Framing Changes of the Value Proposition of Emerging Technologies in a B2B Context

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ABSTRACT

Purpose: Although the literature acknowledges the importance of value proposition change, existing research on how the value proposition can change remains relatively limited. The aim of the study was to develop a framework to explore how the value proposition evolves over time in the case of emerging technologies.

Methodology/approach: Based on a single case and a processual approach, the longitudinal research design tracks changes in the value proposition over a 25-year period.

Findings: The study provides a nuanced account of how framing of the value proposition shifted from vision to network and finally to usage through synergetic relationships with customers as the firm moved from startup to IPO and ultimately to public company. On this view, the value proposition emerges as a dynamic communication process that reduces customer uncertainty about the value of new technologies, leveraging company’s resources and competencies.

Research implications: The findings confirm that value proposition change can be understood as a dynamic communication process that can reduce uncertainty about new technologies and highlights the role of vision in guiding the overall evolution of the value proposition over time, including networking and usage.

Practical implications: The study confirms the importance of reframing the value proposition over time to address customer uncertainty about the value of new technologies, enabling companies to influence expectations by making certain benefits salient. The study also confirms the importance of adopting a proactive approach to value proposition change.

Originality: The study’s primary contribution is the development of a framework for exploring value proposition change in emerging technologies in terms of three distinct frames: vision, network, and usage.

KEYWORDS

Value proposition change; commercialization of emerging technologies; technological innovation in B2B; framing; vision; network; usage

Introduction

The existing literature acknowledges the importance of the value proposition (VP) for business (Payne, Frow, and Eggert 2017; Payne et al. 2020; Webster 2002) as a strategic tool that influences sales by capturing the key benefits of the offering in line with customer needs (Edvardsson et al. 2014). However, although the VP is considered central to business success in all sectors (Barnes, Blake, and Pinder 2009; Lanning 1998; Morris, Schindehutte, and Allen 2005), it is not always well articulated (Barnes, Blake, and Pinder 2009).

A growing body of VP research focuses on conceptualization (e.g., Perrey et al. 2004), constituent value dimensions (e.g., Anderson, Narus, and van Rossum 2006; Rintamäki, Kuusela, and Mitronen 2007), and interactions among multiple actors (e.g., Ballantyne et al. 2011; Frow and Payne 2011; Taylor et al. 2020). As theory evolves, there is increasing recognition that VP must change in order to remain relevant, competitive, and efficient (Ostrom et al. 2015). A number of researchers have argued that VP should change in line with changing customer needs (Lusch, Vargo, and Tanniru 2010; Norton and Pine 2013) or as markets change (Lindgreen et al. 2012). Others suggest that VP should be refined as companies learn more about their business and markets (Covin et al. 2015) or gain more experience with VPs (Maglio and Spohrer 2013). Finally, Covin et al. (2015) identified a reciprocal causality between VP change and performance, noting that new ventures that make VP changes are likely to perform better than those whose VP remains unchanged.

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Among proposed strategies for VP change, Anderson, Narus, and van Rossum (2006) suggested that a VP should be redesigned relative to the best alternative in the market, implying competition as a key determinant of VP. Kowalkowski (2011) theorized that an initial focus on exchange value should shift over time to use value. Bohnsack and Pinkse (2017) developed tactics for reframing VP which, they argued, would enable companies to overcome the technical inferiority of disruptive emerging technologies and increase their attractiveness to customers.

While these studies make useful recommendations, they do not address how the VP changes over time because, in general, VP change has not been viewed as an “ongoing iterative process” (Payne et al. 2020). This in turn has led to calls for further research to explore VP change over time (Ostrom et al. 2015; Payne, Frow, and Eggert 2017).

By way of response, the present study adopts a longitudinal approach to develop a framework to examine how VP evolves during the early and subsequent development of a new technology. The phases of VP change can be aligned with the processes of development and commercialization involved in building the value of a new technology (Aarikka-Stenroos and Lehtimäki 2014; Hung and Chu 2006; Jolly 1997). This process view allows us to conceptualize VP change as a series of sequential phases, in which the underlying pattern is a gradual decrease in uncertainty; as creating value from a technology is a matter of managing uncertainty (Chesbrough and Rosenbloom 2002). To that extent, VP can be defined as a dynamic communication process that reduces customer uncertainty about the quality and functionality of the product and the reliability of the company (e.g., Knight, Pfeffer, and Scott 2015; Nordin et al. 2018).

To illuminate this process, the longitudinal case study reported here tracks the phenomenon of VP change over a 25-year period at a company specializing in AR/VR technologies. Adopting a processual approach, the study identifies three distinct frames used to convey a new technology’s VP: vision, network, and usage. The findings show how this progression occurred as the firm moved from startup to IPO and ultimately to public company.

The rest of the article is organized as follows. Following a review of the relevant literature on VP change and new technology VPs, a theoretical framework is developed to guide analysis of the empirical material. The next section describes the collection, coding, and analysis of the empirical data, and the paper concludes with a discussion of the study’s theoretical and managerial implications.

**Theoretical background**

**VP change**

Although many researchers believe that VP must change in pursuit of better performance and competitiveness (Covin et al. 2015; Kowalkowski 2011; Lindgreen et al. 2012; Lusch, Vargo, and Tanniru 2010; Maglio and Spohrer 2013; Norton and Pine 2013; Ostrom et al. 2015), few studies to date have examined this process. In his conceptual paper, Kowalkowski (2011) noted that the early phases of VP are characterized by limited knowledge of customer needs, difficulty in demonstrating value potential, and a product-oriented mind-set. Kowalkowski (2011) argued that effective VP change depends on recognizing the determinants of value and shifting from the initial emphasis on exchange value to focus on use value. This shift is based on increasing knowledge of customer workflows and needs, customer involvement in cocreation, compelling evidence of value potential, and competence and commitment in delivering complex offerings. Similarly, Day (2020) argued the need to shift the VP perspective from “inside-out” to “outside-in” – in other words, to look at everything the company does through the eyes of the customer rather than treating solutions simply as bundles of products and services.

In questioning the general assumption that change occurs, some scholars raise the question of whether VPs can be said to change or improve at all (Lindgreen et al. 2012). According to Covin et al. (2015), new firms’ initial VPs are experiments based on beliefs about market opportunities. They contend that VP change is based on performance-related data and conclude that this change is driven by “perceived market receptiveness” (p.752). In similar vein, VP development can be viewed as a “systematic search process” (p.669) that enables
companies to improve existing offerings or create new ones (Maglio and Spohrer 2013). Payne et al. (2020) expressed the view that VP should be reviewed regularly, but little is known about the right time to perform and implement such a review. In this regard, Covin et al. (2015) noted that VP change may be an ongoing process based on performance feedback data rather than a one-time event.

A number of researchers have developed tools for assessing and changing existing VPs based on deconstruction into key value dimensions. For example, Kambil, Ginsberg, and Bloch (1996) developed the concept of a value map to determine a position relative to competitors and proposed a three-step program for VP evaluation and change along key dimensions. Anderson, Narus, and van Rossum (2006) proposed changing VPs in relation to the best alternative in the market, implying that competition is a key determinant of VP. However, Kambil, Ginsberg, and Bloch (1996) warned that this emphasis on competing against rivals might lead to product imitation and increasing commoditization. Sheehan and Bruni-Bossio (2015) developed a strategic value curve analysis tool to identify aspects of VP in need of improvement based on Kim and Mauborgne’s (2014) strategy canvas. The tool identifies the most important customer attributes and compares curves against the forecasted VP of the strongest competitor in three to five years.

