



The Application of Computers in the Business Sector: A Look at the Finance and Insurance Industries

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Abstract. The invention of computers in the 20th century was one of the greatest innovations in human history. The incorporation of computers with the Internet then has given rise to even more prominent changes in almost all aspects of human society. This article is based on the historical and ongoing impacts of computers in the finance and insurance industries, which then can lead to projections about future influences.

Keywords: Computers, the inductance industry, the finance industry, data, security

1 Introduction

When the first modern computer was invented by John Mauchly and J Presper Eckert Jr at the University of Pennsylvania in the 1940s, it was giant and mostly served military purposes [1]. Plus, it was also outrageously expensive. However, as time went by, computers had become smaller and smaller, which enabled the production of computers to be less costly. With computers being more and more affordable, they entered schools, families, and business organizations. Nowadays, in most countries, computers are not uncommon at all.

As a matter of fact, the commercial use of computers may go back to earlier days than most people expect. Within less than a decade after John Mauchly and J Presper Eckert Jr invented the first modern computer, Remington Rand invented the first commercial computer in the United States in 1951, which was called UNIVAC I [2]. Although it was still mostly used by the government and remained huge, people also began to use it in different commercial sectors. For instance, Franklin Life Insurance and Pacific Mutual Life Insurance installed UNIVAC I in 1954 to handle their increasing customer data [2]. Hence, it is fair to say that the insurance industry was one of the first a few industries that used computers for commercial purposes.

Over the past decade, computers never stopped to evolve. Nowadays, Web3.0, metaverse, and artificial intelligence are all the development and extension of existing computer technologies [3]. There is no doubt that computers will keep evolving and be used in more and more fields in the future compared with what is going on nowadays. This then makes it significant to look into how computers have been utilized in

the business sector today so that lessons can be taken to ensure that in the future computers can make even more contributions when it comes to commercial purposes.

Particularly, this article will look into how computers have been applied in the finance and insurance industries to help people develop a deeper understanding of the commercial application of computers in the business world. The insurance industry is a fine example in that it was one of the first a few industries that used computers for commercial purposes back in the 1950s. Even today, computers still play an important role in different sectors of the insurance industry, such as data management, settlement of claims, customer services, and likes. A look at how the use of computers has changed in the insurance industry can be illuminating when it comes to helping people understand the different roles that computers have played in different historical times.

In terms of why the financial industry is also a fine example, there are also several justifications. Firstly, just like the insurance industry, the finance industry also deployed computers for commercial purposes early. In the 1950s, the Bank of America introduced digital computers to enhance its service when it came to processing checks [3]. Secondly, the finance industry goes hand in hand with the insurance industry. This enables this article to possibly conduct a comparison between how computers have impacted the two industries similarly or differently. Last but not least, the finance industry is one of the most important industries in this world today. The finance industry has been held accountable for the 2008 Great Recession. Simultaneously, computers nowadays play a huge role in the finance industry, as they are pertinent to mass financial content and businesses data, whose efficiency and quality count on computers.

To sum up, with reference to the finance and insurance industries, this article is intentionally designed to see how computers have impacted business practices. In doing so, this article will not only look at the past and current applications of computers in the two industries, but also conduct a comparison to the roles of computers in these two different industries. The findings then can be used to enhance the application of computers in not only the two industries but also many other related industries.

2 The application of computers in the insurance industry

This part is deliberately designed to cast light on how computers have been used in the insurance industry as well as what impacts computers have exerted on the development of the insurance industry. The insurance industry refers to the industry in which the funds collected from the insured in the form of contracts are used to compensate the economic or other losses of the insured. Insurance is a business practice where the insured pay the insurance premium to the insurer according to the contract, and the insurer bears the liability of compensation for the property or other losses caused by the occurrence of the possible accidents as agreed in the contract.

2.1 The Use of Computers in the Insurance Industry in Early Time

As early as in the 1950s, computers were utilized for commercial purposes in the insurance industry, as Franklin Life Insurance and Pacific Mutual Life Insurance installed UNIVAC I in 1954. Even earlier, the Metropolitan Life installed UNIVAC I in 1953 [4]. These insurance companies then offer great samples for this article to look into how early computers were used in the insurance industry.

