



# The Influence of Confirmation Bias and Survivorship Bias on Electronic Industry

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**Abstract.** This article explores the practical consequences judgmental biases have on organizations through the use of case study. Specifically, confirmation bias and survivorship bias will be discussed using organizations from the electronic industry. By studying the case of Nokia and Sony, this article aims to explain how the two judgmental biases influence the decision of the enterprises and their marketing pattern. This influence directly contributed to the failure of the smart-phone production of the two operations at different points in time. In terms of the existing biases, this article also offers practical suggestions to reduce harmful effects caused by the two judgmental biases. A knowledge management system is introduced as a theoretical solution for confirmation bias and survivorship bias in innovative enterprises.

**Keywords:** Confirmation bias · Survivorship bias · Nokia · Sony · KMS

## 1 Introduction

The electronic product industry has developed rapidly since the 1990s. The emergence of large-scale companies has also promoted the demand of product upgrading. Given the rapid innovation of the industry, developers are increasingly prone to be influenced by confirmation bias and survivorship bias when developing products. This paper will first use Nokia's example to illustrate the negative impact caused by confirmation bias to show how previous success may trample future success by creating confirmation bubbles. Sony's example will then be discussed to illustrate the impact caused by survivorship bias, showing that cross departmental success cannot necessarily be translated into the success of an entirely different product line. Because confirmation bias and survivorship bias have received considerable attention from practitioners and academia, it is worth investigating, this paper is going to combine the two bias and explain what effect they will make, and solutions for them in business operation. This paper contends that through intertwining the theory of a knowledge management system (KMS), this would effectively reduce the countering of judgmental bias from a business perspective, and thereby effectively reducing the consequences of confirmation and survivorship bias.

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## 2 Effect of Confirmation Bias and Survivorship Bias

Initially known as a common type of judgmental bias, confirmation bias can be understood as the tendency to process information by looking for, or interpreting, information that is consistent with one's existing beliefs (Casad, [1]). Wason (1960) is widely considered the first researcher to research on confirmation bias. He made an experiment which asked participants to guess at a rule about number triples. The experiment showed that the evidence found in the literature results in highly misleading impression. Fischhoff and Beyth-Marom ([2]: p.239–260) explained that “confirmation bias has proven to be a catch-all phrase incorporating biases in both information search and interpretation.” Confirmation bias may cause individuals to stop collecting information when the evidence collected so far confirms that people want true views or prejudices and may play a role in the emergence and/or other features (e.g., duration, frequency) of speculative bubbles and other important stylized facts in financial markets (Cafferata & Tramontana, [3]). Such natural tendencies in selective collection of information makes the collected information less open-minded and limited, it may greatly affect the market analysis, and becomes a serious problem to the business's operation.

Survivorship bias is another form of judgmental bias in selection of information. This is caused by focusing on people, things or data that successfully passed a selection process and overlooking those that did not, typically because of the lack of visibility to those analyzing the information (Shermer, [4]). Survivorship bias was first advanced by Abraham Wald, when he participated in a military investigation (Mangel, [5]). In this 30-year retrospective several technology and Internet companies emerged, but only few companies survived after iteration. (Gewirtz, [6]). Survivorship bias will directly affect the acquisition of information, because in this case, the failures will be ignored. This can lead to overconfidence. The surviving firms may spread “wrong information”, which refers to the previous successful experience, which is no longer applicable to this era with the development of the times. Besides, some enterprises will purposefully and actively spread these “wrong information” to benefit from it. This paper aims to link confirmation bias and survivorship bias to explain how Nokia's success in the 21st century led to overconfidence and wrong prediction to its upgrading products.

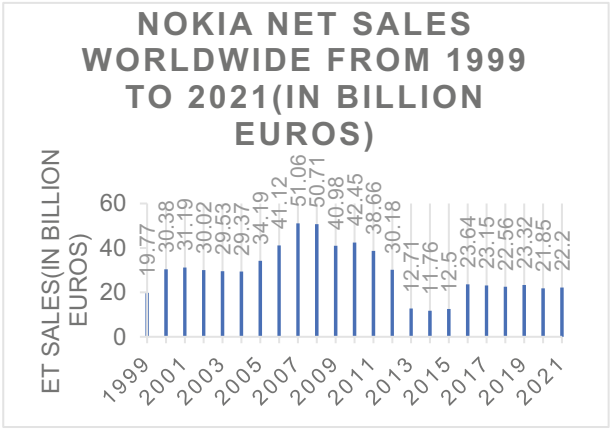
## 3 Demonstration of the Effects on BUSINESS'S Operation: Nokia