According to Covin et al. (2015), a company’s ability to change its VP depends on experience and on managers’ ability to make such a change. Others attribute the need to change VPs to disruptions in the firm’s environment, such as competition and changing customer behaviors (e.g., Lusch, Vargo, and Tanniru 2010; Norton and Pine 2013). Notably, both of these accounts regard VP change as reactive; in contrast, Kim and Mauborgne (2014) and Bruni-Bossio (2015) contend that companies can take a proactive approach by comparing canvases and making anticipatory VP changes.

**Unique conditions for new technology VPs**

For several reasons, framing a VP for an emerging technology is a complex undertaking. First, in the early stages of a new technology, the accompanying uncertainty (Rogers 2003) often hinders viability. This means that technology companies must engage in R&D to identify new technological opportunities, organize the necessary human and financial resources, find the market, and demonstrate value potential. Rindova and Petkova (2007) confirmed that uncertainty makes it difficult for customers to see the value of a new technology, as they do not know what opportunities it offers and there are no available comparators (Fuchs and Diamantopoulos 2010). Additionally, new technology firms may have to market their products in an emerging market, and these new firms tend to be better at adapting their VP to known markets than experimenting with new markets (Covin et al. 2015).

Secondly, emerging technologies are often developed and marketed by new ventures (Ferriani, Garnsey, and Lorenzoni 2012) that have little or no prior experience of defining value (Covin et al. 2019; Wouters, Anderson, and Kirchberger 2018) or a clear vision of how the technology can be used (Chesbrough and Rosenbloom 2002). Covin et al. (2015) emphasized the difficulty of identifying and implementing a robust VP in the absence of significant operational experience. According to previous research, providers typically think of their VP in terms of the offering rather than what customers value (Bower and Christensen 1995; Christensen and Overdorff 2000; Woodruff and Flint 2006) and do not understand how that offering might impact the customer’s business (Wouters, Anderson, and Kirchberger 2018). For that reason, they underestimate the importance of the axiom that “customers pay only for what is of use to them and gives them value” (Drucker 2001, 228) and “how important it is to engineer real magic into VPs” (Young and Burgess 2010, 7).

Despite the potential to strategically influence expectations by developing a VP (Anderson and Narus 1998; Johnson 2001; Borup et al. 2006; Hoppmann, Anadon, and Narayananamurti 2020), empirical research on new technology VPs is scarce (Wouters, Anderson, and Kirchberger 2018). Bohnsack and Pinkse (2017) developed VP reconfiguration tactics to improve the appeal of new technologies that might initially underperform when compared to existing solutions. They argue that the proposed tactics show how a firm can
change value elements to create customer appeal. Reporting how VPs can be used to learn more about pilot customers, Kirchberger, Wouters, and Anderson (2020) provided empirical evidence of their benefits for new technology startups. Noting the unique conditions faced by startups, they emphasize the importance of looking at the market offering from the customer’s perspective. They also point out that VP can serve as a catalyst for optimizing an offering’s attractiveness through monetary quantification by gathering information to substantiate the value proposition.

Other studies have underscored the importance of VPs in translating customer value into quantified benefits (Wouters, Anderson, and Kirchberger 2018; Wouters and Kirchberger 2015). Olleros (2017) referred to the need to find the optimal target market, and Wouters, Anderson, and Kirchberger (2018) noted the importance of tailoring new technology VPs to the specific context. Kirchberger, Wouters, and Anderson (2020) go further in recommending small technical changes to attract customers.

While scholars generally agree about the importance of VP change, there is currently no framework describing how this process evolves, and patterns of change are not well understood. By understanding how this process unfolds, we can also hope to identify specific practical challenges for organizations and to develop guidelines for effective VP change.

**A conceptual framework for VP change**

Over time, as technological solutions are gradually updated, customer needs evolve, and industry configurations change, unknowns diminish. Many scholars have argued that these dynamics make it possible for companies to rethink their VPs (e.g., Maglio and Spohrer 2013). Following Kowalkowski (2011) and Payne, Frow, and Eggert (2017), we can gain a better understanding of VP changes as shifts in focus over time by relating VP phases to the development of technological innovations. The process of transforming a new idea, invention, or market opportunity into a consumer product can be understood as a series of steps and interrelated activities (Karniel and Reich 2011). Various models have been used to describe the stages of technological innovation (Dismukes, Miller, and Bers 2009; Perez 2003; Taylor and Taylor 2012; Wonglimpiyarat 2005; Yeo et al. 2015), but the underlying process can be summarized as *inception, development, and implementation*.

The *inception* phase lays the foundation for the development process as a whole by providing focus and direction, “driven by a dream” (Moore 1999, 25) – an embryonic idea that can be realized. In many cases, the only virtue of a new venture is the entrepreneur’s vision of the future and what he or she wants the business to be (Levin 2000). At this point, a company may have only a vague idea of its target markets, its intended customers, and its business model. How the entrepreneur brings this fleeting idea to life and formulates a vision is therefore critical because at this stage, a leader’s vision is the company’s most powerful tool (Van der Helm 2009). This initial phase is typically characterized by extensive R&D and patent protection activities and an underdeveloped ecosystem. Based on previous research, it is reasonable to assume that a vision of the technological future (Nystrom 1993) may be a winning VP during this phase. The company’s ability to shape and pursue a vision will influence market decisions and the chances of innovation success (Hamel and Prahalad 2005; Markham 2013; Reid and de Brentani 2012). As O’Connor and Veryzer (2001) stressed, innovators must learn to link advanced technologies to market opportunities.

In the *development* phase, as some capabilities are not available internally, one of the biggest challenges for a new technology provider is to build an ecosystem of partners while innovating and bringing the new product to market (Chandler and Lusch 2015; Truong, Simmons, and Palmer 2012). In developing a cutting-edge technology, a company must integrate other advanced technologies into its solutions. As new companies often seek to scale quickly, the need to engage investors and resource owners means that broadly leveraged capital investment and relationship-building initiatives are needed to strengthen the emerging ecosystem and maximize value (Reypens, Lievens, and Blazevic 2016). Because information about the existing ecosystem is crucial, the VP must focus on identifying well-functioning networks that can
facilitate complex qualitative solutions. An increasingly visible commitment to partner development programs accounts for this shift in VP focus, as resource leverage is critical in defining a clear VP (Lindgreen et al. 2012).

In most models, the final phase is implementation, which usually involves more experimental trials. As more use cases emerge, performance data reduce the uncertainty around applications of the new technology, and VP indicates the value created by the technology in use (Grönroos and Voima 2013). This is likely to focus on quantified and efficient solutions that differentiate the technology and confirm its utility (Anderson and Narus 1998; Hinterhuber 2015) in terms of the mutually rewarding outcomes created by suppliers and customers (Payne, Frow, and Eggert 2017). In this way, products can be co-created through participation based on dialogs and other customer inputs (e.g., Eggert et al. 2018; Terho et al. 2012).

Assumptions about VP framing and evolution across development phases are shown in Figure 1. An initial formative phase is oriented around the idea and driven by a vision; the second phase reflects ecosystem development around the emerging technology; and in the third phase, the technology’s benefits are amplified by engaging the customer as co-creator. (These divisions are somewhat artificial, as some events occur across phases.)

**Research method**

The process perspective adopted here yielded a rich picture of the target phenomenon, encompassing developments over a long period (Taris 2000). Rather than describing how certain inputs lead to certain outputs or how static objects exist (Moroz and Hindle 2012), processual case research captures how things develop and change over time (Cloutier and Langley 2020; Langley 1999). Following Pettigrew, Woodman, and Cameron (2001), events and chronology serve as stepping stones in the search for patterns of VP change.

