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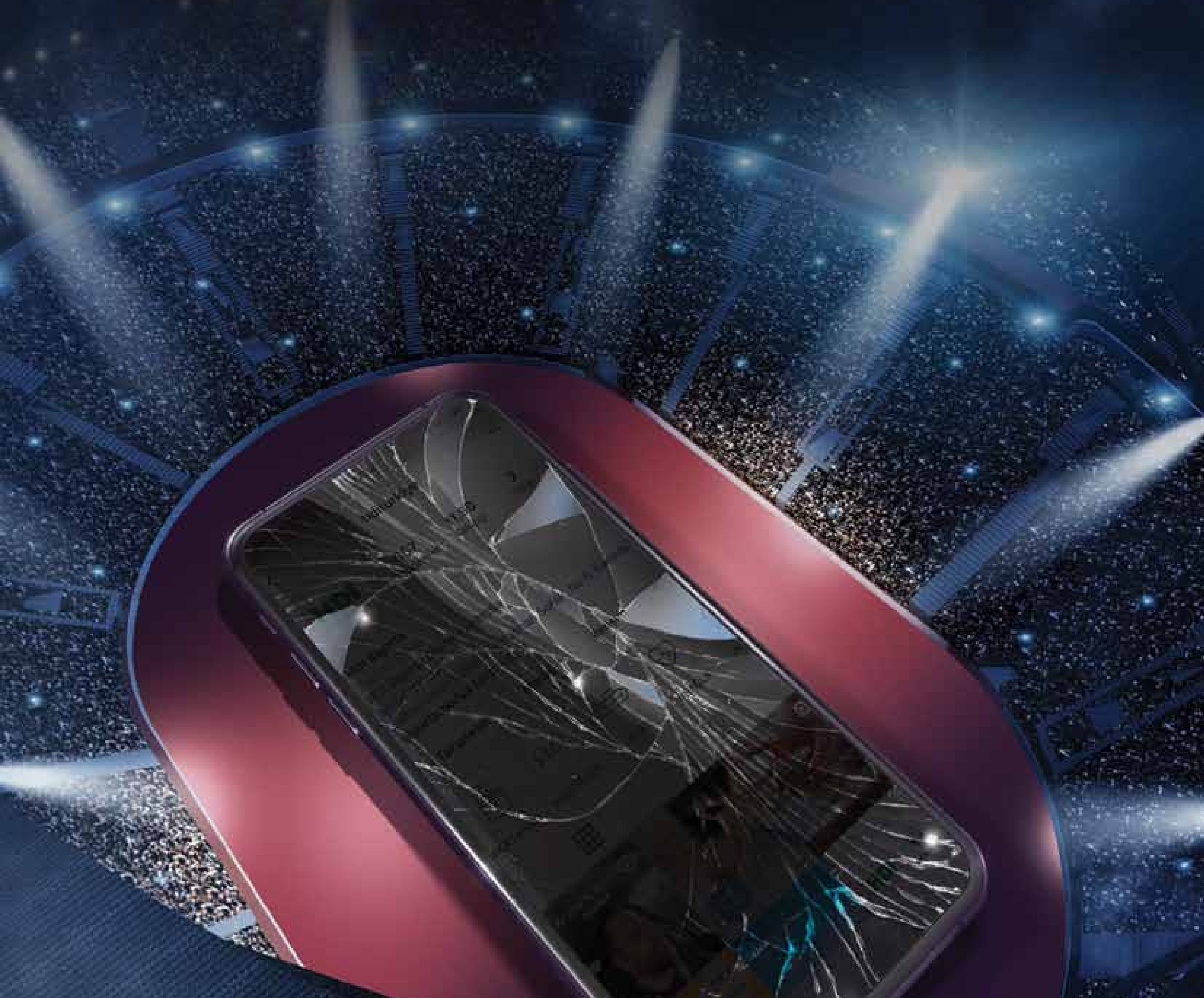

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ORIGINAL ARTICLE

Cyber Insurance - Turkey Practice

Mahmut YAVAŞİ
Elif Banu VARLI

Abstract
Cyber insurance is an integral asset to adjust market motivating forces toward improving Internet security. We follow the advancement of cyber insurance from customary protection approaches to early cyber risk protection approaches to current exhaustive cyber insurance items. Cyber insurance approaches have gotten more thorough as insurers better comprehend the risk landspace and explicit business needs. All the more explicitly, cyber insurers are tending to what used to be viewed as unfavorable issues (e.g., adverse selection/asymmetric information, moral hazard, etc.) that could prompt a disappointment of this market solution. Although some execution issues remain, we recommend the future advancement of cyber insurance will resolve these issues as proven by protection arrangements in other risk domains. The study has established that there is a growing need for cyber insurance in Turkey.

KEYWORDS
Cyber risk, cyber insurance, economics of information security.

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1. CYBER INSURANCE-TURKEY PRACTICE

Cyber insurance is a form of insurance designed to protect policyholders from the effects of cyber attacks such as malware, ransomware, phishing, denial-of-service attacks, contaminated drives, and unauthorized access to computer systems by outsiders, or any other approach used to compromise an organization's network/sensitive data.

As associations become more reliant on their arranged PC resources, the weaker they become to hurt from expanding continuous and harming assaults empowered by availability. Insurance from hurt on any organized PC framework won't ever be 100%. In the previous decade, assurance methods from an assortment of software engineering fields, for example, cryptography and programming have constantly made enhancements but Internet assaults keep on expanding. (Majuca, Yurcik, & Kesan, 2006, s. 1)

With the development and transformation of IT, Big information, Cloud Computing, Internet of Things and Smart Cities there has been a blast of information and more current innovations are concocted each day that will in general simplify our life. Online administrations like web based shopping, net banking, booking of taxis, instructive administrations and IT benefits our life has gotten a lot simpler however at the expense of thorough difficult work of the representatives who guarantee that the administrations run impeccably. Be that as it may, as everything has its advantages and disadvantages, so has IT. Cyber crime risk is increasing immensely in Turkey.

At this point is the lack of experience in providing assurance against cyber risk insurance for the basic problems developing markets such as Turkey. Therefore, the purpose of this study is to test the effectiveness of the Turkish insurance system, which has followed the European Union harmonization process and has successfully managed this process since 2007, in providing assurance to cyber risks.

Companies in Turkey are progressively enduring colossal misfortunes because of a rising number of digital assaults prompting interference of business and loss of client information. As a component of Business Continuity Planning for the Organization companies need to embrace Cyber-Risk Insurance as a feature of Risk Transference. Monetary area dealing with gigantic measures of Customer Personally Identifiable Information and monetary exchanges is among the high-hazard targets, however most banks in Turkey, accepting a couple of enormous private moneylenders, don't have digital danger protection.

Objective of the study is to understand about Cyber-Risk Insurance (CRI), state of adoption of CRI in Turkey, barriers to growth of CRI in Turkey and finally recommending solutions to the issues faced. The main component in the management of cyber events is understanding the risk and preventing the risk.

1.1. What is Cyber Risk?

It is the probable loss that we call risk. We measure the likelihood of a defined severity of loss occurring within a given time period to quantify risk. For example, the chances of a large US healthcare organization suffering a cyber attack that costs it $10 million or more in direct costs in the next 12 months are around 1 in 100. Its odds of experiencing a more serious incident with a higher expense, such as $100 million, are much lower: about 1 in 700. The less probable an incident is, the more serious it is. There is a continuous scale of cost from low to high, and with each degree of failure, there is a corresponding spectrum of probability, with the lowest being the most common and the highest being the least probable. (Coburn, Leverett, & Woo, 2019, s. 22)

The expanding utilization of advanced innovations in financial exercises - while making huge advantages as far as accommodation, profitability and proficiency - is likewise prompting huge dangers. Among them are "digital security risks" which, when they emerge, can upset the accomplishment of monetary and social goals by bargaining the classification, trustworthiness and accessibility of data and data frameworks. It is generally accepted that most organizations have been, will be or don't realize they have been influenced by such "cyber" episodes. Records of the recurrence and extent of (revealed) digital occurrences consistently find critical development as far as the quantities of episodes, the portion of organizations they influence, just as the effect of these episodes on organizations' tasks. The developing extent of advanced innovation in economic exercises implies that this danger is probably going to increment soon. However, the affectability around revelation of cyber episodes and restricted history of misfortune experience, the developing idea of the danger and potential for gathered misfortunes just as the expanding reconciliation of digital innovation into operational frameworks make digital danger an especially challenging risk to gauge - and manage.

(OECD, 2017, s. 11)

There is the potential for many entities to be affected in a single incident, which we call a cyber catastrophe, in addition to a significant loss to an individual organization. The threat of cyber catastrophes is a key factor in deciding how much effort we can put into reducing cyber risk as a society. While the likelihood of a catastrophe is low, the possible effects on our economy, living standards, and way of life may be devastating. It, too, spans a spectrum of magnitude, from incidents like WannaCry and NotPetya, which cost billions of dollars, to future scenarios in which cyber attacks cost trillions of dollars and destabilize our way of life.

The inexorably quick passage into cyberspace has effectively prompted a critical increase in operational risks and the risk of cyberattacks. Cybercrime has progressively become a general public-wide issue that is accepting a ton of consideration from governments across the globe. Activities around cyber insurance and the subsidizing of examination into data protection represent the difficulties around cyber risk and furthermore their significance. Further technological advancements, like the web of things, artificial intelligence, health-tech, advanced robotics and 3d-printing, for instance, will additionally increment cyber risks and lead to the rise of new and unforeseen risks. Also, with changing risks comes the requirement for better insurance. (Wieren, 2016)

Cyber risk was recognized as the danger of highest (or second-highest) concern to working together in more than 33% of OECD countries in the World Economic Forum's 2017 Global Risk Report (and among the five risk of most noteworthy worry in the greater part of OECD countries, a higher offer than either terrorist attacks or catastrophic events). (OECD, 2017, s. 11)

Insurance agencies are accustomed to managing numerous territories of vulnerability and risk. They offer inclusion for catastrophic events, business interference, and even damage from terrorist attacks; nonetheless, insurance agencies are not used to managing a considerable lot of the new occurrences of digital danger. (Siegel, et al., 2018, s. 13)

In any case, digital episodes don't just happen with high seriousness, they can likewise happen with high recurrence. In this sense, the idea of a digital episode is distinctive to that of a cataclysmic event (for example tremor). In light of numerous long stretches of perceptions and authentic records, we realize that cataclysmic events happen with a specific recurrence. For instance, the probability of having a few concurrent seismic tremors all throughout the planet is exceptionally little, however cyberattacks can happen to quite a few associations at the same time. The new WannaCry assault embodies the worldwide and unconstrained nature of a far reaching cyberattack. Encountering an assault doesn't really keep a similar organization from encountering a second assault following the first. This will rely upon the speed of distinguishing proof, investigation, and alleviations, and whether the subsequent assault focuses on the first weaknesses or new unidentified ones. While it is improbable that a solitary quake will happen all throughout the planet (in spite of the fact that zones could be influenced past the prompt tremor zone), the equivalent can't be said for a cyberattack.

Cyberattacks and other digital occasions are made by people. Assaults are generally aimed at explicit focuses considering an unmistakable result (for example benefitting from the assault, causing harm, reacting to political indications). Cyberattacks could really be incited by the conduct of focused organizations or governments. In that sense, digital danger may expect highlights of endogeneity, in this manner losing its quirk. Assaults may likewise have spontaneous ramifications. Digital danger needs to address both pernicious cyberattacks and accidental occasions brought about by machine or human disappointment. Until now, most digital occasions have been supported or abetted by people purposefully or unexpectedly. In examination, cataclysmic events are not the immediate consequence of human action. Furthermore, the normal misfortunes from numerous cataclysmic events can be preferably anticipated over cyberattacks in light of the fact that conditions and areas presented to explicit kinds of catastrophes are notable and continually checked. Verifiable cyberattack information is restricted and not well structured (except for some restricted zones like penetration/classification protection), while catastrophic events are exceptionally examined and inventoried in broad records. Digital dangers, then again, are moderately new occasions, and the current models to survey hazard and the data accessible are as yet restricted. (Siegel, et al., 2018, s. 12)

1.2. What is Cyber Liability Insurance?

Cyber liability insurance is a wide term for protection strategies that address first and third party losses because of a PC based attack or breakdown of an association's data innovation frameworks. For instance, one transporter's approach characterizes PC assaults as, "A hacking occasion or other occurrence of an unapproved individual accessing the PC framework, assault against the framework by an infection or other malware, or a forswearing of administration attack against the insured's system." (Romanosky, Ablon, Kuehn, & Jones, s. 2)

Cyber insurance permits organizations to move a portion of the financial risk related with cyber episodes to an insurer. (Gordon, Loeb, & Sohail, 2003) It is proposed to cover business obligations, including first-party costs, and is regularly introduced as a basic segment of digital danger the executives approach inside associations. Notwithstanding, insurance agencies incorporate additional administrations for their clients that are planned to improve cyber insurance approaches inside an association. Such administrations are in light of a legitimate concern for the insurance agency, as they are planned to improve a safety net provider's danger profile. They run the array from introductory assessments of cyber insurance weaknesses and admittance to consultancies to improve their generally cyber security act, to a scope of administrations to help organizations in case of an episode. (Sullivan & Nurse, 2020, s. 4,5)

Despite the solid development of the cyber insurance market over the previous decade, protection transporters are as yet confronted with various key difficulties: how to create serious strategies that cover regular misfortunes, yet in addition prohibit dangerous occasions; how to evaluate the variety in changes across expected insureds; and how to make an interpretation of this variety into a proper estimating plan?

Since protection in the US is directed at the state level, protection transporters are needed to document notification to state protection commissions depicting each new protection item. These filings incorporate the full content of the approach (inclusion, rejections, triggers, and so forth), a security application poll, and a rate plan describing the equation for determining insurance expenses. Accordingly, these filings give a remarkable chance to see how insurance agencies comprehend and value risks, and explicitly, the business, innovation and cycle controls that are considered in a digital protection, in another defining cyber insurance, rate estimations. (Gordon, Loeb, & Sohail, 2003, s. 2)

Along these lines, some governments all throughout the planet have tried to investigate the role that cyber insurance could play in boosting better cyber safety practices. The UK's NCSC (National Cyber Security Center), for instance, as of late delivered point by point direction on how organizations should approach buying cyber insurance. (Centre, 2020) It features seven network protection addresses that organizations ought to consider prior to purchasing insurance. (Centre, 2020) However, lacking decisive examination has been led to sufficiently investigate whether digital protection creates such certain network protection results. As it is a moderately new contribution for insurance agencies, guarantors as of late have invested a lot of energy explaining what digital protection is, the thing that it does a lot not cover, and how to best form productive portfolios. A portion of those issues are canvassed in this segment. What's more, there are further inquiries concerning the reason for digital protection, how it works by and by and the remarkable difficulties it contains to turn into a completely developed protection area with high take-up. (Sullivan & Nurse, 2020, s. 5)

It is critical to take note of that cyber insurance can ordinarily be bought as either an independent cyber strategy or as a feature of a more extensive insurance bundle that oversees different risks. A devoted cyber insurance strategy is frequently more costly, yet in addition may offer more significant compensation out of cutoff points should an episode occur. (Bernard, 2020) This sort of strategy is additionally bound to incorporate the cyber risk apparatuses that are planned to improve cyber safety inside an organisation. (CISA, 2021) Meanwhile, digital protection strategies that are important for a more extensive bundle can be an appealing recommendation as far as effortlessness and affordability. (Bernard, 2020)

1.3. How US and UK Regulate Cyber Risk Insurance?

Regulatory provisions that control reporting requirements, penalty fees, and compensation to victims account for a large portion of the cost of cyber risk. Data breaches are most costly in countries with the strictest rules, with losses in highly regulated countries more than double those in countries with relaxed data control. The regulatory environment is rapidly evolving. (Coburn, Leverett, & Woo, 2019, s. 183)

The United States has been at the forefront of cyber regulation growth. As a consequence, it has been a complicated patchwork of rules. State-specific cyber breach laws have developed, with many of them being somewhat different from one another, and often even contradicting one another. Most states require reporting to the government and the media if the data breach affects more than 500 people; and some states set thresholds for the warning requirement, such as a fair basis to assume the breach would cause damage. Most states have penalties in place, and some also have legal recourse. (Coburn, Leverett, & Woo, 2019, s. 186)

There are also different applications of federal laws that vary different requirements. The Health Insurance

Portability and Accountability Act (HIPAA) of 1996 governs the privacy of personal health information, while the Gramm–Leach–Bliley Act (GLBA) governs the privacy of financial information, with differing conditions and penalty powers. (Coburn, Leverett, & Woo, 2019, s. 186,187)

The story of the computer genius kid is part of hacking mythology, and it has influenced the adoption of cyber-crime legislation in the United States. In the 1983 Hollywood film War Games, a teenage computer-games enthusiast who doesn't believe any device is fully safe breaks into a US military supercomputer designed to predict potential nuclear-weapons-of-mass-destruction outcomes and nearly starts a world war. This was harmless fun for a kid, but it was a crime for policymakers on Capitol Hill. (Coburn, Leverett, & Woo, 2019, s. 187)

The United States, like other major world forces, has a stockpile of powerful electronic arms that are delivered invisibly. Consider the Windows Eternal Blue attack, which was discovered in the Shadow Brokers' complete control in 2016. It had been an extremely effective method of infiltrating NSA-targeted PCs until it was stolen. One member of the team compared its use to dynamite fishing. Since the US government engages in covert hostile hacking operations on a regular basis in the pursuit of its public interest, its digital security must be maintained at an extremely high standard. Enactment is needed for this.

