

Customer Engagement and Digital Business

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Chapter Title:

Customer Engagement: How AI can turn up the Volume on the Voice of the Consumer in New Product Development

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Abstract

Brands are facing challenging times: their very relevance is under scrutiny, with a recent (2021) BCG report suggesting that customers wouldn't really notice if 75% of them simply ceased to exist. Innovation, including customer experience, is brands' strongest defence against irrelevance and data is the fuel that feeds their innovation engine. Traditionally, the R&D department, using the firm's proprietary resources, had sole responsibility for delivering a steady stream of new products. However pioneering firms quickly discovered that there is vast additional innovation potential just outside the company walls. NPD tends to leverage new tools once they become available and has a history of integrating recent technology into the process; from Computer-Aided-Design (CAD) to marketing analytics.

The proliferation of social media coincides with the expansion of the open innovation paradigm. As a consequence, most firms now tap into multiple data sources of customer insights and data. But it seems that only leaders can manage high-frequency, multiple source data and insight integration and analysis to help inform key innovation decisions. Lead users and other consumers can provide a fertile pipeline of sustainable innovation ideas but the issue for most companies is how do they access the voice of the consumer and how sophisticated is their ability to separate out the signal from the noise. Only a minority of companies use deep learning models and

AI to fuse multiple sources of consumer insight to drive key NPD decisions. Understanding the best ways to leverage multiple sources of data, including social media inputs, remains limited, fragmented and largely anecdotal. In this conceptual chapter, we develop a guide or framework for organisations to help them navigate a path towards enabling AI to amplify their Customer Engagement and to drive successful, sustainable innovation.

Introduction

The advantages of Customer Engagement (CE) for brands are well established, numerous and bi-directional. For existing products and services, CE facilitates sales growth and superior competitive advantage (Hollebeek et al, 2016). Engaged customers typically show greater brand loyalty and satisfaction (Jaakkola and Alexander 2014). But the focus of this chapter is on new products and services and, specifically, we focus on how organisations can leverage AI to derive actionable insights to ignite the sparks of creativity with which to fuel their innovation pipeline. In Jeff Bezos' opinion, the primacy of customer experience is the dominant factor that will outstrip elements such as price and product value as the principal discriminator among competing brands in the next decade (Shanin et al, 2024). We examine how organisations can design, develop and deliver novel and original products and services that leverage customer insights derived from CE. Integrating the voice of the consumer in the innovation process has long been a gold standard practice in innovation. Yet understanding of the best ways to leverage social media across these various stages of the innovation value chain remains limited, fragmented, and mostly anecdotal (Muninger et al, 2022; Bashir, Papamichail, & Malik, 2017; Roberts & Piller, 2016). NPD is a knowledge and data-intensive practice, AI offers the ability to augment what have been, traditionally, human centred activities in the process (Marion et al, 2023).

So many consumer markets are ultra-competitive, red-oceans that now product and innovation teams are increasingly dependent on understanding (in near real-time) consumers' preferences and motivations, how they are talking about products and

brands; this includes broader societal trends that may impact and are thus important to factor in to product development, go-to-market, and brand equity strategies (Huff and Bonde, 2022). CE-inspired innovation offers a strategic approach for firms to overcome the limitations of traditional market research methods by finessing the expertise and creativity of users who are actively shaping the future trajectory of their respective domains regardless of whether it's fashion, food, motoring, home decor or any major consumer market. By establishing collaborative platforms that facilitate knowledge exchange between lead users and internal development teams, firms can accelerate the pace of innovation and enhance the relevance of their offerings in these intensely competitive markets.

The pivotal role of customer experience enhancement is fundamentally anchored in the concept known as the 'Voice of the Customer' (VOC), which serves as a rich repository of product or service-related information with the potential to transform business understanding of consumer behaviour (Zhou and He, 2019). What makes the VOC concept especially important can be linked to the increasingly participative roles that customers undertake in their interactions with businesses. Transitioning from passive recipients to active contributors in the business exchange narrative, customers provide direct feedback that embodies a genuine reflection of their experiences of the product or service in question.

