The Retention Rate Illusion: Understanding the Relationship Between Retention Rates and the Strength of Subscription-Based Businesses

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This paper discusses five important pitfalls when using customer-centric metrics and offers suggestions for adjustment to these metrics in order to make them more useful for various stakeholders. Furthermore, the paper introduces an innovative framework that uses multiple customer-centric metrics to assess the strength of a subscription-based business model.

Keywords: retention rate, renewal rate, subscription-based business, churn, customer-centric metrics

INTRODUCTION

True or False? A business which retains 95% of its customers is always a stronger business than a business which retains only 80% of its customers. Sounds True, right? Actually, it is a False statement. Numerous marketeers, corporate strategists, investors and journalists are making the same incorrect judgement. Why is that? The answer is that they have all become a victim to the *Retention Rate Illusion*.

This paper will discuss five important retention rate illusions. Our objective is to help stakeholders (investors, marketeers, journalists and others) become aware of these illusions and, where possible, to adjust customer centric rates to make them more useful.

SUBSCRIPTION-BASED BUSINESS MODELS

Do you remember when DVD's were used to watch movies at home? Nowadays, most of us use a subscription-based service, such as Netflix to watch movies. The success of subscription-based services has not been limited to movies alone. More and more industries are embracing subscription-based business models where customers pay a periodically recurring fee for access to a product or service. Even sneakers are now offered by Nike as a subscription service. Another example are food-box delivery subscriptions which have taken off fast, saving us time deciding on what meal to serve tonight and buying the right ingredients. One of the largest of these food-box subscription companies, Hello Fresh, has been able to grow its revenues fivefold within 5 years, from less than EUR 100 mln. in 2014 to more than EUR 500 mln. in 2019 and is now worth more than EUR 6 bn. And Hello Fresh is not alone. We see many subscription service companies growing fast and attracting lots of media and investor attention (Tzuo, 2018; Baxter, 2015; Warrilow, 2015).

RENEWAL RATES AS KPI FOR SUBSCRIPTION-BASED BUSINESS MODELS

Although these subscription services businesses may seem very successful, one of their biggest challenges is customer loyalty and retention. Quite a number of these services, like Netflix, Amazon Prime and Hello Fresh, offer monthly subscriptions that can simply be canceled with a few clicks. Not surprisingly, most of these companies see a significant proportion of their customers canceling their subscriptions within a short period of joining. For example, Netflix loses more than 30% of its video streaming service customers within just 12 months of subscribing (Rieck, 2019). Hello Fresh is doing even worse. It has been estimated that more than 85% of their customers cancel their subscription within one year (McCarthy, 2019).

An increasing body of research has been written about the advantages of customer retention. Research shows that customer retention increases the customer lifetime value (e.g., Berger, 1998; Bonacchi, 2008), drives higher productivity (Reichheld, 1996), enables effective innovation (Hax, 2001), drives cross-selling opportunities (e.g. Reichheld, 1996) and increases the company's market valuation (e.g., Kumar, 2009; McCarthy, et al., 2017).

One of the best indicators of the strength of a subscription-based business is its *renewal rate*, which measures how successfully a company retains its customers.

So how do we calculate renewal rates? Renewal rates can be defined as the proportion of customers who renew their contract once it is up for renewal, or mathematically:

$$r^{renewal} = \frac{\text{\# Customers who renew contract}}{\text{\# Customers whose contract is up for renewal}} \quad (1)$$

The problem, however, is that renewal rates are generally not easy to obtain for stakeholders who are looking to understand the success of a subscription service and its durability. Fortunately, an increasing number of companies[1] are reporting their retention rates.

Customer retention rates should be interpreted as the proportion of customers from a preceding period that have been retained in the subsequent period. More formally, we could write customer retention rate as follows[2]:

$$r^{customer} = \frac{\text{\# Customers}_t - \text{\# New Customers}_t}{\text{\# Customers}_{t-1}} \quad (2)$$

Let's take Simcorp, one of the world's largest asset management software companies, as an example to calculate customer retention rates. Simcorp does not report their customer retention rates directly, but they do report on an annual basis their total number of customers and the number of new customers. Using the customer retention rate formula, we are therefore able to calculate Simcorp's customer retention rates as is shown in table 1.

TABLE 1
SIMCORP'S CUSTOMER RETENTION RATES 2016, 2017, 2018 and 2019

	2015	2016	2017	2018	2019
Reported # customers (a)	173	182	186	190	199
Reported # new customers (b)		12	8	10	12
# Customers lost (c) = $a_{t-1} + b - a_t$		3	4	6	3
Customer retention rate		98.3%	97.8%	96.8%	98.4%

As we see in the above Simcorp example, even if a company doesn't disclose its customer retention rates directly, customer retention rates may be derived from aggregated customer data points.