The Federal Information Security Management Act (FISMA) of 2002 was enacted to provide a basis for the feasibility of data security controls for government data frameworks, as well as to allow for the enhancement of least controls for obtaining these frameworks. The National Institute of Standards and Technology (NIST) was chosen to develop the standards and guidelines for implementing and maintaining data protection systems for the board of directors. The Federal Information System Modernization Act of 2014 is a proposed update to FISMA that would give the government a mechanism to review and ensure its data protection controls. (Coburn, Leverett, & Woo, 2019, s. 189)

The Cybersecurity Information Sharing Act (CISA) of 2015 tends to an all around perceived issue: corporate casualties of digital assaults, while regularly the best assets for significant data to forestall future assaults are reluctant to share data that may open them to common or criminal responsibility, shame, loss of trust, or serious dangers. CISA is an endeavor to lighten a considerable lot of these obstacles in order to cultivate more prominent participation and joint effort to battle digital dangers. CISA approves privately owned businesses to share cyber safety danger data for cyber insurance purposes with the central government, and with other private elements. (Coburn, Leverett, & Woo, 2019, s. 189)

The accumulation risk is one of the most difficult aspects of the cyber security landscape. There has been a lot of research done on this topic. For example, the CRO Forum's "Loss Accumulation Risks," which explores the consequences of accumulation risk, is still in its early stages. (Siegel, et al., 2018, s. 13)

Insurance firms have made accumulation risk a top priority, but many consumers are still unaware of its possible consequences. One of the main cloud providers is Amazon Web Services (AWS). Many businesses that use AWS will be impacted in the event of a hypothetical attack. Business interruption, PP&E injury, and casualties are all possible consequences. Because of the complexities of accumulation risk, it's unclear who's insurance will cover what in the event of an assault. (Siegel, at al., 2018, s. 13)

With the European Union guidelines from the 1990s, which were redesigned in the European General Data Protection Regulation of 2018, (GDPR). This greatest update of European information insurance rules in twenty years changes how organizations and public-area associations can deal with the data of clients. Indeed, organizations all throughout the planet that hold information about European residents are dependent upon GDPR. (Coburn, Leverett, & Woo, 2019, s. 190)

GDPR-affected businesses will be held more accountable for their processing of personal data. This can incorporate having information insurance approaches, leading information assurance sway appraisals, and having applicable archives on how information is handled. Under GDPR, the annihilation, misfortune, adjustment, or unapproved divulgence of, or admittance to, individuals' information must be accounted for to a country's information assurance controller. This can incorporate, however isn't restricted to, monetary misfortune, secrecy penetrates, harm to notoriety, and that's only the tip of the iceberg. (Coburn, Leverett, & Woo, 2019, s. 190) GDPR violations will result in fines of up to €20 million, or 4% of a company's annual turnover. (Coburn, Leverett, & Woo, 2019, s. 191)

The US National Association of Insurance Commissioners (NAIC) has endorsed an Insurance Data Security Model Law, which establishes industry standards for information security that will extend to a wide range of meetings, including backup plans, experts, and brokers, recognizing that digital privacy is more important now than at any point in recent memory. Associations are needed to have a composed data security program for ensuring delicate information, including episode reaction and information recuperation intended to show their readiness for digital occasions. Organizations need to guarantee consistency yearly to their state protection officials and advise magistrates of information breaks inside 72 hours of a network safety occasion. The American Insurance Association expressed satisfaction with the adopted model legislation, stating that it was risk-based and consistent with New York's digital security law. (Coburn, Leverett, & Woo, 2019, s. 193,194)

The fundamental distinction between the U.S. furthermore, Europe is the job that guideline has played in the advancement of the digital danger market. There are two pertinent turns of events. The first, thus far generally all around cutting edge advancement, concerns the treatment of digital episodes in the corporate area (counting monetary administrations) and the assurance of purchasers as for the security and respectability of information put away in the internet. The second identifies with the guideline of guarantors as suppliers of hazard answers for their clients. This administrative improvement is as yet in its earliest stages. (Siegel, et al., 2018, s. 15)

The legal landscape around cyber risk is still incomprehensible and unpredictable. Across the globe, administrators, regulators, and courts are creating new rules and points of reference for identifying cyber danger on a responsive premise. This has resulted in a tangle of rules, guidelines, case law, litigation trends, and a climate that makes it difficult to estimate potential costs that could arise from the inevitable digital misfortunes. The legal environment around digital threats is currently incoherent and uncertain. A company that is the victim of a successful cyber attack may be liable to its customers for breach of contract. Companies can face aggressive lawsuits if, as a result of an attack and the ensuing disruption, they fail to meet legally binding obligations insignificant cyber security. (Coburn, Leverett, & Woo, 2019, s. 195)

Cyber insurers have a competitive incentive to reduce the number of cyber accidents and minimize the effects of events in order to restrict the amount they would pay out to customers. Although most businesses consider cyber events to be a low-probability, high-impact occurrence, research shows that cyber insurers deal with them on a daily basis as part of their business model. (HM Government, 2015, s. 3) As a result, cyber insurers can assist in the identification of specific experts who can help reduce risk. (Woods & Moore, 2020)

Cyber insurance, according to some researchers, allows enterprises to evaluate their cyber risk exposure. (OECD, 2017, s. 7) Cyber insurers, for example, can help raise risk management awareness by establishing consistent benchmarks for businesses looking to enhance their cyber security. (OECD, 2017, s. 7) Insurance firms may also help businesses understand their exposure and assist them by evaluating the risks they pose on a regular basis. (Estlin, Saluja, Greensmith, & Tuplin , 2019, s. 12) The experience and knowledge that cyber insurance firms have will help people learn more about risk reduction strategies. (Sullivan & Nurse, 2020, s. 19)

1.4. Why Do We Need Cyber Liability Insurance - Turkey Practice?

Turkey suffered most cyber attacks across the country in 9th place while the IRA, cyber attacks are occurring in the world 556 million years. It is stated that cyber attacks increase by 50% every year. In addition, the cost of cybercrime to the global economy is 445 billion USD annually. Turkey was the victim of more than 10 million people and it is estimated that the total net cost to be 556 million USD. (Altuntaş, Kara, Soylu, & Kırkbeşoğlu, 2018, s. 10)

Cyber attacks have reached such a point today that both public institutions and private companies have become the biggest nightmare. According to researchers, the number of cyber attacks in our country in the first three months of 2017 has increased by 50% compared to the first three months of last year. In our country, an average of 75 thousand cyber attacks occur daily and this number is increasing at an increasing rate. Number of cyber attacks in Turkey, 5th in the world, and ranks 4th in Europe. When looking at the types of cyber attacks, data leakage attempts are 40% and Trojan horse attacks are around 30%. Universities and the Ministry of National Education take the lead when looking at where the most cyber attacks are made. These serious numbers actually make the importance of cyber risks even more remarkable. (Altuntaş, Kara, Soylu, & Kırkbeşoğlu, 2018, s. 10)

First time in Turkey in 2010, it has emerged that there is a need for cyber risk insurance. While in Turkey the first time against the demand for this insurance coverage overseas markets, after 2012 some Turkey offices of global firms began to offer such a guarantee. Thus, the insurance company in Turkey since 2012, began offering coverage in the country. The concept of cyber risks in Turkey, only "data loss" is limited to events considering that, once in place it should be understood that the damage was the result of a much more comprehensive cyber risks and insurance coverage. With the increase in attacks and increased awareness, many companies have accelerated their efforts in this regard. As the first step of these studies, they made expansion in specifications and guarantees. (Altuntaş, Kara, Soylu, & Kırkbeşoğlu, 2018, s. 12)

There are many types of attacks for cyber risk. The five most common types of cyber attacks in Turkey are as follows: Ransom software, phishing attacks, credit card fraud, DOS / DDOS attacks, mobile threats. (Altuntaş, Kara, Soylu, & Kırkbeşoğlu, 2018, s. 10)

In the latest incident has occurred on the 25th March 2021. Following the cyber attack on Yemek Sepeti Elektronik İletişim Perakende Gıda Lojistik AŞ, which was stated by the Personal Data Protection Board (KVKK), which affected 21 million 504 thousand 83 people, an investigation was initiated for data breach. The Information Technologies and Communication Authority (BTK) managed to seize the IP addresses that carried out cyber attacks on Yemeksepeti. In addition, the authorities, who directly contact the companies at risk, also provide information about the measures that can be taken within the institution.

The most important feature that distinguishes cyber risk insurance from other insurers is not the deletion of data, loss or theft. Because data to be damaged in cyber risk insurance is not insured. Data has no monetary value in cyber risk insurance. The request of the third parties arising from the loss of the insured data is insured. Another feature that makes cyber risk insurance different from other insurances is the difficulty in predicting the actual risk as an effect. Because when the damage occurs, it is very difficult to measure this damage. Due to all these complex and difficult determinations, it is not easy for insurers to easily popularize their products in this field and to offer affordable policies to their customers. There is no package policy specified in cyber risk insurance. Therefore, policies with additional coverage are prepared according to the demands and needs of each insured. Cyber risk liability policies cover many risks associated with electronic data and internet use.

Cyber risk insurance can be divided into two as individual cyber risk insurance and commercial cyber risk insurance for the person covered. Under the individual cyber risk insurance coverage; legal counseling service, identity theft, damage to online reputation, online shopping disputes, theft or fraudulent use of payment instruments. In commercial cyber risk insurance; defenses against the public authority and fines, data protection damage of the insurant, cyber ransom damage, information security and confidentiality responsibility, data breach costs, and interruption of work by the insurant are covered.

Another point to be considered here is the issue of taking necessary precautions. Just as traffic insurance does not provide coverage in case of drunk driving and specifies this in its terms, it is necessary to take necessary and certain level security measures in cyber risk insurance. (Çotak, 2019, s. 20)

CONCLUSION

In both contexts result in semi-structured interviews conducted between risk perception and risk assessment perspective of Turkey and the EU insurance companies have been observed that there are huge differences. However, the awareness of businesses related to the potential problems created by cyber risks in Turkey differs from the EU. Although the development of cyber applications in our country is in parallel with developed countries, it has been observed that the awareness and risk perception regarding the risks that will arise as a result of these cyber applications are still at a low level. It can be said that cyber risks also take their share from the relatively low individual risk perception in our country. It is clear that the low risk perception will create some restrictions for insurers to offer coverage for such risks. Risk management or protection from possible damages and taking precautions depends primarily on the development of the insured's awareness and risk awareness. Therefore, as long as risk awareness is not created socially, it will be difficult for insurers to ensure that cyber insurances are sustainable. In other words, cyber insurance sales are far from being a common practice in our country.

According to statistics, attackers continue to access the target system for 299 days without interruption as a result of a successful cyber attack. In other words, institutions can recognize or prevent them after an average of 299 days.

Bank accounts, e-mail addresses and passwords used in every online transaction are opportunities for cybercriminals. In recent years, global crises have occurred with hackers breaking the passwords of public institutions' servers, mobile banking passwords of individual users and even game console passwords.

According to statistics, 91 percent of attacks against internet users are carried out through phishing emails. The most important of these is ransomware that harms both individual users and companies. In attacks carried out with ransomware, which is the most preferred by cybercriminals to make money, criminals demand to decrypt the password for money by encrypting the sensitive files they find on the network and / or the relevant device.

When insurance companies in terms of awareness and efforts in providing their cyber security compared to the EU and Turkey, significant investments in this regard the EU is seen that the insurer did. Most of the EU insurance companies direct 8-12% of their IT investments to security investments. (O'Connor, 2017) No matter how good the cyber security software and firewalls of insurance companies are, security will not be fully ensured if IT workers have insufficient knowledge, skills and awareness. (O'Connor, 2017)

Cyber insurance companies are of great importance in terms of protecting personal data. Therefore, it is equally important for companies to take precautions against possible cyber attacks today. Although insurance companies do not have serious infrastructure, security and education investments of these dimensions in our country, it is seen that awareness regarding the correct direction of these investments is developing in the future. Although best practices in risk analysis processes differ, the problems are similar between the EU and Turkey. However, the extent to which these common problems occur can be further clarified in future studies with the help of quantitative methods, and their levels and effects can be revealed more concretely.

Education is of great importance in protecting individuals from cyber attacks. Regardless of size, industry and geography, cybercrime knows no boundaries. Educating users and increasing their awareness will enable them to recognize and prevent cyber risks and protect themselves against cyber attacks. Considering that internet usage is down to the age of 9, adding cyber security-related courses to the school curriculum may contribute to the measure. As the world evolves into a huge digital age, we need to determine cyber security-related measures from the beginning.

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ORIGINAL ARTICLE

Implementation of COBIT Partially and Possible Risks

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Zübeyir ERGENEKON

Abstract
COBIT is one of the most adopted IT audit framework in the world. Some companies think to implement COBIT partially, not all process of COBIT. In this paper, we are going to some tips to implement COBIT partially in an effective way. Also, we analyze the holistic approach of COBIT and show some examples about partially implementing which destroy the 'holistic approach'. Examples are given from COBIT's PO (Plan and Organise) domain and a combined working process (such as Incident management and change management). Our study will be a guide for sectors that are considering to partially address COBIT, such as the insurance industry.

KEYWORDS
Information Technologies, Insurance

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1. INTRODUCTION

COBIT (Control Objectives for Information and Related Technology) is recognized as a set of best practices for IT management and audit worldwide. The first COBIT version was released in 1996 and currently the latest version is COBIT 2019. COBIT is published by an independent, non-profit organization, which is called ISACA and based in America.

In this paper we will make our comments on COBIT 4.1 version. Our comments maybe are appropriate for other versions of COBIT (COBIT 5 or COBIT 2019) but we have not tested for other versions. Because even though the versions change, the logic of COBIT and many processes remain the same.

COBIT is used in many countries and in many sectors such as finance, telecommunication, energy and insurance for IT audit and governance. But since this is not the subject of our article, we are not going into details. Those who want a detail can see detailed information at ISACA (COBIT Global Regulatory and Legislative Recognition, ISACA, 2014).

In COBIT 4.1, there are 34 processes of 4 main processes and 210 audit criteria related to these processes. You can see the domains (main processes), processes and sub-processes of COBIT at the table 1 below.

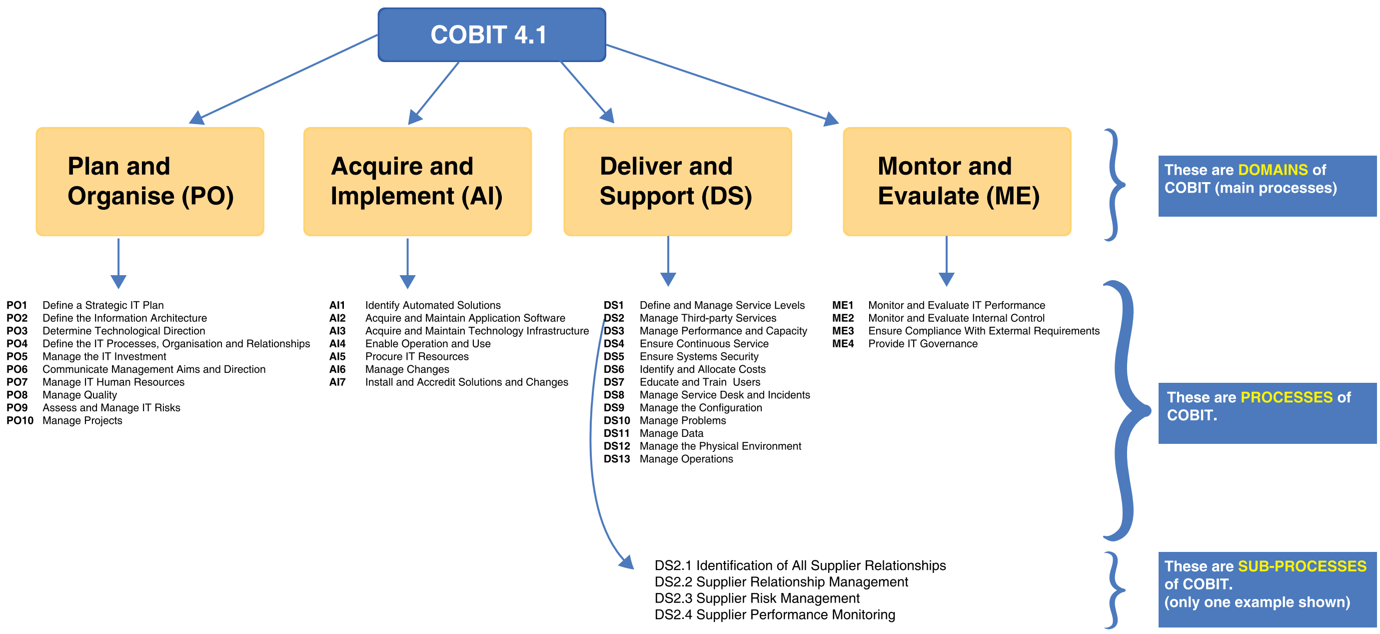

Table 1: COBIT processes.

The increasing importance of information systems has led to an increase in audit and management perception on information systems. In response to this increasing demand, we were met the best practices such as COBIT, ITIL, IS0 27001. While ITIL aims to increase the quality of IT services within IT unit, COBIT aims IT to work in line with the company's strategic goals. ISO 27001 is a standard that deals with data security. The working principles of COBIT and ITIL are in line with the universal data security principles on which ISO 27001 is based.

At this point, we face a new problem. This is how to implement applications such as COBIT and ITIL in business life. Therefore, the value of research and studies on the implementation of standards has increased. In some countries, insurance companies are not as financially rich and not enough regulated as banks; In this case, sectors such as insurance have difficulty in implementing information governance practices such as COBIT. The primary implementation problem is the partial implementation of the COBIT framework, which is difficult to fully implement. Because COBIT is comprehensive and complex, it makes it difficult to fully implement, and it requires serious effort and cost to fully implement. However, examples and case studies at the point of application and partial application are very few. Üvey (2013) also points to this difficulty. Uzunay (2007) stated that COBIT emphasizes the activities that businesses need to do in order to be successful but is not interested in how to do these activities. One reason for the implementation challenge is that COBIT is in this open structure. In this study, we will consider whether COBIT may be implemented partially or not.

2. LITERATURE REVIEW

Zhang and Fever (2013) have written an article on the adaptation of COBIT to BSC (Balance Scorecard). Although the study is not a completely partial application, it sets an example in terms of handling the COBIT processes in different groups. However, Zhang et al. (2013) stated that there was a lack of guidance on the implementation and customization of COBIT and that ISACA presented very few case studies on this subject. Moeller et al. (2013) wrote articles on the sustainability of COBIT 5.

Anomah and Aduamoah (2018) stated in their study that the implementation guidelines for COBIT 5 could not provide guidance on customization. They developed a model for an audit tool with customizing the COBIT 5.

Bartens et al. (2015) have written an article about Using Expert Views for Selective Implementation of COBIT 5. Considering the scarcity of studies on the partial implementation point, we can say that this article is important.

Ana Claudia Martins Amorim (2018) stated in her study that pre-implementation lessons and practical examples for COBIT were scarce and emphasized that due to the complexity, formal implementation guidance was abandoned, and partial implementation was made.

Efe (2013) stated in his study that full compliance to COBIT of regional development agencies may not be possible for but conceptually COBIT can provide a reliable basis for e-government and e-governance requirement of regional development agencies.

As can be seen in the literature review above, there are very few studies and examples regarding the implementation and customization of COBIT, we could not find a study that deals with the partial implementation that we especially focused on.

3. METHODS

3.1. Risks of Implementing COBIT Partially

COBIT is designed to provide integrated IT governance from planning to monitoring. If we select some processes in COBIT and ignore others, we will prevent efficient IT governance and negative results may occur which we present some examples below. In this context, there is a need to identify situations in which processes work with each other and with the overall COBIT system.

However, it is not easy for each company to implement all processes of the COBIT framework at once. This process requires serious labor, money and time. In addition, some companies may not need to implement all COBIT processes due to their business scope.

Therefore, partial implementation of COBIT should be carried out with great care. The COBIT processes to be implement cannot be randomly selected. For this reason, we need to examine the processes of COBIT and how the processes are related to each other so that we can apply COBIT partially without disrupting the integrated and holistic perspective of COBIT. Unfortunately, we have not enough resources, studies and documents to implement COBIT partially. Despite I contact ISACA for this problem, I have not got enough and satisfying answer.