Both academic research and managerial or practitioner experience agree that engaging (potential) customers more closely during the NPD process can help develop products that are more highly differentiated and thus more valued by their users. The advantages reported by organisations who embed the voice of the customer (VOC) in their innovation programmes include both internal efficiency gains and gains in external consumer engagement. Internally, the efficiency gains are shorter innovation cycles and, externally, firms report increased customer retention (Bartl et al., 2012). This is because customers are often experts in specific fields of knowledge (for instance: fashion, technology, healthcare, nutrition etc) and can make valuable NPD contributions through sharing their opinions. In particular, they can surface hard to reach insights about customer wants and needs (Biemans and Griffin, 2018).

This transition signifies a shift wherein customer feedback transcends mere anecdotal accounts, evolving into a rich source of data that mitigates response bias risks, thereby facilitating more accurate data extraction (Mastrogiacomo et al, 2021). Such authentic customer feedback is instrumental in identifying areas of satisfaction or dissatisfaction, enabling businesses to tailor their services or products accordingly. This level of precise feedback is crucial for refining business offerings and value propositions, thereby allowing organizations to improve their performance metrics and align more closely with customer expectations.

However, the acquisition of such valuable customer insights often demands significant investment, generally requiring the deployment of various methodologies such as focus group interviews, omnibus surveys, and extensive market research, each carrying inherent costs, lengthy timelines and potential limitations (Mastrogiacomo et al, 2021; Shahin et al, 2024). In response to these challenges, there is a growing appetite among businesses to explore more cost-effective, more immediate, unbiased, and streamlined methods to understand customer needs and experiences (Sony et al, 2020). Hence the growing interest in data-driven, AI powered approaches to customer experience management (Elg et al, 2021). Such technological advancements are increasingly seen as vital to capturing the nuanced dynamics of customer interactions and leveraging them to enhance strategic business outcomes. As Shahin et al (2024: p61) put it:

Once upon a time, word-of-mouth was the go-to method for managing quality. Fast forward to today, and word-of-mouth has evolved from an interpersonal, face-to-face exchange to a digitized form that is transformative and full of possibilities for business improvement.

This chapter explores how advances in AI are changing the way brands gather, distill, store and activate consumer insights. Accenture runs a global CEO Pulse of Change Index and their 2024 report shows 88% of C-Suite Executives see technological disruption, catapulted by advances in generative AI as the No 1 issue on their agenda. Recent developments in Artificial Intelligence enabled Consumer Intelligence (AICI)

show how AI and machine learning are being used to merge online and offline data (everything from market share reports to customer YouTube videos) to process, interpret and visualise what consumers are saying, thinking and doing so that it all feeds into the front-end ideation process for new product development. Unlike traditional social listening approaches, (AICI) platforms harness data from multiple sources (social, search, survey, internal market intelligence and more) and apply advanced AI and data-mining algorithms to uncover predictive and prescriptive insights. Timely insight into consumers' preferences and motivations have never been so important; these include how they are talking about products and brands, and even broader (lifestyle, consumption and social) trends that are important to product development, go-to-market, and brand equity strategies.

But the challenge is in the interpretation of these signals from consumers, many of which may contain entirely polarised or certainly heavily nuanced messages about the brand that require precise interpretation. Interpreting online forums and blogs and discerning the factors that drive customer satisfaction or dissatisfaction has been described as a 'complex conundrum' (Shahn et al, 2024). Companies are looking for systematic insights to help them triage ideas into their value creation process or innovation funnel (Labrecque et al, 2013) but such insights are rarely written or expressed in a way that their core message leaps out or is immediately apparent (Klein, 2013). For that reason and to coax consumers along, companies must establish the right conditions, often by building consumer communities and creating incentive schemes to empower and incentivise customers to articulate their ideas and feelings and co-create products. In some cases, the role of consumer communities is to help launch something new as brand ambassadors. They also need to address the risks of proactive involvement through social media, including coordination mechanisms and control considerations, which becomes particularly difficult when we note the convoluted nature of both platforms and firms today (Muninger et al, 2022).

