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SONY CORPORATION’S AIBO: AN INTELLIGENT DECISION?[[1]](#endnote-1)

Tulsi Jayakumar wrote this case solely to provide material for class discussion. The author does not intend to illustrate either effective or ineffective handling of a managerial situation. The author may have disguised certain names and other identifying information to protect confidentiality.

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In November 2017, the chief executive officer (CEO) of Sony Corporation (Sony), Kazuo Hirai, announced the release of Sony’s rebooted robo-pup, *Aibo*. Aibo, an acronym for Artificial Intelligence Robot, was a robot dog equipped with sensors and actuator technologies that allowed it to move smoothly and naturally and “run” toward its owner. At the same time, powered by artificial intelligence (AI), this virtual pet could learn and interact with its owner and surroundings—detecting smiles and words of praise and “remembering” what actions pleased the owner—and thereby behave like a real dog.[[2]](#endnote-2) Sony was an iconic Japanese manufacturing company with a more than 70-year history in diverse businesses, including consumer electronics, movies, games, music, insurance, and financial services. While Sony had made a commercial foray into AI as early as 1999 with its Aibo, it had discontinued production of the robotic pup seven years later in 2006, owing to financial troubles. The upgraded Aibo, retaining its original name, was priced at US$1,740[[3]](#endnote-3) before tax and was slated to go on sale in January 2018, initially within Japan.[[4]](#endnote-4)

Hirai, who had taken over as president and CEO of Sony in 2012, had initiated and overseen a painful restructuring exercise lasting over five years, involving significant layoffs, huge losses, and an exit from the market for personal computers (PCs). As a result, in March 2018, Sony expected to post a record operating profit for the first time in two decades. As Sony planned the release of its rebooted robo-pup, Hirai would need to consider the following questions: How did a virtual pet business, especially one that had already proved unviable in the past, fit into such a restructuring exercise? Did Sony have the competitive advantage in AI? Could AI and robotics prove to be the next frontier for Sony? Was Sony’s decision to diversify into AI an intelligent decision?

**SONY[[5]](#endnote-5)**

Sony, a Japanese manufacturing company, was set up by Masaru Ibuka and Akio Morita in 1946.[[6]](#endnote-6) Incorporated as Tokyo Tsushin Kogyo K.K. (Totsuko) in Nihonbashi, Tokyo, it was a small company with a capital of just ¥190,000[[7]](#endnote-7) and approximately 20 employees. Co-founder Ibuka’s desire to produce items needed for everyday life was reflected in the company’s foray into the repair of radios, the creation of an electric cooker, and the manufacture of short-wave converters that had the ability to convert medium-wave radios into all-wave receivers.[[8]](#endnote-8)

In 1950, the company introduced the first Japanese-designed tape recorder, the “G Type” tape recorder, an extremely bulky and low-selling product. In response, the company innovated and designed a new tape recorder, the H Type, which weighed only 13 kilograms. In 1953, Sony signed a deal with Western Electric Company, the parent company of Bell Laboratories, to enter into the business of transistors. Sony’s TR-63, an inexpensive pocket radio, released in 1957, was a huge success and brought international recognition to the brand. However, the move itself had not been an easy one. When Ibuka and Morita decided to diversify into transistors, Totsuko had been in business for a mere six years. While the company had come to be well-known within Japan in the field of tape recorders, its share capital was less than ¥100 million. Despite the uncertainty associated with the new venture, Totsuko invested funds and effort “on a scale almost unthinkable for a company of its small size.”[[9]](#endnote-9) In January 1958, in response to the global aspirations of the founders, who wanted to sell their products across the world, the company’s name was changed to Sony Corporation.[[10]](#endnote-10)

In 1968, Sony established the Columbia Broadcasting System/Sony Records Inc. as a 50–50 joint venture company between Sony Corporation and Columbia Broadcasting System Inc. (CBS) in the United States.[[11]](#endnote-11) As business in the United States grew, the Sony Corporation of America was established with headquarters in New York City. From then on, Sony’s story was one of new innovations and inventions being launched, with the company well on its way to becoming a global electronics giant. Sony’s success could be attributed to Morita’s dedication to “staying two steps ahead of the competition” in developing new products.[[12]](#endnote-12) Thus, products introduced before the 1980s included many firsts, such as the MD-5, the first all-transistor desktop calculator, introduced in 1964; the Trinitron colour television, introduced in 1968; the home-use half-inch “Betamax” video cassette recorder, launched in 1975; the first portable stereo casette player, the “Walkman,” launched in 1979; the world’s first compact disc player, launched in 1982; the high-definition video system, launched in 1984; and the camcorder, launched in 1985.[[13]](#endnote-13)

Sony, right from the early days, focused on producing high-priced, high-quality items, rather than discount products.[[14]](#endnote-14) It also focused on making products for which there was a latent need.[[15]](#endnote-15) Morita had said, “Our plan is to lead the public with new products rather than ask them what kind of products they want. The public does not know what is possible, but we do.”[[16]](#endnote-16)

Morita’s marketing genius revolved around finding a need and fulfilling it. Thus, when Morita found people in the United States listening to music in their cars and carrying large stereos to the beach and the park, he came up with the idea of a portable product that would offer high-quality sound, yet be portable enough to allow the user to listen while doing something else. The resulting product, the Walkman, was one of Sony’s most popular and profitable products.[[17]](#endnote-17) It took more than two years for other companies to come up with competing products, by which time Sony had sold more than 20 million units.

In 1979, Sony established the Sony Prudential Life Insurance Co. Ltd. in Japan as a 50–50 joint venture with Prudential Insurance Co. of America, which was renamed Sony Life Insurance Co. Ltd. in 1991. In 2004, Sony Life Insurance Co. Ltd. became a wholly owned subsidiary of Sony Financial Holdings, a financial holding company.

In the late 1980s, Sony diversified into the entertainment business. In 1988, it bought CBS Records Inc. from CBS, thereby acquiring the world’s largest record company. In 1991, the acquired company changed its name to Sony Music Entertainment Inc. and then to Sony Music Holdings Inc. in December 2008. In 1989, Sony acquired Columbia Pictures Entertainment Inc., which was renamed Sony Pictures Entertainment Inc. in 1991.[[18]](#endnote-18)

In the early 1990s, with Japan entering a decade-long recession, and with founders Ibuka and Morita both incapacitated by strokes, Sony entered into a difficult phase. The company declared its first loss, of more than $200 million, in 1993.[[19]](#endnote-19) Despite its losses and a tough business situation, Sony continued to design and deliver new products.