We must clearly say that companies considering partial implementation should analyze well the interdependence and relationship of the processes they have chosen. It should be taken into consideration which processes provide data input / output to which processes and a method that will not harm COBIT's holistic perspective should be chosen. This is possible by understanding the interrelationships of processes and calculating what will be lost when a process is not implemented. Therefore, in our article, we have provided examples of what processes that are not implemented can cause. At this point, the "COBIT Quick start" approach, which we have included in the following pages of the article, offers a good methodology for partial implementation. COBIT Quick Start version has preferred a partial application method by making a reduction in COBIT sub-processes, not in COBIT processes.

COBIT management guidelines describe the interrelations of processes (IT Govarnance Institute, 2007). In this way, we can understand what processes a process provides input and what processes process a process can benefit from (Figure 1).

Figure 1: Interrelations of PO9 with other COBIT process

In figure 1, we can see for PO9 interrelations with other processes. PO1, PO10, DS2, DS4, DS5, ME1, ME4 processes provide data for the PO9 process. In the same way, in the "output" section we can see, for

PO9 Assess and Manage IT Risks

From	Inputs
PO1	Strategic and tactical IT plans, IT service portfolio
PO10	Project risk management plan
DS2	Supplier risks
DS4	Contingency test results
DS5	Security threats and vulnerabilities
ME1	Historical risk trends and events
ME4	Enterprise appetite for IT risks

Outputs	To						
Risk assessment	PO1	DS4	DS5	DS12	ME4		
Risk reporting	ME4						
IT-related risk management guidelines	PO6						
IT-related risk remedial action plans	PO4	AI6					

which processes PO9 provides information to. These are PO1, ME4, PO6, PO4.

Examples of sub-processes that may pose a risk if not implemented together are as follows:

3.2. Occurring Risks When We Do Not Implement PO2

Related Processes: DS11 Manage Data (PO2.3 Data Classification Scheme provides essential data for DS11)

The PO2 process of COBIT aim to define information architecture. PO2.3 which is a sub-process of PO2 is about classification of data. PO2 provides a schema to be classified according to the criticality and sensitivity of corporate data. For example, the data can be classified according to the need of the organization in the form of ‘public, confidential, top secret’ and so on. With this structure which is classify the data; information such as data ownership details, appropriate security levels and protection controls, data retention and destruction criteria are kept. These data are needed for the correct implementation of operations such as access controls, archiving and encryption.

The DS11 process includes arrangements related to Data Management. If we don’t have information about the classification of the data, we can’t talk about the data management being healthy. Data not classified by criticality and sensitivity may cause many problems. Similarly, the sub-process DS 11.4 includes the information of disposal of data. However, the strategic and supportive data that will be the source of disposal operation information is in the process of PO2.3.

In the short words, we cannot effective and efficient data management without classifying the data. Because of ignoring PO2, we may face with problems with data operations such as protection controls, authorization, data storage and destruction criteria. These two processes of COBIT are a good example of how random selection should not be made when implementing COBIT processes. COBIT refers that there are data inputs from PO2 to implement DS11 in the implementation manual. This confirms what we have described above.

Figure 2: Data Inputs from Other COBIT Processes to DS11 process

Source: IT Governance Institute, COBIT 4.1 Management Guidelines 2007, (online) www.isaca.org, retrieved date 09.08.2018

DS11 Manage Data

From	Inputs
PO2	Data dictionary; assigned data classifications
AI4	User, operational, support, technical and administration manuals
DS1	OLAs
DS4	Backup storage and protection plan
DS5	IT security plan and policies

3.3. Occurring Risks When We Do Not Implement PO3

Related Process: PO3.3 -> Monitor Future Trends and Regulations

PO3 is about determining technological route. The PO3.3 sub-process of this process is concerned with monitoring future trends and regulations and monitors and enforces trends in technological processes. It is important to follow the trends of change and technology with an institutional structure. Otherwise, such values may vary depending on personal policies and competencies.

3.4. Occurring Risks When We Do Not Implement PO5

Related Process: PO5.4 -> Cost Management

Because of the companies are being technological oriented nowadays, IT costs are raising. PO5 of COBIT process present some useful information about cost management. It includes the assessment of the potential effects and the determination of such deviations in the event of a deviation in the budget.

Because of ignoring PO5, we cannot determine the deviations of IT budget and how to affect this to projects. However, cost management is necessary for PO1. We need cost management information in strategic and tactical IT plans.

3.5. Occurring Risk When We Do Not Implement Integrated Processes

We gave some examples above about interrelated processes when you can see with analyzing COBIT processes with care. But some of the COBIT processes are directly interrelated together. COBIT implementation guides point these processes directly. In this chapter we try to give a meaningful example about interrelated process directly.

Incident management, problem management, configuration management, capacity management and availability management are directly integrated with each other. (COBIT DS8.2 and DS10.4 points this direct relationship.)

Incident management tracks the incidents and events. In case of need, some incidents escalate to problem management. If an incident and problem need a software or hardware change, we track this record with change management process. We associate the incidents and problems with configuration items. With the reports of incident and problem management we can obtain capacity needs. Strategic decisions can be acquired from configuration management reports for availability management. To summarize, all this critic processes are interrelated with each other. So, we cannot think ignoring to implement some of these processes.

We need to know what services and works are related with the configuration item. If we stop or change configuration item, what should do we need to do for service continuity? The DS9 process provides some useful data to DS8, DS10 and AI6 processes for the purpose of business continuity.

3.6. Occurring Risks When We Do Not Implement PO7.5 and PO4.13

Related Process: PO7.4 -> Personel Training

PO7.5 -> Dependence Upon Individuals and PO4.13 Key IT Personnel

PO7 process is about management of human resources. PO7.4 sub-process is giving useful advices for personnel training. Education must be provided when an employee hired and other times. IT employee's information, talents and awareness of security are staying up to date with educations. Qualified employees play a large role in the realization of the company's targets. If the training practice does not become a corporate value, the qualifications of employees can be lost over time.

PO7.5 is a sub-process of PO7 which is foreseeing process not to only hold by an employee. As you can guess, information and talents which are holding only by one employee contains major risks for companies. "Key IT personnel" process highlights that critical job functions should not be undertaken by one employee. For the reason of PO4.13 is same line with PO7.5, these processes should be assessed together.

3.7. COBIT 5, COBIT 2019 and Flexibility of Implementing

All COBIT frameworks have their own structure and dynamics even though they are similar in basic. However, companies are insufficient to respond to updated versions of COBIT at the same speed. Altering a development that covers all parts of an organization is a tremendous event.

ISACA emphasizes that COBIT 5 is flexible and can be customized. The clarity of this flexibility in practical business life is not obvious. On the other hand, the situation of COBIT 2019 is a separate subject of study in terms of partial implementation.

As a result, there is not enough knowledge, source, case analysis and industry experiences related to partial implementation of COBIT. We think that ISACA should seriously consider the partial implementation of COBIT.

3.8. Cobit Quickstart Version

COBIT Quickstart is the recommended version of COBIT for SMEs. At the same time COBIT Quickstart version gives a well thought and designed way to the companies who thinks to implement COBIT partially. In COBIT Quickstart version, the COBIT processes implemented generally. We mean that processes like po1, ds1, po4 are chosen generally and decrease the sub-processes like po1.4, ds4.5 etc. You can see this difference at the table 2. This is very intelligent and elegant choice. Thus, we do not lose the holistic approach of COBIT. Ignoring to implement COBIT processes could lead to major risks.

Table 2. Comparison for COBIT and COBIT Quickstart
Source: IT Govarnance Institute, COBIT Quickstart Framework, second edition, 2007, p.14.
Some companies want to use some COBIT processes to increase their level. But especially for the SME's this is not a practical way for every time. Because you need tremendous work, money and effort to apply COBIT completely. You need additional software, culture change and time. Thus, COBIT Quickstart's way

	COBIT	COBIT Quickstart
Domains (Main Processes)	4	4
Processes	34	32
Sub-processes	210	59

is the best way to implement COBIT partially. We do not defense that you should go with the same line with COBIT Quickstart. You should follow the COBIT Quickstart's thought, mind and choosing techniques.

Some of companies do not want to track an extra way and they want to follow a tested way. In this situation implementing COBIT Quickstart is a good way for some companies. But is COBIT Quickstart fit for our company? How do we know that? You can use these tests for answering this question. With "Stay in the blue zone" and "Watch the heat" tests, you can analyze whether COBIT Quickstart is fit for your company.

4. DISCUSSION

Because of COBIT implementation completely is a huge job and effort, this is not suitable for every company. SMEs can choose for them which they really need and meaningful for themselves. They should determine their risks and they should consider these risks when they are choosing processes. In the process choosing, companies must consider the subject of prevention of COBIT holistic view.

They should choose 34 principal process completely and choose other sub-processes to their needs. They must protect the processes of COBIT completely. They can reduce sub-processes that they think to implement. Ignoring principal processes is not a good way and give damage to the COBIT's mechanism. Sub-processes which are related each other should be searched. They should consider what all sub-processes are intended at.

In the COBIT partially implementation plan and process selection, companies must understand holistic IT governance concept what COBIT offer.

In our study, we have theoretically discussed the risks of partial implementation, it will be useful to conduct research on a business that performs partial implementation. However, further versions of COBIT should also be taken into account and it would be useful to consider further COBIT processes. Also Examples from other COBIT processes can also be reproduced. In this study, as an example, the risk assessment of 5 processes in partial implementation is discussed. As we mentioned earlier, the situation of COBIT 2019 and COBIT 5 is a separate subject of study in terms of partial implementation. However, this study can give an idea or methodological example for analyzing the risks in different areas for the cases of separating the part from the whole.

Swallowing a drug by dividing it may not harm but using a medicament by removing a component in the drug can seriously damage the structure.

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ORIGINAL ARTICLE

Effects of Education Related Demographic Characteristics on Finding Job in Insurance Companies

Yusuf AKGÜL

Abstract

In this study, the effects of demographic factors related to insurance education and other education fields, which are considered to be effective in the recruitment of insurance companies operating in different branches in the insurance sector, were examined. In the study, it was also investigated whether the education provided in universities and similar schools is effective in employment. Along with the demographic factors related to education, gender, company employee and direct sales personnel variables were also selected categorically. Working status in insurance companies operating in different branches is a dependent variable and is coded categorically. Employment data on insurance companies between 2014-2020 were used in the study. As a solution method, the multinomial logistic regression method was used. According to the results obtained in the study, it was seen that those who graduated from the insurance and actuarial departments of the universities were employed in non-life insurance companies. However, it has been observed that the majority of those employed in insurance companies are direct sales personnel and they are women. In addition, as a result of the study, it was determined that the education provided in the relevant field was not sufficient for finding a job in the insurance sector.

KEYWORDS

Insurance Companies, Human Resources, Employment, Multivariate Statistics.

JEL CLASSI FICATION

G22, O15, E24, C46

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1. INTRODUCTION

The increasing complexity and rapid pace of the global economy has led to increased competition between businesses in today's economy. In this case, the human resource parameter has become the key to creating a very tight competitive advantage. Managers usually try to find and implement mechanisms that will ensure high performance of their employees in most of the time. Examining employee motivation has always been a central element to manage, especially when managers are faced with further environmental changes, work pressure and staff complaints (Chen, 2016, s. 740).

The insurance industry has become very competitive today and continues to mature rapidly. The general structure of the sector and its private resources are linked to performance differences between companies. The global economic crisis that occurred in 2008 was seen to seriously affect the profitability of insurance companies and increased the underwriting risk (Felício, Rodrigues, 2015, s. 1622).

Acquisition and retention of human resources for a firm are the two most critical factors for the sustainability of the firm. For every company operating in many fields, for example, in profit-making and service-based businesses, human resources are an important factor as they are in direct contact with customers. In addition, it can reduce the ability of companies to enter the market and increase customer dissatisfaction in cases such as the absence and retention of human resources. This negative situation can increase current employee dissatisfaction and decrease a firm's overall performance (Moses, Sharma, 2020, p. 76).

Insurance companies also must create effective human resources in terms of continuing their activities for competing in the market and ensuring customer satisfaction. Since they are in direct contact with customers due to their activities, they must improve their existing human resources and make it sustainable. Insurance companies whose main activity is policy sales and premium collection should have well-functioning human resources processes in developing and protecting human resources.

Considering the employees of insurance companies in the insurance sector in Turkey for the last three years, the average increase rate is between 1% and 3%. There are some reasons why the rate of increase has been so slow in recent years. One of the reasons is that the undergraduate, graduate and postgraduate education given in this field is insufficient and therefore, the qualified personnel needed by insurance companies cannot be trained.

Technological developments in the infrastructure in the insurance sector and the reduction in the need for employees due to the fact that a large part of the business volume is solved by technology due to these developments also causes a slowdown in employment. Although the majority of the market in the sector is controlled by the non-life insurance sector, it causes a slowdown in employment in other branches, as this will only cause the need for personnel in this branch.

In this study, demographic factors related to education, which are effective in recruitment and employment in insurance companies, are examined. Factors affecting the employment of employees are analyzed by the multinomial logistic regression method and it has been investigated in which insurance branch they affect the employment of employees. The findings obtained were interpreted in the conclusion part and policy recommendations that could be implemented were made.

2. LITERATURE REVIEW

Studies on recruitment and employment in the insurance sector are limited and no studies have been found or reached. No study has been found in the literature in which educational status and other demographic characteristics are clearly studied. The majority of the work is on the intellectual capital components in insurance companies, the employee and the working environment, the employees and their loyalty to the company, and the motivation of the employees.

Tomic et al. (2018) examined the relationships between employee engagement, service quality, cost reduction and company performance in order to investigate the effect of employee loyalty on company performance. The research model was developed and experimentally tested on a sample of 100 service companies with 317 surveys conducted in the Republic of Serbia and Bosnia Herzegovina. They used different statistical analyzes and concluded that employee engagement is significantly correlated and has a positive impact on company performance.

According to Grabow (2005) facing increasing spending by public health insurance companies due to their activities, increasing statutory premiums for health insurance and consistently high unemployment, the German government decided to create a public health insurance scheme that came into effect in January 2004.

In the first part of the study, the reasons for reform are discussed and basic issues are presented. According to the reform, the potential of the reform to increase employment was discussed in order to contribute to the increase of legal employment by reducing the legal contributions to the public health program. Finally, the study illustrates alternative healthcare reform models and compares their potential for job growth. Although the government planned health care reform took into account the need to both reduce legal contributions to public health insurance and ease the income tax to compensate for higher individual payments for medical treatment. It limited employment growth potential as it lacked the support of the health bureaucracy and the pharmaceutical industry. It has been stated that such reforms resemble a struggle with a Goliath with strong interest, formations, a slow-moving bureaucracy, and uncertain socio-economic consequences.

Brunt and Bowblis (2017) investigated the different effects of the concentration in the health insurance market on the net remuneration of employees of different company sizes. Consistent with the existing literature assessing insurer market concentration and the compensatory differential theory, they found evidence of higher premiums and reduced net compensation for those working in markets with denser insurers. Moreover, they found evidence that the magnitude of these effects was significantly smaller for large employers. It was noted that mergers of large health insurance companies could have a significant impact on small businesses, but mean the impact was mitigated for larger employers.

Qi and Ming-Xia (2014) investigated the link between ethical leadership and employee vocal behavior by focusing on the mediating role of organizational identification and the moderating role of organizational trust. Results of different data obtained from a pair of followers of 293 supervisors working in an insurance group in China found that ethical leadership was positively associated with the employee's vocal behavior. They also found that organizational identity and ethical leadership fully mediated the positive impact of employees on voice behavior. On the other hand, they found that organizational trust regulates the relationship between organizational identity and employee voice. Another finding is that the mediation effect between ethical leadership and the voice of the employee is governed by moderated mediation.

Rahman, Akhter, Khan (2017), using Herzberg's two-factor motivation theory, tried to investigate the factors affecting the job satisfaction of sales representatives from Islamic (Takāful) and Pakistan's traditional insurance business. They received a total of 318 usable answers using the questionnaire method and the multi-stage stratified random sampling method. Multiple regression and hierarchical regression solution methods, including 11 hygiene-motivation factors were used to observe job satisfaction in the presence of moderator factor and Shariah perception. According to Herzberg's two factor theory, the solution results between these two direct selling groups were completely different with the presence of a moderately variable Sharia perception. Without alleviating the impact of the perception of Sharia, Takāful family and traditional life insurance full-time direct sales agents have shown that hygiene factors and motivation factors are more effective indicators of job satisfaction for Pakistan. While controlling the moderating effect in the presence of moderately variable Shariah perception, the Takāful family salespeople are satisfied with the hygiene factors that the motivators are not significantly affected by the perception of Sharia. On the other hand, it was emphasized that traditional life insurance sales agents do not have any connection with the perception of Sharia.

Kuokkanen, Varje, Väänänen, (2020) examined the emergence and development of the discourse on mental health issues as an occupational health risk in professional discussions among Finnish insurance workers from a historical perspective. According to the findings obtained at the end of the study, it was seen that mental health discourse was affected by organizational, cultural, and political changes. In addition, it was stated that the role and power relations of employees in the insurance sector affect the way mental health problems are expressed in professional discussions. Due to the democratization movement in the workplace and the increasing power of the unions in the 1970s, there were positive developments in terms of mental health of employees, and at the same time, the increase in mental health problems legitimized the activity of the union. However, the trend of individualization, which began in the 1990s and 2000s, led to the view that employees were responsible for maintaining and regulating their mental health and competitiveness, once again limiting the opportunities to express their grievances in the workplace and seeming to undermine solidarity among employees.

Hung, Wu (2016) investigated the effects of the job position and survey duration on the employee's corporate loyalty to the insurance company after the merger. According to the results, it was seen that both the job position and the duration of the survey are important determinants for the organizational commitment of the employee. Besides, according to the results, it was observed that there was no interaction effect between the duration of the survey and the job position. It was stated that the survey duration for each year, the organizational commitment average of the represented employees was significantly higher than the staff employees. It was observed that the average organizational commitment difference between representatives and employees decreased from year to year during the survey period.

Oosthuizen, Visser, Mudzimu (2014) tried to determine the relationship between job stress, work-home intervention and organizational culture perceptions of insurance workers in Zimbabwe. The data used in the study were obtained from the data set consisting of 190 employees who completed the Occupational Stress Inventory-Revised (OSI-R), Work-Home Intervention Questionnaire (SWING) and the Organizational Culture Index (OCI). They used correlation and standard multiple regression analysis methods in data analysis. According to the results obtained in the study, the OSI-R's Role Overloading, Role Inadequacy, Role Uncertainty, Role Limit, Responsibilities, Physical Environment sub-dimensions, Positive Work-Home Initiative and Negative Work-Home SWING and OCI's Bureaucratic, Innovative and A significant positive correlation was found between Supportive Culture subscales. According to the findings, it was seen that insurance employees, who are under constant pressure of the sector, contributed to new information in the context of the job stress experienced. It is also stated that it can be used to improve the work-life balance of the insured and the impact of the organizational culture perceived by the insured and to gain insight.