Literature Review

Approaches to integrating the Voice of the Customer

There is widespread acceptance that incorporating knowledge from a broad scope of external sources into the new product development (NPD) process leads to higher innovation performance (Foss et al, 2011; Nelson and Winter, 1982). Developments in information and communication technology have enabled firms to build large customer databases with real-time access at customer touch points so that companies can observe customer behaviour throughout their customer journey (Verhoef and Lemon, 2013). However, the main challenge associated with leveraging ideas from consumers is that they often have difficulty in articulating their latent needs or volunteering original ideas for solutions on their own (Dubiel et al, 2014). Quality, quantity, and variety of input tend to vary among distinct types of customers, and they vary, too, over the duration of their engagement in NPD (Verhoef et al., 2013). Frequently, only incremental innovations stem from these efforts. The same criticism is often levelled at the design thinking approach to innovation: its absolute focus on users tends to anchor the ideas that emerge in incremental rather than radical space (Robbins and Fu, 2022).

In the last decade, social media platforms have emerged as a frequently used source of insights and ideas from engaged consumers. Within organisations, the rise of Open Innovation has coincided with the proliferation of social media and in the quest to gain competitive advantage through innovation, firms have opened their value creation processes to seek ideas from external sources. Roberts and Piller (2016) confirmed that 82% of firms were using social media to enhance their innovation processes. Social media has many forms, but they are rarely static, and their audiences can be fickle. Its principal categories often overlap and include social communities, social publishing, social commerce, and social entertainment (Tuten, 2023). Although some companies have been able to use social media to develop new insights that lead to successful new products, many others do not quite know how to use social media for innovation. Indeed, some companies have seen their innovation performance negatively affected. For instance, some get distracted by the diversity of input from social media; their traditional filters for screening data do not apply and they can waste

resources by not being able to authenticate the source or reliability of the information (Roberts and Piller, 2016).

Researchers have described three separate levels of engagement for innovation managers in terms of the extent they might involve social media in their NPD (Griffin et al, 2014). **Level One** requires the lowest level of investment and engagement and is the most passive level. A firm can simply collect, interpret, and take appropriate action with online data that are already available. Products and product-related issues are discussed and debated in numerous bulletin boards, discussion forums, blogs, and other online platforms. Even while remaining anonymous, organisations can find out what customers think about their products and can take action appropriate to the problems they encounter.

However, some mass end users actively seek a broader audience and maintain blogs (e.g., Dooce, Treehugger), create podcasts (e.g., on YouTube), or join social commerce platforms (e.g., Trip Advisor, Reddit). These vehicles provide an opportunity for product assessment or demonstration of the use of products. However, only a small fraction of customers take the trouble to generate online product reviews and they may not represent more mainstream customers. Lead users, as a particularly passionate and knowledgeable user subgroup, often go well beyond verbal, front-end NPD input, and can even offer ready-made product concepts, prototypes, or even marketable products. Lead-user innovation challenges traditional assumptions about the source of innovation by emphasizing the importance of users who are not just early adopters but who also possess unique, forward-thinking insights into their own needs. By involving these lead users in co-creation activities, firms can uncover latent demands and develop solutions that resonate deeply with emerging market trends (Urban and von Hippel, 1988).

Level Two goes beyond listening 'incognito' to customer conversations on different platforms and proposes firms take an active part in the digital dialogue where they disclose their identity and their purpose. There are compelling reasons for firms to interact on an existing, third-party platform, nevertheless such a strategy is risky. Firms or brands don't have the same amount of control on a third-party site as they would

have if they built their own platform and their own brand community. On a third party, open platform, the brand's tone of voice and the way it interacts with consumers is visible to everyone — including the competition.

If the firm takes the time and invests in its own platform, it can circumvent many of these risks. It also can build a closed user circle or offer an invitation-based membership. However, the main challenge is that the community must remain vibrant, relevant and interesting for its members, otherwise it will atrophy. Companies such as C-Space (formerly Communispace) curate these brand community spaces and promise 'customer inspired growth' for its many customers.

Level Three refers to the integration of customers into the heart of the innovation process. This often manifests as consumer ideation forums – MyStarbucksidea.com as an example - an online community for people to share, vote, discuss and put into action ideas on how to enhance their Starbucks experience. The site was founded to create an open dialogue and collaborative environment with consumers to share their thoughts and ideas and allow them to play a vital role in how they interact with Starbucks, both in and out of stores (Starbucks.com). Within the first 5 years, over 150,000 customer ideas were submitted, and many were implemented. AICI now allows firms to have multiple, simultaneous routes for the voice of the consumer to enhance and inform the innovation process for new product development.