In 1993, Sony established Sony Computer Entertainment Inc. to handle the company’s ventures into the video game hardware market. In 1994, Sony’s entertainment division launched its PlayStation (PS) video game console in the Japanese market at a price of ¥39,800 ($360). By May 1995, Sony had sold over one million PS consoles to Japanese gamers alone. In September 1995, Sony launched the PS console in the United States for $300 and sold over 100,000 units in just two days, while in the United Kingdom and the European Union the console went on sale at the same time for £299.[[20]](#endnote-20) By 2002, the game unit was contributing more than 10 per cent of the company’s yearly revenues.[[21]](#endnote-21) In 2006, twelve years after initially launching the console, Sony stopped manufacturing the original PS, ending its reign as the first console to sell a hundred million units.[[22]](#endnote-22) Sony sold 150 million of the PS2 and 83 million of the PS3 before announcing their discontinuance in January 2013 and May 2017, respectively.[[23]](#endnote-23)

Sony introduced its home-use PC, the VAIO brand of computers, in 1997.[[24]](#endnote-24) The VAIO brand name was associated with high-end computers ever since its inception.[[25]](#endnote-25) In 2014, amid a shrinking global PC market, and with the PC segment underperforming its other segments,[[26]](#endnote-26) Sony announced plans to sell off its VAIO computer division to a Japanese investment fund, Japan Industrial Partners.[[27]](#endnote-27)

In 2001, Sony established Ericsson Mobile Communications AB (Sony Ericsson) as a 50–50 joint venture with Swedish company Telefonaktiebolaget LM Ericsson (Ericsson). In 2012, Sony Ericsson became a wholly owned subsidiary of Sony after it acquired Ericsson’s 50 per cent equity interest, and its name was changed to Sony Mobile Communications AB.[[28]](#endnote-28)

Television (TV) represented a key business unit for Sony. The company had been attempting a turnaround of the TV business since 2011. Given TV’s importance in Sony’s overall strategy, Sony undertook several reforms in 2014 to improve its competitive advantage in the TV business and return it to profitability. These efforts included shifting the product mix within the TV business and focusing on increasing profits from high-end models. Sony also attempted to harness market expansion in emerging markets by developing products that catered to specific local needs, and undertook strategies aimed at cost reduction and improving operational performance through focusing attention on all functions relevant to the TV business.[[29]](#endnote-29)

Sony’s other profit centre was Sony Online Entertainment (SOE), founded in 1997, which had introduced the Internet virtual reality game *EverQuest* in 1999.[[30]](#endnote-30) Analysts had estimated that one year after the initial release in March 2000, the game had garnered 200,000 subscriptions, which increased to more than 450,000 subscriptions by July 2003 and further to 550,000 by October 2004. However, after 2005, the number of subscriptions declined sharply, dropping to 200,000 in May 2006.[[31]](#endnote-31) In 2015, market research agencies forecasted the fast-paced worldwide growth of gaming revenues to exceed $86 billion by 2016. Within gaming, while mobile gaming was predicted to be the hottest niche, multi-player online computer games such as *EverQuest* were expected to grow at an annual rate of 10 per cent.[[32]](#endnote-32) However, in February 2015, a struggling Sony sold its profit centre SOE to a relatively unknown investment firm called Columbus Nova, which renamed SOE the Daybreak Game Company.[[33]](#endnote-33) According to analysts, SOE had been an “odd fit” in the struggling Sony, which had already sold off product lines such as its VAIO computers in an attempt to improve its financial results.[[34]](#endnote-34)

In April 2013, Sony began a new medical business by establishing Sony Olympus Medical Solutions Inc., a venture between Sony and Japan’s Olympus Corporation, wherein Sony owned a 51 per cent stake.[[35]](#endnote-35)

Sony’s AIBO

In 1999, Sony introduced AIBO ERS-110, its four-legged entertainment robot dog. Aibo, meaning “companion” or “friend” in Japanese, but also standing for Artificial Intelligence Robot, was one of the first AI products built for ordinary consumers. In Japan, Sony’s initial batch of 3,000 Aibos sold out over the Internet within a mere 20 minutes; another 2,000 were sold in the United States over four days in June 1999.[[36]](#endnote-36) These sales were despite the ERS-110’s price of ¥250,000 in Japan and $2,500 in the United States.[[37]](#endnote-37) Aibo’s launch was accompanied by the launch of a motion editor—the “AIBO Performer Kit” (ERF-510)—that enabled users to create original movements for the Aibo.[[38]](#endnote-38)

Sony launched the Aibo in Europe in October 1999. It also announced a new special edition model (ERS-111) to be launched in November 1999 for the European, Japanese, and U.S. markets. For a period of one week, Sony offered the sale of a limited number—10,000 units—of the new model, with the intention of “keeping a close contact with customers to favour feedback and help further develop the performance of AIBO.”[[39]](#endnote-39) Sony recorded 135,000 orders in that single week alone, a testimony to Aibo’s tremendous popularity and appeal. In fact, Sony sold 150,000 units of the Aibo before ceasing production in 2006.[[40]](#endnote-40)

With an eye on profits, Howard Stringer, who was appointed the new CEO of Sony in June 2005, took the decision to “kill” the Aibo. Up until 2005, the company had launched eight basic models of the Aibo in 23 different colours and types.[[41]](#endnote-41) The third and final-generation version of the robot dog, launched in November 2003, was equipped with “a camera in its eye that could be used to recognise its owner and record images, while its personality could be reprogrammed from lovable to mischievous.”[[42]](#endnote-42) It was “able to speak 1,000 words; react appropriately to an owner’s commands and motions; keep blogs, complete with pictures taken by cameras behind its eyes; and play music.”[[43]](#endnote-43)

However, Sony was experiencing poor financial results in 2005.[[44]](#endnote-44) Despite its popularity, the robotics division—whose only product for sale was the Aibo—produced only $40 million to $80 million in revenue.[[45]](#endnote-45) In a bid to generate cash as well as profits, Sony decided in 2005 to put to sleep not only the Aibo but also the Qrio, “a humanoid robot that could walk on two legs but had never been sold commercially.”[[46]](#endnote-46)

Speaking about the decision later in 2017, CEO Hirai said, “It was a difficult decision to stop the project in 2006, but we continued development in AI and robotics. . . . I asked our engineers a year and a half ago to develop Aibo because I strongly believe robots capable of building loving relationships with people help realise Sony’s mission (to inspire).”[[47]](#endnote-47)

The result was an “ivory-white, puppy-sized, 30-centimetre plastic-covered hound with flapping black ears and a wagging tail.” It was “billed as a pet that behaves like a real dog, except it uses AI, not canine instinct, to learn and interact with its owner and surroundings.”[[48]](#endnote-48) The rebooted and upgraded Aibo was equipped with sensors, cameras, microphones, and Internet connectivity. It also possessed advanced AI backed by cloud computing, so as to develop the dog’s personality.[[49]](#endnote-49)

