Underwriting of tomorrow, today

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Introduction

"In the new world, it is not the big fish which eats the small fish, it is the fast fish which eats the slow fish." (Klaus Schwab, 2015 Economic Forum)

Digitalization has had a tremendous impact on our lives and on the world we live in. One of my childhood memories from the early 90s is that my mother received a clothing catalogue every six months and my sister and I were allowed to pick one item that she then ordered by post[1]. It usually took another three to four months to receive that order (don't get me started on what happened when the size was wrong!). Although popular at that time with branches across Europe, the company did not make it till today as they were too slow to react to the changing environment and customer expectations. In today's world, customer's expectations are high. People want a simple process, great customer service and fast delivery. But is the life insurance industry ready to meet those expectations?

The life Insurance industry has not been immune to the digital transformation and changing customer needs, however due to the nature of the business (long-term investments and a heavily regulated environment), digital disruption has not transformed insurance as much and as fast as some other industries (e.g., retail or travel and accommodation services). There is no Uber of life insurance yet, but that does not mean that insurance companies will remain unchallenged by disrupters and hence can continue doing things the same way as they did in the past.

[1] I grew up in the Czech republic and at that time this was a popular way of buying new clothes.

Sure, we see that automation of existing processes is an ubiquitous trend even among insurers, but make no mistake, it is only a minimal requirement: it is the new products and offerings that will determine who will rise to the top.

In insurance, there are currently two key moments for a customer: purchase and collection. A lot of advancements have been made in the area of collection, e.g., fraud detection using advanced machine learnings algorithms, but as my job revolves mainly around underwriting, I will focus now on the first part: purchase. As you will see, that will also set the stage for other interactions.

Underwriting today and in the future

Underwriting is a crucial part of the process of purchasing a life insurance cover. This is the phase when an insurance company determines the riskiness of an applicant in order to set an appropriate price. Traditionally, underwriting has been a manual process with long waiting times. A typical life insurance application consists of a lengthy questionnaire (quite often in paper form) with detailed questions about personal data, health, family history, lifestyle, driving history, prescription check and more. Blood and urine sampling is also a standard part of the application process. When all required information is submitted, an underwriter makes an assessment by looking at the provided data and consulting with internal and external medical guidelines.

As one can imagine, such an assessment is prone to manual errors and potential bias and can easily take a month or two, even in case of a healthy applicant. While this approach worked well in the past, I believe that with today’s technology and new data sources, insurance companies could do better. In particular, I see two trends emerging from the digital transformation that have impact on how underwriting is done:

1. Shortening and simplification of the application process using statistical insights
2. Product personalization and shift focus from loss indemnification to loss prevention

Trend # 1: Shortening and simplification of the application process using statistical insights

Customers expect a fast and simple issuance process, low prices and a great customer experience. It is clear that with the current business requirement for fully underwritten products, fast issuance times are not feasible if blood and urine tests are still required and each application needs to be reviewed by an underwriter. But do we really need all the information that is currently being requested as part of the application process?

At Aegon, we have looked at the most common questions asked on a typical health questionnaire and investigated which questions are crucial to gauge the mortality of the applicant. Knowing which questions add value is of great importance, because it allows us to reduce the application form to a great extent. To achieve that we mapped the current underwriting questions on to a publicly available dataset from the US National Center for Health Statistics[2] and used survival analysis to investigate the significant drivers of mortality. We found that apart from age and gender, only about 10 questions are significant predictors of all-cause mortality!

Apart from reducing the number of questions on the health application, we have also looked at the additional benefit that blood and urine tests have on assessing all-cause mortality. The result showed that for an average healthy individual , age and gender explains nearly everything and there is only limited benefit from asking any additional questions – especially

[2] National Health and Nutrition Examination Survey (NHANES) is a survey designed to access health and nutrition status of adults in the U.S. The survey combines interviews and physical examinations (including blood and urine tests). The survey is nationally representative. More information about the survey can be found on: https://www.cdc.gov/nchs/nhanes/about_nhanes.htm

if the primary goal is to assign underwriting class. Unfortunately, age and gender alone are not enough as we do not know the current health status of these people without asking for some additional information. For the less healthy individuals, there is benefit from asking the 10 additional questions. However, given the answers to those questions, there seems to be only limited benefit from doing blood and urine tests. In fact, instead of requiring an invasive testing for every application above a certain face amount (as it is customary now), we could be more effective by requiring these tests only for those that are above a certain pre-defined relative risk score threshold.