Herselman (2006) examined the qualifications and behaviors of a group of black financial advisors in terms of empowerment concept in a study based on research conducted in a life insurance company. According to the author, it tries to show this empowerment in terms of creating conditions in which people can achieve their goals. This discussion demonstrated that there is an ongoing process that is defined and placed in the context of South African society and the aspects of the company concerned, consisting mainly of dimensions based on empowering agency institutions and practices.

Yeganeh et al. (2014) examined the intellectual capital situation and its components (human capital, customer capital and structural capital) in public and private insurance companies. The effect of ownership type of insurance companies on the degree of importance of intellectual capital and components has been examined. In this study, a descriptive questionnaire method was used in terms of data collection. According to the findings obtained at the end of the study, it is seen that the ownership type of insurance companies has a significant effect only on the human capital variable. However, it has been observed that it does not have a significant effect on customer capital and structural capital variables. In addition, it was stated that the ownership type of insurance companies has a significant effect on the intellectual capital variable, and the situation of intellectual capital in private insurance companies is better than that of public insurance companies.

Kalkavan, Katrinli, Çetin, (2015) examined the effects of the Leadership Development Model, which was developed in parallel with the restructuring of the human resources department of an insurance company operating in the Turkish Insurance Sector Elemental Branch, on the institution and its employees as part of the change management process. In the study, it was aimed to reveal the contribution of the said development model to the relevant institutions and employees and to give an idea about the possible model methods in different institutions and organizations.

Lee et al. (2014) proposed an integrative transfer of the education model in their study and examined the effect of pre-training performance on the relationship between work environment variables and transfer-related variables. The structural equation modeling used in the study was performed using data collected from 365 Korean employees of a large general insurance company. All of the employees participating in the sample participated in a leadership development program. According to the results obtained from the multi-group analysis, it was observed that the effect of work environment variables on the variables related to transfer was managed by the pre-training performance of the employees. According to the findings obtained as a result of the study, it was understood that a more detailed education transfer model is required that sees performance not only as an outcome variable but also as a precursor variable. However, it has been suggested to implement different strategies to encourage training transfer according to the pre-training performance level of the employees.

3. INFORMATION ABOUT INSURANCE SECTOR EMPLOYMENT NUMBERS

The concept of employment is an essential concept for any entity that carries out commercial and service activities, whether for profit or not. One of the elements necessary for the delivery of the produced services and activities to people and their services is human. The concept of employment gains more importance in the insurance industry. For these market players who are in direct contact with the customer, the concept of people has been always at the forefront. Human beings are at the top of the list of factors that enable the activities to be carried out effectively and efficiently. In short, human resources in the insurance industry are one of the first in the planning.

Table 1 shows the number of employments in the Turkish Insurance Sector by years. When analyzed by years, the number of employments of those graduating from high schools and equivalent schools decreases. We can say the same thing for secondary schools and their equivalent schools in years 2015, 2016 and

2018. Employment numbers of primary school graduate decreased in 2016 and 2017. Employment numbers for 2-year vocational school graduates decreased in 2018.

Table 1. Employment Numbers of Years in The Turkish Insurance Sector.

	Primary school	Secondary School and Equivalent	High School and Equivalent	2-year Vocational School	University	Postgraduate
2014	119	99	1.660	1.604	7.726	1.357
Change %	0	0	0	0	0	0
2015	129	96	1.531	1.643	8.214	1.449
Change %	0,08	-0,03	-0,08	0,02	0,06	0,07
2016	102	82	1.495	1.682	8.635	1.559
Change %	-0,21	-0,15	-0,02	0,02	0,05	0,08
2017	93	94	1.366	1.696	9.182	1.643
Change %	-0,09	0,15	-0,09	0,01	0,06	0,05
2018	114	72	1.323	1.600	9.189	1.772
Change %	0,23	-0,23	-0,03	-0,06	0,00	0,08
2019	123	73	1.243	1.606	9.360	1.823
Change %	0,08	0,01	-0,06	0,00	0,02	0,03
2020	107	75	1.191	1.631	9.685	1.934
Change %	-0,13	0,03	-0,04	0,02	0,03	0,06

4. METHODOLOGY AND DATA

4.1. Variables

Categorical and numerical data were used in the study. The data used in this study was taken from Turkey Insurance Association website. Only the demographic data in the table could be obtained from the website of the Turkish Insurance Association. Data between the years 2016-2020 were used in the study . Two types of data were used. The categorical data used in the study were determined as company type, employment status and gender. Employment status, which is a categorical variable coded in two groups as company employee and direct sales personnel. The dependent variable as company type is divided into non-life, life, life&pension categories. The gender variable is divided into groups as men and women. Other numerical variables are divided into groups as basic education, vocational degree education, university and postgraduate. The variables and their abbreviations coded in SPSS used in the study are given in Table 2.

[1] The data set used in the study does not require ethics committee permission, legal permission or special permission. Research and publication ethics were followed in the study.

Table 2. Variables and Encodings

Categorical Variables			
Employment	**Encodings**	**University Graduate**	**Encodings**
Company Employee:	Company Employee	Economics	UNVEKO
Direct Sales Personnel:	DSPS	Business Administration	UNVISL
Gender		İnsurance or Actuarial	UNVSI.AK
Man:	Man	Engineering	UNVMUH
Woman:	Woman	Other	UNVDIG
Company Type		**Postgraduate**	
Non-Life	HD	Economics	LUEKO
Life	H	Business Administration	LUISL
Life and Pension	E	İnsurance	LUSIG
Basic Education Variables		Engineering	LUMUH
High School	LISE	Other	LUDIG
Vocational School Degree Education			
Vocational School Insurance Department	YSIG	Vocational School Other Departments	YDIG

4.2. Multinomial Logistic Regression

Logistic regression analysis (LRA) is a statistical solution method that models the probability of the dependent variable called binary. LRA assumes a linear relationship between the log probabilities of the dependent variable and the independent variables in the equation. LRA method is the solution method that is used frequently in many scientific fields. There are also different types of logistic regression method. One of them is the multinomial logistic regression (MLR) method. MLR method is applied as a different generalization of logistic regression to problems involving more than two groupings (Moon, Kim, 2020, p. 1).

Multinomial logistic regression analysis is a type of logistic regression analysis and is conceptually consistent with logistic regression analysis (Aldrich & Nelson, 1984; Hosmer & Lemeshow, 2000). The logistic regression method was first proposed by Berkson (1944). According to the number of categories of the dependent variable in the model, it can be expressed as logistic regression, binary logistic regression or multinomial logistic regression. Multinomial logistic regression analysis is basically based on the assumption that the categories of the dependent variable are completely separate. Considering the dependent variable, a category should serve as a basic category and accordingly, the regression coefficient of the basic category in the model can be calculated (Long, 1997). A multinomial logistic regression model can be thought of as K-1 logistic models for K dependent variables. For such reasons, the multinomial logistic model theory is similar to the logistic model theory. It also uses binary data to analyze the non-fulfillment rate in the formation of a logistics model. When working with a multinomial logistic model, a dependent variable is matched with the base category to calculate the probability ratio of the determined underlying category (Chan, Chang, Chen, Lee, 2019, p. 423):

When the definition of the dependent variable representing the investigated case is qualitative and offers more than two possible outcome categories, a multinomial logistic regression analysis is used to estimate the probability of occurrence for each alternative. To start the analysis, firstly the reference category is defined. Consider, for example, a model in which a dependent variable is presented qualitatively with three possible response categories. Let the selected reference category be 0 and there will be two other event possibilities that will be represented by categories 1 and 2 related to that category.

To explain this situation, if two explanatory variable vectors are defined with the corresponding predictive parameters (Fávero, Belfiore, 2019, p.563).

$$Z_{i1} = a_1 + B_{11} * X_{1i} + B_{21} * X_{2i} + \cdots + B_{k1} * X_{ki} \quad (1)$$

$$Z_{i2} = a_2 + B_{12} * X_{1i} + B_{22} * X_{2i} + \cdots + B_{k2} * X_{ki} \quad (2)$$

where the logit number, each parameter to be estimated is displayed in the lower symbol. Then, if the dependent variable representing the item under study generally presents M response categories, the estimated logit number will be (M - 1). Therefore, it will be easy to predict the probability of occurrence for each of the categories. The general expression of logit Zim (m =0, 1,…, M-1) for a model in which a dependent variable assumes M response categories is:

$$Z_{im} = a_m + B_{1m} * X_{1i} + B_{2m} * X_{2i} + \cdots + B_{km} * X_{ki} \quad (3)$$

where $Z_{i_0} = 0$ and $e^{Z_{i_0}} = 1$.

In this case, the probability of an event not occurring and an event occurring are calculated using the following equations, respectively:

Probability of occurrence of the non-event:

$$1 - p_i = \frac{1}{1+e^{Z_i}} \quad (4)$$

Probability of occurrence of the event:

$$p_i = \frac{e^{Z_i}}{1+e^{Z_i}} \quad (5)$$

Probability of occurrence for category 0 (reference):

$$p_{i_0} = \frac{1}{1+e^{Z_{i_1}}+e^{Z_{i_2}}} \quad (6)$$

Probability of occurrence for category 1:

$$p_{i_1} = \frac{e^{Z_{i_1}}}{1+e^{Z_{i_1}}+e^{Z_{i_2}}} \quad (7)$$

Probability of occurrence for category 2:

$$p_{i_2} = \frac{e^{Z_{i_2}}}{1+e^{Z_{i_1}}+e^{Z_{i_2}}} \quad (8)$$

At the same time, the total probability of occurrence of events represented by different categories is equal to 1. For M answer categories:

$$p_{i_m} = \frac{e^{Z_{i_m}}}{\sum_{m=0}^{M-1} e^{Z_{i_m}}} \quad (9)$$

4.3. Estimation of the Multinomial Logistic Regression Model

In this study, the dependent variable is divided into three categories: those employed in non-life insurance companies (HD), those employed in life insurance companies (H), and those employed in life and pension insurance companies (E). In addition, the interaction effects of independent variables such as employment type, gender, and university graduation were also examined. In this case, the MLR equation to be estimated according to the categorical dependent variable is as follows for M = 3 (reference category "0"):

$$Z_{i1} = a_1 + \beta_{11} * EMPLOYMENT + \beta_{21} * GENDER + \beta_{31} * UNVEKO + \beta_{41} * UNVISL + \beta_{51} * UNVHUK + \beta_{61} * UNVSI.AK + \beta_{71} * UNVMUH + \beta_{81} * UNVDIG + \beta_{91} * (EMPLOYMENT * GENDER * UNVEKO) + \beta_{10.1} * (EMPLOYMENT * GENDER * UNVISL) + \beta_{11.1} * (EMPLOYMENT * GENDER * UNVHUK) + \beta_{12.1} * (EMPLOYMENT * GENDER * UNVSI.AK) + \beta_{13.1} * (EMPLOYMENT * GENDER * UNVMUH) + \beta_{14.1} * (EMPLOYMENT * GENDER * UNVDIG) \tag{10}$$

$$Z_{i2} = a_1 + \beta_{12} * EMPLOYMENT + \beta_{22} * GENDER + \beta_{32} * UNVEKO + \beta_{42} * UNVISL + \beta_{52} * UNVHUK + \beta_{62} * UNVSI.AK + \beta_{72} * UNVMUH + \beta_{82} * UNVDIG + \beta_{92} * (EMPLOYMENT * GENDER * UNVEKO) + \beta_{10.2} * (EMPLOYMENT * GENDER * UNVISL) + \beta_{11.2} * (EMPLOYMENT * GENDER * HUK) + \beta_{12.2} * (EMPLOYMENT * GENDER * UNVSI.AK) + \beta_{13.2} * (EMPLOYMENT * GENDER * UNVMUH) + \beta_{14.2} * (EMPLOYMENT * GENDER * UNVDIG) \tag{11}$$

The MLR equation estimated for postgraduate education is as follows:

$$Z_{i1}^{*} = a_1 + \beta_{11} * EMPLOYMENT + \beta_{21} * LUEKO + \beta_{31} * LUISL + \beta_{41} * LUHUK + \beta_{51} * LUSIG + \beta_{61} * LUMUH + \beta_{71} * LUDIG + \beta_{81} * (EMPLOYMENT * LUEKO) + \beta_{91} * (EMPLOYMENT * LUISL) + \beta_{10.1} * (EMPLOYMENT * LUHUK) + \beta_{11.1} * (EMPLOYMENT * LUSIG) + \beta_{12.1} * (EMPLOYMENT * LUMUH) + \beta_{13.1} * (EMPLOYMENT * LUDIG) \tag{12}$$

$$Z_{i2}^{*} = a_1 + \beta_{12} * EMPLOYMENT + \beta_{22} * LUEKO + \beta_{32} * LUISL + \beta_{42} * LUHUK + \beta_{52} * LUSIG + \beta_{62} * LUMUH + \beta_{72} * LUDIG + \beta_{82} * (EMPLOYMENT * LUEKO) + \beta_{92} * (EMPLOYMENT * LUISL) + \beta_{10.2} * (EMPLOYMENT * LUHUK) + \beta_{11.2} * (EMPLOYMENT * LUSIG) + \beta_{12.2} * (EMPLOYMENT * LUMUH) + \beta_{13.2} * (EMPLOYMENT * LUDIG) \tag{13}$$

5. ANALYSIS RESULTS AND FINDINGS

In the analysis results section of the study, the results obtained by the multinomial logistic regression method are included. The analysis part of the study was applied in the following order and the results obtained were given under different headings. The dependent variable in the study was coded as HD, H and E.

Group 1) It was analyzed according to categorical variables, basic education and vocational high school graduation status.

Group 2) It was analyzed according to categorical variables, university graduation status.

Group 3) It was analyzed according to categorical variables, postgraduate degree.

The results obtained in the study are given in summary tables.

5.1. Analysis Results According to Categorical Variables and University Graduation Status

Analysis results according to categorical variables, basic education and vocational high school graduation status variables, there are no significant statistical variables or model could be obtained with the multinomial logistic regression analysis.

In the tables where the results obtained as a result of multinomial logistic regression are summarized, variables with significant probability values are included.

Table 3 shows the steps taken while creating the MLR model. In the first model created with the independent variables used in the model (Model 0), the probability value is not significant. Probability values are also observed by adding the variables in which the effects of the interaction of independent variables with each other are given to the model. With the entry of the EMPLOYMENT * GENDER * UNVDIG interactive variable into the model no. 1, the probability value is found to be meaningful. The last interactive variable EMPLOYMENT * GENDER * UNVEKO was included in the model with the ongoing additions and finally the model number 4 was obtained since the probability value is p <0,05.

Table 3. **Model Step Summary**

		Model Fitting Criteria			Effect Selection Tests		
Model	**Effect(s)**	**AIC**	**BIC**	**-2 Log Likelihood**	**Chi-Square[a]**	**df**	**Sig.**
0	**Intercept, EMPLOYMENT, GENDER, UNVEKO, UNVISL, UNVHUK, UNVSI.AK, UNVMUH, UNVDIG**	1234,811	1326,522	1198,811			
1	**EMPLOYMENT * GENDER * UNVDIG**	1196,505	1318,786	1148,505	50,306	6	,000
2	**EMPLOYMENT * GENDER * UNVMUH**	1183,179	1336,031	1123,179	25,326	6	,000
3	**EMPLOYMENT * GENDER * UNVISL**	1180,937	1364,360	1108,937	14,242	6	,027
4	**EMPLOYMENT * GENDER * UNVEKO**	1176,616	1390,609	1092,616	16,321	6	,012

Stepwise Method: Forward Entry

a. The chi-square for entry is based on the likelihood ratio test.

Table 4 contains information about the model created. When all variables entered the model, the -2Log-Likelihood value was calculated as 1092,616 in the last model created. This means that since the probability value p <0.005 is small, the final model formed is significant. When the goodness of fit test was examined, Pearson and Deviance values were found to be statistically significant. In other words, the probability value for Pearson must be less than P <0.005, and the Deviance probability value must be greater than P> 0.005. Table 4 provides these conditions. Also, Cox and Snell, Nagelkerke and McFadden R2 values were found to be significant.

Table 4. Model Fitting

	Model Fitting Criteria			Likelihood Ratio Tests		
Model	**AIC**	**BIC**	**-2 Log Likelihood**	**Chi-Square**	**df**	**Sig.**
Intercept Only	1629,813	1640,003	1625,813			
Final	1176,616	1390,609	1092,616	533,196	40	,000

	Goodness-of-Fit			Pseudo R-Square	
	Chi-Square	**df**	**Sig.**	**Cox and Snell**	,357
Pearson	1997,349	1674	,000	**Nagelkerke**	,440
Deviance	1053,827	1674	1,000	**McFadden**	,264

The results in Table 5 are obtained when the life and pension insurance company variable is taken as the reference category. When Table 5 is analyzed, the following can be said for non-life insurance companies, according to variables whose probability values are significant.

Employment in non-life insurance companies focuses on direct sales personnel. In other words, most of the employees are employed as direct sales personnel.

Graduates of law and insurance / actuarial departments of universities are employed in non-life insurance companies. However, graduates of other departments of universities are not employed in non-life insurance companies.

Women graduating from the business department of universities and men graduating from engineering departments of universities are employed as direct sales personnel in non-life insurance companies. However, women who have graduated from business administration departments of universities are not employed as company personnel in non-life insurance companies. Again, women who have graduated from economics, engineering and other departments of universities are not employed as direct sales personnel in non-life insurance companies.

For life insurance companies, women graduating from other departments of universities are employed as company employees. However, women who have graduated from engineering departments of universities are not employed as company employees in life insurance companies.

Table 5. Parameter Estimates for Non-Life and Life Insurance Companies

Parameter Estimates									
			Std.					95% Confidence Interval for Exp(B)	
COMPNY TYPE[a]		B	Error	Wald	df	Sig.	Exp(B)	Lower Bound	Upper Bound
HD	Intercept	,343	,177	3,758	1	,053			
	[EMPLOYMENT=0]	1,088	,202	28,867	1	,000	2,967	1,996	4,413
	UNVHUK	1,124	,170	43,706	1	,000	3,078	2,206	4,296
	UNV SI.AK	,327	,048	46,875	1	,000	1,386	1,263	1,522
	UNVDIG	-,063	,018	11,906	1	,001	,939	,906	,973
	[EMPLOYMENT=0] * [CINS=0] * UNVEKO	-,158	,058	7,522	1	,006	,854	,762	,956
	[EMPLOYMENT=0] * [CINS=0] * UNVISL	,116	,046	6,460	1	,011	1,123	1,027	1,227
	[EMPLOYMENT=1] * [CINS=0] * UNVISL	-,077	,034	5,254	1	,022	,926	,867	,989
	[EMPLOYMENT=0] * [CINS=0] * UNVMUH	-,429	,196	4,796	1	,029	,651	,443	,956
	[EMPLOYMENT=0] * [CINS=1] * UNVMUH	,315	,151	4,360	1	,037	1,370	1,019	1,840
	[EMPLOYMENT=0] * [CINS=0] * UNVDIG	-,067	,032	4,471	1	,034	,935	,879	,995
H	Intercept	-,267	,319	,704	1	,402			
	[EMPLOYMENT=1] * [CINS=0] * UNVMUH	-,757	,285	7,044	1	,008	,469	,268	,820
	[EMPLOYMENT=1] * [CINS=0] * UNVDIG	,181	,057	9,998	1	,002	1,199	1,071	1,342

a. The reference category is: E.

b. This parameter is set to zero because it is redundant.