This longitudinal approach also facilitates exploration of processes and dynamics of the VP change in a single setting (Sigelkow 2007; Yin 2009). The case company was selected as an appropriate empirical context that intensely manifested (Patton 2015) the target phenomenon of VP change by (1) introducing a new technology, (2) focusing at length on that technology, and (3) offering extensive publicly available data. As recommended for single-case studies, data were triangulated using multiple sources of archival data to increase robustness and quality (Yin 2014). This rich and dense empirical evidence (Geertz 2010) collected to provide a deeper understanding of the phenomenon included 482 press releases, 11 case company annual reports, 1 previous shareholder’s annual report, 28 earnings and special calls, 7 shareholder letters, 4 secondary documents from interviews with the case company CEO, 16 corporate presentations, retrospective web pages, and relevant magazines (see Appendix, Table A1).

The information disclosed in press releases can be considered “accurate and complete so as not to mislead” (Trautmann and Hamilton 2003, 8) because of the anti-fraud requirements of federal law. As this transparency provides an insight into the company’s current affairs and strategic

| Development phase | VP Frame | Characteristics |
|-------------------|----------|-----------------|
| Inception         | Vision   | Focus on future vision |
| Development       | Network  | Focus shifts to partners, relationships, and integration |
| Implementation    | Usage    | Focus shifts to use cases, cocreation, and application outcomes |

**Figure 1.** VP evolution: A tentative framework.
decisions, annual reports and press releases are commonly used as a data source when exploring how a company communicates with its key stakeholders (Chapman 2020). For example, in previous analyses of VP, Bohnsack and Pinkse (2017) used press releases, and Payne and Frow (2014) used annual reports.

For present purposes, website information was retrieved from Internet Archive, the largest historical web archive dating back to 1996, which “keeps all retrieved copies of Webpages . . . so that changes in a page over time can be tracked and old pages . . . can still be found” (Thelwall and Vaughan 2004, 163). Additionally, transcripts of earnings announcements, which provide a detailed record of prepared management remarks, questions, and discussions with analysts illuminated executive thinking and corporate strategies and expectations. Secondary data based on published interviews with the CEO as the public face of the company were included in the second round of analysis because an entrepreneur with a clear vision can contribute to a successful VP (Lanning and Michaels 1988).

**Material collection and coding**

Material collection began in January 2019 and ended in July 2020. The process proved challenging because the company had existed under various names. Founded in 1991, the company became widely known in the VR industry as Forte Technologies. After VR Acquisition acquired all of the company’s assets, the name was changed to Kaotech Corporation in 1997 and subsequently to Interactive Imaging Systems (in 1998), Vicity Corporation (in 2004), and Icuiti Corporation (in 2005). The current name (Vuzix Corporation) was registered in 2007. For that reason, complex search strategies were needed, drawing on databases that included Seeking Alpha, the U.S. Patent and Trademark Office, and Internet Archive. Throughout the process, MAXQDA software (VERBI Software 2020) was used to organize the documents, switching back and forth between data analysis and coding. Appendix B lists the data sources referenced in the analysis.

After a close reading of the documents to gain a deeper understanding of the industry, data coding was done in several rounds. In the first round, theoretical coding (Saldaña 2021) was used to keep track of codes based on “the terms used by [participants] themselves” (Strauss 1987, 33). This produced a large number of content-based codes, making it difficult to search for patterns. After careful consideration, the time frame was expanded from 10 years to encompass the entire 30 years of the company’s history, beginning with its first significant VR product. This expansion revealed the company’s bankruptcy, which could only be found in the annual report of one of its shareholders (Kopin Corporation 1998). Reading corporate documents, including interviews with the CEO, transcripts of earnings announcements, and letters to shareholders helped to understand the challenges that faced the company in this emerging industry, along with the strategies it pursued.

The study is grounded in an abductive approach, which can be characterized as “inference to the best explanation” (Harman 1965). Based on “theoretical sensitivity” (Glaser and Holton 2004) and earlier theoretical concepts, the themes derived from the first round of coding formed the basis for a general framework that guided further coding of the data to identify examples of broad predefined theoretical categories. The goal of data analysis was to generate new theoretical insights (Timmermans and Tavory 2012) by moving between emerging concepts and empirical data (Gioia, Corley, and Hamilton 2013). Having identified the relevant frames (see Appendix Table A2), the codes were counted to compare their prevalence in each phase as a means of capturing differences between the three time periods (see Figure 2).

**VP framing and changes over time**

**Emerging themes**

“View the future”

The original company was founded in a basement in 1989 to produce sound cards, with capital of $15,000 (McDowall 2019). Following this inception phase, a prototype of VFX-1 was unveiled at the 1994 Consumer Electronics Show as an alternative to location-based VR arcades such as CyberMind in San Francisco, BattleTech Center in Chicago, or
Exhilarama in Crestwood, Missouri (Poole 1994). In one interview, the founder revealed that he was “lucky enough to have a relationship with some folks in Japan that allowed us access to their little microdisplays,” and they became “the first guys to make a VR headset” (McDowall 2019). VFX-1 went down in history as the first fully functional consumer VR helmet – “the first true VR hardware product for the PC” (McDonald 1994, 45). According to the company’s CEO, sales of these units in the first quarter of the year amounted to between five and six million dollars.

For a short time the company was an “unquestionable leader in bringing this technology to consumers at a competitive price” (McDonald 1994, 45), driven by an audacious vision to create a consumer device that was the first VR headset (McDowall 2019). This was a natural outgrowth of the unabated enthusiasm for computer-generated virtual worlds in the 1990s; other emerging commercial tethered headsets for virtual gaming included Nintendo’s VirtualBoy, Victormaxx’s Cyberbmaxx, and Virtual I-O’s i-Glasses. As video games were on the rise, and users were ready for home versions, the company’s marketing campaign focused on the VR experience for gamers, promising to “immerse you in the game without distracting you.” The VFX-1 became a symbol of the times and featured in the “Celebrate the Century” series of U.S. postage stamps, which commemorated important events of the twentieth century. The headset also appeared in a Nike commercial featuring Andre Agassi (Nadeau 2006) and in the television series The X-Files.

Despite VFX-1’s popularity in 1996, the founder admitted in hindsight that it was “really early in the game” (McDowall 2019), and the company filed for bankruptcy protection (Kopin Corporation 1998). However, the company reemerged under a different name in 1997 after the founder bought back its assets from external shareholders – a turning point he refers to as “the start” (McDowall 2019). In 1998, the company’s website stated that it was “still committed to bringing affordable virtual reality products to the world, and we are getting a new look and image.” Based on their prior experience and knowledge, they knew they needed to find a market segment that could tolerate their early technical solutions: “we needed to be in a vertical market … that can deal with the fact that it was clunky … so, we focused on the U.S. defense markets” (McDowall 2019). In other words, they found a market that was interested in the technology despite its limitations.

As a customer, the military presented new development opportunities and challenges in terms of product weight, size, and portability. The outcome was the TAC-eye tactical line, which is currently used “in night vision and thermal imaging systems from Raytheon, Elcan, Saab and others that supply the U.S. military, law enforcement, and our NATO allies in Europe.” This laid the foundation for further development of wearable systems, driven by an ambitious and aspirational vision. This eyewear solution is an integral part of the vision of the future that has since become the leitmotif of the company’s VP, captured in the trademark “View the future” (United States Patent and Trademark Office 2020).

In pursuing competitive advantage, extensive investment in R&D crystallized the idea of reducing the devices’ size and weight. This was achieved by switching from sensors to waveguides, which opened the door to AR technology. Waveguide technology is based on a transparent optical lens and an adjacent HD display engine that fits inside the frame. This solution reduces display cost and weight, and the company concluded that “traditional direct displays are not the answer.” Instead, the aim was to produce “ultra-thin, high-resolution, eyeglass-styled display systems at a low cost” as “an excellent alternative to conventional optics.” This vision was the main innovation driver, and the company’s gradual pivot to AR technology hinged on this “holy grail, the waveguide technology.”