Nokia cooperation used to be the leading mobile phone maker at a global scale and dominate the world market. Nokia became the largest mobile phone manufacturer in the world in the late 1990s. As a pioneer in the smartphone industry, Nokia was the first business to introduce consumers to the smartphone, with its initial Symbian Series 60 devices in 2002. For the next five years, Symbian phones maintained a leadership position with literally no problem in the smartphone pack (Bhalodiya & Sagotia, [7]). The success of Nokia was based on its advanced enterprise culture. For Nokia, the satisfaction of consumers was the most important thing to consider. They understood that their key aim was to serve the consumer with high-quality products. One advantage of Nokia is the innovation through the value chain. Technological innovation is a top priority for Nokia, based on market segmentation, branding, and design (Steinbock, [8]).

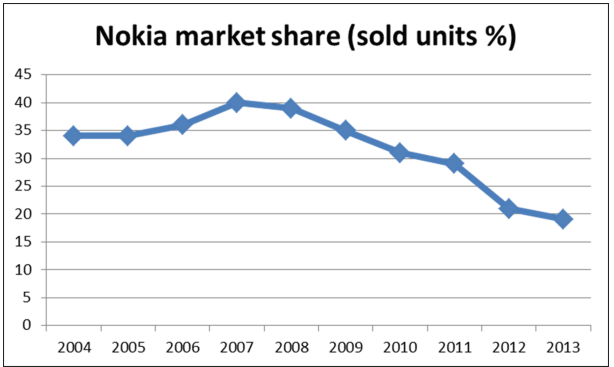
During this period, it is safe to argue Nokia did not have extensive confirmation bias, regarding what kind of products they must provide. Nokia kept innovating the system of the cellular phones. All the actions above helped Nokia to become the most popular mobile phone brand in the world. However, Nokia finally lost consumers and lost dominance in the smartphone market in the 2010s. One considerable factor that contributed to the decline of Nokia was the confirmation bias planted in Nokia cooperation, regarding both software and hardware. In 2007, the iPhone 4 was published by Apple with a brand-new iOS system. iPhone introduced video calling, multitasking, and a new uninsulated stainless-steel design that acted as the phone's antenna." (Stanko, [9]). This is greatly different from the function of Nokia that the Symbian system could provide. With an iPhone, consumers can receive calls, send messages, listen to music, look through internet, and even establish connection between computers and phones, depending on the iPhone's software (Wilson & Fenlon, [10]). Besides, for hardware, Apple took a new chip which was different from any other smartphones. However, Apple's innovation in hardware or software did not get Nokia's attention. Till 2011, under the pressure of apple, Nokia had to give up Symbian system. However, they did not choose to work with Android, which proved to be the only strong competitor with Apple in the late century, and they worked with Surface and invented Windows system. "They didn't make the leap of faith onto Windows Phone until 2011. Now they are suffering from their slow response." (Wayne, [7]). The iPhone had a full touch screen and app-based operating system, which developed a new definition of smartphone. (Bhalodiya & Sagotia, [11]). It soon got flavored by the consumers because of its fancy appearance and new IOS system. This was a big challenge to Nokia and meanwhile, a signal sent by the market—the taste of consumers had changed. Unfortunately, at this time, Nokia made a slow response to the changing prevalence and did not pay attention to the markets. They persisted that they owned the most advanced system of smartphones and believed that consumers would still support Nokia. It was more difficult for a leader in the industry to make a quick response to the changing market. This was how confirmation bias influenced their judgment. Nokia ignored the evidence that showed the change in consumers' attitudes and believed in their decision. Currently, Nokia was out of the global trend. The iPhone attracted more and more consumers while Nokia lost consumers day by day. Finally, Apple took up a large amount of market share. At the time that Nokia realized that they need to change their product, it was too late. The smartphone market has been carved up by other brands. The confirmation bias contributed to the decline of Nokia. The decline of Nokia can be seen clearly from the sales and the market share from the data (Figs. 1 and 2).