Another advantage of using a survival model instead of a manual review is the fact that we can score each application and the score is directly tied to all-cause mortality. We can therefore establish a direct link between all-cause mortality and each underwriting class by setting a score threshold for each. With a risk scoring API (An Application Programming Interface), we can then score each application in real-time and receive underwriting decision within seconds.

Does that mean that underwriters will be without jobs in a couple of years? I do not think so, but certainly roles will change. In my opinion, for more complex cases which require looking at additional, mostly unstructured documentation, there will still be a need for an underwriter. The main difference between the manual and automated approach is that in the future underwriters will be able to focus on cases that require more attention and expertise instead of having to look at everything. As Mr. Garg of RGA puts it: *"Today,* *humans make the underwriting decisions with some help from machines. Tomorrow, machines will make the underwriting decisions with some help from humans.[3]"*

For decades underwriters used the same methods and the same type of data to underwrite an insurance policy. While this system worked well in the past, with new data and new techniques, insurance companies can now deliver better and faster underwriting experience and as result, truly differentiate themselves from competitors.

Trend # 2: Product personalization and shifting focus from loss indemnification to loss prevention

Thanks to the rapid advancements in technology, people can monitor their health better and cheaper than ever. According to a survey conducted by Pew Research Center, roughly 1 in 5 U.S. adults wears regularly a smartwatch or a fitness tracker[4]. But even if someone is without a smartwatch or other specialized equipment, chances are that her activity is being tracked anyway. For example, Apple phones have a built in pedometer, and other distance movement functions to track activities every time we carry a phone with us (that is, nearly all the time for most of us…). Heart rate can also be easily and accurately measured by simply putting a fingertip on the phone's camera. An inspiring example is a colleague of mine who wanted to lose weight in the most efficient way. He did a genetic test to determine what type of exercise (e.g. short-term intensity training or long-distance endurance training) is more suitable for him. He then tracked his weight progress using a mobile app and successfully achieved his goal.

[3]Source: https://rgare.com/knowledge-center/media/articles/art-or-science-cultivating-the-next-generation-of-underwriting-talent-holds-the-key

[4]Source: https://www.pewresearch.org/fact-tank/2020/01/09/about-one-in-five-americans-use-a-smart-watch-or-fitness-tracker/

As customers are increasingly aware of their own health, they also expect more individualized approach when it comes to insurance. They do not want to pay an average price for an average product, they want to have a tailored price and a product which reflects their lifestyle. Therefore new insurance models have to emerge, in which insurers will take a more active role and have more frequent touch-points with customers. Insurance companies who want to stay relevant in the future will not only serve as a protection provider but they will also assist their customers in living a healthy and long life.

There is no doubt that lifestyle choices have a big impact on health. Some of these, such as smoking and alcohol or drug consumption have been a standard part of medical questionnaires for quite a long time, however physical activity is rarely taken into account by underwriters. New studies nevertheless suggest that physical activity is a significant predictor of mortality. For example, a study from Munich Re examined the effectiveness of using step count (as measured by a wearable device) in stratifying mortality in combination with traditional underwriting variables such as age, gender, smoking, BMI, cholesterol, etc. The Munich Re study found that the number of steps per day is the second most significant predictor of mortality after age [5]! At Aegon, we have also looked at how physical activity impacts all-cause mortality using NHANES data reaching similar results. The risk of dying for those who exercise less than 1 hour per week is 88% higher compared to those who exercise more often[6].

There are a couple of insurers in the market who already moved towards prevention rather than indemnification and incorporated new data sources into underwriting. A great example

[5] Source: https://www.munichre.com/us-life/en/perspectives/wearables/Stratifying-mortality-risk-using-physical-activity-as-measured-by-wearable-sensors.html
[6] Calculation based on NHANES 2009-2014 data. Hazard ratio adjusted for various socio-demographic indicators and medical history.

is John Hancock who teamed up with Discovery's Vitality brand, a tech-driven platform that rewards policyholders for living healthy, to offer them a Vitality program that rewards healthy behaviour. John Hancock started with this program in 2015 and since 2018, all John Hancock policies come with Vitality. Policyholders can choose between a basic and a plus option. The basic option is offered to all policyholders for free and allows them to access expert fitness and nutrition services while also setting personalized goals. Policyholders are rewarded when they reach a goal. The second option is a paid option that comes with a variety of incentives including discount on annual premiums, subscription to Headspace and the possibility to earn an Apple watch[7].