By the time of its IPO in 2009, the company had a clear vision of the role smartglasses would play in the future. Backed by proprietary technology, the aim was to develop “the broadest range of video eyewear solutions in each of its various markets, including 3D video, virtual and augmented reality solutions.” As a compelling story with potential to scale, this vision was instrumental in convincing investors to back the IPO. The company leveraged its “existing reputation within the defense markets” as proof of quality and legitimacy, confirming its stability and operational continuity. In this way, the
company presented both a vision and the ability to execute that vision, backed by years of experience and innovation awards.

From about 2010, the company began to promote smartglasses as a natural evolutionary step, making active use of analogies with ordinary glasses to reduce any sense of alienation. They leveraged comparison to make this new technology more concrete and familiar: “like sunglasses,” “a pair of Oakleys,” “worn like glasses.” In addition, the company planted the seed for smartglasses as the dominant design for AR experiences through ongoing assertions that “AR applications need a better and more natural user interface than the smartphone provides, which is driving the need for smartglasses.” As the technology evolved, the VP shifted from smartglasses as a “support for AR applications” (in 2009) to “a peripheral to the smartphone” (in 2012) to a “wearable computer” that can replace mobile phone (in 2017).

This trajectory is closely linked to the company’s commitment to becoming “an innovator in virtual display design,” updating solutions in the context of a changing ecosystem. To succeed in this regard, they needed to “challenge ourselves to invent better features,” noting that “[we] pride ourselves in creating solutions that benefit people around the world.” In 2014, the CEO claimed that their enterprise market experience offered them “a window of opportunity to form industry standards and strong relationships in the enterprise space.” To ensure the quality and potency of its solutions, the company developed an IP strategy to match, “these patents are very synergistic with our current and planned product lines.” As the founder told investors, “Our goal is to remain the best in class from a technology standpoint through continuous innovation of our products.”

“We are in the process of building out an ecosystem”

During the development phase, the company began to place greater emphasis on expanding the ecosystem and actively building partner networks. The impetus was to create a complete technical solution “by integrating our partners’ advanced technologies into our next-generation products.” Channel support initiatives were launched to encourage collaboration, including programs for value-added resellers, industry partners and wholesalers, and an internet center for developers.

To facilitate the expansion of its network, the company went public in 2009 to attract more investors. The IPO raised the requisite capital to build an ecosystem while increasing “visibility and improved potential access to a larger shareholder base.” To strengthen its position in the stock market, the company began trading shares on NASDAQ in 2015 and was included in the Russell 2000 Index, which is favored by mutual funds. After the IPO, the company increasingly targeted institutional and retail investors to ensure it was “a more attractive investment vehicle to a broader base of potential investors.” External inflows have enabled the company to improve its proprietary waveguide optics and strengthen its technological lead: “Intel’s investment has really allowed us to step up our waveguide optics development efforts.” The company subsequently communicated this information as a significant achievement and a sign of financial stability.

In developing the ecosystem as a “significant factor for growth,” encompassing software applications, mobile device management, as well as tool providers, retailers, integration and consulting partners, the message was: “When you put all of this together, you end up with the ability to deploy a successful solution.” In 2017, the company acknowledged that its ability to serve all enterprise verticals was “a function of the ecosystem we have developed,” allowing its solutions to be deployed in “essentially every enterprise vertical market, including warehousing in logistics, insurance inspection, manufacturing, service, and biopharma.”

In addition, the company began to nurture developers by opening an internet developer center to encourage content creation, which is critical for AR: “an abundance of content makes the industrial enterprise . . . the logical next frontier for AR.” Shortly after, in 2014, the company opened its app store, offering a range of apps for smartglasses in categories ranging from video streaming to visual communication. The company portrayed this collaboration as mutually beneficial; once smartglasses became an established mobile platform alongside tablets and phones, software providers would offer the company’s solutions in combination with their apps.
Based on waveguide optics marketing, the company has made a concerted effort to build relationships with original equipment manufacturers (OEM) “with the objective that they then [will] incorporate them into products they sell.” The company has its own ISO-certified production facility for cost-effective waveguide production and has expanded its expertise in the design, development, and manufacture of OEM solutions, adopting a rational and selective approach to partner acquisition: “We want synergistic relationships that will add value to the users and not cannibalize our own business for a smaller margin.” Among other initiatives, the company announced the development of AR eyewear co-branded with Toshiba and the development of a custom waveguide-based optics engine in collaboration with a major U.S. defense contractor.

Similar collaborations with other partners have fostered the development of significantly improved new solutions. For example, the company’s M400 smartglasses integrated the Snapdragon XR1 platform for on-device image processing based on machine learning. Partnering with Plessey Semiconductor enabled the development of high-performance lightweight AR smartglasses based on an advanced micro LED-based light engine. In showcasing these achievements, the CEO acknowledged that the company could not create these products without its partners: “It’s a whole ecosystem, a solution for people.”

“Making a difference for some companies”

Once resources were secured, the company was able to produce and pilot solutions in the marketplace, acquiring further information from pilot studies. The technology’s capabilities were demonstrated in a variety of use cases, including manufacturing and warehouse logistics, remote care, training and telemedicine, and hazardous operating environments. By 2015, the company’s key business areas were field service, logistics and warehousing, medical applications, pharmaceuticals, manufacturing, and general aviation. At that time, referring to the move from early testing to actual production programs, the CEO admitted that they were “not there yet, but the transition has happened.” Real deployment examples confirmed adoption of the new technology: “There is already a growing awareness of AR and acceptance of it in enterprise, leading to significant cost efficiencies and production advances in the workplace, with numerous Fortune 500 companies using AR on Vuzix smartglasses.” By 2017, the CEO was positive about the level of industry acceptance: “It is very apparent to us that the enterprise smartglasses industry has shifted into the adoption phase.”

Using customer case studies, the company began to showcase its technology’s integral role in solving real-world customer problems, claiming that “the enterprise market is not driven by cool tech. It is driven by the creation of true business value.” In support of these claims, the company showed how customers achieved results with their solutions that support “real use case, generating hard ROI.” For example, Becton Dickinson reported that it had reduced travel costs and accelerated machine repairs by 60% using Vuzix solutions, and John Deere claimed to have increased work speed while reducing error rates to near zero. In communicating value and attracting customers, these stories highlighting the benefits of technology that “expedites the way the job gets done” are increasingly important. According to customers like GE Digital, “Our pilot has shown there is immediate value when engineers and technicians can communicate live while working hands-free and heads-up.”

Increasingly, the company emphasizes active collaboration with customers in all phases from prototype design to production, including the creation of customized solutions and soliciting customer feedback. As an example of this co-creation rooted in customer feedback, the M300 model was “the culmination of over two years in the field, experience and feedback from M100. This is what sets [us] apart from all other smartglasses manufacturers.” The company marked 2017 as the beginning of a transition from first-generation devices to well-formed solutions based on “significant industry input”:

[W]e’re focused on listening to our customers, gathering the information they need, and then passing it on to our engineering team … there’s a closed loop between our customers and the engineering teams to make sure that what we have in the field now is meeting their needs … We even make prototypes … [for] feedback, [which we] roll … into our next end products.
This approach enables the company to understand exactly how its technology helps customers to succeed in their markets and supports their daily operations. In 2018, driven by this growing knowledge of its customers, the company began to address the needs of field workers, expressing the technology’s value in human terms: “When you’re at work, you need applications that help you get a job done, and so you don’t need massive fields of view ... you need your work instructions.” This shift of focus to end users positions solutions as empowering, “always focused on user comfort” and “designed to work.” In response to demand, various options have been developed, including left-eye, right-eye mountable, hat-mount clips, and smartglasses with prescription lenses. According to the company, these AR solutions “revolutionize the workplace” by linking frontline “connected workers” hands-free to real-time data.

