship with its user.
- **Solar Phone** - Phone that recharges itself in the sun so the battery can last week or months
- **Unbreakable Phone** - Phone that can withstand extreme abuse

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2.2. Idea Screening

Given everything we learned through our market and consumer research leading up to the team brainstorming session, our group unanimously agreed that the idea for a 3D hologram device was the most promising. In order to confirm this instinct, we submitted the idea to a go/no go assessment adapted from Cooper (2008: 227), which evaluates the product concept along six factors (see Exhibit 8). The following sections offer a summary of our evaluation under each of these.

Exhibit 8: Criteria for Concept Screening

Factor 1: Strategic Fit & Importance
• Alignment of project with our business's strategy
• Importance of project to the strategy
• Impact on the business

Factor 2: Product & Competitive Advantage
• Product delivers unique customer (or user) benefits
• Product offers customer (or user) excellent value for money (compelling value proposition)
• Differentiated product in eyes of customer/user
• Positive customer/user feedback on product concept (concept test results)

Factor 3: Market Attractiveness
• Market size
• Market growth & future potential
• Margins earned by others in this market
• Competitiveness – how intense & tough the competition is (negative)

Factor 4: Core Competencies Leverage
• Project leverages our core competencies & strengths in:
   - Technology
   - Production or Operations
   - Marketing (image, brand, communications)
   - Distribution & sales-force

Factor 5: Technical Feasibility
• Size of technical gap (straightforward to do)
• Technical complexity (few barriers, solution envisioned)
• Familiarity of technology to our business
• Our technical track record on these types of projects
• Technical results to date (proof of concept)

Factor 6: Financial Reward versus Risk
• Size of financial opportunity
• Financial return (NPV, ECV, IRR)
• Productivity Index (PI)
• Certainty of financial estimates
• Level of risk & ability to address risks

New-product projects are scored by the gatekeepers at the gate meeting, using these six factors on a scorecard (0 - 10 scales). The scores are tallied & displayed electronically for discussion. The Project Attractiveness Score is the weighted or unweighted addition of the six factor scores, and taken out of 100. A score of 60/100 is usually required for a Go decision.

(excerpt from Cooper, 2008: 227)

2.2.1. Strategic Fit and Importance

This idea is highly compatible with the innovation strategy detailed in section one, especially in terms of Nokia's desire to produce radical innovations, regain lost market share and increase its partnerships. A 3D hologram device would be a radical form of innovation, since there is no product like it currently on the market. Second, the potential market disruption this product would present would certainly help Nokia achieve its goal of (re)gaining market share in the burgeoning smart device market. Finally, since there are already a handful of small companies experimenting with 3D communication technology, such as Musion Systems LTD (see case study on following page), this product would offer an excellent project for Nokia to form new partnerships around.

2.2.2. Product and Competitive Advantage

The 3D hologram technology is not new, but a 3D hologram smart device does not yet exist on the market. Mobile phone manufacturers have merely introduced smart phones with 3D – but not 3D holographic – technology (e.g. News.com.au, 2011). In other words, it is unique. There is a strong consumer trend towards (re)personalization, i.e. the move away from impersonal communication towards more personal communication, whether in business or leisure. This device offers the highest possible personal experience in telecommunication, more personal than any other telecommunication device offered by competitors such as Google or Apple. Consequently, it is able to satisfy customers' needs better than any other product. Nokia could establish a competitive advantage [Relative competitive position].

2.2.3. Market Attractiveness

This product would be introduced as a next generation smart device, and, as mentioned in section 1, this market is growing at an exponential rate, especially with respect to smart phone and tablet PC. Moreover, the demand for business, leisure, and lifestyle devices with innovative attributes is increasing (Nokia, 2009, 2010). Additionally, radical innovations typically experience high levels of interest and are able to capture market share, as demonstrated by Apple's iPad.

2.2.4. Technological Feasibility

Although it seems like something out of a science fiction movie, the technology for 3D virtual communication already exists. For example, Musion has already developed and applied this technology in several contexts, including concerts, live speeches and news broadcasts (see Musion, 2011 and Exhibit 9 below). Amending this technology to a mobile device may be complex, but in light of the strong research and development capabilities of Nokia and Musion, the probability of a 3D holographic smart device development can be deemed high.