Simcorp exhibits customer retention rates of more than 96%, which could indicate a very strong business. However, in general, stakeholders should be cautious about the value of such high retention rates. Often, they assume that these reported retention rates are a good proxy for realized renewal rates. Stakeholders should be aware that sometimes companies that report their retention rates, may be doing so in order to create an illusion of a strong subscription-based business, whereas their underlying business may be quite weak.

THE RENEWAL RATE ILLUSION: REPORTED RETENTION RATES MAY NOT BE INDICATIVE OF REALIZED RENEWAL RATES

The first illusion deals with the fact that stakeholders should be careful interpreting high retention rates as an indication of high renewal rates. Especially, *when customers have long term contracts, retention rates are often overstated relative to the underlying renewal rate.* This may be because customers are sometimes unable to contractually walk away from their supplier during their contract, or only by incurring significant costs. Any customer who cannot cancel their contract without undue cost or effort would therefore be retained which positively but falsely impacts the retention rate.

In order to understand the level of alignment between retention rates and the underlying renewal rates, we need to focus on the relationship between them. The relationship between the underlying renewal rate and the retention rate can be described as follows[3]:

$$r^{renewal} = 1 + t\,(r^{customer} - 1) \tag{3}$$

where: $r^{renewal}$ = Renewal rate
$r^{customer}$ = Annual customer retention rate
t = Contract duration (years)

Another example is KONE, one of the largest manufacturers of elevators globally, which has an average retention rate of around 95% in its maintenance business. Its maintenance contracts generally have a contract duration of three years. Using the formula, we could calculate KONE's underlying renewal rate as follows:

$$r^{renewal} = 1 + t\,(r^{customer} - 1) = 1 + 3\,(0.95 - 1) = 0.85$$

On average, 85% of KONE's maintenance customers have been renewing their contract with KONE. Or to put it in another way, 15% of their customers do not renew their maintenance contract, also referred to as churn. This renewal level will be more useful in assessing the strength of KONE's business model, than taking the 95% retention rate at face value.

The formula also makes it easy to understand that the longer the duration of the contract, the more the retention rate will differentiate from the underlying renewal rate. If, for example, KONE had maintenance contracts that lasted for 20 years and KONE still reported a 95% retention rates, its underlying customer renewal rate would drop to 0%! This is a great example of a situation where a 95% retention rate basically says very little about the customer's intention to renew their contract and the strength of the business.

Rearranging the formula from above allows us to calculate the retention rate based on a given renewal rate:

$$r^{customer} = 1 - \frac{(1 - r^{renewal})}{t} \tag{4}$$

where: $r^{customer}$ = Annual customer retention rate
$r^{renewal}$ = Renewal rate
t = Contract duration (years)

Using this formula, Table 2 shows the customer retention rates with a 50% renewal rate with different contract lengths.

TABLE 2
RETENTION RATES WITH DIFFERENT CONTRACT LENGTHS

Contract length (years) for $r^{renewal} = 50\%$	1	5	10	25
Annual retention rate	50%	90%	95%	98%

As the above table shows, without knowing the duration of the contract, it is very hard to indicate whether these high retention rates are the result of a high renewal rate or driven by the inability of customers to cancel their contract.

Lastly, according to the same formula, it should be evident that with a contract duration of one year, renewal rates and retention rates fully converge, and retention rates may act as a useful indicator for the underlying renewal rate. Still, stakeholders need to be cautious as there are other important illusions which may result in an incorrect assessment of the strength of a subscription-based business. One of these illusions deals with the fact that there are multiple definitions of retention rate, which we will address in the next paragraph.

THE RETENTION RATE DEFINITION ILLUSION: COMPANIES MAY USE DIFFERENT RETENTION RATE DEFINITIONS TO INFLUENCE STAKEHOLDERS

We defined customer retention rates as the percentage of customers who still have a contract with the company compared to the prior year. Given that customer retention rates are not formally defined within the generally accepted accounting principles (GAAP), companies have some flexibility how they define retention rates. This lack of a common definition further increases the likelihood that stakeholders wrongfully assume that a reported retention rate would be a good proxy for the company's underlying renewal rate.