Attributing a number of implementations to partner programs, the company claims to “turn whiteboard ideas and spreadsheet ROI calculations into real ROI dollars in the pockets of our clients.” The company specifically notes that working with developers has enabled it to attract more customers; for example, the VSee Lab and SightCall Telemedicine platforms added more than 1,200 enterprise and telemedicine customers in 2019. High value is also placed on waveguide technology as “bringing something to the table that you can’t get elsewhere” by enabling the company to produce high-quality devices for OEM partners at low cost.

In 2019, the company continued to express confidence that “the technology will become mainstream much quicker than most people think, as we are building this future right here” and foresees the use of AR in conjunction with AI and machine learning: “We’re about the AI-connected expert ... we can [almost] deliver all information ... to the field worker. The fieldworker may never have to call a human expert.” This is also a sign of how the company’s future vision adapts to the spirit of the times, including integrated video streaming in 2015, the addition of Alexa Assistant in 2018, and its work with drones in 2019. The company continues to emphasize the transition to smartglasses, noting that the industry is on the cusp of transformation: “AR and smart glasses ... are the computing platform of the future” and will “change the world of computing.” This emphasis is also apparent in the company’s declared mission “to make wearable AR glasses as common as sunglasses.” In 2020, AR smartglasses were presented as a solution to key business problems, solidifying the smartglasses as the dominant design for AR. Safety requirements drove the increased use of remote AR solutions in medical operating rooms, remote assistance, and first responder connectivity. The CEO neatly summarized the VP as follows: “We see that growth continuing into the foreseeable future ... why send the person when you can send the pair of glasses? They are faster, cheaper, safer and more. [It will be] part of the new normal.” By leveraging its ability to weather turbulence under pressure, the company continues to strengthen its vision of the industry’s transition to smartglasses through extensive technology penetration, making its VP ever more robust.

**Depicting a framework for VP change**

Based on the empirical material, we can identify three frames informing the process of VP change (see Appendix Table A2). The main features of the first frame are captured by terms like vision, view the future, future prospects, form factor, market potential, shift to smartglasses, and expertise. The second frame is characterized by terms such as networking, collaboration, ecosystems of partners, supply chain, collaborative solutions, channel partner programs, and strategic relationships. Finally, terms related to the third frame include customer feedback, use cases, experimentation, pilot programs, production rollout, deployment, customized solutions, ROI, and market acceptance.

These frames inform VP change across development phases. In the initial phase, the vision in play is a proxy, as newly founded businesses are typically driven by a grand idea but rarely have the necessary resources to implement it. The network frame subsequently becomes more prominent, reflecting the company’s extensive collaboration with partners. Finally, as adoption of the technology increases, there is an overarching focus on usage.

At the outset, it was anticipated that the frames would change as development progressed, but it subsequently became apparent that they coexisted, with one dominant frame at any given point in time. In light of these patterns, the preliminary
framework was refined as the empirical study captured the changes in *vision*, *network*, and *usage* frames. Figure 2 shows the frequency of frames’ occurrence in each phase.

![Figure 2. Overview of the process of VP change.](image)

The vision frame appeared early in the analysis. The company’s visionary story incorporates features such as *visualizing an attractive future*, *arguing for potential market advantage*, and *manifesting leading expertise*. Given the hopes for VR technology circulating in the press worldwide, *visualizing an attractive future* was a justified choice, building on this wave of belief in the technological future to attract investors and partners and to convince them of the company’s likely profitability. Using the catchphrase “view the future” as a mental shortcut prompts stakeholders to consider the company’s vision as being “as important as the actual production of artifacts and the validation of knowledge claims” (Van Lente and Rip 1998, 245).

In developing this vision, the CEO’s entrepreneurial experience was invaluable because he understood the industry and how the solution would fit in. This was certainly the case when targeting military projects for entry into the enterprise market; the company developed a successful tactical product that still exists. This also provided relevant knowledge for future operations, as military and enterprise users have similar requirements in terms of precision, performance, and safety. The commitment to waveguide technology shifted the strategic focus to AR technology and contributed to the company’s clear vision. In the 2019 interview, the founder also began to refer to the popular “garage startup” myth, a ubiquitous reference point for entrepreneurial startups that evokes associations with large tech companies (Audia and Rider 2005).

*Arguing for potential market advantage* helps to clarify the company’s vision for its technology. First, as AR developers are still trying to find the optimal form factor – glasses, headset, tablet, mobile phone, projector, or heads-up display – this emphasis on market advantage makes the case for smartglasses as the dominant design. Second, the company claims that AR will disrupt the smartphone market by proving that smartglasses are a better option. If smartglasses can replace ubiquitous gadgets like smartphones, that will create major business opportunities for AR. While the company does not mention that switching from smartphone to smartglasses may be confusing, it tries to position mobile AR as a gateway to the enterprise AR market. At the same time, by likening smartglasses to conventional spectacles, a complex technology is portrayed as something simple and commonplace.
Finally, the idea of manifesting leading expertise is woven into the company’s vision, reflecting its leadership position at the forefront of technological development based on R&D investment, a sophisticated IP strategy, and industrial standardization. The claim that this cutting-edge expertise sets high standards and differentiates the company from its rivals fits the vision frame. By way of support, the company’s first VR product permeated pop culture by appearing on television shows and postage stamps, and it has been winning awards for innovation, design, and engineering since 2005. By addressing problems of cost and weight, the company has also won industry credibility and respect (MacDougall and Conrad 2009).

**The transition to network**

During the development phase, VP framing shifted to an emphasis on network as the company built its ecosystem of hardware manufacturers, software programmers, and service providers. In discussions of value, this network frame highlights the central role of partners and collaborative solutions, emphasizing features that include strong representation in equity markets, supply chain and technology partners, and integration of partners’ resources in solutions.

Expansion of the ecosystem was facilitated by developing an investor network, reaching institutional investors through IPO and NASDAQ. Strong representation in the equity markets reflects investor confidence in the firm’s performance and credibility and in its future. The company presents funding rounds as an indicator of stability and potential upscaling, collaboration outputs, and access to financial resources.

The supply chain and technology partners feature highlights the partnerships that play a key role in the development of a complex technology-based solution. In this regard, the CEO has claimed that there can be no such solutions without the ecosystem. To secure strategic collaborations with major companies, the company’s strategy emphasizes this network dimension. The company has invested heavily in channel partner programs that foster collaboration across the industry and leverage the value of synergy (Reypens, Lievens, and Blazevic 2016). Much of this effort is devoted to securing the involvement of OEMs and large partners in developing the company’s proprietary technology.

Bundling hardware and software as integrated solutions (Kwan and Hottum 2014), the aim is to consolidate the network by sharing knowledge and resources (Frow and Payne 2011).

Integration of partners’ resources in solutions places further emphasis on the network frame and the outcomes of pooling expertise with its partners (Terho et al. 2012). This is a practical realization of the ability to manage strategic partnerships and the commitment to translating this into an end product. It also demonstrates the company’s ability to deliver collaborative solutions unhindered while maintaining quality standards that meet the relevant compliance criteria. This ability is crucial for delivering high quality products, shortening product life cycles, and tailoring offerings to meet customer needs.