Exhibit 9: Musion Case Study

Musion's Eyeliner System is a high definition holographic video projection system allowing spectacular three-dimensional moving images to appear within a live stage setting.

Live or virtual stage presenters can appear alongside and interact with virtual images of humans or animated characters. The Projection Screen is the essence of co-creation, bringing companies and customers together within an immersive communication experience that taps into the emotional impulses of today's market. It's a sensory technology that wholly engages its audience and can transform information systems into visual capital that draws in today's reality consumer.

Musion utilizes the current generation of High-Definition technology and integrates it into a visual ecosystem that enables HD media to fully realise its potential within the blossoming digital ecosystem. The Eyeliner hologram is unique worldwide and protected by patents granted in countries all over the world, including the USA, Japan and Europe.

2.2.5. Leveraging Competencies and Resources

Nokia has strong competencies and resources which are able to support the product and its success. Specifically, Nokia has strong R&D capabilities and has already been working on 3D imaging (Nokia, 2009: 111). Moreover, Nokia has a strong manufacturing base with production facilities in nine countries (Nokia, 2010: 40), meaning it has economies of scale and scope that

could produce these 3D holographic devices at relatively low costs. Unfortunately, the project's R&D costs are expected to be high. However, Nokia is listed on the stock exchange and would be able to raise additional finance in the capital market. Nokia also has strong marketing capabilities. its brand is globally known and still is one of the most valuable brands in the world (Datamonitor, 2010: 5). Nokia's brand so far stands for reliability, with innovativeness being applying more to the reputations of its competitors (i.e. Apple and Google). Nokia has a global reach having sales and distribution in more than 160 countries (Nokia, 2010: 40). Their communication network is strong and they have already run huge and successful product launch campaigns providing it with valuable experience.

2.2.6. Risk vs. Reward

Although R&D expenses are expected to be high, 3D holographic devices can be sold at a premium price since consumers have shown to be willing to pay a higher price for innovative devices, as demonstrated by Apple's iPad. Since Nokia can benefit from its existing resources and competencies, it can produce this product at relatively low prices, hence profitability compared to competition can be deemed good. Thus, the risk appears to be manageable.

Based on the screening results for this idea, we strongly recommend going ahead with it.

3. Concept Development
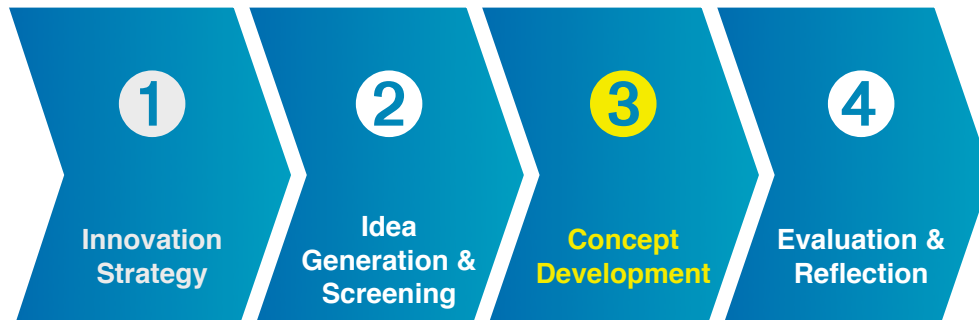
As mentioned in the previous section, our screening process revealed that the most promising idea for Nokia to pursue would be the '3D device'. In order to refine this idea into two product concepts, we adapted the framework used by Barkley (2007) (see Exhibit 10).

Exhibit 10: Refining the product concept

Idea	Concept	Product	Application
Customer frustrated by the limits of traditional video chatting compared to having a conversation in real life	Develop a family of 3D mobile devices that allow users to have more realistic virtual conversations	Smartphone and tablet PC equipped with a 3D camera and holographic projector	Diverse applications for both home and work use

Adapted from Barkley, 2007:176)

The purpose of developing a product concept is to create a realistic image of the product being proposed, so that it can be evaluated by the company and potential customers before the product goes into development (Bruce, 2007). In constructing our product concept, we created a textual description of the phone and tablet, a visual prototype, a list of key features, and user scenarios. We agreed on preliminary names for these products: *RealD Talk* and *RealD Tab.*