The rebooted Aibo, meant to be launched initially only in the Japanese market, was priced at ¥198,000. Further, Aibo’s AI was powered by a subscription-based cloud service. To connect to this cloud service, owners would need to spend an additional ¥2,980 ($26) per month (or approximately $790 if paid in full for three years) on a basic three-year subscription plan. Pet owners could also use a companion application (app) to access the aibo store where they could buy additional tricks and add-on hardware accessories such as a toy bone that was priced at approximately $26.[[50]](#endnote-50)

Aibo’s Competitors

Aibo’s competitors included Toyota’s Kirobo Mini and SoftBank Robotics’s Pepper. Kirobo Mini was a robot that, according to its makers, had “emotional value” as well as economic value since it was priced much lower than the Aibo at £300 (about $400). Kirobo Mini was only 10 centimetres tall, doll-like, and had the intelligence of a five-year-old. It was equipped with a camera, microphone, and Bluetooth, and could connect to a smartphone, which needed to be installed with a special software application. Further, Kirobo Mini turned its head toward a voice, although its voice recognition was not perfect.

Japanese corporation SoftBank Robotics had developed Pepper, an expressive humanoid robot designed to identify and react to human emotions. Equipped with a camera and sensors, Pepper, which was four feet (122 centimetres) tall and weighed 62 pounds (28 kilograms), cost ¥198,000 (about $1,600). Pepper could react to human emotions by offering comfort or laughing if it was told a joke, and had the ability to learn.[[51]](#endnote-51)

**SONY’S CORPORATE STRATEGY**

A corporate strategy[[52]](#endnote-52) of diversification involved four concepts: portfolio management, restructuring, transferring skills, and sharing activities. Portfolio management involved diversification through acquisition. The company would acquire sound and attractive companies, and retain competent managers of the acquired units. Restructuring involved actively reorganizing business units, thereby leaving the parent company a stronger, transformed company. A corporate strategy of diversification also aimed at exploiting the interrelationships between businesses by transferring skills or sharing activities. The company could thus transfer skills or expertise among similar value chains. The ability to share activities meant that two business units within a company could share the same sales force or logistics networks.[[53]](#endnote-53)

Sony’s corporate strategy, since 1999, had comprised structural reforms, including withdrawing from certain businesses, consolidating operating bases, and reducing the workforce. These reforms had produced some benefits, but were inadequate to cope with the pace of change in Sony’s operating environment, which was characterized by rapid technological progress and industrial realignment.[[54]](#endnote-54) In October 2003, Sony, under the leadership of Nobuyuki Idei, adopted a second phase of structural reforms, focused primarily on the electronics business. The restructuring plan, called “Transformation 60” (TR60), was scheduled for completion in 2006, Sony’s 60th anniversary. TR60 was meant to be a set of reforms aimed at “clarifying the operational structure and concentrating resources and technology for growth” on the one hand, and “fundamentally reforming the operational profit structure” on the other. Thus, Sony sought to converge its electronics, entertainment, and financial businesses as part of this restructuring exercise and to centralize the management resources within the Sony group. It also sought to reduce its consolidated fixed costs (from fiscal year [FY] 2002) by approximately ¥330 billion by the end of FY2006, as well as its production material and other variable costs, and thereby increase the operating profit margin by 4 per cent. Further, Sony planned to reduce its 154,500 regular employees (excluding the finance sector) by about 20,000 over 2003–2006, cutting 7,000 employees in Japan alone.[[55]](#endnote-55) However, the restructuring was unsuccessful. In 2004, driven by an increase in the electronics segment’s restructuring charges, a decrease in sales and increase in research and development (R&D) costs in the game segment, and the absence of profits in the pictures segment, Sony’s operating income decreased 46.7 per cent compared with FY2003.[[56]](#endnote-56) Sony’s revenues also dropped in FY2005 (see Exhibit 1).

In June 2005, Sony appointed Stringer as the new chairman and CEO of Sony. Led by Stringer and Ryoji Chubachi, president and CEO of the electronics business, the new management concluded, based on an extensive market review with key stakeholders, that while Sony maintained a strong and diversified corporate portfolio, it suffered from “certain market-based and self-imposed structural challenges” that affected its ability to compete effectively. Such challenges revolved around “eliminating Sony’s ‘silo’ organizational structure; strategically focusing its overly broad range of product offerings that dilute internal resources; enhancing limited product interoperability; strengthening software and service development; and divesting non-strategic assets that divert management’s focus.”[[57]](#endnote-57) The company drew out a revitalization plan that aimed to strengthen Sony’s competitiveness in three core sectors—electronics, game, and entertainment—through a balanced mix of restructuring and growth initiatives combined with a new organizational structure.[[58]](#endnote-58)

To combat the layers and cumbersome decision-making structure within Sony and eliminate business silos, Stringer created a new, more streamlined centralized electronics business group. Further, he sought to implement restructuring initiatives that would provide a path toward profitability. These initiatives included cost reductions worth ¥200 billion by 2008 through a shutdown or consolidation of 11 of the 65 manufacturing sites, a 20 per cent reduction in product model count, and a reduction in head count of 10,000 persons. Additionally, such restructuring included realizing ¥120 billion in proceeds from sales of non-strategic assets, such as real estate and minority equity stakes. He also sought to strengthen Sony’s electronics business to establish market-leading positions in segments such as television, digital imaging, video recorders, and portable audio, while at the same time strengthening the semiconductor and key component businesses. The revitalization plan also included broad-based growth initiatives in electronics, game, entertainment, and other segments.[[59]](#endnote-59)

However, Sony continued to struggle, posting record losses as its key consumer electronics sector declined (see Exhibit 2). In April 2012, Stringer stepped down and was succeeded by Hirai, an executive from the company’s video game division. Under the leadership of Hirai, Sony announced “One Sony,” which was “an integrated new management approach designed to accelerate decision making across the entire Sony group.”[[60]](#endnote-60) In 2012, Hirai announced a five-pronged strategy to transform the company, with a focus on restructuring. The strategy involved:

* Strengthening core areas within the electronics business, namely digital imaging, game, and mobile, so that these three areas would generate 70 per cent of the sales and 85 per cent of the operating income of the entire electronics business by March 31, 2015.
* Turning around the television business through reductions in both fixed and operating costs, reducing the model count by 40 per cent in FY2012 compared with FY2011, and bolstering the competitiveness of its product lineup.
* Expanding its business in emerging markets from 40 per cent in FY2009 to 60 per cent in FY2014.
* Creating new businesses and accelerating innovation, especially in the medical business—Sony planned to enter the medical equipment business and the medical diagnostics business.
* Realigning the business portfolio and optimizing resources, with key decisions, including the sale of the chemical products-related business and the sale of assets such as the U.S. headquarters in New York City for more than $1 billion.[[61]](#endnote-61)