Customer Engagement

The concept of customer engagement extends beyond mere transactions to encompass emotional connections, brand loyalty, and advocacy. Building upon the customer engagement framework proposed by Brodie et al. (2011), this chapter underscores the importance of cultivating deep, enduring relationships with customers, which in turn fosters brand advocacy and encourages positive word-of-mouth referrals. Customer engagement transcends traditional marketing approaches by emphasizing active participation, dialogue, and co-creation between firms and customers throughout the innovation process. As highlighted in the seminal work of Prahalad and Ramaswamy (2004), co-creation involves collaborating with customers

to ideate, design, and refine products and services, thereby aligning offerings more closely with customer needs and preferences.

In recent years, customer engagement (CE), which refers to a customer's resource investment in his/her brand interactions (Hollebeek et al., 2019), has been heralded as an important value-creating imperative for contemporary organizations (Chang et al., 2019). For example, CE has been shown to contribute to sales increases, greater share-of-wallet, reputational advancement, and superior competitive advantage and profitability (Brodie et al., 2011). CE is also shown to insulate firms against customer attrition (Chathoth et al., 2016), thus reducing customer churn (Itani et al, 2020).

In the realm of innovation, customer engagement serves as a catalyst for creativity and idea generation. Chesbrough's (2003) concept of open innovation emphasizes the importance of tapping into external sources of knowledge and expertise, including customers, to drive innovation. By involving customers in the innovation process, firms can gain valuable insights, uncover unmet needs, and co-create solutions that should resonate more with target markets. Furthermore, CE plays a vital role in market validation and iterative product development. Drawing upon the lean startup methodology proposed by Ries (2011), it is important to engage with customers early and often to gather feedback, validate assumptions, and pivot if required to optimise product-market fit.

Lead User Innovation

The interest in applying lead user methods to the development of new products and services (Franke et al, 2006) has been growing. It has been fueled by practical demonstrations that such methods can, under the right circumstances, effectively and systematically generate successful ideas for commercially attractive new products, services and experiences (Herstatt and von Hippel, 1992; Lilien et al., 2002; Olson and Bakke, 2001; Urban and von Hippel, 1988). As a good case in point, "Threadless.com" offers a full lineup of apparel, accessories, home decor, and footwear, based on thousands of designs submitted and voted on by its online community. Similarly, the My Starbucks idea platform has produced more than 300

ideas from the online community that the company subsequently has implemented (Muninger et al, 2022). The academic field of lead-user innovation, pioneered by Eric von Hippel in the 1980s, has evolved significantly, influencing, and influenced by, both theoretical research and practical applications in various industries. In his seminal papers in the 1980's, Von Hippel introduced the concept of lead users. Lead users are defined as members of a user population who (1) anticipate obtaining relatively high benefits from obtaining a solution to their needs and so may innovate and (2) are at the leading edge of important trends in a marketplace under study and so are currently experiencing needs that will later be experienced by many users in that marketplace (von Hippel, 1986). The original academic work that led to defining lead users in this way was built on findings from von Hippel (1986, 2005).

The element of *high expected benefits* in the definition is derived from studies into the economics of innovation which showed that the greater the expected benefits an entity (or individual) expects to receive from any given innovation, the greater will be their investment in finding the right solution (von Hippel, 1988). The second part, that lead users are *ahead on a leading marketplace trend* suggests that this special insight makes them more likely to produce a novel idea that adds value to the proposition. Both of these elements are conceptually independent of each other.

In the 1990's scholars began to broaden the scope of the theory of lead users as the concept expanded into different sectors (such as medical devices and software) which broadened the idea's importance. Thus, Urban and von Hippel (1988) found that an industrial software product concept developed by lead users had greater marketplace appeal than did concepts developed by conventional marketing research methods. Morrison, Roberts, and von Hippel (2000) showed that manufacturers of information technology (IT) systems for libraries judged that many of the IT innovations developed by libraries themselves had potential value as commercial products sold in the marketplace. Lu'thje (2003) found that 48 percent of surgical innovations developed by surgeons in university clinics in Germany had been or would be produced as commercial products. Thus, lead users can be a more fertile source of potential new products and services than the company's own internal innovation teams.