When we take life insurance companies as a reference category, we get the results in Table 6. Again, according to Table 6, employment in non-life insurance companies concentrates on direct sales personnel. In addition, those who have graduated from law departments of universities are employed. Women graduating from engineering departments of universities are employed as company employees in non-life insurance companies. However, women who have graduated from other departments of universities are not employed as company employees. In life and pension insurance companies, women who graduated from engineering departments of universities are employed as company employees, while women who graduate from other departments are not employed as company employees.

Table 6. Parameter Estimates for Non-Life and Life&Pension Insurance Companies

Parameter Estimates									
								95% Confidence Interval for Exp(B)	
COMPNY TYPE[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	Lower Bound	Upper Bound
HD	Intercept	,611	,306	3,979	1	,046			
	[EMPLOYMENT=0]	1,211	,327	13,716	1	,000	3,355	1,768	6,367
	UNV HUK	1,450	,396	13,438	1	,000	4,262	1,963	9,254
	[EMPLOYMENT=1] * [CINS=0] * UNV MUH	,706	,284	6,170	1	,013	2,027	1,161	3,538
	[EMPLOYMENT=1] * [CINS=0] * UNV DIG	-,182	,058	9,979	1	,002	,833	,744	,933
E	Intercept	,267	,319	,704	1	,402			
	[EMPLOYMENT=1] * [CINS=0] * UNV MUH	,757	,285	7,044	1	,008	2,131	1,219	3,727
	[EMPLOYMENT=1] * [CINS=0] * UNV DIG	-,181	,057	9,998	1	,002	,834	,745	,933

a. The reference category is: H.

b. This parameter is set to zero because it is redundant.

When we take non-life insurance companies as a reference category, we obtain the results in Table 7. We can say the following for life insurance companies. Employment in life insurance companies does not focus on direct sales personnel. Those who have completed the law department of universities are not employed in life insurance companies. In addition, women who have graduated from the engineering departments of universities are not employed as company employees. Women who have graduated from other departments of universities are employed as company employees.

We can say the following for life and pension insurance companies. Employment in life and pension insurance companies does not concentrate on direct sales personnel. Graduates of law and insurance / actuarial departments of universities are not employed. In addition, women who have graduated from business administration departments of universities and men who have graduated from engineering departments of universities cannot be employed as direct sales personnel in life and pension insurance companies.

Graduates from other departments of universities are employed in life and pension insurance companies. Women graduating from economics, engineering and other departments of universities are employed as direct sales personnel in life and pension insurance companies. In addition, women who have completed the business division of universities are employed in life and pension insurance companies as company employees.

Tablo 7. Parameter Estimates for Life and Life&Pension Insurance Companies

Parameter Estimates									
								95% Confidence Interval for Exp(B)	
COMPNY TYPE[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	Lower Bound	Upper Bound
H	Intercept	-,611	,306	3,979	1	,046			
	[EMPLOYMENT=0]	-1,211	,327	13,716	1	,000	,298	,157	,566
	UNV HUK	-1,450	,396	13,438	1	,000	,235	,108	,509
	[EMPLOYMENT=1] * [CINS=0] * UNV MUH	-,706	,284	6,170	1	,013	,493	,283	,862
	[EMPLOYMENT=1] * [CINS=0] * UNV DIG	,182	,058	9,979	1	,002	1,200	1,072	1,343
E	Intercept	-,343	,177	3,758	1	,053			
	[EMPLOYMENT=0]	-1,088	,202	28,867	1	,000	,337	,227	,501
	UNV HUK	-1,124	,170	43,706	1	,000	,325	,233	,453
	UNV SI/AK	-,327	,048	46,875	1	,000	,721	,657	,792
	UNV DIG	,063	,018	11,906	1	,001	1,065	1,028	1,104
	[EMPLOYMENT=0] * [CINS=0] * UNV EKO	,158	,058	7,522	1	,006	1,172	1,046	1,312
	[EMPLOYMENT=0] * [CINS=0] * UNV ISL	-,116	,046	6,460	1	,011	,891	,815	,974
	[EMPLOYMENT=1] * [CINS=0] * UNV ISL	,077	,034	5,254	1	,022	1,080	1,011	1,154
	[EMPLOYMENT=0] * [CINS=0] * UNV MUH	,429	,196	4,796	1	,029	1,536	1,046	2,256
	[EMPLOYMENT=0] * [CINS=1] * UNV MUH	-,315	,151	4,360	1	,037	,730	,543	,981
	[EMPLOYMENT=0] * [CINS=0] * UNV DIG	,067	,032	4,471	1	,034	1,069	1,005	1,138

a. The reference category is: HD.

b. This parameter is set to zero because it is redundant.

5.2. Analysis Results According to Categorical Variables and Postgraduate Degree Status

When Table 8 is examined, it is seen that 2 models have been created. It has been observed that a significant difference will occur in the model with the introduction of EMPLOYMENT * LUEKO interactive variables into the model. As a result of the entry of these variables into the model, the probability value p <0.005 became significant.

Table 8. Model Step Summary

			Model Fitting Criteria			Effect Selection Tests		
Model	Action	Effect(s)	AIC	BIC	-2 Log Likelihood	Chi-Square[a]	df	Sig.
0	Entered	Intercept, EMPLOYMENT, LU EKO, LU ISL, LU SIG, LU MUH, LU DIG	996,731	1068,085	968,731	.		
1	Entered	EMPLOYMENT * LU EKO	994,594	1076,142	962,594	6,136	2	,047

Table 9 contains information about the model created. When all variables entered the model, the -2Log-Likelihood value was calculated as 962,594 in the last model created. This means that since the probability value p <0.005 is small, the final model formed is significant. When the goodness of fit test was examined, Pearson and Deviance values were found to be statistically significant. In other words, the probability value for Pearson must be less than P <0.005, and the Deviance probability value must be greater than P> 0.005. Table 7 provides these conditions. Also, Cox and Snell, Nagelkerke and McFadden R2 values were found to be significant.

Table 9. Model Fitting Information

	Model Fitting Criteria			Likelihood Ratio Tests		
Model	**AIC**	**BIC**	**-2 Log Likelihood**	**Chi-Square**	**df**	**Sig.**
Intercept Only	1109,142	1119,335	1105,142			
Final	994,594	1076,142	962,594	142,547	14	,000

	Goodness-of-Fit			Pseudo R-Square	
	Chi-Square	**df**	**Sig.**	**Cox and Snell**	,111
Pearson	1031,845	936	,015	**Nagelkerke**	,137
Deviance	835,295	936	,992	**McFadden**	,071

When Life&Pension (E) insurance companies selected as the reference category, the results obtained for Non-Life insurance companies are examined in Table 10, the following can be said;

* LUISL, LUSIG and LUDIG variables are seen to be significant. The probability values of these variables are less than p <0.05.

* Those who have post graduated from business and insurance departments work or are employed in non-life insurance companies.

* Those who have completed other postgraduate programs do not work or are not employed in non-life insurance companies.

* Direct sales personnel do not work or are not employed in life insurance companies.

* Those who graduate from the engineering departments of universities do not work or are not employed in life insurance companies.

Table 10. Parameter Estimates for Non-Life and Life Insurance Companies with Postgraduate Degree

COMPNY TYPE[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
HD	**Intercept**	,816	,133	37,484	1	,000			
	LUISL	,118	,033	12,481	1	,000	1,125	1,054	1,201
	LUSIG	,389	,080	23,790	1	,000	1,475	1,262	1,724
	LUDIG	-,154	,022	49,899	1	,000	,857	,821	,895
H	**Intercept**	-,260	,240	1,180	1	,277			
	[EMPLOYMENT=0]	-,931	,284	10,769	1	,001	,394	,226	,687
	LU MUH	-,734	,305	5,786	1	,016	,480	,264	,873

a. The reference category is: E.

b. This parameter is set to zero because it is redundant.

When the life insurance company is selected as the reference category, the results in Table 11 are obtained. According to Table 11, employment in non-life insurance companies concentrates on direct sales personnel. Postgraduates of business, insurance and engineering departments are employed in non-life insurance companies, while those who graduate from other postgraduate departments are not employed. And, those who graduate from the graduate department of economics are employed as direct sales personnel.

Employment in life and pension insurance companies focuses on direct sales personnel. In addition, postgraduate of engineering is employed in life and pension insurance companies.

Table 11. Parameter Estimates for Non-Life and Life&Pension Insurance Companies with Postgraduate Degree

Parameter Estimates									
								95% Confidence Interval for Exp(B)	
COMPNY TYPE[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	Lower Bound	Upper Bound
HD	Intercept	1,076	,226	22,671	1	,000			
	[EMPLOYMENT=0]	1,019	,267	14,588	1	,000	2,771	1,643	4,676
	LUISL	,317	,102	9,700	1	,002	1,373	1,125	1,676
	LUSIG	,390	,192	4,114	1	,043	1,478	1,013	2,155
	LUMUH	,805	,304	7,019	1	,008	2,238	1,233	4,061
	LUDIG	-,149	,049	9,223	1	,002	,862	,783	,949
	[EMPLOYMENT=0] * LUEKO	16,871	,320	2777,568	1	,000	21221856,859	11332007,795	39742931,413
E	Intercept	,260	,240	1,180	1	,277			
	[EMPLOYMENT=0]	,931	,284	10,769	1	,001	2,537	1,455	4,424
	LUMUH	,734	,305	5,786	1	,016	2,083	1,146	3,786

a. The reference category is: H.

b. This parameter is set to zero because it is redundant.

The results in Table 12 are obtained when non-life insurance companies are taken as the reference category. According to Table 12, there is a negative trend in direct sales personnel employment in life insurance companies. Those who have completed the business, insurance and engineering departments of postgraduate programs are not employed in life insurance companies. However, those who have completed other postgraduate programs are employed. Those who have completed other graduate programs are employed for life and pension insurance companies.

Table 12. Parameter Estimates for Life and Life&Pension Insurance Companies with Postgraduate Degree

Parameter Estimates									
								95% Confidence Interval for Exp(B)	
COMPNY TYPE[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	Lower Bound	Upper Bound
H	Intercept	-1,076	,226	22,671	1	,000			
	[EMPLOYMENT=0]	-1,019	,267	14,588	1	,000	,361	,214	,609
	LUISL	-,317	,102	9,700	1	,002	,728	,597	,889
	LUSIG	-,390	,192	4,114	1	,043	,677	,464	,987
	LUMUH	-,805	,304	7,019	1	,008	,447	,246	,811
	LUDIG	,149	,049	9,223	1	,002	1,160	1,054	1,277
E	Intercept	-,816	,133	37,484	1	,000			
	LUISL	-,118	,033	12,481	1	,000	,889	,833	,949
	LUSIG	-,389	,080	23,790	1	,000	,678	,580	,793
	LUDIG	,154	,022	49,899	1	,000	1,167	1,118	1,218

a. The reference category is: HD.

b. This parameter is set to zero because it is redundant.

6. RESULTS

According to the findings obtained as a result of the study, some important points stand out in terms of employment in insurance companies after university graduation. The first of these is that the probability value of the gender variable alone is found to be insignificant in the obtained models. In other words, it has been observed that gender is not important in recruitment by insurance companies. However, another point related to employment is that there is a concentration in the employment of university graduate women in insurance companies. At the same time, most of the women were employed as direct sales personnel. Another important point is that those who graduated from the insurance & actuarial and law departments of universities are only employed in non-life insurance companies. The probability and coefficient of being employed in non-life insurance companies for graduates of the law department is higher than those who graduated from the insurance & actuarial department.

After postgraduate education, employment in insurance companies also focuses on direct sales personnel. Again, those who have completed the business, engineering and insurance departments of postgraduate education programs are employed in non-life insurance companies. Those who graduate from other postgraduate and engineering programs are employed by life insurance companies, and those who graduated from other graduate programs are employed by life insurance companies.

When the results are reviewed, the fact that only those who graduated from the insurance & actuarial department are employed in non-life insurance companies and that they are not employed in other insurance fields is an indication of the inadequacy of the education provided by the insurance department of universities. This also shows that the insurance education provided at universities does not coincide with the practice in the field. Another important issue may be that insurance companies employ a small number of graduates from this department. For example, the maximum number of actuary who can work in an insurance company is two or three people. On the other hand, some of the certificates and exams required to work in insurance companies are not passed by most employee candidates.

The reflection of this situation on the economy will be in the form of unavailable idle human resources. In other words, it means that human capital, which plays an important role in the development of the country in terms of internal growth, cannot be used. This is one of the major obstacles to economic growth.

The policy recommendation that can be implemented according to the author's best knowledge is that universities that provide education in the field of insurance employ experienced people in this field as teachers and give more importance to practice in constant communication with insurance companies. Another suggestion might be to reduce the existing quotas, in departments providing education in the field of insurance in order to prevent post-graduation backlog. At the same time, all kinds of technological support required for training in this field must be provided. In other words, online trainings and seminars can be organized for updated topics about insurance.

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ORIGINAL ARTICLE

How Digitalization Affects Insurance Companies: Current Status And Future Expectations

Erdem KIRKBEŞOĞLU

Abstract
The aim of this study is to define the effects of digital technologies on the insurance industry. In order to answer the research question, the literature is searched with a systematic review. And the journal articles, proceedings, research reports and projects completed between 2005 and 2021 are also examined. Thanks to this systematic literature review, it has been determined how the business processes of insurance companies will undergo possible evolutionary change in the future.

KEYWORDS
Digitalization, Insurance.

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1. INTRODUCTION

The technological development acceleration that started with the Industrial Revolution shows that there are changes not only in business life, but also in our social and psychological behavioral patterns. The main feature of this new era, which we have named with different names such as the post-modern age, information age, technology age or digital age, is that "speed" has become more important than ever. Many sectors that are important for the world economy have become sensitive to this pace. The success of the goods or services produced is more sensitive to fast and quickly accessible data and new technologies. The finance sector, which is among these sectors, similarly needs high technology and provides stability within the economic system through the data produced by these technologies.

The modern financial system requires the use of digital technologies much more than in the past. Digitalization, which started with the banking sector, is also at the focus of the insurance industry today. However, we think that the main reason for the emergence of the digitalization process in different periods between the two life bloods of the financial sector is the conservative nature of the insurance system. Unlike many other sectors, the insurance industry is a sector that requires detailed data on more risk groups. An insurance company is in a structure that develops products that are compatible with the data in the market, prices the risk based on big data, predicts claims in advance through data and directs the collected premiums to investment in the financial markets in the most effective way. To put it more clearly, for the success of the insurance system, which is based on collecting premiums and paying claims, in achieving this balance, it is of great importance to use big data effectively and to meet the new expectations created by the age of speed. Modern insurance now needs much more than selling the policy or paying damages. Insurance companies have to invest much more in technology and digitalization for a profitable portfolio.

Insurtech, also known as insurance technologies, has emerged as a guiding development for insurance companies in terms of risk calculation, pricing, preventing adverse selection, and effective claim management. However, the common point that insurers agree on is that digital technologies, although they have already transformed many other industries to a great extent, are quite late in the transformation of the insurance industry and their current potential is not yet fully understood. Many recent scientific studies point to a paradigm shift in the insurance system in the near future (Moneta, 2014; Berger et al., 2016; Catlin et al., 2015; Johansson and Vogelgesang, 2015; Biener et al., 2015; Eling and Lehman, 2018; Cappiello, 2020). Startups and data providers that were not actors of the insurance system in the past are today both the biggest supporters of insurance companies and a major threat to the future.

In this context, our study aims to research the future of digitalization in the insurance industry. However, our sub-research questions are as follows:

1. Which digital technologies affect the insurance industry?
2. What is the impact of new technologies on the basic functions of the insurance industry?
3. What are the possible losses of insurance companies in the face of the new business system created by technology?

Therefore, the focus of this study is to describe the implications of information technologies, which are claimed to revolutionize the insurance business system in the near future, on practitioners and provide future clues.

2. RESEARCH FOCUS

In order to answer the research question, the literature is searched with a systematic review. In the first stage, we review the journal articles and proceedings where the terms “artificial intelligence, big data, digitalization, digital, machine learning, technology, block chain, internet of objects, cloud computing, telematics, insurtech” are included with the term “insurance”. Our aim here is to define the impact of information technologies on the insurance industry. We review all journals and proceedings on Web of Science, Scopus, Ebsco and Proquest and Google / Google Scholar. In addition, research reports and projects completed between 2005 and 2021 are also examined. Thanks to this systematic literature review, it has been determined how the business processes of insurance companies will undergo possible evolutionary change in the future.

3. CONCEPTUAL FRAMEWORK

In its simplest definition, digitization is the process of transferring accessible information and resources to a digital environment that can be perceived by a computer. This classic definition is more than just the meaning it implies. Especially in the world of businesses, we can say that digitalization and digital transformation are the source of great changes in the last two decades. Digital transformation at the business level refers to enabling, improving or transforming the business process using digital technologies and digitized data. The effect of digitalization on businesses emerges at the point that digital technologies change the organizational structure, change the quality of products and services, and change the marketing, sales and promotion style of these products and services. In addition, it is also easier for all departments that construct the organizational structure to produce more effective methods, analyses and projections using reliable data compared to the previous process. In this context, digital transformation represents a revolutionary change for all organizations.

While many industries, including the insurance industry, felt the effects of digital transformation, they did not believe that it could cause a revolutionary change as mentioned above. Technological and digital transformation in particular signals the opportunity or threat to many organizational actors, especially organizations in the financial sector. Although organizations that adapt to this change can turn risk into opportunity; For organizations that do not care about this change, a devastation can occur. For this reason, it is important for organizations to have high awareness and strategic action plans to reduce the risk of failure in order to avoid the possible destructive effects of digital transformation (Matt et al., 2019). The digital transformation strategy represents an important focus of the basic strategy of organizations, rather than a simple information processing strategy aimed at efficient management of information technology infrastructure and software systems (Kofler, 2018).