As part of the restructuring, Sony sold its PC business and at the same time separated its businesses into distinct subsidiaries, starting with the television business in July 2014, which began to operate as Sony Visual Products Inc. In 2015, the video and sound business was split out and began to operate as Sony Video & Sound Products Inc., while in 2016 the semiconductors business was split out and began to operate as Sony Semiconductor Solutions Corporation. In April 2017, the imaging products and solution business was split out and began operating as Sony Imaging Products & Solutions Inc., thereby completing the sequential separation of Sony’s business units into distinct subsidiaries.[[62]](#endnote-62)

In FY2015/16, Sony moved away from restructuring toward “profit generation and investment for growth” with the objective of transforming Sony into a highly profitable enterprise. As part of its mid-range plan, it also established financial targets for the consolidated Sony group of 10 per cent or more return on equity[[63]](#endnote-63) and ¥500 billion or more operating income in the fiscal year ending March 31, 2018. Sony’s key strategies for business operations involved “business management that emphasized profitability, without necessarily pursuing volume; business management that granted each business unit greater autonomy and mandated a focus on shareholder value; and clearly defined positioning of each business within a broader business portfolio perspective.”[[64]](#endnote-64) Further, Sony classified each of its businesses as a “growth driver,” “stable profit generator,” or “area focusing on volatility management” based on its specific characteristics and the competitive landscape, and in terms of its position within Sony’s overall business portfolio. Sony assigned a target return on invested capital to each of its business, which itself was linked to the return on equity target for the Sony group as a whole, and was managed with a clear emphasis on profitability.[[65]](#endnote-65)

However, the revitalization of the electronics business through a strategy emphasizing differentiation and not volume was only the first step in generating sustained higher profits and transforming Sony into a high-profit organization. To achieve the financial targets for FY2017/18 and to generate sustainably high profits in FY2018/19 and beyond, Sony would need to also focus on the profits and profitability of the other segments (see Exhibit 3). It now sought AI as a future pillar of growth. However, the AI business, as any new business unit, would need to pass three tests for diversification (see Exhibit 4). At the same time, the success of a diversification strategy would typically involve going beyond financial analysis by answering six questions to help managers identify the inherent strategic risks and opportunities (see Exhibit 5).[[66]](#endnote-66)

**AI**

AI was “the simulation of human intelligence processes—including learning, reasoning, and self-correction by machines, especially computer systems.” Particular applications of AI included expert systems, speech recognition, and machine vision.[[67]](#endnote-67) A survey across 112 countries and 21 industries in 2017 pointed to AI being seen as a means of revolutionizing business.[[68]](#endnote-68) Industries whose product offerings and processes were likely to be heavily impacted by AI in the next five years included the technology, media, and communications industry; consumer and financial services; professional services; health care; energy; and the public sector. Within these industries, customer-facing activities such as marketing automation, support, and service, as well as information technology and supply chain management were likely to be most impacted by AI in the next five years. Companies, then, had several reasons to adopt AI, ranging from acquiring a competitive advantage to their being able to enter into new businesses (see Exhibit 6). However, despite the overwhelming positive response regarding the need to adopt AI, only 23 per cent of the respondents surveyed had incorporated AI into processes and product or service offerings; 54 per cent had no adoption plans in progress.[[69]](#endnote-69)

Organizations could be divided into four clusters based on their adoption of AI. Pioneers were organizations “on the leading edge of incorporating AI into both their organization’s offerings and internal processes.” Investigators were organizations that understood AI, but were not deploying it beyond the pilot stage. Pioneers and investigators were finding entirely new ways of using AI to create new sources of business value. Experimenters were organizations adopting or piloting AI without a deep understanding of it, while passives were organizations with little knowledge and no adoption of AI. Of the organizations interviewed across these four clusters, 61 per cent believed that developing an AI strategy was urgent, yet only 50 per cent had such an AI strategy in place.[[70]](#endnote-70)

Leaders in using AI had identified business cases for AI, while the laggards had no such business cases; leaders also had senior management on board and involved with AI strategy-related decisions. However, the hurdles in adopting AI even for such leaders lay in a lack of understanding data, data collection, and preparation, and in a lack of internal skills to train AI algorithms with appropriate data. In addition to effective data mastery and technological challenges, adopting AI led to managerial challenges, which resembled the challenges of any technology-driven change and included “vision and leadership, openness and the ability to change, long-term thinking, close alignment between business and technology strategy, and effective collaboration.” The specific AI-related challenges included developing an intuitive understanding of AI among employees; organizing for AI, which required organizational flexibility and people from different disciplines working together; getting humans and machines to work together and work off each other’s strengths; and, finally, using AI to build sustainable competitive advantage in a changing environment led by AI.[[71]](#endnote-71)

However, as had been noted by analysts, “Just about any company today needs a plan with respect to AI. Most do not have one, and those that have been slower to move have some catching up to do. Those that continue to fall behind may find the playing field tilted ever more steeply against them.”[[72]](#endnote-72)

Sony and Artificial Intelligence

Sony’s foray into R&D in AI began with the Aibo in 1999, which featured AI technologies such as face recognition and speech recognition. Sony then incorporated these technologies into its other products and services, such as digital cameras and personalized TV program recommendation services. Simultaneously, Sony established the Sony Intelligence Dynamics Laboratory in 2004 to study the autonomous development of intelligence, called Intelligence Dynamics.[[73]](#endnote-73) The corporate R&D group formed in 2006 took up the task of studying AI technologies, including deep learning and reinforcement learning.[[74]](#endnote-74) The innovative products and services created by the R&D division included Augmented Reality Experience (SmartAR), activity recognition, and facial recognition login capabilities that were used, respectively, in the “AR Effect” app from Xperia, Xperia’s Lifelog app, and by PS4. In February 2016, Sony Mobile Communications AB incorporated AI into its Xperia Agent, which “responded to users’ voices and provided useful information, communication assistance with voice and gestures, and home appliance controls.” Additionally, in March 2016, Sony’s Future Lab Program unveiled Project N, “a neckband-style wearable device that provide[d] a totally hands-free interactive interface for accessing music and audio information, without the need for an earpiece,” which relied on advanced audio signal processing and robust speech recognition.[[75]](#endnote-75) Sony Computer Science Laboratories, Inc. was also engaged in a broad range of AI research, from basic theoretical studies to the application of AI.