AI in Customer Engagement

Artificial intelligence (AI) refers to computer programmes that act, respond, or behave intelligently (Poole and Mackworth, 2010). AI can come in humanoid and non-humanoid forms (e.g., automated services) that can mimic or perform human tasks and solve problems through learning, analysing and interpreting data (Mellit and Kalogirou, 2008). AI has evolved rapidly from performing simple tasks (e.g., Siri) to undertaking more sophisticated social functions such as recognising customers' emotions from, for instance, facial coding, for subsequent intervention (Prentice et al., 2019a). In their book *Prediction Machines: The Simple Economics of Artificial Intelligence* (2022), Agrawal, Gans, and Goldfarb offer a more pragmatic definition of AI as a "prediction technology that reduces the cost of predictions." Where humans make predictions today—for example, market forecasting—AI makes them faster, better, and cheaper. NPD is founded on assumptions all of which are based on prediction. Each prediction is fraught with risk, so anything that improves the accuracy and quality of prediction is likely to be of significant help in the innovation process.

AI applications in customer engagement are diverse: these include chatbots, predictive analytics, and personalized marketing. AI-driven chatbots, such as those developed by IBM and Google, use natural language processing to simulate human-like interactions, providing 24/7 customer service (McTear et al., 2016). Predictive analytics employ machine learning algorithms to analyse customer data and predict future buying behaviours, thereby allowing companies to tailor their marketing strategies effectively. For instance, AI can be used in personnel recruitment by combining face recognition and natural language processing technologies during interviews; training and development using robots and visual scanning technologies; and salary evaluation through neural network functioning (Jia et al., 2018).

Personalization, another critical application of AI, involves analysing individual customer data to deliver tailored content and recommendations. Companies like Amazon and Netflix use AI to suggest products or content based on previous interactions, significantly enhancing customer satisfaction and retention (Gupta and George, 2016). It is appropriate for AI to be used as a tool to facilitate the collection, distillation, and exploitation of customer feedback because that's precisely how AI's

large language models were themselves developed. That is why in March 2023, Open AI was so keen to distribute ChatGPT as widely as possible. Reinforcement Learning from Human Feedback (RLHF) is a technique in machine learning where models, particularly in the domain of artificial intelligence, are trained and improved based on direct feedback from as many human interactions as possible. The concept integrates human judgments into the reinforcement learning loop, allowing the model to align more closely with what customers want and expect. In practical terms, RLHF involves users interacting with an AI system—such as providing ratings, corrections, or choices—and the system then uses this feedback to adjust its algorithms and improve its outputs. This method is particularly valuable in domains such as natural language or image processing or autonomous vehicle navigation. By leveraging human feedback, RLHF enables AI systems to perform tasks in ways that are more intuitive and satisfactory to human users, thus significantly enhancing the user experience and the core product's effectiveness. Hence, AI is the perfect vehicle to interpret customer feedback on other brands and categories.

The Future of AI and Voice of the Customer

If sustained investment, coupled with academic and practitioner interest in a topic is a sign of its significance, AI is at the top of the hype cycle. Renno et al (2022) note that over the past five years, venture capital invested more than \$170 billion in AI hardware and software platforms and algorithms. That comes on top of investments made by the leading cloud service providers (Amazon Web Services, Google, Microsoft Azure), which are the prime innovators in this space. In the vein of Clayton Christensen's analytical approach (2016) to understanding disruption and innovation, the underlying technologies of Large Language Models (LLMs), particularly those such as OpenAI's Generative Pretrained Transformer 4 (GPT-4) and Google's BERT are radically redefining the market research market. These models, which are at the forefront of generative artificial intelligence, utilize deep learning methodologies to process and learn from expansive datasets (Shahin et al, 2022). This ability to analyze vast amounts of text—ranging from books and articles to websites and code—allows these systems to uncover patterns and insights previously obscured within massive data troves (Ozkaya, 2023).

The advanced capabilities of LLMs like GPT-4, which powers applications such as ChatGPT, and BERT, which underpins Google's Bard, are catalyzing a transformative shift in how we interact with information. Traditionally, search engines have operated by indexing and retrieving information, but LLMs enhance this framework by generating, summarizing, and interpreting content (Shahin et al, 2023). This ability not only to digest but also to produce nuanced, contextually appropriate content—whether in the form of human-like text or complex code snippets—is a hallmark of their design (Strobelt et al, 2022).