The use of *revenue retention rates* is common among the so-called Software as a Service (SaaS)-companies. The revenue retention rate measures the development of revenues from the same group of customers and can be written as:

$$\text{Revenue Retention Rate} = \frac{\text{Customer Group Revenue}_{t}}{\text{Customer Group Revenue}_{t-1}} \tag{5}$$

The change in revenues from the same group of customers will mainly depend on the following five factors: customer retention rate, change in pricing, change in demand for the same set of services, proportion of customers upgrading or downgrading (up-/down-selling) and sales of other services to the same customer (cross-selling).

In practice, companies generally use two definitions of revenue retention rates. *Net* revenue retention rate includes all the five factors listed above, while *gross* revenue retention rate only focuses on the drivers which negatively impacted revenues. Losing customers and down-selling (for example moving your Netflix premium account to a basic Netflix account) are therefore important drivers underlying the gross retention rate.

Based on a reported net revenue retention rate, we could calculate the customer retention rate by using the following formula:

$$r^{\text{customer}} = \frac{r^{\text{net revenues}}}{(1+p)\times(1+q)\times(1+s)} \tag{6}$$

where: $r^{net\ revenues}$ = Net revenue retention rate
$r^{customer}$ = Annual customer retention rate
p = Annual change in price (in %)
q = Annual change in demand for same set of services (in %)
s = Annual change in sales as a result of cross- and up-selling (in %)

In order to use the formula effectively, we need to estimate the level of subscription price change, the change in subscription usage and the level of upselling and cross selling. Since companies generally do not disclose these numbers to investors, it may seem rather difficult to estimate these numbers. Understanding the company's strategy and potential customer switching barriers could be helpful in estimating these variables.

For example, a company using an ecosystem approach, would be much more likely to upsell and cross sell services to its existing customers, compared to a company offering just one service. Earnings transcripts, annual reports and investor presentations may also act as valuable resources. In addition, stakeholders could use annual inflation rates as their base estimate for annual price changes, if they are unable to find any useful information about specific price developments.

Let's use the net revenue retention rate of Dropbox as an example on how to use the formula to calculate its customer retention rate. The online storage subscription service has been quite successful in increasing its revenue per existing customer. During 2019, Dropbox was able to increase its revenues per existing customer by 19%. They also reported a net revenue retention rate of 116%. Hence, using the formula, we are now able to calculate its customer retention rate:

$$r^{customer} = \frac{r^{net\ revenues}}{(1+p)\times(1+q)\times(1+s)} = \frac{1.16}{1.19} = 0.975$$

In order to derive customer retention rates from the gross revenue retention rate, we simply use the same formula, provided that its individual drivers should be less or equal to zero.

$$r^{customer} = \frac{r^{gross\ revenues}}{(1+p)\times(1+q)\times(1+s)} \tag{7}$$

with $p, q, s \leq 0$.

THE NARROW VIEW ILLUSION: COMPANIES MAY TEMPORARILY INCREASE RETENTION RATES TO INFLUENCE STAKEHOLDERS

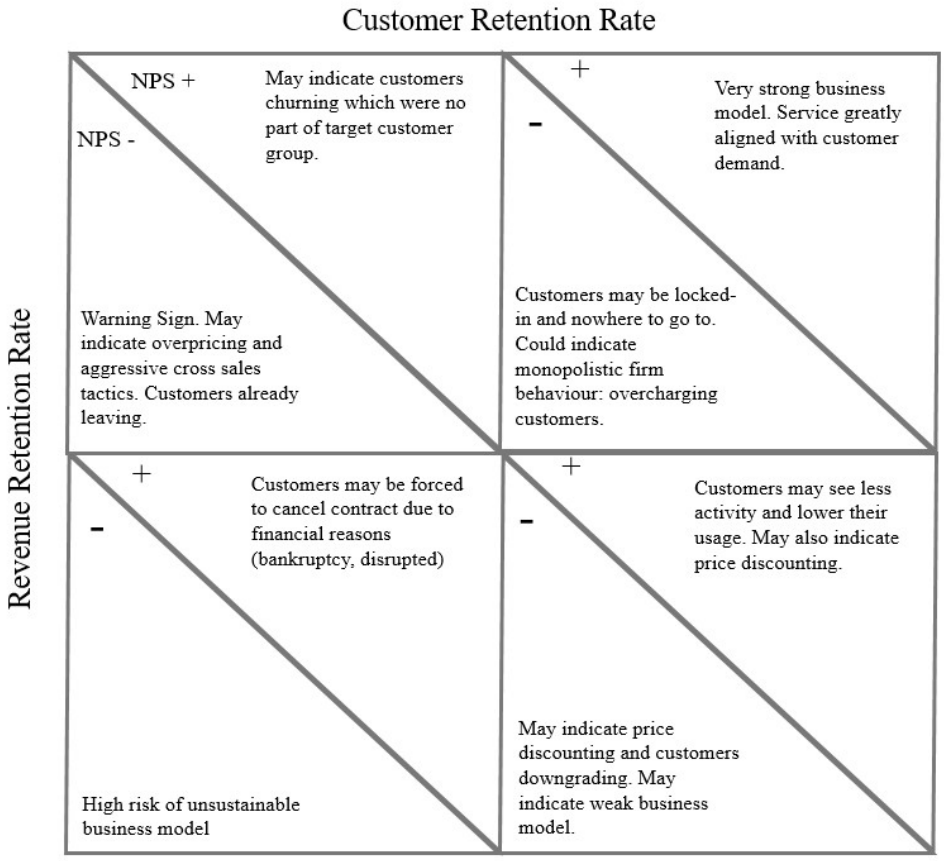
Companies have the tendency to highlight only those retention rates that give stakeholders a favorable view of the company. Stakeholders limiting themselves to analyzing just these customer-centric measures may find themselves exposed to a biased view of the company. This potential illusion, caused by a one-dimensional view of the company's customers, could be mitigated by broadening the analysis and include other customer-centric measures. This would significantly improve the quality of the overall business model assessment.