With an intention of building up its AI business and turning it into its major revenue source, Sony had already invested an undisclosed sum in a California-based start-up, Cogitai, Inc., in 2016. Cogitai, Inc., a one-year-old firm, was focused on technology that allowed machines to learn continually and autonomously from interaction in the real world.[[76]](#endnote-76) As stated by Sony, “the two companies planned to collaborate towards the development of novel AI technologies using deep reinforcement learning with prediction technology that could be used as the basis for the next generation of AI applications and products.”[[77]](#endnote-77) However, in AI, Sony would have to play catch up with major technology companies such as Facebook, Apple Inc., and Alphabet Inc.’s Google.[[78]](#endnote-78)

Hirai recalled Sony’s mission: “To be a company that provides customers with *kando*,” which meant to move people emotionally, and to inspire and fulfill their curiosity. Sony’s vision, he recalled, was to use its passion for technology, content, and services to deliver kando—in ways that only Sony could. He believed that Sony, to achieve its mission, should create new customer value at the “last one inch,” i.e., the very closest point of contact with its customers, through R&D that was based on innovation and the challenge detailed in the company’s founding prospectus.[[79]](#endnote-79) As Hirai had stated in Sony’s corporate strategy meeting held in June 2016,

Even as the requirements of hardware change over time, its importance as the first and last customer touchpoint is something that doesn’t change, and I believe this is somewhere that Sony can demonstrate its uniqueness and find new sources of growth. Our strength at Sony lies in our ability to develop products that exist at the closest point of contact with customers and resonate with them at an emotional level, and to place those products in the hands of customers around the world.[[80]](#endnote-80)

Sony’s Aibo would be a product that would combine Sony’s strength areas, such as video and audio technologies, sensors, and mechatronics, with AI, robotics, communications, and other elements. It would thus offer a new proposal to customers at the “last one inch” within the confines of their homes, thereby making homes a more enjoyable space. The robot, which would be capable of forming an emotional bond with customers, would help Sony to deliver emotionally compelling experiences, and to regain its technological competitiveness through AI. The foray into AI was intended to chase new growth through innovation.[[81]](#endnote-81) But the company had not yet firmed its revenue streams from its traditional business lines. How should one interpret Sony’s decision to diversify into AI? Was moving into AI an intelligent decision?

EXHIBIT 1: SONY SALES AND OPERATING REVENUES, 2003–2017

|  |  |  |
| --- | --- | --- |
| **Year** | **Sony Revenues**  **(in 100 billion yen)** | **Sony Revenues**  **(in billion US$)** |
| 2003 | 74.73 | 62.28 |
| 2004 | 74.96 | 72.01 |
| 2005 | 71.59 | 66.91 |
| 2006 | 74.75 | 63.89 |
| 2007 | 82.96 | 70.30 |
| 2008 | 88.71 | 79.75 |
| 2009 | 77.30 | 69.49 |
| 2010 | 72.14 | 64.85 |
| 2011 | 71.81 | 64.56 |
| 2012 | 64.93 | 58.37 |
| 2013 | 67.96 | 61.10 |
| 2014 | 77.67 | 69.83 |
| 2015 | 82.16 | 73.86 |
| 2016 | 81.06 | 72.87 |
| 2017 | 76.03 | 68.35 |

Note: ¥ = JPY = Japanese yen; ¥1 = US$0.008978 on March 31, 2017.

Source: Created by the author based on Sony annual reports; “Sony’s Total Revenues from 2008 to 2017,” Statista, accessed November 30, 2017, <https://www.statista.com/statistics/279269/total-revenue-of-sony-since-2008/>.

EXHIBIT 2: SONY OPERATING INCOME AND NET INCOME, 2003–2017

|  |  |  |
| --- | --- | --- |
| **Year** | **Operating Income**  **(in billion yen)** | **Net Income**  **(in billion yen)** |
| 2003 | 185.44 | 115.51 |
| 2004 | 98.90 | 88.51 |
| 2005 | 113.92 | 163.83 |
| 2006 | 191.25 | 123.61 |
| 2007 | 71.75 | 126.32 |
| 2008 | 374.48 | 369.43 |
| 2009 | −227.80 | −98.90 |
| 2010 | 31.80 | −40.80 |
| 2011 | 199.80 | −259.60 |
| 2012 | −67.27 | −456.66 |
| 2013 | 230.10 | 43.03 |
| 2014 | 26.49 | −128.37 |
| 2015 | 68.54 | −125.98 |
| 2016 | 294.19 | 147.79 |
| 2017 | 288.70 | 73.28 |

Note: ¥ = JPY = Japanese yen; ¥1 = US$0.008978 on March 31, 2017

Source: Created by the author based on Sony annual reports; “Sony’s Net Income from 2008−2017,” Statista, accessed November 30, 2017, <https://www.statista.com/statistics/279271/net-income-of-sony-since-2008/>; “Net Sales and Operating Income of Sony's Game and Network Services (G&NS) in the Fiscal Years 2012 to 2017 (in Billion Yen),” Statista, accessed November 30, 2017, https://www.statista.com/statistics/323452/sony-net-sales-and-operating-income-game-network-services/.

**EXHIBIT 3: SONY CORPORATION FINANCIAL RESULTS—BUSINESS SEGMENTS, 2015–2017**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Business Segment Information | **Fiscal Year ended March 31** | | | **Fiscal Year ended March 31** | | |
| 2015 | 2016 | 2017 | 2015 | 2016 | 2017 |
| **Sales and Operating Revenue**  **(in billion yen)** | | | **Operating Income Loss**  **(in billion yen)** | | |
| Mobile Communications | 1,410.2 | 1,127.5 | 759.1 | −217.6 | −61.4 | 10.2 |
| Game & Network Services | 1,388 | 1,551.9 | 1,649.8 | 48.1 | 88.7 | 135.6 |
| Imaging Products & Solutions | 700.6 | 684 | 579.6 | 38.7 | 69.3 | 47.3 |
| Home Entertainment & Sound | 1,238.1 | 1,159 | 1,039 | 24.1 | 50.6 | 58.5 |
| Semiconductors | 700.1 | 739.1 | 773.1 | 96.2 | 14.5 | −7.8 |
| Components | 250.7 | 224.6 | 195.4 | −7.5 | −42.9 | −60.4 |
| Pictures | 878.7 | 938.1 | 903.1 | 58.5 | 38.5 | −80.5 |
| Music | 560.4 | 619.2 | 647.7 | 58.2 | 86.5 | 75.8 |
| Financial Services | 1,083.6 | 1,073.1 | 1,087.5 | 193.3 | 156.5 | 166.4 |
| All others | 385.6 | 332.2 | 267 | −94.2 | 1.7 | 30.9 |
| Corporate and Elimination\* | −380.1 | −343 | −298.1 | −129.4 | −107.7 | −87.1 |
| Consolidated | 8,215.9 | 8,105.7 | 7,603.3 | 68.5 | 294.2 | 288.7 |

Note: ¥ = JPY = Japanese yen; ¥1 = US$0.008978 on March 31, 2017; \*Corporate and Elimination includes headquarters restructuring costs and certain other corporate expenses, including the amortization of certain intellectual property assets such as the cross-licensing of intangible assets acquired from Ericsson at the time of the Sony Mobile Communications acquisition, which are not allocated to segments. The term “Electronics” refers to the sum of the Mobile Communiations, Game & Network Services, Imaging Products & Solutions, Home Entertainment & Sound, Semiconductors, and Components segments.