Moreover, the practical applications of these technologies are broad and continually expanding. From translating languages to summarizing extensive documents, to providing answers to complex queries, LLMs are extending the boundaries of what automated systems can do. Importantly, the utility of these models in various domains hinges on the relevance and breadth of the training data, suggesting that their future applications could be as limitless as the data from which they learn (Veres, 2022). This evolution is a significant shift in our foundational technologies, indicative of Christensen's patterns of disruptive innovation, as they reshape industries and redefine our interactions with digital systems.

Artificial Intelligence (AI) is revolutionizing every element of business practice. Early adopter firms have turned to AI for various applications, but the number one benefit it offers is increased innovation (Jyoti & Riley, 2022). Yet, despite the reported benefits of AI in NPD, the adoption rate is quite low, about 13% across firms globally (McKinsey, 2023). A particular NPD area in which AI excels as Forrester (2022) outline, is AI-enabled consumer intelligence (AICI) platforms, which enable brands and firms to leverage insights derived from data emanating from outside their firm (e.g., social, web, and/or consumer data) and combine it with their own data (e.g., CRM, website) to optimize the experience of their current customers. Additionally, such systems look beyond firms' current customers' behaviour patterns, needs, and preferences to rapidly deliver actionable insights on emerging trends, outliers, and unexpected shifts or changes in consumer behaviour.

Ipsos (Huff and Bonde, 2022) also see AICI as the future of customer engagement. They believe the path to understanding consumers in 2022 requires more than what conventional social listening techniques can provide. Brands also need to augment their traditional market research techniques with a composite, global, AI driven solution that covers all the right sources. But, the problem is rarely a scarcity of data. On the contrary, there is usually too much data, creating data overload. The question is how to separate the signal from the noise. This is where democratizing data, supported by smart machines, automation and AI, come in. Machine learning (ML), for example, helps sift through large volumes, reduce “noise” in datasets, and detect weak market signals as they emerge.

Dr Bob Cooper is the founder of Stage Gate and one of the most cited academics in the world of new product development. He writes that AI has been around for several decades, quietly making things like data analysis more efficient and automating routine tasks. Only recently has the potential of AI been trained on new product development (NPD) processes. Currently, just less than a third of new product projects succeed commercially; AI offers tremendous potential to transform these results. Early-adopter firms have demonstrated that AI has many applications in the NPD process and can yield substantial payoffs—as much as a 50% reduction in new product development times. Thus, many firms are getting into adopting AI for NPD, and have set up agile teams to move this transformation forward (Cooper and McCausland, 2024). Ogundipe et al, (2024) acknowledge that AI is a transformative force in new product development that ‘reshapes the journey from ideation to market penetration.’(p950)

First, AI can both augment and accelerate ideation and creativity by generating ideas from data-driven insights. AI empowers innovation managers with sophisticated tools for analyzing societal trends, consumer behaviour, preferences, and sentiments, to help guide strategic decision-making. AI can improve the process of analysing consumer needs by the adoption of Natural Language Processing (NLP). Prototyping represents a critical stage wherein AI facilitates rapid iteration and refinement, expediting the development cycle and enhancing product adaptability. Leveraging machine learning algorithms, product managers can swiftly iterate prototypes based

on user feedback, ensuring their MVPs are consistent with customer expectations. AI is also being introduced into product testing: it facilitates rapid testing of multiple variations of product designs or prototypes. When it comes to product design, AI-driven solutions revolutionize user experience and usability, leveraging natural language processing, computer vision, and recommendation systems to personalize product interfaces and cater to customised user preferences. As an example, NASA has used generative design computer-aided software to make the structural elements of Mars rovers more robust and yet lighter (Marion et al, 2023).

Advanced sentiment analysis capabilities use natural language processing (NLP) techniques to understand the feeling, tone, and emotion of online conversations. And data-science powered capabilities like image analysis, scene recognition, and logo detection provide critical context about visual content. As Sandro Kaulartz, Chief Research Officer within Ipsos Social Intelligence Analytics service line puts it, “Machine intelligence does a great job in laying the foundations, helping us navigate between complex contextual layers – not easily available to the human eye. But human-machine teams unlock this potential - and also deliver scale, speed, and accuracy to have confidence in results.’