The word “digital transformation” represents a sharp transformation in this sense. The insurance industry, despite its late awareness level, is in the process of adapting to this change by adapting innovative business models like many other sectors. The unique business system of the insurance industry is much more traditional than many other industries. For example, there are no big differences between the operational functioning of insurance activity in the 17th century and the current system. The same traditional structure is still maintained in terms of pricing risk, management of claims processes, marketing and distribution channel structure. Of course, modern changes also come to mind. However, there was no significant change or transformation in the operational and technical dimensions of the business until the near future. The traditional perspective in the insurance system has seen digital technologies only as a tool until the 2000s. According to this understanding, digitalization refers only to various information systems instruments that facilitate operational work. Therefore, the prevailing opinion is that digital is not at the centre of the business system. However, in the near future, data provider companies such as Amazon, Apple, Facebook and Google are expected to be actors of the insurance industry. Because the raw material of the insurance system is data. In the insurance system, there is a high level of data dependency in pricing, claim management, sales, reinsurance, financial investment and many similar transactions. As Schmidt (2018) points out, digital technologies such as cloud computing, telematics, internet of things, mobile phones, blockchain technology, artificial intelligence and predictive modelling mark the birth of a new business system for the insurance industry. This new business system will be one that enables new ways of communication, information sharing and insurance. According to Eling and Lehman (2018), digital technologies in the insurance industry are expected to affect organizational processes in three dimensions. We also support this view:

1. Sales and customer relations dimension
2. Digitization of organizational processes dimension

3. Development of new products dimension

Operationally, the first and most significant impact is expected to occur in sales and customer relations dimensions. At this point, the main problem is to what extent insurance companies can understand or meet the expectations of the new generation (called Y and Z generations) sensitive to digital. The new generation, which is expressed with various names such as Generation Y, Generation Z or Millennium Generation, has very different expectations from previous generations. The expectations of this generation are changing very rapidly. They have very different characteristics from previous generations such as fast consumption, the effort to reach information in a short time, interest in products and services with visual content, adapting quickly to change and understanding from all kinds of digital. According to Bieck and Tjioe (2015), the young generation under the age of 30 prefer unconventional insurance distribution channels (e.g. websites, mobile phone apps, auto dealerships, retailers) rather than traditional distribution channels (e.g. agency, broker, bank). Similarly, Bieck et al. (2014) find that Generation Z is less price sensitive in terms of insurance products and they prefer personalized products and distribution channels. More clearly, this new generation with higher self-perception places more emphasis on personalized insurance products and finds traditional insurance products designed for the general public inadequate. These findings have found support in other studies (e.g. Barwitz et al., 2016; Catlin et al., 2013). The common finding of the studies is that the diversification in customer profiles that demand insurance has changed remarkably. It is the need for an organizational structure and strategy that is digital and more accessible, personalized, quick price comparison can be made through websites, and can be supported through online applications. However, it is important to keep contextual differences in mind. For example, the Customer Journey Insurance Research conducted jointly by Google and Zurich Insurance revealed that 84% of consumers in Germany learned the prices of insurance products through digital technologies, but 59% purchased from traditional insurance distribution channels (Google and Zurich, 2016). However, the general trend shows that the use of digital technologies in insurance sales is increasing rapidly in developed countries.

The second significant effect is related to the digitization of all organizational processes. In fact, this expression means the automation of business processes. For example, innovations such as automatic creation of policies, automatic reporting of damage, automatic product offers, and automatic implementation of the underwriting process with various algorithms will provide significant cost savings for insurance companies. Maas and Bühler (2015) found that 41% of insurance activities in Germany, Switzerland and Austria are automated through digital instruments, and they provide insurance companies with a cost savings of around 14%. Similarly, according to Catlin et al. (2015), this cost saving is around 30%. The most important reason for this cost saving is that big data becomes more usable in the insurance system. Increased use of big data spreads automation-based insurance operations. Therefore, a shrinkage should be expected in the workforce of underwriting, technical and claims departments, which have an important place in the traditional business system of insurance. In addition, the need for traditional distribution channels will decrease. In many academic or sectoral studies, it is stated that the need for insurance agents will decrease. However, the main reason for the decrease in the need for agencies cannot be explained solely by the tendency of the new generation to digital distribution channels. In the future, insurance companies will be in a position to access flawless and large amounts of data more easily and quickly. Therefore, they will have more opportunities to create a customer portfolio that suits their own risk perceptions. Agencies' commission concerns lead to the emergence of an asymmetric information problem with insurance companies. On the one hand, there are insurance companies that can predict risk more consistently based on data, and on the other hand, insurance agents whose survival depends on the commission. This may be a reason for the decrease in the need for insurance agents in future.

However, according to Eling and Lehman (2018), it will not be so easy and practical to use big data in insurance companies. Because, although a workforce saving is achieved in operational departments, another workforce will be needed in the interpretation of digital data (e.g. telematics devices, social networks, customer notifications, photographs, etc.). This limited workforce should be supported by machine learning-based algorithms. Therefore, the success of insurance companies will be determined by the cooperation they will establish with the IT companies or the IT workforce they will supply. Another problem is the policies for the protection of personal data. Increasing risks related to informatics in societies has pushed governments to take measures to protect personal data. The level of information security that these measures will reach in the future will determine whether insurance companies can use this data or not.

The third significant effect is that digitalization enables the development of existing products or the emergence of new products. The new products that will emerge in the insurance sector due to digitalization are summarized under six sub-headings:

1. Telematics Device Insurance,

2. Sharing Economy,
3. Gig Economy,
4. Peer-to-Peer (P2P) Insurance,
5. Insurance Products for Cyber Risks,
6. The Cost Benefit of Blockchain in Insurance Products.

Telematics is a system that uses real-time data transfer and tracking technologies. These devices installed in automobiles record the location information of the vehicle, the driving style of the driver or whether he / she is obeying the rules with GPS. Considering the prevalence of automobile insurances all over the world, the conversion of insurance companies from risk calculation tendency with certain assumptions (for example demographic factors such as city, age, gender, etc.) to risk calculation based on real data will bring high profitability in motor insurances. It is possible to systematically record the risks of individuals through wearable digital products not only in automobile insurances but also in life and health insurances (Swiss Re, 2016; Anchen et al., 2015). Especially, digital tools (watch, mobile phone, etc.) that record the healthy lifestyle habits and exercise tendencies of the insured, facilitate the risk analysis of insurance companies. Traditional insurance pricing techniques evaluate individuals in similar risk groups in the same risk category. However, for individuals with low risk in this group, this method of calculation means high premium payment. Therefore, wearable digital technologies can enable them to purchase large insurance coverage with low insurance premiums for each individual who wishes to use these products in the future.

“Shared Economy” and “Flexible Economy” are seen as another possible source of change in this third effect. With the technological advancement, innovative and income generating new trade styles have become widespread. There is a change from classical organizational structures where individuals only work in office environments to a flexible and freelance working culture. Of course, this kind of work culture is not valid for all sectors. However, this new working style that will meet the expectations of the new generation will affect many sectors. In the Covid-19 pandemic, adaptation to home-office or freelance working style has accelerated. Especially the new generation, which is called the Z generation, finds the patterns and norms of previous generations as normative and prefers the consumption patterns based on technological possibilities more. Sharing economy and flexible economy have emerged based on this need.

A sharing economy is defined as an economic system in which assets and services are shared between private individuals. These virtual platforms, which allow almost everyone to provide and receive services over the Internet, have the opportunity to make additional income for the service provider and the opportunity to save for the service user. Thus, consumers can quickly compare prices and get the most suitable service for their budgets. Therefore, the main purpose in the sharing economy is to supply an unused good or service from digital platforms for a short time. Today, we can provide services such as home rental, car sharing, taxi and rental cars, shared office use, through many web platforms. Platforms such as Airbnb, Couch Surfing, Amazon, eBay, VRBO and Uber used around the world are examples of these. On the other hand, flexible economy refers to a labour market characterized by short-term or self-employment as opposed to a fixed employment contract. Therefore, the main difference of the flexible economy from the sharing economy is that the employer and the workforce are brought together on a digital platform. The gig economy is a short-term, independent contract, piecework / micro-level system that brings together the customer and the workforce through a digital platform. For example, a person who wants to have his house renovated can get this service from a builder who works independently through a web or mobile phone application instead of contacting a construction company. The most important advantage of this freelance working system, which takes place in the digital environment, is that it brings together the customer and the workforce easily and quickly. These people, who can work wherever they want, say goodbye to problems such as spending time in traffic to and from work, and they can meet their lives according to their own comfort needs compared to working full-time. Childcare, lecturing, construction, home catering services are the most preferred examples through these platforms. According to the data of the global freelance platform Upwork, 57.3 million people are living as freelancers today in the USA. By 2027, this figure is predicted to reach 86.5 million (Upwork, 2017).

This consumption pattern, which is frequently preferred by the new generation, of course also affects the insurance industry. When the current situation is examined, it is seen that there are various problems in the insurability of the sharing economy and the gig economy. For example, in applications such as Airbnb, the risks of guests and tenants are not covered by the homeowner’s traditional home insurance policies. Similar problems are also observed in car sharing platforms. Most auto policies do not provide coverage if vehicles are rented for a certain fee or used as an informal taxi service. In the face of these restrictions, digital platforms are working hard to fill the gaps in insurance. For example, the housing sharing platform Airbnb provides Host Protection Insurance to its customers and charges an extra fee for this insurance. The Host Protection Insurance program provides up to $ 1 million in protection against damage to a registered location or Airbnb property during a stay. Similarly, Uber provides an insurance service that provides an assurance of up to $ 1 million in possible damages when the Uber application is open, that is, when the customer gets in the vehicle. Therefore, even if not 100%, digital platforms are working to provide a protection service that includes the insurance system. In the future, insurance companies are likely to recognize these digital platforms as important customers and develop their products to include them.

Another contribution of digitalization to products and services in the insurance industry has emerged with the Peer to Peer (P2P) approach. P2P Insurance is when a group of like-minded and knowing each other comes together and buys insurance cover together. The most important difference compared to traditional insurance is that the individuals that make up the insurance portfolio have similar life habits and similar risk tendencies. In this way, the insurance company can make a more realistic premium calculation for this limited number of people in the same risk pool, and the members of the group can buy high coverage with low premiums. As mentioned before, the hypothetical realization of premium calculations with various demographic information meant high premium payment for individuals who were included in that group but had a higher risk perception. Therefore, a person can get coverage from the insurance company for the same risk by bringing together people who have a risk perception like himself. If the group comprising the portfolio does not suffer any damage at the end of the policy period, some of the insurance premiums accumulated in the pool can be refunded or kept for the next year. Damages up to a certain amount (which is determined by the insured) are evaluated within the scope of exemption, and if this damage is exceeded, the insurance company may step in. Therefore, it offers the policyholders flexibility to adjust some details of the policy according to their own risk perception and creates an insurance portfolio that can be managed more easily for the insurance company. Insurance companies such as Friendsurance, Guevara, Inspeer, TongJuBao.com and Lemonade offer this service. The main purpose of P2P insurance is to enable people to minimize their false claims of damage by overwhelming their sense of responsibility.

Similarly, cyber risks are another issue that has started to be discussed today and is expected to have reflections in the insurance system. Cyber risks, which insurance companies have started to provide assurance, aims to provide assurance against risks that cause them to lose money, customers and reputation by targeting the information technology infrastructures of the companies if they occur. However, the studies conducted reveal that as of today, full protection cannot be provided against the losses due to interrelated cyber losses, data deficiency and information asymmetries (Biener et al., 2015). However, it is inevitable to create more consistent products regarding cyber risks in the near future (Eling and Lehman, 2018).

We expect another reflection of technology-based innovations in insurance products in blockchain technology. According to the Research of Smart Contracts in Financial Services by Capgemini Consulting Firm, it has been stated that smart contracts gathering insurers, customers and third parties under a single platform in motor vehicle insurances will lead to process efficiency and reduction of claims processing time and costs (Capgemini, 2016). In addition, third parties of the insurance claim process such as automobile services, assistance companies and hospitals will be included in the system, enabling faster service. It has been determined that the use of these smart contracts in the British insurance system saves approximately $ 1.67 billion annually (Capgemini, 2016). This amount means a savings of 12.5% from the current claim payments. If smart contracts are used in the US insurance system, it is estimated that 21 billion dollars can be saved annually (Capgemini, 2016). With a cost advantage of this size, the insured will be provided with insurance coverage by paying less premiums.

In summary, the use of more data for new products related to technology and digitalization in insurance organizations and the fact that these data consist of real personal data regarding the insured will enable them to make more reliable premium calculations. A reliable premium account means a profitable insurance portfolio. Especially investments in telematic devices will support this. In addition, the shift of commercial life to web platforms such as sharing and gig economy will lead to legitimacy of virtual commerce in the insurance system. Today's business systems have gradually begun to adapt to the patterns of the new generation and the flexible structure that does not like bureaucracy. P2P insurance and blockchain technology will provide both a convenience for the new generation of insured and a serious cost advantage for insurance companies.

4. THE EFFECT OF NEW TECHNOLOGIES ON THE BASIC FUNCTIONS OF THE INSURANCE SECTOR

Eling and Lehman (2018) and Capiello (2020) have similarly expressed the change in the basic functions of insurance companies in the face of new technologies. We aimed to revise the claims of these researchers with reference to both studies. Table 1 represents the digital technologies that are expected to be used in four basic functions of insurance companies.

Product Development

Table 1. The Effects of Digital Technologies on Basic Functions of Insurance Companies

Basic Functions	Digital Technologies	Effects on Functions
Product Development	• **Big Data** • **Block Chain**	It will be possible to develop new products specific to individuals or groups with more reliable and more data.
		With the application of smart contracts to new insurance products, insurance companies will both increase demand and reduce costs in the long run.
		Telematics devices support the collection of big data.
Risk Analysis and Pricing	• **Artificial intelligence** • **Big Data** • **Internet of Things** • **Block Chain** • **Cloud computing**	It is possible to provide personal data for risk assessment.
		It is possible to make more reliable pricing by means of telematics devices.
		Information asymmetry between the insurance company and the insured is eliminated.
		It is possible to prevent or reduce risks with Internet of Things sensors.
		With Block Chain technology, it is possible to prepare policies automatically and digitally according to the risk profile of the individuals.
		Contract information can be stored digitally.
Marketing, Sales & Customer Service	• **Big Data** • **Chatbot** • **Mobile Devices** • **Aggregator Websites** • **Robo-Advisor** • **Cloud computing** • **Video Platforms** • **Web Site, Social Networks**	Digitally stored contracts and their data will increase.
		It will be possible to sell products automatically via chatbot or real people will be engaged only when necessary.
		It will become widespread to be able to prepare contracts with devices such as iPad that allow independent sales from the workplace.
		Aggregator websites that can make price comparisons and policy sales between companies will become widespread.
		In life and pension products, robo-advisors will begin to guide investment preferences. The need for financial advisors will decrease.
		The intensity of face-to-face sales will decrease with new digital applications.
		An insurance company that knows its customers well will create customer loyalty and cross-sell opportunities will increase.
		The opportunity to introduce products and services to the customer with simple video visuals will increase.
		Product information / advertisement, reputation management will be ensured.
		It will become widespread to provide after-sales services with chatbots.
Claim Management	• **Artificial Intelligence and Big Data** • **Block Chain** • **Mobile Devices**	Fraud prevention will be ensured through data analysis.
		It will be possible to calculate and pay the amount of loss automatically.
		It will be possible to store information for automatic payment.
		Claim payments can be made with mobile applications.

Source: Adapted from Eling and Lehman (2018) and Capiello (2020).

In the traditional structure of insurance, it was not an achievable situation for the insurance company to know its customer and develop suitable products. Because this required big data. However, in today's world, we see that many data provider technologies are starting to be at the centre of business life. The nature of the interactions of insurance companies with data providers is also important in this sense. To put it more clearly, it is thought that the processes of customers' purchasing the product can be predictable through the data obtained from various data sources of insurance companies (Swiss Re, 2020). For example, a young person who finds a new job is likely to tend to increase healthcare opportunities in the next step, choose a better-quality residential area, get married, and over time will be able to spend more luxury. Big data provide the opportunity to make important predictions about the spending trends of individuals today. Therefore, being able to anticipate the next steps of customers and provide them with the right insurance products will mean making insurance sales easier. On the other hand, the courage to design new products with blockchain technology will also increase. Because the tendency of the new generation to access products and services quickly and the effort to avoid bureaucracy in classical business processes will make it necessary for insurance companies to use smart contracts (block chain) more. For example; With the Fizzy project, AXA Insurance has designed an insurance product that will instantly pay compensation to passengers whose flights are delayed. Fizzy works with a system that establishes a connection between the computer that reports the flight delay and the insurance company, without any claim forms, proof of delay or other paperwork. The policy is purchased, stored on the blockchain, and the decision of whether the policyholder is eligible for compensation is made by smart contracts in the blockchain, not by the insurer. Therefore, it is likely that such new products suitable for the lifestyle of the new generation will proliferate.

Risk Analysis and Pricing

As it is known, the main problem of insurance companies is to achieve actuarial balance. In order to establish this balance successfully, insurance companies need real and a large number of reliable data. However, in the vast majority of developed and developing insurance economies, many insurance products are still priced on more general and hypothetical data (eg demographic factors such as city, age, gender, etc.). Big data minimizes errors that may arise due to these hypothetical calculations. For example, it is possible to instantly monitor a person's risks through telematics devices and wearable computers. For example, with wearable devices, the health status of policyholders can be monitored in real time, making it easier for them to receive customized offers. Likewise, thanks to telematics connected to automobiles, the real risks of drivers are recorded throughout the year, allowing personal risk analysis and pricing. In addition, smart sensors are an important risk management support for homeowner and workplace insurances. These sensors work with the Internet of Things logic. For example, sensors installed in homes and business centres can inform the insured through computers in advance of many risks such as smoke, mould, toxic gases, internal water leaks. Likewise, machine damages, employee and customer injuries and work interruption losses can be reduced thanks to the Internet of Things sensors placed on construction machines (Canaan et al., 2016).

With the use of blockchain technology in the Risk Analysis and policymaking process, insurance companies will be able to make policy renewals faster and through automated smart contracts. The digitally stored information of the insured will allow the automatic contract to be suggested. The policy will be certified by electronic signing and can be stored digitally. For example, in 2018, AIG Insurance successfully implemented the first multinational insurance policy using blockchain and smart contracts with the support of Standard Chartered and IBM (Derebail, 2018).

Marketing and Sales

Marketing and sales, which is the most important function of the insurance system, contributes to the insurance company to reach the most suitable customer portfolio for itself. Choosing the most suitable customer is undoubtedly related to the level of risk. All insurance companies want to work with a customer base with low risk and no moral hazard. In traditional insurance, the measurement of risk is carried out on the losses caused by the insured in the past and the distribution of these losses according to various demographic characteristics. However, in recent years, it has become easier to predict the behaviour of customers, to predict what kind of product they will need in a timely manner and to calculate the risk perceptions of these people through new technologies of data providers. Artificial intelligence systems offer significant advantages in predicting the purchasing tendencies and needs of customers.