The new model of offering insurance products with such a health incentive program shows promising results. Vitality policyholders worldwide live on average 13-21 years longer than the rest of the insured population (!) and John Hancock Vitality policyholders take nearly twice as many steps as an average American[8]. According to another study conducted by Vitality and RAND Europe, incentivizing physical activity leads to increased activity levels. The results suggest that those who participate in the Vitality program with Apple watch / Fitbit benefit had on average an additional 4.8 days per month in which they were active compared to those who only participated in the basic Vitality program[9]. Though there are also elements of positive selection here, it is not only those who are fit and healthy that can benefit from more individualized pricing and incentives.

As we can identify risks more accurately and better reflect behavior, we can offer insurance at fair price to those who have traditionally been rejected or paid unaffordable premium

[7] Source: https://www.johnhancockinsurance.com/vitality-program.html
[8] Source: https://www.prnewswire.com/news-releases/john-hancock-leaves-traditional-life-insurance-model-behind-to-incentivize-longer-healthier-lives-300715351.html
[9] Source: https://d16pi0tqkfzkv3.cloudfront.net/assets/microsites/vitality-international/pdfs/rand-rr2870.pdf

rates in the traditional system. WinSocial, a Brazilian start-up company that rewards healthy lifestyle, is a great example of such new proposition. WinSocial offers term and accidental disability life insurance to people with diabetes, population that have been traditionally underserved in the Brazilian population.

The prevalence of diabetes worldwide has been rising sharply in the last two decades and nowadays diabetes is among the top 10 leading causes of death worldwide. Brazil is no exception to this trend as about 11% of the total adult population have diabetes[10] and the number is expected to rise. Although it is a serious disease that can lead to fatal consequences, diabetes can also be well treated, delayed or even avoided in the case of type II with healthy lifestyle, balanced diet and maintaining a normal body weight. Therefore, it is often diabetics who understand more than anybody else that healthy lifestyle is important. This prompted WinSocial in partnership with MAG Seguros[11] to launch WinSocial & Diabetes initiative which offers a 1 year renewable insurance cover that rewards a healthy lifestyle. Underwriting is done in an easy and interactive way using a simple mobile app. Upon completion of the health check on the app, the user gets a health score and can apply for an insurance through the app. The better the score, the lower the premium. That means that diabetics who maintain a healthy lifestyle and can prove that their glucose levels are within recommended limits can not only have an affordable cover, they may even receive a discount based on their lifestyle. Since its launch in 2017, this initiative has been well-accepted by the diabetics community and beyond. Although, WinSocial only focuses its marketing efforts on diabetics, about 2/3 of current customers are non-diabetics, suggesting

[10] Source: https://idf.org/our-network/regions-members/south-and-central-america/members/77-brazil.html
[11] Mongeral Aegon

that if a diabetic person is satisfied with the process, the good news is shared with others who then also buy a cover.

WinSocial describes itself as a start-up focusing on social inclusion through technology and in the future WinSocial would like to expand coverage into other groups excluded from traditional insurance such as hypertension and HIV[12].

With the wealth of knowledge we have today, the best risks are not the same as we thought they are in the past. Underwriting moves from one-time assessment into a continuous process which allows insurance companies to not only price more accurately and retain better risks, but also to promote and incentivize a healthy lifestyle.

Concluding remarks

Advancements in digital technology have had a major influence on how customers wish to interact with companies. Insurance companies should take this as an opportunity to rethink their models in order to get closer to their customers and offer them products that fit their needs and expectations. Underwriting plays a crucial role in this. While traditional underwriting worked well in the past, modern underwriting will have to be able to offer more personalized experience with minimal invasive tests and shorter waiting times. Smart insurance companies will move from pure protection provider to a health coach and wellness services in order to incentivize healthy behaviour and to keep good risks. Strategic partnerships will play a key role in this. While some companies might decide to outsource the whole underwriting to a third party provider, I believe that the truly successful companies will combine internal approach with strategic partnerships as it is too important function to be completely outsourced. Successful companies will also have to be flexible to

[12] Source: https://www.aegon.com/newsroom/news/2019/winsocial/

accommodate new data sources and emerging technologies in short production cycles – something that traditional insurance companies have not been very good at so far. So, the stage is set for those insurers who seize the opportunity to do well and create growth in market too often seen as stale.