Clearly, the potential benefits of using AI to integrate the voice of the consumer into the innovation process are enormous. But, as Renno et al (2022) demonstrate, AI is still more hype than reality in most businesses. With advances being made in so many diverse fields, so rapidly, it's practically impossible for SMEs to navigate the evolving AI landscape and to understand precisely what approaches and tools they ought to be using at each phase of the innovation value chain (Hansen and Birkinshaw, 2006).

An important concept in NPD is that product development is a process. And like any process, NPD can be managed to make it faster, more effective, or, ideally, more productive. The NPD process is portrayed as a series of “stages”, each stage comprising a set of recommended tasks undertaken by the project team; before each stage is a decision point or “gate”, where management makes the go/no go decision

– to kill a bad project or to continue to invest and move forward into the next stage (Cooper, 2024).

Conclusions and Recommendations – the Task Ahead

Organisations are investing in AI because they see it as the best path to taking customer-engagement to the next level. Although the uptake of AI in SMEs remains limited, we believe that investing in these approaches will, eventually, deliver superior customer insights at a lower cost and higher speed than conventional research approaches. In Table 1, we have broken down the innovation value chain into 4 constituent parts – beginning with the front-end processes of opportunity recognition and ideation, then moving to developing these initial, raw concepts into testable Minimal Viable Products (MVPs) or prototypes (Ries, 2013). The third phase is testing these ideas with key stakeholders including, inter-alia, consumers, retailers, and distributors. The final phase, should all the foregoing phases work out, is the pilot launch or full-scale introduction. In our Table, we have outlined all the elements of these phases in which AI can help capture and interpret customer data. We further identify the core technologies that are used in these various applications, and we include the names of the organisations which are currently in the forefront in developing and marketing each of these technologies. In this way, we have developed a user guide for organisations who may want to take an *a la carte* approach to using AI to boost or strengthen individual elements of their NPD process.

Table 1 About Here

In summary, there are four key areas in the innovation process in which AI can move the dial for organisations and offer them superior outcomes at a faster speed and a lower cost. This is a fast-moving picture and as AI continues to gain traction, its capabilities will increase, and it will improve across all dimensions. Managers of innovation projects need to embed AI into their processes to secure some blue-

coean, competitive advantage through innovation and to ensure their brand remains not just relevant but compelling.

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	Stages in the NPD Process			
	Ideation & Concept Development	Prototyping	Testing	Launching
Potential Applications of AI	AI finds needs and opportunities AI Merges data from different sources (Nielsen market share data and YouTube etc) AI does data and text mining AI derives insights and generates concepts AI Can power brainstorming and come up with ideas Customer Journey Mapping	Designs prototypes in multiple iterations Builds digital prototypes and digital twins Creates products and develops formula's (such as chemical molecules) Undertakes structural optimisation to reduce weight and cost Creates conversational interfaces (Siri and Alexa)	Designs field trials Refines designs based on customer feedback Processes and interprets customer feedback and makes sense of unstructured text (NLP)	Radical Personalisation of UX Curated Predictive Content Recommendations Self-service guides and Chatbots Recommendation Engine
The companies and technologies powering each phase	Technologies: Big Data Analytics, Sentiment Analysis Tools, Consumer Behaviour Predictive Models Natural Language Processing (NLP)	Technologies: Computer-Aided-Design (CAD), digital twin software and simulation tools.	Technologies: AI, Machine Learning, Natural Language Processing (NLP), Data Analytics, Heatmaps	Technologies:
	Companies: IBM Watson, Google Analytics,	Companies: ANSYS, Siemens Digital	Companies: Usability Hub, Pendo, Content	Companies: Salesforce, Microsoft

	OpenAI GPT, Autodesk		Square, PlaybookUX	Dynamics365, Tableau
Case Examples	Nike GE Pfizer	Spotify Siemens NASA	Tesla Unilever Logitech	P&G American Express Amazon

Table 1 *How AI Can Boost Consumer Data through all phases of the NPD process*