### **3.1 Demonstration of the Effects on BUSINESS'S Operation: Sony**

Like the fate suffered by Nokia, another industry giant also faced similar challenges due to judgmental bias---Sony. The creation of Sony's highly popular Walkman portable music player made Sony popular in the world for the first time. After that, the Sony digital camera also attracted many consumers. These two successful cases made Sony become a giant in the market. In 2001, Sony Ericsson started to produce camera phones, and they believed that they could produce the best phones. However, there was something wrong with their strategy in the software of the phone. When Sony tried to design their

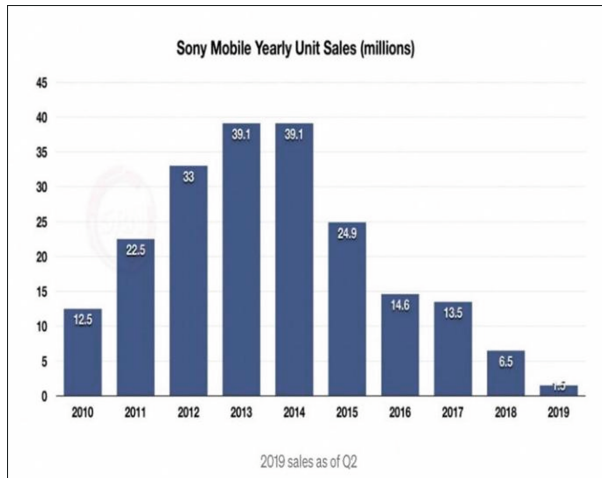


**Fig. 1.** Graph of statistic on Nokia net sales worldwide from 1999 to 2021 (in billion euros). Developed from ‘Statista’ [12]



**Fig. 2.** Graph of statistic on Global market share held by Nokia smartphones from 2004 to 2013. Adapted from ‘Disruptive innovation. SE’. [13]

phones, they copied the pattern of what they designed for the camera. Since the camera is a successful example, they thought this can would be successful again for the phone if they followed the same way. So, Sony designed their phones with high-resolution lenses and good music function. At first, the phone sold well, but in long term, as Apple developed, the function of the camera and music were no longer attractive to consumers. For smartphones, the use of a camera just took up a small percentage of the consumers’ consideration. However, Sony did not learn deep about the smartphone market and even misunderstand it with the camera market, they over trusted the successful case of the digital camera and confused the target consumers. They considered the smartphone users had the same needs with the camera users so that the camera was the most important for Sony smartphone. It was clear that Sony and ignored other software in the phone just because they had succeeded in the digital camera market. Sony as a survivor in the camera market, they pretended that the camera was still the most attractive function to



**Fig. 3.** Graph of statistic on Sony mobile yearly unit sales. Adapted from ‘Sony reconsidered’

the consumers. This is how Survivorship bias influenced their judgment. Finally, Sony’s phone lost the smartphone market and was no longer important to consumers. In 2019, Sony Mobile earns practically 0% of the smartphone market’s profits and accounts for practically 0% market share (Fig. 3).

#### 4 Solution for Confirmation Bias and Survivorship Bias in BUSINESS’S Operation

Given the former demonstration of negative consequences might be triggered by a combination of Confirmation Bias and Survivorship Bias, they could be especially problematic for a business’s operation if they mislead the market analysis. Ways to lighten the influence of two biases are beneficial in a business’s decision-making process. Through historical research on the two biases, general methods to reduce their influence mainly related to individuals’ adoption of a more open-minded, receptive, and comprehensive data-collection way. More specifically, those general methods could be selectively modified and applied to business operations.

One way, members of the market analysis team should work “linear” rather than “circular” (Kassina, et al., [14]). This means that analysts of the business should investigate the current market before they got exposed to the actual target. With the natural confirmation bias, people tend to misinterpret the information to fit their target (Pohl, [15]). Thus, with the absence of aim, analysts will more likely form an objective, unbiased report. A similar process was already implemented by some credible institutions such as the FBI. In the FBI’s revised standard procedure, they include such bias-avoided considerations like “examiners must complete and document analysis of the latent fingerprint before looking at any known fingerprint” (OIG, [16]). This practice allows a more accurate analysis in the criminal field. Logically, the same benefit also applied to businesses but in different content. In the business aspect, substituting “fingerprint”, the

target could be a product proposal, marketing plan, or investment pitch. For instance, a company wants to analyze whether their old strategy still fit the current market. When the administrator directly instructs analysts on the goal, given the former survivorship bias about the company's past success followed by confirmation bias's effect when collecting or interpreting market information, analysts are very likely to come up with a pro-answer. Therefore, in this potential solution, confirmation bias and survivorship bias will not be triggered due to the non-existence of the original belief and experience.