At Metropolitan Insurance, the motivation to deploy computers in its business indeed had little to do with the computer technology itself in the first place. In fact, at the time, Metropolitan insurance was suffering from severe labor shortage [4]. Being short-staffed, Metropolitan Insurance was interested in any kind of technology that could reduce its need for clerical labor. In view of this, it was not surprising that Metropolitan Insurance used computers for actuarial applications. This not only solved the problem of labor shortage at Metropolitan Insurance, but also saved the company a large amount of cost. At the time, Metropolitan Insurance used to rent IBM punched card tabulating equipment [4]. When computers were utilized to handle the actuarial applications, there was no need to rent such equipment from IBM. Although this use of computers in the insurance industry was a tiny step from today's perspective, it was a great innovative effort back in the 1950s. After enjoying the benefits of computers, in 1956, Metropolitan Insurance decided to go further with computers in its insurance business, as it bought even more computers so that it could handle the premium billing applications more effectively [4].

In case of Franklin Life, since it was smaller than Metropolitan Insurance, it indeed used computers in its business differently. In addition to premium billing, Franklin Life also used computers in its accounting (premium, dividend, and agency commission) [4]. It also used computers for valuation of reserve services. Later, Franklin Life even used computers to combine different documents and files into one master file, which greatly enhanced efficiency of client management at the organization [4].

In the late 1950s, when IBM introduced computers with the base of punched card tabulating equipment, more and more insurance companies began to use computers in their business, and they also used the computers for even more different purposes [4]. Some insurance companies used computers to arrange and manage the payroll of their employees, even including agent commissions. This was popular because computers were unlikely to make human errors in process such as calculating the commissions. Moreover, in some cases, several insurance companies would use computers to create and monitor the implementation of group insurance policies [4].

Based on the descriptions above, it is easy to see that the early application of computers in the insurance industry had several features. To begin with, whether it was the actuarial application, the premium billing, or other applications of computers in the insurance industry mentioned above, they were unexceptionally about the efficiency of their business process, as computers in early time cut much repetitive data and steps in their business operations. Secondly, the early application of computers in the insurance industry also reveals that the commercial purposes that computers served at the time were mostly internal. Insurance companies might use computers to solve labor shortage or handing process more efficiently. Either way, clients were not

able to use computers directly. In other words, clients of the insurance companies at the time did not have much chance to experience computers themselves.

2.2 The Use of Computers in the Insurance Industry in Modern Time

In the 21st century, the world has experienced the Fourth Industrial Revolution, where digitalized computer technologies and the Internet have transformed social and economic structures and led to new ways of thinking in many industries, including the insurance industry [5].

On the one hand, like the early time, in modern time, computers are still used to enhance management and efficiency internally in insurance companies. For example, it is not uncommon for insurance companies to use computers to analyze demographic data about their clients, such as life habits [6]. This then allows insurance companies to make fairer risk assessments before deciding whether to offer insurance service to a client and how much the insurance service should charge. In addition, computers also allow insurance companies to make more effective decisions regarding whether to deny or pay a claim. This is because computers can make it extremely easy for claim investigators to check insurance claims, as well as other documents such as doctor reports or police notes. Here, the use of computers in the insurance industry remains the same as early time, although nowadays computers process or handle data digitally.

On the other hand, computers are also used directly by the clients of insurance companies. In other words, in addition to internal purposes, computers can also be used directly by clients of insurance companies externally. One example in case is the application of computer vision, which is used by clients in the process of making settlement claims. When clients cannot visit the insurance company for settlement claims in person, the computer vision technology can analyze the images that the clients upload in real time and send them to the appropriate insurance broker. At the same time, it can estimate and adjust the maintenance cost, determine whether it is within the insurance coverage, and even detect whether there is insurance fraud [6]. During the rage of Covid-19, computers have been used more than often by clients of insurance companies [7]. Some clients sign insurance contracts without leaving their home, while others make settlement claims and get compensated completely online [8]. From this perspective, computers in modern insurance company have also facilitated the communication between the industry and their clients.

However, despite these positive changes, one concern regarding the use of computers in the insurance industry is data security [9]. State Fam, one of the largest insurance companies in the United States nowadays, suffered from a major data breach due to a credential stuffing attack [10].

2.3 Summary

With reference to the use of computers in the insurance industry in early and modern times, it is evident that the use of computers in business sectors is featured with continuity and evolution. On the one hand, continuity is illustrated with information man-

agement in the insurance industry. Whether it is in the past or nowadays, computers have always been used by the insurance companies to better arrange and use client data. On the other hand, the evolution is revealed in two ways. Firstly, even for the purpose of better information management, insurance companies have used computers to collect more client data and used algorithms to make further decisions in its service offerings. Secondly, insurance companies nowadays also use computers to facilitate communication with clients and enhance their service experience. In a nutshell, computers in the insurance industry mostly serve three business purposes: better information management, better communication, and better client experience.