Source: Created by the author based on *Sony Investor Relations*, United States Securities and Exchange Commission, Form 20-F FY2016, 41, accessed November 12, 2017, https://www.sony.net/SonyInfo/IR/library/FY2016\_20F\_PDF.pdf.

EXHIBIT 4: THREE ESSENTIAL TESTS FOR DIVERSIFICATION

Source: Created by author based on Michael E. Porter, “From Competitive Advantage to Corporate Strategy,” *Harvard Business Review* 65, no. 3 (May–June 1987): 3, 6. Available from Ivey Publishing, product no. 87307.

EXHIBIT 5: SIX QUESTIONS TO ASSESS DIVERSIFICATION SUCCESS

1. What can our company do better than its competitors in the current market?
2. What strategic assets do we need to succeed in the new market?
3. Can we catch up to or leapfrog competitors at their own game?
4. Will diversification break up strategic assets needed to be kept

together?

1. Will we be simply a player in the new market or will we emerge a winner?
2. What can our company learn by diversifying, and are we sufficiently organized to learn it?

Source: Created by the author based on Constantinos C. Markides, “To Diversify or Not to Diversify,” *Harvard Business Review* 75, no. 6 (1997): 93–99. Available from Ivey Publishing, product no. 97608.

EXHIBIT 6: REASONS FOR ADOPTING Artifical Intelligence (AI)

1. AI will allow us to obtain or sustain competitive advantage (84%)
2. AI will allow us to move into new businesses (75%)
3. New organizations using AI will enter our market (75%)
4. Incumbent competitors will use AI (69%)
5. Pressure to reduce costs will require us to use AI (63%)
6. Suppliers will offer AI-driven products & services (61%)
7. Customers will demand AI-driven offerings (59%)

Source: Created by the author based on Louis Columbus, “How Artificial Intelligence Is Revolutionizing Business in 2017,” *Forbes*, September 10, 2017, accessed December 7, 2017, <https://www.forbes.com/sites/louiscolumbus/2017/09/10/how-artificial-intelligence-is-revolutionizing-business-in-2017/#1a43aa525463>.