Along with the staff's working procedure, external technology could also support businesses' correct decisions by reducing two biases. Confirmation bias and survivorship bias are triggered in an individual's subconscious decision-making process (Eriksen, et al. [17]) (Kicielinski, et al. [18]). Thus, their counteraction could be achieved by erasing subjective involvement in the final decision from only one individual. A knowledge management system (KMS) is a hybrid system from various technology including "information repositories, data warehouses, intranets, search engines, data filters, collaboration tools, and intelligent agents" (Wiewiora, 2013; Alavi et al., [19]), is a potential solution for confirmation bias and survivorship bias in innovative enterprises. Previously, KMS was proved to positively influence employees' performance in other industries. In the case study on PT Perusahaan Listrik Negara, an electricity corporation in Indonesia, researchers concluded that KMS plays the role of "improve the quality of human resources for project clients as well as for the operational needs of all employees" (Budianto & Sardjono, 2022) [21]. Also, the factors of "ability of employees to access KMS (Darudiato & Setiawan, 2013)... Knowledge Creation (Husin, 2017), Knowledge Storage (Igbinovia & Ikenwe, 2018), Knowledge Retention (Bairi et al., 2011), Knowledge Sharing (Murad et al., 2018), Knowledge Utilization (Puryantini et al., 2017) and work accuracy (Desita, 2017)" (Budianto & Sardjono, 2022) provided by the KMS implemented in PT Perusahaan Listrik Negara is proven to be positively related with employees performance (Budianto & Sardjono, 2022). This case exemplifies a KMS application for an electricity company and successfully fits the goal of increase their employees' work performances. In another aspect, by conducting research through a survey of France biotechnology companies, researchers found that "KMS practice can enhance sustained competitive advantages in innovation performance" (Lundvall & Nielsen, 2007). Given KMS's ability to increase employees' performance and its ability to facilitate innovation indicated in the two cases, implementation of KMS in innovative enterprises is very likely to serve the goal of ensuring the competitive advantage of the company. More generally, the implementation of KMS in decision-based programs were proven to facilitate a more effective and high-quality decision result (Gulser & Badur, 2011). Thus, through improve the decision-making process, KMS is a potential solution for the biases. Altogether, with former successful demonstrations of KMS adoption in other industries and the theoretical study of KMS benefits, it is safe to suggest that KMS will fit the goal of counteracting the effect of confirmation bias and survivorship bias. To efficiently implement it, the business could require analysts to upload their information collection and check each other's before forming a conclusion. Accordingly, KMS could push the analysts to consider the alternatives more comprehensively to document a more overarching market analysis. As a result, by exposing the alternatives, KMS lightens

the influence of confirmation bias; by demonstrating the limitation of the company's experience, KMS reduces the effect of survivorship bias.

## 5 Conclusion

With the increasingly salient role taken by product innovation in the technology industry, the influence of biases such as confirmation bias and survivorship bias in those enterprises also becomes more costly for both the companies and its consumers. This paper, through discussions based on companies' cases and an investigation of the theoretical process of the two biases, found that training on employees working procedures with the correct implementation of KMS could potentially soften the negative effect brought by judgmental biases, thus catalyzing companies' efficient decision-making process and positively contribute to organizational decision making. This paper highlights two major contributions. From a business perspective, with full acknowledgement that product innovation cannot be guaranteed to succeed and market response may often be randomized. This paper does not intend to state that the KMS will definitively lead to successful product innovation. Rather, the paper aims to contend that through effective utilization of knowledge management within employees, decision makers would less likely suffer from obvious cases of distorted thinking in the process of product innovation. Theoretically, we highlighted the consequences of judgmental biases in a business setting and build a connection between judgmental bias and product innovation. This aims to encourage future scholars to explore such relationships in an empirical setting, providing more insights to this topic through a theoretical lens.

## References

1. B. J. Casad (2019, October 9). confirmation bias. Encyclopedia Britannica. <https://www.britannica.com/science/confirmation-bias>
2. B. Fischhoff, R. Beyth-Marom (1983). Hypothesis evaluation from a Bayesian perspective. *Psychological Review*, 90, 239-260. DOI: <https://doi.org/10.1037/0033-295x.90.3.239>
3. Cafferata, F. Tramontana (2019). "A financial market model with confirmation bias," *Structural Change and Economic Dynamics*, Elsevier, vol. 51(C), pages 252–259. <https://doi.org/10.1016/j.strueco.2019.08.004>
4. M. Shermer (2014). Surviving Statistics. *Scientific American*. 311. 94-94. <https://doi.org/10.1038/scientificamerican0914-94>.
5. F. J. Marc Mangel (1984, June 1). Abraham Wald's Work on Aircraft Survivability. Retrieved from xmol: <https://www.x-mol.com/paper/1416664902212984832?adv>. <https://doi.org/10.1080/01621459.1984.10478038>
6. D. Gewirtz (2018, May 28). Technology that changed us: The 1990s, from Worldwide Web to Google. Retrieved from ZDNet: <https://www.zdnet.com/article/technology-that-changed-us-the-1990s/>
7. N. Bhalodiya, N. Sagotia (2018). Reasons behind the failure of Nokia: a Case study of Telecom sector. *International Journal of Management and Humaniti*.
8. D. Steinbock, (2001). *The Nokia Revolution*. AMACOM, New York.