A product concept is "an approximate description of the technology, working principles and form of the product, usually expressed as a sketch or as a rough three-dimensional model, and is often accompanied by a brief textual description" (Ulrich & Teppinger 2003: 61). Lees and Wright (2004) identify three types of concept statements for new products: (1) *stripped* product concept statements, which are "brief, nonemotive, factual description[s]" (p. 389); (2) *embellished* concepts, which are "written in a commercialized manner with a persuasive tone" (p. 392); and (3) *visual* concept statements, which supplement the copy of an embellished concept statement with a graphical depiction of the product (Lees & Wright, 2004). Given the radical nature of our concept, we felt developing a fairly detailed, *visual* concept statement for would be necessary for consumer evaluation.

3.1. Textual Description

We created the following embellished textual description of the RealD Talk and RealD Tab:

Welcome to the next generation of communication technology. With Nokia's RealD Talk and RealD Tab, virtual conversations come closer to reality than they've ever been before. Like a scene from a science fiction movie, Nokia's patented RealD projection technology allows you to talk to people who are across the ocean as if they were across the table. Imagine being able to meet face-to-face with far away friends, family or clients with the push of a button. Equipped with a powerful Microsoft operating system, the RealD Talk and RealD Tab have all of the features of today's most popular smart phones and tablets, including internet, email, and endless apps for both home and work. However, with RealD projection technology, these applications come to life, as games, websites and even people are projected off of the screen in crystal-clear holograms that can be seen without 3D glasses. The RealD Talk and RealD Tab promise to revolutionize mobile communication. Don't be left behind, get yours today.
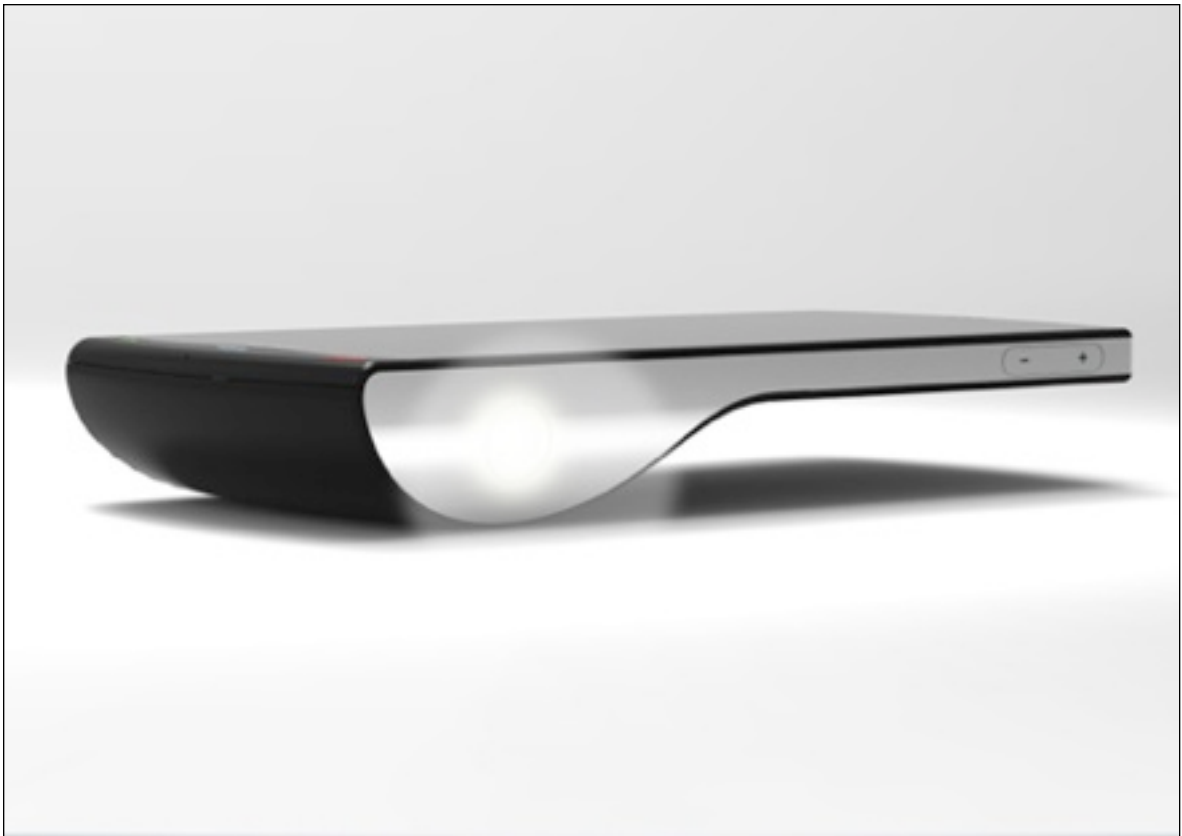
3.2. Visual Prototype