ENDNOTES

1. This case has been written on the basis of published sources only. Consequently, the interpretation and perspectives presented in this case are not necessarily those of Sony Corporation or any of its employees. [↑](#endnote-ref-1)
2. AFP and Reuters and Harry Petit, “Sony Revives Aibo, Its £1,300 Robot Dog That ‘Builds a Loving Relationship’ with Its Owner,” *Mail Online*, November 1, 2017, accessed November 24, 2017, www.dailymail.co.uk/sciencetech/article-5037783/Sony-revives-robot-pet-dog.html. [↑](#endnote-ref-2)
3. All currency amounts are in U.S. dollars unless otherwise specified. [↑](#endnote-ref-3)
4. Reuters, “Sony Is Bringing Back Its Pet AI Project—A Robotic Dog,” CNBC, November 1, 2017, accessed November 7, 2017, https://www.cnbc.com/2017/11/01/sony-revives-pet-ai-project-with-updated-aibo-robot-dog.html. [↑](#endnote-ref-4)
5. This section is largely drawn from “History,” Sony, accessed November 7, 2017, https://www.sony.net/SonyInfo/CorporateInfo/History/SonyHistory/1-02.html. [↑](#endnote-ref-5)
6. In Japan, Masura Ibuka was considered as the true founder of Sony. He was the engineering genius behind many of its products and the one who inspired the research teams, while Morita was regarded as the marketing genius and internationalist that made Sony into what it was; “Sony: Its History and Success, Akio Morita, Transistor Radios, The Walkman and Changes at Sony,” Facts and Details, accessed February 6, 2018, http://factsanddetails.com/japan/cat24/sub157/item918.html. [↑](#endnote-ref-6)
7. ¥ = JPY = Japanese yen; ¥1 = US$0.008978 on March 31, 2017. [↑](#endnote-ref-7)
8. “Corporate History,” Sony, accessed November 22, 2017, https://www.sony.net/SonyInfo/CorporateInfo/History/history.html. [↑](#endnote-ref-8)
9. “Chapter 5: Rest Assured We Can Make It,” Sony, accessed November 7, 2017, https://www.sony.net/SonyInfo/CorporateInfo/History/SonyHistory/1-05.html. [↑](#endnote-ref-9)
10. Mark Hall, “Sony,” Encyclopedia Britannica, accessed November 5, 2017, https://www.britannica.com/topic/Sony; it was difficult to pronounce Tokyo Tsushin Kogyo or even Totsuko. After mulling over various names, the name decided upon was “Sony.” Sony was derived from the Latin *sonus*, meaning “sound,” and was a combination of sonus and “sunny boy,” the English slang for a young innovative man. It was conceived to be an international term, rather than a Japanese term. [↑](#endnote-ref-10)
11. In 1988, the joint venture became a wholly owned subsidiary of Sony Corporation, and in 1991 changed its name to Sony Music Entertainment (Japan) Inc.; Sony Investor Relations, United States Security Exchange Filings, Form 20-F FY2016, 64–65, June 15, 2017, accessed November 12, 2017 , https://www.sony.net/SonyInfo/IR/library/FY2016\_20F\_PDF.pdf. [↑](#endnote-ref-11)
12. Gadget Guru, “Akio Morita,” *Entrepreneur*, October 10, 2008, accessed November 12, 2017, https://www.entrepreneur.com/article/197676. [↑](#endnote-ref-12)
13. “Corporate History,” Sony, accessed November 25, 2017, https://www.sony.net/SonyInfo/CorporateInfo/History/history.html#list2. [↑](#endnote-ref-13)
14. Thus, Sony’s first transistor radio, at $29.98, was priced at almost the same value as televisions sold at the time. [↑](#endnote-ref-14)
15. To pursue this goal, Sony employed 1,000 engineers in its research laboratories. [↑](#endnote-ref-15)
16. Gadget Guru, op. cit. [↑](#endnote-ref-16)
17. Ibid. [↑](#endnote-ref-17)
18. Hall, op. cit. [↑](#endnote-ref-18)
19. Ibid. [↑](#endnote-ref-19)
20. £ = GBP = British pound sterling; £1 = US$1.30 on March 31, 2017; James Rivington, “Sony PlayStation: The First 20 Years,” Tech Radar, Febrary 25, 2008, accessed November 13, 2017, www.techradar.com/news/gaming/consoles/sony-playstation-the-first-20-years-249792. [↑](#endnote-ref-20)
21. Hall, op. cit. [↑](#endnote-ref-21)
22. D.S. Cohen, “The History of the Sony PlayStation,” Lifewire, October 17, 2016, accessed November 13, 2017, https://www.lifewire.com/history-of-sony-playstation-729672. [↑](#endnote-ref-22)
23. Cal Jeffrey, “PlayStation 3 Officially Slips into Its Twilight Years as Sony Japan Ships Last PS3 Console,” Techspot, May 30, 2017, accessed November 11, 2017, https://www.techspot.com/news/69508-playstation-3-officially-slips-twilight-years-sony-japan.html. [↑](#endnote-ref-23)
24. VAIO variously stood for Video Audio Integrated Operation and Visual Audio Intelligent Organizer. [↑](#endnote-ref-24)
25. Tom Waren, “A Look Back at Sony’s Iconic VAIO Computers,” The Verge, February 8, 2014, accessed November 13, 2017, https://www.theverge.com/2014/2/6/5385716/sony-vaio-iconic-pcs-photo-essay. [↑](#endnote-ref-25)
26. Catherine Shu, “Sony to Exit PC Business by Selling VAIO,” TechCrunch, February 6, 2014, accessed November 29, 2017, https://techcrunch.com/2014/02/06/sony-vaio-sale/. [↑](#endnote-ref-26)
27. Sam Byford, “Sony Quits the PC Business to Focus on Mobile,” The Verge, February 6, 2014, accessed November 30, 2017, https://www.theverge.com/2014/2/6/5385212/sony-sells-off-vaio-pc-division; Sony intended to “cease planning, design and development of PC products,” since—for a variety of reasons “including the drastic changes in the global PC industry”—the optimal solution was to “concentrate its mobile product lineup on smartphones and tablets and to transfer its PC business to a new company.” [↑](#endnote-ref-27)
28. Sony Investor Relations, op. cit. [↑](#endnote-ref-28)
29. Sony, “Sony Announces Plans to Address Reform of PC and TV Businesses,” press release, February 6, 2014, accessed November 22, 2017, https://www.sony.net/SonyInfo/News/Press/201402/14-019E/. [↑](#endnote-ref-29)
30. Hall, op. cit. [↑](#endnote-ref-30)
31. Bruce Woodcock, “MMOG Active Subscriptions 21.0,” mmogchart.com, accessed November 24, 2017, https://web.archive.org/web/20061103162327/http://mmogchart.com/Chart2.html. [↑](#endnote-ref-31)
32. Mike Freeman, “What’s Next for EverQuest and Former Sony Gaming Unit,” *San Diego Union-Tribune*, May 8, 2015, accessed November 21, 2017, www.sandiegouniontribune.com/business/technology/sdut-Sony-Daybreak-video-game-PlanetSide-EverQuest-2015may08-htmlstory.html. [↑](#endnote-ref-32)
33. Aaron Souppouris, “Sony Has Sold the MMO Division Responsible for ‘EverQuest’ and ‘Planetside 2,’”Engadget, February 2, 2015, accessed November 13, 2017, https://www.engadget.com/2015/02/02/sony-online-entertainment-sale-daybreak-game-company/. [↑](#endnote-ref-33)
34. Freeman, op. cit. [↑](#endnote-ref-34)
35. Sony Investor Relations, op. cit. [↑](#endnote-ref-35)
36. “Aibos History,” Sony Aibo, accessed December 2, 2017, www.sony-aibo.com/aibos-history/. [↑](#endnote-ref-36)
37. Sony, “Sony Launches Four-Legged Entertainment Robot,” press release, May 11,1999, accessed December 2, 2017, https://www.sony.net/SonyInfo/News/Press\_Archive/199905/99-046/. [↑](#endnote-ref-37)
38. Ibid. [↑](#endnote-ref-38)
39. “Aibos History,” op. cit. [↑](#endnote-ref-39)
40. John Borland, “Sony Puts Aibo to Sleep,” CNet*,* January 27, 2006, accessed November 30, 2017, https://www.cnet.com/news/sony-puts-aibo-to-sleep/; Samuel Gibbs, “Sony Brings Its AI-infused Robotic Dog Aibo Back from the Dead,” *Guardian*, November 1, 2017, accessed November 30, 2017, https://www.theguardian.com/technology/2017/nov/01/sony-aibo-ai-robotic-dog-back-from-dead. [↑](#endnote-ref-40)
41. “Aibos History,” op. cit. [↑](#endnote-ref-41)
42. Ibid; Charles Arthur, “Why Did Sony Kill off Its Robot Aibo Dog?,” *Guardian*, February 2, 2006, accessed November 30, 2017, https://www.theguardian.com/technology/2006/feb/02/sony.gadgets. [↑](#endnote-ref-42)
43. Borland, op. cit. [↑](#endnote-ref-43)
44. “Sony Unsure Electronics Profitable in 2004-05,” Business Recorder, January 29, 2005, accessed November 5, 2017, http://fp.brecorder.com/2005/01/20050129161032/. [↑](#endnote-ref-44)
45. Arthur, op. cit. [↑](#endnote-ref-45)
46. Ibid. [↑](#endnote-ref-46)
47. Gibbs, op. cit. [↑](#endnote-ref-47)
48. Ibid. [↑](#endnote-ref-48)
49. Ibid. [↑](#endnote-ref-49)
50. Natasha Lomas, “Sony Reboots Aibo with AI and Extra Kawaii,”TechCrunch, November 1, 2017, accessed December 2, 2017, https://techcrunch.com/2017/11/01/sony-reboots-aibo-with-ai-and-extra-kawaii/. [↑](#endnote-ref-50)
51. AFP and Reuters and Harry Petit, op. cit. [↑](#endnote-ref-51)
52. A diversified company pursued strategy at two levels: at the business unit level and at the corporate or company-wide level. The former was concerned with creating competitive advantage in each of the businesses in which the company operated, and was called competitive strategy. The latter, strategy at the corporate or company-wide level, was called corporate strategy, and was concerned with two different questions: what businesses should the company be in, and how the company should manage the array of business units. Competition, in the case of a diversified company, occurred not at the corporate, but at the business unit level. Successful corporate strategies were those that “grow out of and reinforce competitive strategies;” Michael E. Porter, “From Competitive Advantage to Corporate Strategy*,” Harvard Business Review* 65, no. 3 (May-June 1987). Available from Ivey Publishing, product no. 87307. [↑](#endnote-ref-52)
53. Porter, op. cit., 10–14. [↑](#endnote-ref-53)
54. Sony Corporation, *Annual Report 2004*, accessed December 3, 2017, https://www.sony.net/SonyInfo/IR/library/ar/2004/qfhh7c000000g7xm-att/SonyAR04-E.pdf. [↑](#endnote-ref-54)
55. Sony, “Transformation 60—Confirming Sony’s Position as a Leading Consumer Brand in the 21st Century,” press release, October 28, 2003, accessed December 3, 2017, https://www.sony.net/SonyInfo/News/Press\_Archive/200310/03-047E/; Sony Corporation, *Annual Report 2004*, op. cit. [↑](#endnote-ref-55)
56. Sony Corporation, *Annual Report 2004*, op. cit. [↑](#endnote-ref-56)
57. Sony Corporation, *Annual Report 2006*, 5, accessed December 4, 2017,