**The transition to usage**

With increased customer engagement and results across a wider range of use cases, the usage frame became dominant. This framing of events and issues in terms of benefits to end users also entails gains for prospective customers by creating greater certainty about how and where the solution can be deployed. This is achieved by demonstrating market adoption, demonstrating a functional and leading product, and demonstrating a commitment to customer support.

Demonstrating market adoption highlights the industry’s ongoing transition to hands-free smartglasses. Additional use cases, an increasing number of pilot programs, and the transformation of pilot projects into rollouts all contribute to AR adoption. The company refers to analysts’ predictions of growing use of smartglasses to support its vision of a technology-driven future, citing increasing revenue, emerging industry standards, and new market players as signs of this accelerating acceptance.

Demonstrating a functional and leading product is based on outcomes from customer pilot studies. The company improves its solutions by gathering information from these trials and presenting the customers’ results. This theme is supported by stories of successful deployment from various fields. Subsequently, following implementation and roll-out, accounts of the business rationale for real use cases in practice demonstrate the benefits and ROI value of the offering in quantifiable form. By
showcasing these working solutions, the company can make a convincing case, validated by certification conforming to industry standards.

One key feature of the usage frame is demonstrating commitment to customer service. In collaboration with partners, the company engages actively in customizing solutions to meet the specific needs of industrial clients, noting that “one size does not fit all when it comes to hardware and software solutions.” Based on customer feedback, the development of comfortable devices that enable shift work reflects an increasing concern with the “end user.” These customer testimonials also serve as empirical evidence of the effectiveness of collaborative solutions. Engaging customers in learning (Payne, Storbacka, and Frow 2008) through engineering support and helping them to solve problems signals the VP’s emerging “outside-in” perspective (Day 2020).

While it is apparent that the usage frame is dominant during this phase, vision and network continue to play a supporting role in the VP. By juggling these frames, the company leverages its partners’ names to highlight industry recognition and customer achievements, reinforcing its vision for the future by declaring that “AR will change the human experience and the world.”

Importantly, the study results show that the company not only makes promises but creates actual value for the customer, which according to Lanning (2020) means taking VP seriously. He stresses the importance of using VP to address “how the business will make the value actually happen for the customer” (p.307) rather than reducing it to a tool for communicating value. Overall, the present analysis confirms the company’s strategic use of VP changes to provide greater certainty about the technology and the company itself. In particular, the company’s history confirms its agility in taking risks, testing quickly, learning from experimentation, and pivoting to new approaches. In its efforts to become an industry leader, the company has pursued deliberate tactics to develop its IP portfolio, expand partnerships, raise funding, and obtain compliance certifications. Clearly, the best way to mitigate the negative effects of external changes is to anticipate them, and the company constantly evaluates and reconciles various items of information in making decisions and allocating resources.

Conclusion

The aim of the present study was to develop a theoretical framework to capture VP evolution. The results suggest that VP evolves through three phases that are framed in different ways, using terminologies that reflect the current focus of activities in development phase. The empirical findings identify three such frames: vision, network, and usage. The initial vision frame represents an ambitious and aspirational view of the future, in which the enterprise solution is an essential component. In later stages, the network frame gains prominence as the focus shifts to ecosystem creation. Finally, as the technology becomes more widespread, the usage frame becomes dominant, emphasizing a close synergy with the customer.

Viewing VP development as a process that evolves sequentially through these three phases guides our understanding of how VP changes. The present study tells one story of VP change and confirms that it is an ongoing iterative process (Covin et al. 2015; Payne et al. 2020). This account aligns with Kowalkowski’s (2011) conclusion that effective communication of VP involves flexible shifts of VP focus at different stages. This study contributes to the literature by identifying the emphasis on vision and network and by proposing a proactive approach to VP change. In short, companies can cultivate VP change by recognizing that an ever-changing environment demands continuous reassessment and change. While this is not the only way in which VP change occurs, the present findings show how, by acknowledging uncertainty, companies can shape and adjust their VP to promote greater certainty around new technologies.

The study’s second contribution is its description of how VP framing proceeds from vision to network and ultimately usage in close synergy with customers. As well as illustrating the emergence of each frame, the study reveals that an existing frame is not replaced by a new one; instead, the dominant frame changes. Contrary to the preliminary assumption that frames would displace each other, the observed patterns indicate that the vision and network frames recur across all phases and remain useful for communicating the case company’s VP.
This study highlights the enabling effect of the vision frame in creating an initial VP that reflected public beliefs about the emergent industry. The leader’s vision provides a useful initial focus because it is sometimes a new company’s only asset. The role of vision is getting traction in VP literature in terms of importance of shared strategic vision for leadership support (Payne, Frow, and Eggert 2017). Although important, vision has to be supported by network- and usage-driven efforts, initiatives or strategies.

The network frame emerged as the company’s strategic focus shifted to the ecosystem. This complements the literature on the resource-integrating role of VP within the ecosystem (Frow et al. 2014) by highlighting the significance of communicating the role of the ecosystem to customers through the VP. To formulate a clear VP, organizations must leverage their resources by making decisions that ensure their efficient mobilization, coordination, and deployment (Lindgreen et al. 2012). This ability to integrate resources helps to mitigate customer uncertainty or skepticism by demonstrating an ability to manage strategic partnerships.

The usage frame corroborates the idea that involving customers in cocreation practices is “the very basis of value” (Prahalad and Ramaswamy 2004, 5), not least because “value is created in a customer’s idiosyncratic use situation” (Eggert et al. 2018, 80). In particular, understanding what customers perceive as value by involving them in cocreation helps to develop a VP that customers will find meaningful, leading in turn to company financial gain. This aligns with suggestions that VP should be linked to customer outcomes (Payne, Frow, and Eggert 2017) to provide compelling evidence of value potential (Anderson, Narus, and van Rossum 2006; Kowalkowski 2011; Hinterhuber 2015). Finally, the present study contributes to longitudinal research by using retrospective web pages (e.g., Hackett and Parmanto 2005) to trace an organization’s strategy development through old or deleted content.

For managers, this study confirms the importance of regular VP assessment and revision as a means of influencing customer expectations by foregrounding salient features and benefits. In particular, new companies can use the proposed framework to address customer uncertainty about their technology by altering VP framing. Companies should also ensure that they can support their claims by enacting VPs to create value for customers. It is also important for companies to adopt a proactive approach to VP change by constantly evaluating information to shape and adapt their VP for strategic purposes.

Because it is based on a single case, this exploratory study has some natural limitations, some of which highlight possible avenues for future research. First, to develop the framework and its application in different contexts, alternative research methods and designs should be considered. Corporate framing of emerging technologies and its influence on public discourse represents another promising research direction. Finally, prospective studies can deepen understanding of the development of vision-based VPs and accompanying frames. Granted these shortcomings, the present study can be said to advance theoretical and practical understanding of how VP change evolves time.

Notes

1. Each phase is described by a descriptive quote that alludes to the dominant frame.

Disclosure statement

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References

Aarikka-Stenroos, L., and T. Lehtimäki. 2014. Commercializing a radical innovation: probing the way to the market, industrial marketing management. Elsevier Inc 43 (8):1372–84.

Anderson, J. C., and J. A. Narus. 1998. Business marketing: Understand what customers value. Harvard Business Review 76 (6):53–67.

Anderson, J. C., J. A. Narus, and W. van Rossum. 2006. Customer value propositions in business markets. Harvard Business Review 84:3–13.

Audia, P. G., and C. I. Rider. 2005. A garage and an idea: What more does an entrepreneur need? California Management Review 48 (1):6–28. doi:10.2307/41166325.

Ballantyne, D., P. Frow, R. J. Varey, and A. Payne. 2011. Value propositions as communication practice: taking a wider view. Industrial marketing management 40 (2):202–10.
Pettigrew, A. M., R. W. Woodman, and K. S. Cameron. 2001. 
Studying organizational change and development: challenges 
for future research. *Academy of Management Journal*
44 (4):697–713.