The figures below offer visual depictions of the RealD Talk and RealD Tab, including product features and user experience:

Ad-like images of the RealD Talk and RealD Tab
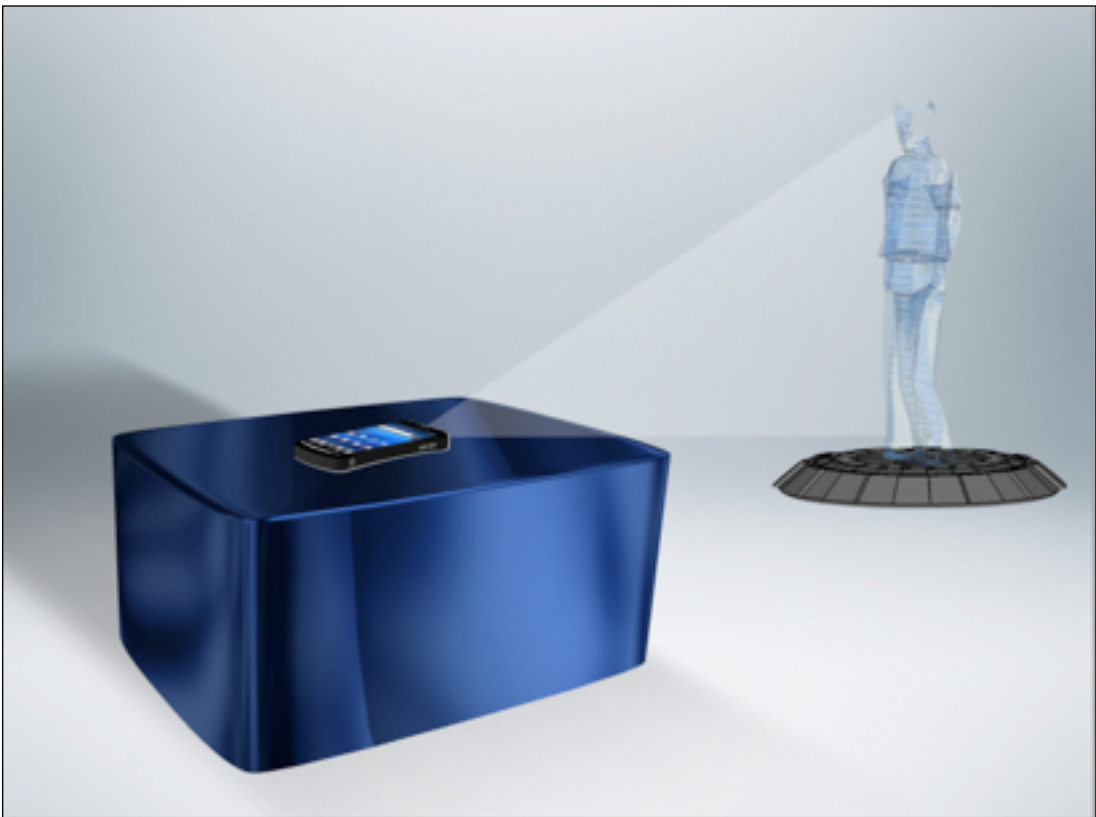
A depiction of Nokia's RealD Holographic technology in action

Angled view showing the ergonomic shape and side-projector function included in the RealD Products

Depiction of the customer experience when using RealD products at work

3.3. Key Features

The table below describes the main features that come standard with the RealD Talk and Re-alD Tab:

Product Features	RealD Talk	RealD Tab
High Resolution 2-D/3-D touch Screen	✔	✔
Sleek, ergonomic shape	✔	✔
Microsoft Operating System	✔	✔
Third Party Games and Applications (2d and 3d)	✔	✔
2D and 3D holographic Projection	✔	✔
Larger size, more memory, more processing power		✔
Ability to connect with your home PC through the cloud		✔
Kickstand		✔
Dual Projectors - Tabletop touchscreen and 2D/3D holographic projection display		✔
Durable, stylish protective case		✔

3.4. Product Benefits

Development of these products would be highly beneficial for both the consumer and Nokia. For the consumer, the RealD product line will offer a new, more realistic mobile communication experience, while minimizing travel costs, and maximizing productivity. This benefit is particularly attractive given the rising costs of fuel and the increased emphasis on corporate and personal and corporate sustainability. By offering more valuable long-distance interactions, these products also promise to increase personal fulfillment and quality of life for its users.

For Nokia, the RealD product line is equally attractive. After years of lagging behind the competition in terms of innovation, these products would would give Nokia a first-mover advantage, disrupting the mobile communications market by introducing a new technology. This should hopefully reverse Nokia's dwindling profitability and retreating market share, while giving them a foot in the door to the Tablet PC market currently dominated by Apple. This newly strengthened industry position promises to strengthen Nokia's brand image, positioning the company as an up-market innovator.

3.5. Target Market

The RealD Talk and RealD Tab target consumers who want to enjoy realistic face-to-face communication with far away friends, family and colleagues, as well as the enhanced enter-

tainment and professional applications offered by a 3D display (i.e. 3D games, video, data charts, etc.). These customers also expect the features found in more traditional smartphones and table PCs, including email, internet, instant messenger and limitless third-party apps. We've identified at least four market segments in which these customers may be found, including families with adult children, frequent travelers, entrepreneurs and knowledge workers, and corporate users.

Target Segment	Customer Need	Corresponding Feature/Benefit
Families with adult children	• Meaningful communication with loved ones who are far away • Experience face-to-face interaction without being tied to a home PC	• RealD Holographic technology allows you to communicate with others as if they are in the same room. • RealD Phone and Talks are among only a handful of mobile devices with video-chat capabilities, and are the only mobile devices with 3D chat technology.
Frequent travelers	• Meaningful communication with loved ones who are far away • Perform many functions without carrying multiple gadgets • Access a variety of entertainment (i.e. music, movies, games) that do not require a lot of "stuff" such as equipment or DVDs • Get work done while on the road	• RealD Holographic technology allows you to communicate with others as if they are in the same room. • The RealD talk and RealD tab are equipped with a Microsoft operating system that syncs with Outlook and allows users to download third-party apps. • With RealD Holographic technology and third party application capability, the possibilities for innovation are endless. Users will be able to play 3D video games, watch 3D and more as more applications are developed. • The RealD Tab's Dual Projector and home PC access capabilities allow users to watch a holographic projection of their computer screen while typing on a virtual keyboard.
Entrepreneurs & knowledge workers (i.e. consultants, attorneys)	• Interact face-to-face with clients and partners while minimizing travel costs and maximizing billable working hours • Access files on home PC, contacts, email and other data while away from the office • Perform a variety of home and work applications with one device	• RealD Holographic technology allows you to attend meetings without leaving the office. • The RealD Tab allows users to access their home PC directly. • The RealD talk and RealD tab allows users to download an endless variety of Microsoft and third-party applications for both home and work.
Corporate Users	• Need for real-time collaboration between geographically dispersed teams • Minimize costs and lost time due to travel • Access files on home PC, contacts, email and other data while away from the office	• RealD Holographic technology allows you to attend meetings without leaving the office. • The RealD talk and RealD tab are equipped with a Microsoft operating system that syncs with Outlook, the most popular corporate productivity software. • The RealD Tab allows users to access their work PC or corporate intranet directly