    https://www.sony-latin.com/corporate/SOLA/acerca/infocorporativa/pdf/info\_financiera/SonyAR06-E.pdf. [↑](#endnote-ref-57)
58. Ibid., 3–7. [↑](#endnote-ref-58)
59. Ibid., 5–7. [↑](#endnote-ref-59)
60. Sony Corporation, “Corporate Strategy,” *Annual Report 2012*, accessed December 12, 2017, https://www.sony.net/SonyInfo/IR/library/ar/2012/policy/. [↑](#endnote-ref-60)
61. Ibid.; Sony Corporation, *Annual Report 2013*, accessed December 12, 2017, https://www.sony.net/SonyInfo/IR/library/ar/2013/shr/pdf/AnnualReport\_E.pdf. [↑](#endnote-ref-61)
62. Sony Investor Relations, op. cit. [↑](#endnote-ref-62)
63. Return on equity was defined as the net income attributable to Sony Corporation’s stockholders divided by stockholders’ equity; Sony Investor Relations, op. cit. [↑](#endnote-ref-63)
64. “Corporate Strategy: Corporate Strategy Meeting—June 29, 2016,” Sony, accessed December 12, 2017, https://www.sony.net/SonyInfo/IR/strategy/. [↑](#endnote-ref-64)
65. Sony Investor Relations, op. cit. [↑](#endnote-ref-65)
66. Constantinos C. Markides, “To Diversify or Not to Diversify,” *Harvard Business Review* 75, no. 6 (1997): 93–99. Available from Ivey Publishing, product no. 97608. [↑](#endnote-ref-66)
67. Margaret Rouse, “AI (Artificial Intelligence),” TechTarget, accessed November 30, 2017, http://searchcio.techtarget.com/definition/AI. [↑](#endnote-ref-67)
68. Louis Columbus, “How Artificial Intelligence Is Revolutionizing Business in 2017,” *Forbes*, September 10, 2017, accessed December 7, 2017, https://www.forbes.com/sites/louiscolumbus/2017/09/10/how-artificial-intelligence-is-revolutionizing-business-in-2017/#1a43aa525463; Sam Ransbotham, David Kiron, Philipp Gerbert, and Martin Reeves, “Reshaping Business with Artificial Intelligence: Closing the Gap between Ambition and Action,” *MIT Sloan Management Review*, September 6, 2017, accessed December 12, 2017, https://sloanreview.mit.edu/projects/reshaping-business-with-artificial-intelligence/ (This survey was conducted by *MIT Sloan Management Review* with the Boston Consulting Group). [↑](#endnote-ref-68)
69. Columbus, op. cit. [↑](#endnote-ref-69)
70. Ibid. [↑](#endnote-ref-70)
71. Philipp Gerbert, Martin Reeves, Sebastian Steinhäuser, and Patrick Ruwolt, “Is Your Business Ready for Artificial Intelligence?,” BCG Henderson Institute, September 6, 2017, accessed December 13, 2017, https://www.bcg.com/publications/2017/strategy-technology-digital-is-your-business-ready-artificial-intelligence.aspx. [↑](#endnote-ref-71)
72. Ransbotham, Kiron, Gerbert, and Reeves,” op. cit. [↑](#endnote-ref-72)
73. The technical features of Intelligence Dynamics were learning by prediction, and self-development by intrinsic motivation—the capability of machines to develop skills autonomously as open-ended systems. [↑](#endnote-ref-73)
74. Sony, “Sony Joins Forces with Cogitai to Conduct Research and Development for the Next Wave of Artificial Intelligence,” press release, May 18, 2016, accessed December 15, 2017, https://www.sony.net/SonyInfo/News/Press/201605/16-052E/index.html. [↑](#endnote-ref-74)
75. Ibid. [↑](#endnote-ref-75)
76. Reuters, “Sony Invests in Artificial Intelligence Startup Cogitai,” VentureBeat, May 17, 2016, accessed December 10, 2017, https://venturebeat.com/2016/05/17/sony-invests-in-artificial-intelligence-startup-cogitai/. [↑](#endnote-ref-76)
77. Sony, “Sony Joins Forces with Cogitai to Conduct Research and Development for the Next Wave of Artificial Intelligence,” op. cit. [↑](#endnote-ref-77)
78. Reuters, “Sony Is Bringing Back Its Pet AI Project—A Robotic Dog,” op. cit. [↑](#endnote-ref-78)
79. The founding prospectus, drawn up by Ibuka in 1946, sought, among other goals, to “establish an ideal factory that stress[ed] a spirit of freedom and open-mindedness, and where engineers with sincere motivation [could] exercise their technological skills to the highest level; reconstruct Japan and to elevate the nation’s culture through dynamic technological and manufacturing activities; and to . . . apply highly advanced technologies which were developed in various sectors . . . to common households;” Tokyo Telecommunications Engineering Corporation, “The Founding Prospectus,” Sony, 1946, accessed November 5, 2017, https://www.sony.net/SonyInfo/CorporateInfo/History/prospectus.html. [↑](#endnote-ref-79)
80. “Corporate Strategy: Corporate Strategy Meeting—June 29, 2016,” op. cit. [↑](#endnote-ref-80)
81. *Nikkei Asian Review*, “Sony Is Solidly in the Black after Years of Restructuring,” June 1, 2017, accessed November 7, 2017, https://asia.nikkei.com/magazine/20170601/Business/Sony-is-solidly-in-the-black-after-years-of-restructuring. [↑](#endnote-ref-81)