Another change in marketing and sales processes occurs through mobile phone applications and websites. A customer service model is created that is digital and more accessible, personalized, quick price comparison can be made through websites, and can be supported quickly through online applications when technical support is needed. It is noteworthy that aggregator websites, which allow price comparisons between various insurance companies, have started to increase in number. These sites also provide the opportunity to purchase policies. In addition, chatbots are software that have the ability to communicate with the insured with the help of an artificial intelligence and serve to communicate quickly based on the message between the insured and the insurance company. Especially, this is exactly the communication method of the new generation that we call Generation Z. Similarly, it is seen that the use of robo-advisor in life insurance and pension products is increasing rapidly. Robo-advisors are algorithm-based fintech products that analyse data from financial markets and advise client portfolios like traditional investment experts. The ability of this artificial intelligence to advise on investment preferences of individuals in life and pension products will cause the concept of financial consultancy to change in the near future.

These possible expectations in the marketing and sales processes are alarming for many agencies and brokers today. Although insurance companies state that sales made through agencies, brokers and banks will never lose their importance, when the available data are analyzed, it is seen that there is a rapid change. For example, two scientific studies commissioned by Accenture Risk Management company in 2013 and 2017 reveal how policy holders' perspective on digital insurance has changed in four years. In 2013, 23% of consumers were keen to purchase insurance products from digital platforms; It was determined that this rate increased to 29% in 2017. Similarly, in 2013, 54% of consumers stated that they were willing to receive information about insurance products from online platforms (websites, mobile phones, e-mail, chatbots and social media); It was determined that this rate increased to 68% in 2017. In addition, in the same study, it was determined that 74% of consumers were willing to listen to insurance product recommendations to be provided by robo-advisor (Accenture, 2017). Therefore, although it is seen that digital sales have a very low share as of today within the scope of distribution channels, the pace of change is very high. In a short period of ten years, significant changes can be experienced and the current concerns of agents and brokers can become reality. As in the nature of all organizations, the profit-oriented perspectives of insurance companies and the success of online and digital applications after the Covid19 Pandemic will encourage the continuity of this process.

Claim Management

Calculation of risk through more realistic and simultaneous data will result in more successful claim estimates. This not only leads to a more reliable calculation of expected claim, but also saves the reserves that need to be set aside for claim. In addition, it will be possible to reduce insurance frauds with various artificial intelligence technologies. The follow-up of the insured in the high-risk group is made easier with big data. As mentioned earlier, it will also be possible to accelerate or automate claim payments with blockchain technology. In summary, in addition to a decrease in claims payments and claims provisions for the insurance company, service satisfaction can also be increased for the insured through rapid damage payment. For example, Lemonade Insurance Company has reached a worldwide brand value by making a claim payment in a short time like three minutes via the mobile phone application.

5. CONCLUSION: EXPECTATIONS AND FORECAST

The insurance system perceived the digital transformation and the importance of digital later than other fintechs. Although sectoral media reports express the threat to be created by digitalization with the decrease in the share of traditional distribution channels, the change to be experienced in the future will be much more extensive and large. Therefore, our aim in this section is to identify the threats and opportunities that await insurance companies in the face of digitalization, and at the same time to predict the possible major change.

All over the world, insurance companies still consider information technologies and related technological resources as an outsourcing. The perspective of insurance companies' use of technology is that it is a service supply. Therefore, according to the type of business processes, this resource use will continue as in the past. However, the digital transformation mentioned above indicates that insurance companies should move towards a paradigm shift. More successful management of risk through telematics devices, wearable computers, smart contracts, the internet of things, and the ability to price all these digital processes with an artificial intelligence will lead to a serious competitive advantage against another insurance company. In addition, the role of customers in the insurance process will not be the same as before. Insurance companies will need to act more quickly and flexibly in the face of customers for many reasons such as being able to intervene in the contract, follow the process digitally, P2P Insurance, provide the right to choose the price through aggregators, and communicate more with chatbots. Most importantly, the new generation will expect the insurance system to be included in their shopping style. To be more precise, the change to be experienced will be much more than purchasing an outsourcing service.

According to Eling and Lehmann (2018: 370), automobile manufacturers are the leading threats that will affect insurance companies. Because automobile insurances are still the dominant type of insurance all over the world and the technological change in automobile production makes automobile manufacturers asymmetrically advantageous against insurance companies. Cars of the future are capable of measuring drivers' risks. Through driverless vehicles and telematics, the world's major automakers are beginning to have the ability to measure drivers' risks. Insurance companies' ability to measure risk, which was the biggest competence in the past, is now more dependent on these technologies. This is a situation that puts automobile manufacturers in an advantageous position over insurance companies. Automobile manufacturers or distributors, who have been working as agents to date and prefer to receive commissions, may turn into insurance companies that only provide coverage for cars in the future. Automobile manufacturers can become the new actors of the insurance system in the future, with the ability to measure drivers' risk using new technologies and to access the first data at the time of loss.

It is possible to further expand this asymmetrical advantage. Elon Musk recently stated for Tesla that by calculating the data on vehicles and the driver's driving profile, they can calculate the accident probability and the customer's risk trend, and the premiums can be calculated monthly, not annually. The ability of low-risk drivers to purchase insurance products with very low insurance premiums (20-30% lower than traditional insurance companies) is a serious competitive advantage (Zarifis, 2020). This is true not only for automobile manufacturers, but also for many large companies that provide data to various insurance branches. For example, technology-oriented companies such as Apple, Amazon, Google and Facebook have the opportunity to become an actor of the insurance industry due to their large data (Eling and Lehman, 2018: 371). Because the main skill in insurance is to be able to measure risk, and soon big data providers will become more aware that they have this know-how.

However, having qualified and big data alone is not enough for these companies to establish new companies in the insurance system. For example, the Google Compare Insurance Company, which was founded by Google in 2012, decided to terminate its activities in 2016, although it entered the market in automobile insurance in a very ambitious way. It is estimated that the insurance activity did not include large profit margins for a company such as Google, and they ended this activity in a short time (Accenture, 2016). Also, regardless of the insurance profession, it requires experience. For these new companies entering the market, it does not seem easy to fill the lack of experience with high technology. According to Eling and Lehman (2018: 371), another reason why these companies avoid entering the insurance market is that they do not want to lose their reputation. The insurance profession is a profession with more legal problems compared to many other sectors. Legal problems with the insured, even for minor insurance claims, may negatively affect the reputation these companies have created in the market so far. Therefore, low profitability and possible loss of reputation are the main obstacles for new technology companies to enter the market.

InsurTech is one of the stakeholders that will determine the future of the insurance industry. Despite the pandemic, Insurtech investments in the world reached 7.1 billion dollars in 2020, with an increase of 12% compared to the previous year (Willis Towers Watson, 2020). We observe that InsurTechs generally provide services in three categories:

1. InsurTechs Offering Pre-Sales Solutions: These are web platforms where customers can compare prices and content between insurance companies through aggregators. It is ensured that new generation customers have insurance products in a fast and simple way, just as they want. However, research shows that insured who buy insurance policies from digital platforms have lower company loyalty compared to those who buy insurance policies in traditional ways (Bain, 2020).
2. InsurTechs Offering After Sales Solutions: The software enables the insured to access contract information and digitally see the stages in the claim process. In addition, solutions that enable insurance companies to calculate repair costs and work flow according to the type of part in the damage process are also offered.
3. InsurTechs Offering New Business Model and Product: Initiatives that offer new business models such as sharing economy, gig economy, P2P insurance and telematics devices, which were mentioned at the beginning of our study, fall under this category.

Today, the interaction of insurance companies with InsurTechs continues in a controlled manner. Insurance companies are trying to purchase or cooperate with these startups to purchase services. It seems that the extent to which insurance companies will invest in these technological startups will soon become clear. However, studies (for example, Furr & Shipilov, 2019) state that past examples of acquisitions have created negative consequences. The right thing is that insurance companies cooperate with technology producing companies in the medium and long term and leave those companies free in technological production. More precisely, it is an irreversible cost for an insurance company to purchase an insurtech. However, establishing new collaborations that change with time and in line with sectoral expectations and establishing flexible partnerships with these companies in the medium and long term can provide much more gain.

In addition, abandoning traditional methods at once and relying on the power of digitalization can create just as erroneous results. What matters is step-by-step modernization. Disposing of existing old systems in a short time can bring a lot of risks and costs. Instead, insurers should believe the necessity of digital transformation and develop new applications that meet customer expectations and efficiently replace legacy systems step by step (Furr & Shipilov, 2019).

Technological transformation or integration comes to mind when it comes to digitalization in insurance. However, research reveals that digitalization is all about the customer. The critical point for the insurance company is that it understands its own customers and retains them by offering customized products. Digital technologies must be a tool to do this. Having high technology is not enough to satisfy the customer. The important thing is to use technology to meet customer expectations. The real change is seen in the expectations of the new generation, and this generation has a high connection to technology. It should not be considered possible to retain the next generation in future. Undoubtedly, the next generation will spend less time on face-to-face sales to purchase insurance, will not want bureaucratic difficulties in tracking claims processes, and will tend to prefer more personalized products and prices. In addition, changes in the commercial life due to technology will bring new opportunities for insurance companies. Web platforms that sell or lease new or second-hand products and services such as Amazon, Hepsiburada, Gittigidiyor, Yemeksepeti, Uber, Airbnb, N11 will continue to spread and new insurance products will be needed for these new areas. These product and service transfer platforms, which were not considered legitimate in the past, should be expected to be the most legitimate channels of trade in the future. For this reason, change in the insurance sector concerns distribution channels, assistance services, damage repair centers as much as the insurance company. Digital insurance sales may not completely replace agents and brokers. However, it will seriously affect the agencies and brokers who act reckless about technology. Similarly, depending on the automation in claim process, the need for the insurance claim adjuster will decrease.

As a result, insurance is one of the sectors with the highest dependence on data. It is of great importance that insurance companies calculate the risk with personal and more reliable data and construct or market this based on the interests of the new generation in the future. In the future, being fast and flexible in terms of technological adaptation will be much more valuable than before. Perhaps the expected change will not be revolutionary, or it will not necessitate a thorough aggressive change for insurance companies. However, for insurance companies to succeed in their future strategies, their fate will be determined by closely following new technologies and their contacts with the entrepreneurs who produce them.

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ORIGINAL ARTICLE

Analysing The Determinants Of Profitability Of Domestic And Foreign Non-Life Insurers In Turkey

Özcan IŞIK

Abstract
The main goal of this study is to empirically analyze the insurance-specific, industry-specific and macroeconomic factors affecting the profitability of foreign- and domestic-owned non-life insurers operating in the Turkish insurance sector over the period of 2014-2019. For this purpose, a balanced panel data of 27 non-life insurers is used in the study. Results from the random effects model demonstrate that debt ratio, premium retention ratio, listed status, and growth of total assets are significant factors that determine the profitability of domestic-owned companies. However, the factors affecting the profitability of foreign-owned insurers are company size, debt ratio, underwriting risk, premium retention ratio, listed status, and company age, respectively. Meanwhile, the variables such as GDP growth, inflation rate, and market concentration have a significant effect on the profitability of neither foreign nor domestic-owned non-life insurers.

KEYWORDS
Profitability, Insurance, Panel data, Turkey.

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1. INTRODUCTION

Insurers are one of the important institutions of the financial service industry. Thanks to their premium income, insurers contribute significantly to both the development and deepening of capital markets and the steady growth of the economy (Haiss and Sümegi, 2008; Akotey et al., 2013; Camino-Mogro and Bermúdez-Barrezueta, 2019). Also, insurers are one of the basic risk management tools that individuals, companies and countries use to transfer the possible risks they may face (Işık, 2019; Harrison and Ng, 2019).

In recent years, both increased public awareness of insurance and the increase in the share of insurers in the financial system have led to an increase in competition in the sector. However, any problem that can occur in the insurance market may negatively affect the performance of all companies operating in the sector, which directly influences all stakeholders related to the insurance sector and economic activities. Therefore, regularly analyzing the profitability performance of companies operating in the insurance market can help to establish stability in the sector by increasing the efficiency of insurance activities. Moreover, higher profitability not only enables insurers to gain a competitive advantage in the market but is also important for their existence and growth. In this context, it is crucial to know what drives insurers' profitability.

Considering that profitability is an important performance criterion, the aim of this study is to empirically analyze insurance-specific, industry-specific and macroeconomic factors that affect the profitability of non-life insurers in Turkey, a developing economy. Our article contributes to the existing empirical literature in three ways. Firstly, our article extends the literature on profitability determinants by comparing the performance of foreign- and domestic-owned insurers in the context of the Turkish insurance industry. Secondly, the sample selected for analysis covers a current period of 2014-2019. Lastly, on a methodological basis, the factors determining profitability are modelled separately in the analysis of non-life insurers' profitability using the panel random-effect estimation model.

The remainder of the paper is organized as follows. General indicators regarding the Turkish Insurance Sector are briefly evaluated in Section 2. Section 3 reviews previous studies in the literature that investigate factors affecting insurers' profitability. Section 4 defines the data set and the methodology. Section 5 explains empirical findings of our study and Section 6 concludes.

2. TURKISH INSURANCE SECTOR INDICATORS

As of 2019, according to the insurance and private pension report published by the Ministry of Treasury and Finance, the number of companies operating in insurance industry is 63. There are a total of 38 insurance companies in non-life insurance branches. On the other hand, 5 life insurance companies, 17 pension companies and 3 reinsurance companies operate in the sector. When the capital structure of these companies is examined, it can be said that foreign-owned insurers are predominant in the sector. As shown in the Table 1 international capital share in capital for all sector is %62.18. These data show that foreign capital owners are interested in the Turkish Insurance Sector. Finally, when the employment capacity of the sector is considered, it can be said that 90,801 personnel work in the sector.

According to the data in the Table 1, a total of 67.8 billion Turkish Lira gross premiums were generated in 2019 in the Turkish Insurance Sector. 57.4 billion Turkish Liras of this amount was produced within the scope of non-life insurances. The remaining 11.4 billion Turkish Liras was generated in life insurances. Considering that premium production shows the size of the sector, it can be stated that non-life insurances have great importance in the sector. When this situation is analyzed proportionally, the gross premium amount generated by non-life insurances constitutes 84.6% of the whole sector. When the amount of incurred loss realized in 2019 is considered, it is observed that this amount is 39.1 billion Turkish Liras. 35.5 billion Turkish Liras of this amount occurred in non-life branches, while the remaining was realized in life insurances. Based on these data from Table 1, it can be stated that the premium amount meets the incurred loss amounts both at the branch level and within the scope of the whole sector.

Table 1. General Indicators of the Turkish Insurance Sector (2019)

General Figures	Values
Number of Active Company	63
Active Non-Life Insurance Companies	38
Active Life Insurance Companies	5
Active Pension Companies	17
Active Reinsurance Companies	3
International Capital Share In Capital for Non-Life Companies	%64
International Capital Share In Capital for Life Companies	%57,65
International Capital Share In Capital for All Sector	%62,18
Capacity of Employment	90.801
Non-Life Gross Premium Volume[a]	57.4
Life Gross Premium Volume[a]	11.4
Total Gross Premium Volume[a]	67.8
Non-Life Incurred Loss[a]	35.5
Life Incurred Loss[a]	3.6
Total Incurred Loss[a]	39.1

Source: https://www.hmb.gov.tr/sigortacilik-ve-ozel-emeklilik-raporlari, (09.04.2021)
[a] denotes billion Turkish Liras (TL)

3. LITERATURE REVIEW

For a sample covering a five-year period between 1993 and 1997, the factors affecting the operational performance of 47 Bermudan insurance/reinsurance companies have been investigated by Adams and Buckle (2003). Empirical findings from panel data analysis demonstrate that variables such as firm type dummy variable, leverage, liquidity and loss ratio have statistically significant effects on ROA (Return on Assets).

Based on a panel data of 211 general insurers from the UK over the period 1986 to 1999, Shiu (2004) has examined important factors influencing the financial performance. The results from panel data estimations reveal that interest rate, underwriting profits, unexpected inflation, and liquidity are significant factors influencing the financial performance.

In the Bosnia and Herzegovina, Pervan et al. (2012) have determined the factors affecting return on equity of insurance companies by employing the data from 2005 to 2010. Results of dynamic panel data analysis show that age, past profitability, and market share are positively correlated with profitability, whereas claims ratio is inversely associated with profitability.

Öner Kaya (2015) has empirically investigated the factors affecting the level of profitability for a data set covering 24 non-life insurers in Turkey during the period between 2006 and 2013. Based on the fixed effects panel data analysis results, it has been concluded that variables such as size, current ratio, age, loss ratio, leverage, growth in premium are the main determinants in explaining the change in profitability.

The macroeconomic and insurance-specific determinants of financial performance of eight largest non-life insurers in Poland during the years 2006-2013 is studied by Ortyński (2016). Using regression analysis, the author reports that the size in terms of gross written premium and total investment exerts positive and significant influence on profitability, whereas net claims ratio and net operating expenses ratio are positively related to the profitability.

Ullah et al. (2016) have examined how the profitability of general insurance companies in Bangladesh is affected by insurance-specific internal factors during the period 2005-2014. The results obtained from the regression analysis show that all selected internal factors have significant effects on the profitability performance (ROA).

Based on a panel data of 137 insurance companies from four CEE (Central and Eastern European) countries (i.e., Croatia, Slovenia, Hungary and Poland) from 2010 to 2014, Kramaric et al. (2017) have investigated important factors influencing profitability performance. The results from random effects estimation reveal that ROA and ROE (Return on Equity) are positively affected by the variables like age and gross domestic product (GDP) growth.

Hasan et al. (2018) have analyzed the link between firm-specific and macroeconomic factors with profitability performance (ROA and ROE) for 32 listed non-life insurers in Bangladesh for the period 2009–2015. The findings from panel data regression methodology reveal that profitability indicators are significantly affected by firm-specific factors rather than macroeconomic factors.

Employing the data of Serbian non-life insurers in the 2010-2015 period, Pjanić et al. (2018) have explored the variables that influence the financial performance measured by ROA. The results show that ROA is significantly affected by the variables such as profit growth, equity ratio, operating costs, premium growth, underwriting risk, and size.

Using a sample of selected life insurance companies in 8 Asian countries between the years 2008-2014, Zainudin et al. (2018) investigate the factors influencing profitability measured by the ratio of net profit to total assets. Their results from random effect panel estimator indicate that the firm-level variables such as size, underwriting risk, and the ratio of equity capital to total assets are found to be significant in the ROA model.

Camino-Mogro and Bermúdez-Barrezueta (2019) evaluated the micro and macro determinants that influence the non-life and life companies' profitability in Ecuador during 2001–2017. Their results from PCSE models reveal that micro and macro factors are significant determinants in explaining the change in profitability in both life and non-life insurance sectors.

Focusing on 30 non-life insurance companies in Turkey and using static panel data regression analysis, Karadağ Erdemir (2019) has reported that profitability (ROA) is significantly associated with ROE, capital ratio, premium production ratio, current ratio, expense revenue ratio, and leverage ratio in the period of 2010-2014.

The impact of internal and external determinants on the profitability of 24 insurance companies operating in the US and the UK are examined empirically by Batool and Sahi (2019) with panel data techniques. According to the results obtained from the study covering the 2007-2016 period, the internal and external determinants that influence the profitability of the companies in the insurance sector of both countries are mostly similar.