4. Evaluation and Reflection
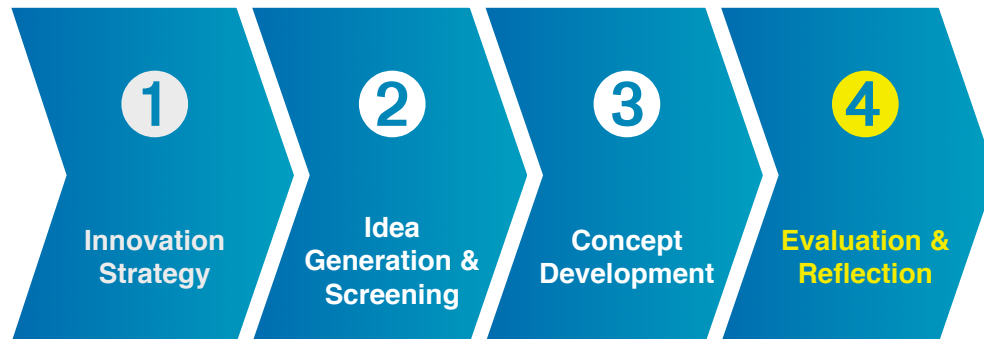
We conclude this report with a brief summary of its main ideas and lessons learned, as well as a discussion of the shortcomings we perceived in both the process we undertook and its resulting product concepts.

4.1. Main Findings

Nokia has received significant attention from the press because of the company's apparent lack of innovativeness. This has been supported by our external and internal environment analysis which revealed that Nokia falls short on innovation compared to its competitors and is losing market share in the most promising segment, i.e Smart Devices. Due to the challenges presented by the current situation in the market, it was decided to develop a new product which would significantly improve Nokia's position in the market. To achieve this, greater attention was paid to radical and open innovation which involved co-opetition and co-creation with customers.

After assessing the consumer and market trends, the potential of smart devices was identified as the future of telecommunications. Through the idea generation and screening process it was established that the 3D Hologram Device had the most potential to turnaround Nokia's current situation. The targeted market segments were business people and home users. It was also also found that although there was a lot of hype on 3D technology, no products have yet been introduced to the market.

The key points obtained from this experience included learning that innovation is a non-linear process. This was determined through the as we constantly had to revert back to previous steps in the process and make changes.

4.2. Limitations of the Process

Different methods were used in the idea generation process, but reliance on convenience sampling and failure to obtain a significant amount of feedback led to far-from-representative sample. Due to lack of specific data, the screening process was somewhat more casual and abbreviated than the actual process Nokia might undertake when developing new products.

4.3. Limitations of the Product

Although 3D Hologram technology already exists, the feasibility of fitting this technology into a smaller device such as the smartphone or tablet might be quite costly. Based on the results obtained from the questionnaire it is hard to determine how much consumers are willing to pay for such a device. Another question raised is whether the product could be produced at a price that would reap significant benefits to Nokia while at the same time be affordable to consumers.

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Appendix 1: Innovation Radar - Explanation of Scores

Dimension	Defnition	Examples
Offerings	Develop innovative new products or services	Nokia was ranked quite low on this dimension in comparison to its competitors. Google and Apple both have been introducing new products which add value to consumers such as Iphone and Itunes for Apple and Google Maps and Google Earth for Google.
Platform	Use common components or building blocks to create derivative offerings	Apple, Google and RIM have all introduced new technologies (Android for Google) upon which new products and services could be built whereas Nokia seems to be lagging behind.
Solutions	Create integrated and customized offerings that solve end-to-end customer problems	Nokia ranked lowest on this dimension since it failed to offer any new product or service which solves consumer needs, especially when compared with its competitors.
Customers	Discover unmet customer needs or identify underserved customer segments	Through its software and hardware, Apple has met both unmet customer needs and has. Google has identified various unmet needs and developed services that meet these needs such as Google Mail and Google Maps. RIM focuses mostly on the business segment and covers all their basic needs through the Blackberry Phone.
Customer Experience	Redesign customer interactions across all touch points and all moments of contact.	Apple ranked highest on the customer experience dimension as it has greatly enhanced customer experience through it's products. It has set the new trend for mobile phones and portable media players.
Value Capture	Redefine how company gets paid or create innovative new revenue streams	Apple and Google offer various application and services from where they can generate revenues whereas Nokia offers a narrower range through OVI 3.
Processes	Redesign core operating processes to improve efficiency and effectiveness.	Nokia proved to be relatively inefficient in that, it launches products too late in the market relative to its competitors.
Organization	Change form, function, or activity scope of the firm.	Nokia is quite a bureaucratic organization and it takes quite a long time to get approvals from senior management to operation level employees. On the other hand Google and Apple have quite a flat organizational structure.
Presence	Create new distribution channels or innovative points of presence, including the places where offerings can be bought or used by customers	Both Nokia and Apple have their own stores where customers can test the products. Whereas Google's services can be downloaded or used online.
Supply Chain Presence	Think differently about sourcing and fulfillment.	Apple was ranked highest in this dimension having an extremely efficient supply chain, whereas Google does not yet have a supply chain. Nokia has an integrated supply chain and maintains long term relationships with it's suppliers.
Networking	Create network-centric intelligent and integrated offerings	Nokia has a wide distribution network which allow the company to reach customers all over the world.
Brand	Leverage a brand into new domains	Both Nokia and RIM could improve on this dimension as their brand extends to mobile phones and accessories mostly. On the other hand, Google and Apple have extended their brands to a broader range.