Poole, S. 1994 *Leave the helmet behind*. PC Gamer August 49.

Prahalad, C. K., and V. Ramaswamy. 2004. Co-creating unique 
value with customers. *Strategy & Leadership* 32 (3):4–9.
doi:10.1108/1087570410699249.

Reid, S. E., and U. D. Brentani. 2012. Market vision and the 
front end of NPD for radical innovation: The impact of moderating 
effects. *Journal of Product Innovation Management* 29:124–39.
doi:10.1111/j.1540-5885.2012.00955.x.

Reypens, C., A. Lievens, and V. Blazevic. 2016. Leveraging 
value in multi-stakeholder innovation networks: A process 
framework for value co-creation and capture. *Industrial 
marketing management* 56:40–50.

Rindova, V. P., and A. P. Petkova. 2007. When is a new thing 
_a good thing?_ Technological change, product form design, and 
perceptions of value for product innovations. *Organization 
Science* 18 (2):217–32. doi:10.1287/orsc.1060.0233.

Rintamäki, T., H. Kuusela, and L. Mitronen. 2007. Identifying 
competitive customer value propositions in retailing. 
*Managing Service Quality* 17 (6):621–34. doi:10.1108/09604520710834975.

Rogers, E. M. 2003. *Diffusion of innovations*, 551. New York: 
Free Press.

Saldaña, J. 2021. *The coding manual for qualitative researchers.* 
Sage.

Sheehan, N., and V. Bruni-Bossio. 2015. Strategic value curve 
analysis: diagnosing and improving customer value proposi-
tions. *Business Horizons* 58 (3):317–24. doi:10.1016/j.
bushor.2015.01.005.

Siggelkow, N. 2007. Persuasion with case studies. *Academy of 
Management Journal* 50 (1):20–24. doi:10.5465/amj.2007.24160882.

Strauss, A. L. 1987. *Qualitative analysis for social scientists.* 
Cambridge: Cambridge university press.

Taris, T. *Longitudinal data analysis*. London: Sage, 2000.

Taylor, S. A., G. L. Hunter, A. H. Zadeh, D. Delpechitre, 
and J. H. Lim. 2020. Value propositions in a digitally 
transformed world. *Industrial Marketing Management* 
87:256–63. doi:10.1016/j.indmarman.2019.10.004.

Taylor, M., and A. Taylor. 2012. The technology life cycle: 
conceptualization and managerial implications. *International 
Journal of Production Economics* 140 (1):541–53. doi:10.1016/j.
ijpe.2012.07.006.

Terho, H., A. Haas, A. Eggert, and W. Ulaga. 2012. ‘It’s almost 
like taking the sales out of selling’—Towards 
a conceptualization of value-based selling in business mar-
kets. *Industrial Marketing Management* 41 (1):174–85.
doi:10.1016/j.indmarman.2011.11.011.

Thelwall, M., and L. Vaughan. 2004. A fair history of the web?
examining country balance in the internet archive. *Library 
& Information Science Research* 26 (2):162–76. doi:10.1016/j.
lisr.2003.12.009.

Timmermans, S., and I. Tavory. 2012. Theory construction in 
qualitative research: from grounded theory to abductive 
analysis. *Sociological theory* 30 (3):167–86.

Trautmann, B., and G. Hamilton. 2003. *Informal corporate 
disclosure under federal securities law: Press releases, analyst 
calls and other communications*. Chicago: CCH.

Truong, Y., G. Simmons, and M. Palmer. 2012. Reciprocal value 
propositions in practice: constraints in digital markets. 
*Industrial Marketing Management* 41 (1):197–206.
doi:10.1016/j.indmarman.2011.11.007.

United States Patent and Trademark Office. 2007.*Trademark 
Electronic Search System (TESS).* Assessed August 2,2020. 
https://tmsearch.uspto.gov/bin/showfield?docid=
480221m26y.2.4

Van der Helm, R. 2009. The vision phenomenon: towards 
a theoretical underpinning of visions of the future and the 
process of envisioning. *Futures* 41 (2):96–104. doi:10.1016/j.
futures.2008.07.036.

Van Lente, H., and A. Rip. 1998. The rise of membrane 
technology: From rhetoric to social reality. *Social Studies 
of Science* 28 (2):221–54. doi:10.1177/030631298028002002.

VERBI Software. 2020. *MAXQDA* 2020. Berlin: VERBI 
Software. 2020.

Webster, F. E. 2002. *Market-driven management: how to 
define, develop, and deliver customer value* 28. NY: John 
Wiley and Sons.

Wonglimpiyarat, J. 2005. Does complexity affect the speed of 
innovation?. *Technovation* 25 (8):685–82. doi:10.1016/j.
technovation.2004.01.010.

Woodruff, R. B., and D. J. Flint. 2006. Marketing’s service-
dominant logic and customer value. In *The service-dominant 
logic of marketing: dialog, debate and directions*, ed. R. F. 
Lusch, and S. L. Vargo, 183–95. Armonk, NY: M.E. Sharpe.

Wouters, M., J. C. Anderson, and M. Kirchberger. 2018. New-
technology startups seeking pilot customers: crafting a pair 
of value propositions. *California Management Review* 
60 (4):101–24. doi:10.1177/0008125618778855.

Wouters, M., and M. A. Kirchberger. 2015. Customer value 
propositions as interorganizational management accounting 
to support customer collaboration. *Industrial Marketing 
Management* 46:54–67. doi:10.1016/j.indmarman.2015.01.005.

Yeo, W., S. Kim, H. Park, and J. Kang. 2015. A bibliometric 
method for measuring the degree of technological innovation. 
*Technological Forecasting and Social Change* 95:152–62. doi:10.1016/j.techfore.2015.01.018.

Yin, R. K. 2009. *Case study research: design and methods* 5. 
Thousand Oaks, CA: Sage.

Yin, R. K. 2014. *Case study research: design and methods 
(applied social research methods)*. Thousand Oaks, CA: 
Sage publications.

Young, L., and B. Burgess, eds. 2010. *Marketing technology as 
a service: Proven techniques that create value*. Chichester: 
John Wiley and Sons.
## Appendix A

### Table A1 Data sources.

| Data source                          | Number of items | Publication period |
|--------------------------------------|-----------------|-------------------|
| Presidents’ letters to shareholders  | 7               | 2014–2020         |
| Annual reports                       | 12              | 2010–2020         |
| Press releases                       | 482             | 1997–2020         |
| Webpages, promotional materials      | 102             | 1995–2020         |
| Corporate presentation               | 16              | 2013–2020         |
| Earnings/special calls               | 28              | 2015–2020         |
| Interviews                           | 4               | 2005–2009         |
Table A2. Empirical data: Illustrative excerpts.