3 The application of computers in the finance industry

This part serves the purpose of identifying how computers have been utilized in the finance industry, based on which the influence of computers in the insurance industry will also be identified. As a matter of fact, the finance industry is a relatively broad concept, and it refers to businesses that deal with financial commodities, including banking, insurance, trust, securities, and leasing. Since this article has talked about the insurance industry in the last section, in this part, the finance industry specifically refers to the banking industry.

3.1 The Use of Computers in the Finance Industry in Early Time

In the fall of 1956, the Bank of America became the first bank in the United States that put computers to commercial use in the finance industry [5]. Compared with the insurance industry, the finance industry was exposed more to numbers, data, and statistics. As a result of this, it was not surprising that in early time, the finance industry jumped to the computer to deal with the large number of cuttings and reports in its business procedures. For example, the Bank of America in the 1950s used computers to automate the accounting process [5]. In detail, the Bank of America used special numeric symbols with the help of the computer system. The symbols then could be printed on checks using a special magnetic ink. These checks could be read by computer devices [5]. With the help of the computers, the Bank of America developed an automated check reader, and this check readers could deal with as many as 10 checks within one second [5]. In other words, in early time, the use of computers in the banking system enabled the Bank of America to get rid of the redundant work of sorting checks by hand and reduced the waiting time for clients to cash their checks.

In the 1960s, banks in the UK introduced a series of programs based on computers to further enhance their efficiency, such as undertaking figure works [11]. This was highly similar to what happened in the insurance industry in the 1950s, where insurance companies use computers to refine their internal management. Also in the 1960s in the UK, the first automatic teller machine (ATM) was invented with the help of computers in London [12]. This also not only enhanced the efficiency of banks, as they did not have to deal with clients waiting in a long line for cash, but also en-

hanced client experiences in that ATMs usually could work 24/7. In other words, they could draw cash even in hours where banks were not working.

The indications from the use of computers in the finance industry in early time were twofold. For one thing, just like the insurance industry, the finance industry also used computers for better information management internally. For another, unlike the insurance industry, from the very beginning, the finance industry externally allowed clients to experience computers. In other words, even in early time, the finance industry used computers to enhance client service experience. This was highly unlike what happened in the insurance industry.

3.2 The Use of Computers in the Finance Industry in Modern Time

By and large, just like the insurance industry, the use of computers in modern finance industry is also featured with evolution and continuity from the use of computers in the finance industry in early time.

In recent years, the combination of computers with telecommunication technologies have enhanced the inquiry service of the finance industry. The computer system uploads the account information of the clients to the computer network, which enables clients to check their savings without going to the bank [13]. In the meantime, when there are transactions in the bank account of clients, the computer network can notify clients [13]. On the one hand, this helps enhance client experience. On the other hand, this reduces the workload of banks.

In addition, nowadays, the bank industry also uses computers for customer relationship management (CRM), which helps banks understand who the desirable clients are and how to keep profitable clients by introducing the concepts of active marketing, cross selling, profit analysis, and personalized services [14]. On top of this, other applications of computers in the finance system include mobile payment and the electronic money payment system. More recently, chatbots based on predetermined computer programs have been utilized to help clients better meet their own personal needs [14].

However, similar to the insurance industry, data security is also a concern for clients in the finance industry. In 2014, JP Morgan reported the data breach of 83 million clients [15].

3.3 Summary

From the very beginning, the finance industry used computers for better client experience, more efficient procedures, and better information management. More recently, the finance industry has used computers for better communication with their clients. These commercial purposes of computers are also identified in the insurance industry. This reveals that in these two industries, computers, regardless of how they are used, mostly serve these business purposes. In the meantime, it is identified that computers in the finance industry are not trusted when it comes to data security, which is also a problem in the insurance industry. This indicates that data security is crucial for the future of computers in business applications.

4 Conclusion

This article compared the use of computers in the insurance and finance industry in different times respectively. Then, it also compared the use of computers in the two industries. Despite the similarities and differences in the two industries, the findings suggest that better information and data management, better communication, and better client experience are the main purposes of computer applications in the business sectors. However, the limitation is that these findings may not apply to other industries, as the finance industry and the insurance industry are unique in their own ways. These two industries are faced with multiple statistics and document works in the daily routine. Hence, future studies may focus on other industries to cast light on more use of computers in the business world. In the meantime, for future development of computers in the business sector, data security should be given the weightiest priority.

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