In the Canadian life insurance sectors, Killins (2020) has conducted a study that aims at exploring the factors influencing profitability for 37 companies within the period 1996:Q1-2018:Q2 employing static and dynamic panel data estimators. Based on the findings obtained from the study, the variables such as size, liquidity, capital ratio, industry concentration (HHI), equity market returns, and GDP growth are the major determinants of profitability indicators measured by ROA and ROE.

insurance-specific variables affecting insurance companies' performance in Serbia during the period of 2008 to 2016 is explored by Vojinović et al. (2020) employing panel regression analysis. Estimation results for 19 insurance companies suggest that the statistically significant determinants of the variable of profitability measured with three alternative indicators (ROA, ROE, and the ratio of net profit to total premium) are liquidity, market penetration ratio, risk exposure, and size, respectively. Another important result of the study is that life insurers have higher profitability compared to non-life insurers.

In insurance sector of UAE, Sasıdharan et al. (2020) explored the determinants of profitability of 18 companies from 2010 to 2018 by using regression analysis. The results demonstrate that profitability of insurers is significantly related to the internal factors (i.e., size, capital adequacy ratio, and loss ratio).

In another study on the Turkish insurance industry, Özen and Çankal (2020), using panel data of 21 non-life insurers for the period 2006-2017, concluded that the profitability variable was significantly affected by both internal and external factors.

Tsvetkova et al. (2021) have utilized a sample of 45 insurers from Russian Federation to examine the relation between profitability and its determinants during the years 2012 to 2018. They find that only ROE variable has significant influence on ROA model.

Based on a sample of 14 Indian life micro-insurance companies over the period from 2009 to 2019, Banerjee and Savitha (2021) have examined market and firm-level concentration on ROE by using panel data techniques. Empirical findings demonstrate that the effect of firm-level concentration on the profitability measure is positive, whereas the effect of market share on the profitability measure is negative.

4. METHODOLOGY

4.1. Data

We use an annual data set of a balanced panel of 27 non-life insurers in Turkey during the period 2014–2019. Insurance-level data are compiled employing the insurance reports of the Turkish Ministry of Treasury and Finance (https://en.hmb.gov.tr/insurance-reports), while the data on macroeconomic variables are obtained from the Central Bank of the Republic of Turkey.

4.2. Model Specification and Variables

The following ROA model is estimated to analyze the determinants of profitability of insurers:

In this specification, i and t stand for non-life insurer and time, respectively. refers to the intercept; represents unobserved time-invariant firm effects and is a random error term. Eq. (1) is first estimated for all insurers in the sample, and then for two sub-samples created based on the ownership structure of the insurers. The first sub-sample covers domestic insurers and the second sub-sample consists of foreign insurers. Within the scope of the study, an insurer is defined as a foreign (domestic) insurer when more than 50% of its share capital belongs to foreign investors. Explanations for the insurance-specific variables and the external (industry and macroeconomic) variables included in the ROA model specified as in Eq. (1) are provided in Table 2.

Table 2. Variables and Expected Signs

Variables	Notation	Calculation	Expected sign
Dependent variable			
Return on assets	ROA	The ratio of net profit to total assets	
Explanatory Variables			
Firm-specific			
Size of company	SIZE	Logarithm of total assets	+
Leverage ratio	LR	Ratio of total liabilities to total assets	+/-
Underwriting risk	RISK	The ratio of total claim incurred to total net earned premiums	-
Premium retention ratio	PRR	the ratio of net premiums to gross premiums	+/-
Listed company	LIST	It is a dummy variable that equals one if the insurer is listed, otherwise zero.	+/-
Age of company	AGE	Logarithm of the number of years since the insurer's foundation	+/-
Growth in assets	GRO	The percentage change in assets compared to the previous year	+/-
Industry-specific			
Industry concentration	HHI	it is defined as the sum of the squares of the market shares of all the insurers within the sector.	+
Macroeconomic			
GDP growth	GDP	Annual real GDP growth rate	+
Inflation	INF	Annual percentage change in the consumer price index	+/-

4.3. Hypotheses

The theoretical discussions on the impact of each explanatory variable in explaining the change in profitability are presented in this section.

4.3.1. Size of Company

According to the traditional neoclassical hypothesis, larger firms can minimize their costs and increase their competitiveness in the market thanks to economies of scale. In addition, these firms have the resources and capabilities to cope with uncertain market fluctuations. Therefore, the firm size variable can be expected to receive a positive sign (Burca and Batrinca, 2014; Elango et al., 2008; Camino-Mogro and Bermúdez-Barrezueta, 2019).

4.3.2. Leverage Ratio

According to the free cash flow hypothesis developed by Jensen (1986), high financial leverage can force company management to generate cash flows to meet liabilities to lenders, which contributes to its profitability. However, high financial leverage may cause companies to have difficulty meeting their underwriting obligations. Hence, increasing financial risk may decrease profitability performance (Isik and Tasgin, 2017). As a result, the effect of leverage on profitability is ambiguous.

4.3.3. Underwriting Risk

Underwriting risk or the loss ratio shows the efficiency of the underwriting activities of insurers. In theory, an increase in incurred claims compared to premiums earned in the insurance industry is expected to reduce profitability (Öner Kaya, 2015).

4.3.4. Premium Retention Ratio

Companies with a strong capital structure can have higher premium retention rates compared to other companies, which can positively affect their profitability performance. However, unexpected losses may increase the bankruptcy risk of companies that do not have a strong capital structure and have a high premium retention rate. Thus, the association between premium retention ratio and profitability may be expected to be positive or negative (Öner Kaya, 2015).

4.3.5. Listed Company

Listed companies are more visible than unlisted companies and can reach a wider range of investors, which can help them find capital more easily (Nguyen and Nguyen, 2021). However, the requirement for listed companies to disclose large amounts of information to capital market participants can bring additional costs to the listed company, which can adversely affect performance (Ozili, 2017). Therefore, the relationship between this variable and profitability is ambiguous.

4.3.6. Age of Company

Older companies could build up a good reputation in the market because of their long period of service. In addition to this, they are more experienced. Therefore, experience and reputation gained over a long period of time can contribute to their profitability. However, Older companies' lack of flexibility to adapt quickly to changing economic conditions can hurt their profitability (Majumdar, 1997).

4.3.7. Growth in Assets

Fast-growing companies can earn more profits by expanding their business. However, the profitability level achieved by fast-growing companies attracts the attention of rival companies and causes the number of participants in the sector to increase. This may reduce the positive impact of growth on profitability (Işık, 2017).

4.3.8. Industry Concentration

According to the structure-conduct-performance (SCP), it is expected that the profitability is likely to be high with the effect of monopoly profits in the sector where concentration is high (Smirlock, 1985).

4.3.9. GDP Growth

On the one hand, as financial markets gain momentum during cyclical upswings, the transaction volume in the capital market increases, which in turn increases the value of insurers' investment portfolios of capital market instruments. On the other hand, GDP growth also influences the demand for insurers' products and services. We thus expect a positive impact of GDP development on profitability (Alhassan et al., 2015; Killins, 2020).

4.3.10. Inflation Rate

Increasing interest rates due to high inflation may increase the returns on the investment portfolio of insurers. However, increasing inflation may also lead to a decrease in demand for insurance products. As a result, the effect of the inflation rate on the profitability of insurers is ambiguous (Alhassan et al., 2015).

4.4. Estimation Method

Before starting econometric analysis, it should be noted that the estimation of the model in Eq. (1) is constructed on a short-time dimension (t = 2014–2019) with 27 cross-sections (i = 27 insurers). According to Baltagi (2013), panels with a minimum of 2 cross-sections and a maximum period of 10-20 are called micro panels, whereas panels with a minimum of 7-20 cross-sections and a minimum of 20-60 periods are called macro panels (Baltagi, 2013:1). Hence, micro and macro panels require the application of different econometric steps. For example, the issues such as cross-sectional dependence and unit root are critical issues that need to be tackled in macro panels. However, these two issues, which are important for macro panels, lose their importance for micro panels due to the random sampling of cross-sections (Baltagi, 2013:1). As a result, since the micro panel is used in this study, cross-sectional dependence and unit root tests are not performed.

We have employed the Hausman test to choose the appropriate panel regression estimator in the estimation of the model in Eq. (1), The Hausman test results for all three samples (the whole sample and subsamples) indicate that the parameters of the panel model in Eq. (1) need to be estimated by the random effects estimator.

4.5. Summary Statistics

Table 3 provides some summary statistics on profitability and its determinants (i.e., insurance-specific, industry-specific, and macroeconomic variables) for both entire sample and the sub-samples. The differences between two sub-groups (i.e., foreign- and domestic-owned insurers) are examined by utilizing t-test and Wilcoxon rank-sum test. When the data in Table 3 are examined, it is seen that foreign-owned insurers are significantly older than domestic-owned insurers. However, the mean (median) value of financial leverage for domestic-owned insurers is statistically higher than that for foreign-owned insurers. We observe that domestic-owned insurers have significantly higher growth rate in total assets than foreign-owned insurers. Except for these three variables, the differences between the other firm characteristics of the two sub-groups are not statistically significant.

Table 3. Summary Statistics for Entire Sample and Sub-Samples

	Mean	Median	Std. Dev.	Min.	Max.	N
All Insurers						
ROA	.006	.029	.123	-.992	.193	162
SIZE	20.252	20.533	1.605	15.932	23.016	162
LR	.761	.751	.128	.479	1.702	162
RISK	.762	.702	.501	.051	3.424	162
PRR	.611	.606	.224	.073	1	162
LIST	.185	0	.39	0	1	162
AGE	3.589	4.06	1.576	0	7.609	162
GRO	.086	.051	.262	-.285	2.405	162
HHI	777.935	773.8	32.626	743.38	838.75	162
GDP	.044	.034	.043	-.009	.122	162
INF	.116	.095	.051	.076	.224	162
Foreign-Owned Insurers						
ROA	.004	.028	.089	-.369	.154	90
SIZE	20.195	20.144	1.609	16.863	23.016	90
LR	.739	.744	.087	.56	1.062	90
RISK	.776	.696	.555	.051	3.424	90
PRR	.616	.603	.257	.073	1	90
AGE	3.708*	4.069*	1.225	1.386	5.425	90
GRO	.049	.033	.15	-.285	.72	90
Domestic-Owned Insurers						
ROA	.009	.034	.156	-.992	.193	72
SIZE	20.323	20.634	1.607	15.932	22.914	72
LR	.787**	.771**	.163	.479	1.702	72
RISK	.744	.718	.427	.125	2.729	72
PRR	.605	.621	.175	.082	1	72
AGE	3.441	4.052	1.927	0	7.609	72
GRO	.132**	.062***	.352	-.2	2.405	72

Note: ***, **, and * indicate statistically significant difference between the values of foreign- and domestic-owned insurers at 1%, 5%, and 10% significance levels, respectively.

4.6. Correlation matrix

The Pearson's pair-wise correlation matrix between the variables employed in our regression model is reported in Table 4. It can be seen that LR and RISK present the highest correlations with ROA. The correlation coefficients calculated between the pairs of variables are not very high, which shows us that the multi-collinearity is not an important issue for analysis.

Table 4. Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) ROA	1.000										
(2) SIZE	0.235	1.000									
(3) LR	-0.333	0.041	1.000								
(4) RISK	-0.338	0.242	0.577	1.000							
(5) PRR	0.202	0.489	0.136	0.183	1.000						
(6) LIST	-0.104	0.349	0.125	0.208	0.028	1.000					
(7) AGE	-0.127	0.236	0.182	0.143	0.270	0.104	1.000				
(8) GRO	-0.025	0.050	0.084	0.050	0.131	0.187	0.030	1.000			
(9) HHI	0.016	0.143	-0.029	0.192	-0.041	0.000	0.053	-0.072	1.000		
(10) GDP	0.076	0.024	0.090	-0.154	0.042	0.000	0.010	0.065	-0.600	1.000	
(11) INF	0.231	0.164	-0.102	0.109	0.006	0.000	0.059	-0.125	0.486	-0.486	1.000

5. Empirical Results

The empirical estimations of ROA model specified as in Eq. (1) are reported in Table 5. While the results of the main sample including all insurers are given in the first column of Table 5, the results for the subsamples of domestic- and foreign-owned insurers are reported in the second and third columns of Table 5, respectively.

We observe that the coefficient of the firm size is positive in all models. However, it is statistically significant only in column 3, which indicates that the ROA will increase as the firm grows for foreign-owned insurers. This result, which is consistent with the theory of economies of scale, supports the results of Pervan et al. (2012), Burca and Batrinca (2014), Kočović et al. (2014), Batool and Sahi,(2019) and Vojinović et al. (2020).

Regarding the leverage ratio (LR), we observe a negative and significant association for all models. The negative and significant results from all three models show that insurers acting as a risk transfer mechanism in financial markets will face lower profitability as they use higher debt to finance their total assets. The negative linkage between leverage ratio and ROA supports the findings of Hasan et al. (2018) and Camino-Mogro and Bermúdez-Barrezueta (2019).

As expected, the coefficients estimated for the underwriting risk variable are negative in all models. However, these coefficients are statistically significant only for the entire sample and sub-sample of foreign insurers. This finding indicates that insurers with a high level of underwriting risk have a lower profitability. The predicted negative results for this variable are parallel to some previous studies (e.g., Burca and Batrinca (2014) and Ullah et al. (2016).

The positive and significant coefficient of premium retention ratio in all models confirms our expectations and reveals that the profitability of insurers operating in the Turkish insurance sector is positively affected by the premium retention ratio. This result, similar to that of Burca and Batrinca (2014), can also be explained by the strong capital structures of insurers.

In terms of the listed insurer dummy variable, we have observed interesting findings regarding this variable. Although this variable is insignificant in the full sample, it is statistically significant in sub-samples of foreign- and domestic-owned insurers. However, the effect of this variable on ROA is different depending on the both sub-samples. In other words, our results show that listed insurers in the sub-sample of domestic (foreign) owned insurers have a lower (higher) ROA than unlisted insurers.

The effect of the age variable on ROA is significant only in the sub-sample of foreign-owned insurers. The fact that the estimated coefficient for this variable is negative means that as foreign-owned insurers get older, their profitability decreases. This result is consistent with that of Kočović et al. (2014).

Growth of total assets is negatively correlated with ROA in all samples, but the estimated negative impact is found to be statistically significant only in terms of full sample and sub-sample of domestic-owned insurers. This result indicates that fast-growing companies in the Turkish non-life insurance market tend to operate with low profitability.

As for the HHI variable, no statistically significant relationship is found between this variable and ROA, indicating that market concentration is not a significant determinant of the change in ROA. Our findings, similar to those reported by Camino-Mogro and Bermúdez-Barrezueta (2019) and Killins (2020), do not confirm the SCP hypothesis.

As expected, the ROA of insurers is positively and significantly affected by GDP growth. However, this effect is not valid for both sub-samples. The positive impact of GDP growth is consistent with previous studies (Kramaric et al., 2017; Batool and Sahi, 2019; Killins, 2020).

As for the inflation rate, another important macroeconomic indicator included in the ROA equation, the influence of this variable on ROA is also positive in both full sample and sub-samples but is statistically significant only in the full sample. Our statistically significant and positive finding is in line with the finding reported for the UK by Batool and Sahi (2019).

Table 5. Random Effects Regression Results

	All insurers in the sample (1)	Domestic-owned insurers (2)	Foreign-owned insurers (3)
SIZE	0.0109	0.0148	0.0127**
	(0.0082)	(0.0111)	(0.0058)
LR	-0.5890***	-0.6600***	-0.4730***
	(0.1300)	(0.2060)	(0.1150)
RISK	-0.0436***	-0.0240	-0.0497***
	(0.0138)	(0.0407)	(0.0137)
PRR	0.1390**	0.167*	0.0987***
	(0.0644)	(0.101)	(0.0291)
LIST	0.0061	-0.0604*	0.0594***
	(0.0211)	(0.0360)	(0.0137)
AGE	-0.0071	0.0005	-0.0209**
	(0.0094)	(0.0128)	(0.0092)
GRO	-0.0692**	-0.0728*	-0.0526
	(0.0336)	(0.0440)	(0.0373)
HHI	0.0003	0.0004	0.0003
	(0.0003)	(0.0003)	(0.0004)
GDP	0.0074*	0.0115	0.0061
	(0.0040)	(0.0080)	(0.0055)
INF	0.0057**	0.0077	0.0050
	(0.0032)	(0.0047)	(0.0038)
_cons	-0.1360	-0.2790	-0.1840
	(0.1960)	(0.2420)	(0.3380)
Hausman test	6.38	8.95	5.73
Wald test	403.71***	174.01***	278.90***
	0.7428	0.7392	0.8268
Number of groups	27	15	12
Number of obs.	162	90	72

Note: We run random-effects GLS regressions with robust standard errors clustered at the insurer level to estimate the all models. Robust standard errors in parentheses. We include year dummies to account for the common shocks in the market but their coefficients are not reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

6. CONCLUSIONS

Important steps have been taken for the liberalization of financial services industry since the 1980s in Turkey. However, the liberalization process of the insurance industry started a little later compared to the banking industry. In this context, various regulations have been made to strengthen the infrastructure in the Turkish insurance sector, which has contributed to establishing stability in the sector. Regular analysis and evaluation of the performance of the insurance sector, which has an extremely important position in the Turkish financial system, is of great importance at both micro and macro levels.

The objective of this study is to empirically investigate the factors that influence the profitability of 27 non-life insurers operating in Turkey. We utilize random effect panel regression analysis to estimate the relationship between profitability and its determinants for foreign- and domestic-owned non-life insurers.

Our findings demonstrate that the factors influencing the profitability performance of foreign and domestic non-life insurers are different except for leverage and premium retention ratio. To put it more clearly, the profitability of domestic-owned insurers is positively affected by premium retention ratio but negatively affected by leverage ratio, listed status, and growth in total assets. However, the profitability of foreign-owned insurers is positively affected by company size, listed status, and premium retention ratio but negatively affected by leverage ratio, underwriting risk, and company age.

The insurance market in Turkey has gained significant momentum in the last decade. The profitability of insurers is an important factor in strengthening the financial structure of the sector and ensuring stability in the sector. Therefore, our empirical results for both foreign- and domestic-owned insurers provide important information to regulatory authorities in terms of promoting competition as well as ensuring stability in the sector. In addition, our results regarding the determinants of the profitability of insurers can facilitate strategic decisions by foreign investors, who have invested significant amounts in the Turkish insurance industry in recent years. Finally, knowing what drives the profitability of insurers can make it easier for managers to make decisions about ensuring sustainable profitability, increasing service quality, and managing risks better.

The fact that the data set used in this study covers six years between 2014-2019 can be considered as a limitation. In future studies, the research subject can be deepened by using a data set covering a longer period and different performance measures. In addition, examining life insurers in future studies within the scope of analysis may contribute to a better understanding of the determinants of profitability in the insurance industry.

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