| Dominant Frame | Features | Empirical example |
|----------------|----------|-------------------|
| **Vision**     | Visualizing a future technology market | “One of the most promising future uses of video eyewear is in applications where virtual environments enhance rather than replace real environments. This is often referred to as Augmented Reality or AR/VR.”  
“Mobile devices and mobile internet access will have a more profound impact than the wired Internet … interactive AR content is expected to significantly change how mobile products are used.”  
“Wearable devices are the foundation of a rapidly emerging industry that has the potential to reshape our daily lives.”  
“… hands-free head-mounted displays that connect the digital world to the real world can change the future of the computing industry … wearable displays and smartglasses promise new experiences that cannot be accessed in any other way.”  
|                   | Arguing potential advantage of technology | “We believe the growing use of AR smartphone applications is driving demand for a wearable display solution that eliminates the need to hold the smartphone … the need for AR applications with a better and more natural user interface … is driving demand for smartglasses.”  
“The smartphone is an unnatural and difficult form factor for experiencing AR. We believe that AR smartglasses are needed to deliver this experience correctly.”  
“The phone is ripe to be replaced sooner or later or at least augmented with a pair of smartglasses that present the augmented world seamlessly and naturally to the user.”  
“The industry has rightly concluded that a pair of smartglasses that people would actually want to wear is the ideal form factor for consuming AR content. Achieving this is one of the biggest current challenges in bringing AR to the masses.”  
“Our mission is to make wearable AR glasses as common as sunglasses; the goal … is to use smartglasses to bring the best and most innovative AR applications to consumers and enterprises. Join us to learn first-hand how Augmented Reality smartglasses will change the world as a hands-free alternative to your phone.”  
|                   | Manifesting leading expertise | “We are always looking to stay ahead of the curve … [we] define industry standards by listening and responding to the needs of our customers and the marketplace in general.”  
“Corporate and technological advances together help Vuzix to continue to lead the wearable tech space.”  
“Our dedication to maintaining and further developing our strong patent position … These patents offer synergies with our current and planned product lines … as a cornerstone for anyone who wants to reach out and touch virtual objects in space—user interfaces that really touch the virtual world.”  
“In addition to developing an extensive patent portfolio, the company has invested north of $100 million to advance and develop its proprietary waveguide optics technology and bring it to market … with years of manufacturing knowhow, proprietary process development, and … ‘secret sauce and custom equipment,’ we can now design and manufacture some of the world’s highest-performing waveguides.”  
[‘we’re] becoming the tech platform for AR displays and enterprise smartglasses … waveguide technology solves one of the biggest problems in the AR industry: optics that fit in glasses. We feel we are now unique in terms of our production capability.”  
| **Network**      | Showing strong representation in equity markets | “With our shares trading on NASDAQ following our uplisting on January 28, 2015, we’re also a more attractive investment vehicle for a broader base of potential investors.”  
“We are thrilled to join the Russell Microcap Index … We believe our inclusion in the Index will serve as a valuable tool to broaden our shareholder base, including broader exposure to institutional investors.”  
“Our strengthened balance sheet and increasing share price allowed us to meet NASDAQ’s initial listing criteria. This uplisting has facilitated increased visibility and improved potential access to a larger shareholder base now that we are listed on a U.S. national stock exchange. Our profile with the investment community was further enhanced in late June 2015 following our inclusion in the Russell Microcap Growth Index.”  
|                   | Demonstrating a network of tech and supply chain partners | “Global technology leaders including SAP, NTT, DOCOMO, and Metaio, as well as strategic value-added resellers and many others, are currently driving business by creating smartglasses applications specifically designed to run on the M100 and releasing them for sale to their customers.”  
“Our extension list of value-added resellers has grown from a handful to hundreds of partners and now incorporates nearly all the vertical markets in the enterprise space today. This is important to understand because we have the exposure and the ability to place products that are essential to every enterprise’s vertical market, including warehousing and logistics, insurance inspection, manufacturing field service, and biopharma.”  
“Our ability to shift smartglasses in practically all enterprise vertical markets is a function of the ecosystem we have developed and the versatility of our smartglasses.”  
[‘We are] engaged in alliances with public partnerships like Toshiba, Qualcomm, Plessey, and others, and we are building strategic partnerships with numerous companies that want to own a significant piece of this growing market segment.”  

(Continued)
Table A2. (Continued).

| Dominant Frame | Features |
|----------------|----------|
| **Demonstrating integration of partners’ resources** | Qualcomm’s Snapdragon XR1 platform will help Vuzix to advance our AR smartglasses in terms of power efficiency, delivery of a smoother user experience, and better overall system performance... in combination with other leading technologies, this will enable Vuzix to push the form factor envelope for our next-generation waveguide-based Vuzix Blade™ smartglasses.|
| | “LogistVIEW’s Connected Worker Platform leverages the Blade’s built-in HD camera to capture data and location using computer vision. These visual data are then processed by LogistVIEW’s cloud-based AI engine to produce worker instructions in the form of AR/VR visuals that are anchored in the real world and seen through the Blade’s crisp see-through waveguide lenses.” |
| **Usage** | The two companies are partnering to develop advanced display engines for Vuzix waveguide optics to enable next-generation AR smartglasses. Combining Vuzix’s extensive expertise and IP in smartglasses and waveguide optic technologies and Plessey’s microLED light source product family, Quanta-Brite™ provides the basis for a new generation of AR smartglasses with the sleekest form factor to date. |
| **Demonstrating market adoption** | “We are witnessing at first hand an accelerating shift in the enterprise smartglasses market in terms of investment and commitment of resources across multiple industries.” |
| | ”[We are] achieving notable success as the industry sits on the cusp of major customer adoption.” |
| | “There is already a growing awareness and acceptance of AR in enterprise settings, with significant cost efficiencies and production advances in the workplace, numerous Fortune 500 companies are using AR on Vuzix smartglasses in industrial settings.” |
| | “Clearly and inevitably, migration to hands-free wearable smartglasses is underway in manufacturing, warehousing and logistics, remote field services, and many other vertical markets.” |
| | “It’s very clear to us that the enterprise smartglasses industry has moved into the adoption phase and is likely to see strong growth rates consistent with market research forecasts of demand for hundreds of thousands of devices globally in 2018.” |
| **Demonstrating a functional and leading product** | “Our customers are generating incredible ROI. What previously cost them $2,500 per day now costs next to nothing.” |
| | “The M100 is the first and only certified smartglasses hardware to be used in Airbus manufacturing facilities, reducing layout times inside the airframe by a factor of six, with practically zero errors.” |
| | “DHL, Ricoh, and Ubimax completed a very successful vision picking trial at our Ricoh facility, with proven efficiency increases of 25%. Now DHL is expanding its program to two sites in Columbus, Ohio, along with expanded pilots in the Netherlands.” |
| | “[We] worked extensively with Amazon and Oracle... to integrate their cloud-based analytics platforms on the Vuzix M300 smartglasses... [that] now leverage voice skills from Alexa on the IoT Analytics platform... to provide real-time information to users. For the operator in the field or on the 20th floor, this means they can go to work and start troubleshooting or making adjustments to equipment with access to real-time connected data... operating completely hands-free.” |
| | “Smartglasses featuring Vuzix’s proprietary see-through optics technology packed into a lightweight and compact form factor continues to deliver digital content and real-world experiences that have never before been consumed using smartglasses. From drone support to real-time language translation, these applications are causing excitement among our customers across markets in which they are currently sold.” |
| **Showing commitment to customer care** | “The M300 design is the culmination of over two years in the field... experience and feedback from M100... was baked into the design of the M300, and the response to date confirms that most of the hardware hurdles have been eliminated in this new product.” |
| | “You expect your employees to wear this device for... a typical eight-hour work day? We’ve been working very hard... to make the devices lightweight, small and light enough to wear, so that you can have a comfortable day... it has all kinds of accessories; it’ll work with hard hats, left- or right-eye dominant individuals, safety glasses, prescriptions—we’ve tried to cover the bases.” |
| | “[We] found that one size does not fit all when it comes to hardware and software solutions. For customers that require advanced features, Vuzix has been successful in directly upselling solutions like Vuzix Remote Assist and Ubimax Frontline or working through our partner channels with established companies like Dynamic, Brochesia, Help Lightning, Librestream, PTC, SightCall, TeamViewer, and others.” |
| | “Our products are available as either monocular or binocular display systems... and we customize configurations for our clients and manufacturing for our OEM partners.” |