9. Stanko (2015). The history of Apple company. *Збірник тез VIII всеукраїнської студентської науково-технічної конференції „Природничі та гуманітарні науки. Актуальні питання“*, 1, 97–98.
10. Figure 6: Construction of a capacitive touchscreen (Wilson, Chandler,... (n.d.). Retrieved May 7, 2022, from ResearchGate website: [https://www.researchgate.net/figure/Construction-of-a-capacitive-touchscreen-Wilson-Chandler-Fenlon-Johnson-2007\\_fig1\\_322702455](https://www.researchgate.net/figure/Construction-of-a-capacitive-touchscreen-Wilson-Chandler-Fenlon-Johnson-2007_fig1_322702455)
11. Nokia revenue 1999–2018 | Statista. (2018). Retrieved from Statista website: <https://www.statista.com/statistics/267819/nokias-net-sales-since-1999/>
12. Admin, Admin, & 19, A. on M. (2013, April 22). Nokia's decline in figures. *Disruptive innovation*. SE. Retrieved September 26, 2022, from <http://disruptiveinnovation.se/?p=131>
13. 14. S. M. Kassin, I. E. Dror, J. Kukucka (2013). The forensic confirmation bias: Problems, perspectives, and proposed solutions. *Journal of Applied Research in Memory and Cognition*, 2(1), 42–52.
14. R. F. Pohl (2012). *Cognitive Illusions: A Handbook on Fallacies and Biases in Thinking, Judgement and Memory*. In Google Books. Psychology Press. [https://books.google.com.hk/books?hl=en&lr=&id=MS5Fr8safgEC&oi=fnd&pg=PA79&dq=confirmation+bias+%5C&ots=9PICQIbQUa&sig=m4Oyv3l-pdn5Tg5NYw7xrzdPWE&redir\\_esc=y#v=onepage&q=confirmation%20bias%20%5C&f=true](https://books.google.com.hk/books?hl=en&lr=&id=MS5Fr8safgEC&oi=fnd&pg=PA79&dq=confirmation+bias+%5C&ots=9PICQIbQUa&sig=m4Oyv3l-pdn5Tg5NYw7xrzdPWE&redir_esc=y#v=onepage&q=confirmation%20bias%20%5C&f=true)
15. A Review of the FBI's Progress in Responding to the Recommendations in the Office of the Inspector General Report on the Fingerprint Misidentification in the Brandon Mayfield Case. (2011, June). Retrieved from U.S. Department of Justice Office of the Inspector General: <https://www.oversight.gov/sites/default/files/oig-reports/s1105.pdf>
16. 17. M. D. Eriksen (2019, August 13). Contract Price Confirmation Bias: Evidence from Repeat Appraisals. Retrieved from SpringerLink: <https://link.springer.com/article/https://doi.org/10.1007/s11146-019-09716-w#citeas> DOI: <https://doi.org/https://doi.org/10.1007/s11146-019-09716-w>
17. K. P. Kicieliniski (2021, April 4). Letter to the Editor regarding triggering of acute coronary occlusion by episodes of anger. Retrieved from Oxford Academic: <https://academic.oup.com/ehjacc/article/10/4/470/6284282?login=true>. <https://doi.org/10.1177/2048872619604116>
18. Wiewiora (2017, December 19). Unpacking 'lessons learned': investigating failures and considering alternative solutions. Retrieved from Taylor and Francis Online: <https://www.tandfonline.com/doi/abs/https://doi.org/10.1057/kmrp.2013.26> DOI: <https://doi.org/10.1057/kmrp.2013.26>
19. W. Budiarto, W. Sardjono (2022). The Implementation of Knowledge Management System (KMS) Evaluation Model in Improving Employee Performance: A Case Study of the State Electricity Company (Persero). *ComTech: Computer, Mathematics and Engineering Applications*, 13(1). Retrieved from <https://journal.binus.ac.id/index.php/comtech/article/view/6873>



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