Appendix 2: Questionnaire

What activities do you commonly use your mobile devices for?
Check all that apply

- Personal calls (i.e. talking to friends and family)
- Work-related calls
- Browsing the internet
- Email and messaging
- Playing games
- Watching TV and videos
- Listening to music
- Staying organized (i.e. calendar, contacts, lists, etc.)
- Social media (i.e. Twitter, Facebook, etc.)
- Other: _____

When buying a new mobile device, what issues are important to you?

	1 - Doesn't matter to me at all	2	3 - Sort of important, but I won't base my entire decision on it	4	5 - So important it will make or break my decision
Low Price	○	○	○	○	○
Stylish appearance	○	○	○	○	○
Device popularity or trendiness	○	○	○	○	○
Availability of third-party apps	○	○	○	○	○
Communication features beyond talk and text (i.e. video chat, instant messenger)	○	○	○	○	○
Operating system (i.e. Symbian, Google, Windows, etc.)	○	○	○	○	○
Brand image	○	○	○	○	○

Are there any other features you consider important when purchasing a mobile device that were not included above?
If so, please describe

< 18 yrs

Demographic Details

Age

< 18 yrs	⬍

Sex

Male	⬍

Optional questions and comments

These questions are optional, so write as much or as little as you want!

If your could design your 'dream' phone or other mobile device, what would it be like?

We plan to use the information you've provided to design a new, innovative mobile device. Do you have any other comments or ideas for us?

(Submit)

Appendix 3: Record of Meetings & Responsibilities

Session 1 (15-02-2011)

- Getting acquainted with the topic
- Structuring the way forward
- Decided on which new product development process to adopt

Session 2 (23-02-2011)

- Decided to adopt Nokia as a company for this project
- Basic Industry Analysis

Session 3 (08-03-2011)

- Discussed how to obtain ideas for new product generation
- Group Brainstorming Session
- Planned focus groups, designed questionnaire, opened a Facebook group for submission of ideas. All respondents were asked to submit ideas within the Smart Device Market.
- Decided on which screening criteria to adopt

Focus Groups (11-03-2011 and 12-03-2011)

- Focus groups were held in the evenings on 11-03-2011 and 12-03-2011. Participants consisted mainly of group members' friends and classmates.

Session 4 (16-03-2011)

- Analysis of collected information was carried out and common themes were found and grouped
- List of new product ideas was generated

Session 5 (22-03-2011)

- Screening process of ideas was carried out and most of the ideas were eliminated based on intuition
- The most promising idea from the list was chosen – 3D Hologram Device
- 3D Hologram Device screened using a combination of Cooper (2008) And Wong (1993)

Intersession (23-3-2011)

- In between sessions we had a brief interview with Anoop Nathwani - Senior Manager, Strategic Supplier Relationship Management at Nokia Corporation on (23-03-2011)

Session 6 (25-03-2011)

- Developed two product concepts based on 3D Hologram Device
  - RealD Talk – Smartphone with 3D hologram Device incorporated
  - RealD Tab – Tablet with 3D Hologram Device incorporated
- Discussed key features of new concepts and benefits both to consumers and company

Session 7 (27-03-2011)

- Discussed Nokia's marketing strategy for this new product
  - Identified Target Segments and Corresponding Features
  - Determined how the company wanted to position itself

 In every session, we determined points we wanted to include for each segment. We were all assigned different segments to write-up over the Easter break which we sent to each other. Conference calls were held on Skype were we discussed our progress and difficulties we had. When all sections were finished, all our contributions were merged together.

Session 8 (02-04-2011)

- Final revision and editing of the report was carried out