For example, companies could increase their customer retention rates by offering significant price discounts at or just before renewal date. In this case, stakeholders may overestimate the strength of the subscription-based business as the company would likely report high customer retention rates, while the underlying driver for the renewal is not a durable one. In general, companies who are using such sales tactics should not be regarded as strong subscription-based business models.

One way to spot these sales tactics is to broaden the view and include revenue retention rates as part of the analysis. Lowering prices and other inducements to renew a contract, will result in lower revenue retention rates. Therefore, in cases where companies exhibit high customer retention rates and low revenue retention rates, stakeholders need to be cautious about the long-term viability of the business model.

When stakeholders analyze customer retention rates, revenue retention rates[4] and additional customer-centric metrics such as Net Promotor Scores (NPS) (Reichheld, 2003) in a coherent manner, they would be able to derive valuable insights about the strength of a subscription-based business model. Table 3 provides a framework using three customer-centric measures.

TABLE 3
THE STRENGTH OF A BUSINESS BASED ON MULTIPLE CUSTOMER-CENTRIC METRICS



There are multiple important insights which can be derived from this Customer-Centric Metrics (CCM)-framework. It is possible to position a company in the framework with only three datapoints. Based on the specific position within the framework, a stakeholder would be able to get a good view of the strength and durability of the business model. Importantly, this framework would also be able to guide the stakeholder to specific areas which may warrant further analysis.

Let's use SAP, the global leader in enterprise resource planning (ERP) software, as an example here. SAP publicly claims they have very high customer retention rates. While they do not give a specific number, they have indicated their customer retention rates >97%. As their on-premise product has an annual maintenance fee, their renewal rate would also be >97%.

Furthermore, helped by their breadth of its product portfolio, SAP has been very successful in cross selling multiple products to its existing customers. Consequently, we could estimate that its adjusted revenue retention rate would be higher than 100%. Our final datapoint, NPS, comes from SAP's 2019 Annual Report. SAP's NPS was -6 for 2019.

Based on these three datapoints, we are able to position SAP in the lower half of the top right-hand quadrant of our CCM-framework. We conclude hereby that SAP would be considered a strong business with a high durability. We also gained an important insight which warrants further analysis. Given SAP's

position in the framework, SAP may have a weakened relationship with their existing customers. While these customers are not able to simply walk away from SAP as SAP's products often perform mission critical functions at the customer's premises, it could point out to some risks going forward. One of the risks for SAP is a reduction in sales to their existing customer base. Also, sales to new customers could become more challenging as potential customers become increasingly aware of the possibility that other customer may have experienced a weakened relationship with SAP. Therefore, SAP's specific positioning in the framework could result as an early warning indicator of lower renewal rates in the future.

The CCM-framework has been designed to offer very specific powerful insights based on a company's positioning within the framework. This framework will be helpful for stakeholders in their analysis of the strengths and weaknesses of a subscription-based company. We also argue that this framework will be very valuable for subscription-based companies themselves. By using this framework, they would be better equipped to understand the behavior of their customers, which may provide further guidance in their business and marketing strategies.

THE PERIODICITY ILLUSION: COMPANIES MAY USE A DIFFERENT TIMEFRAME IN ITS RETENTION RATE CALCULATION

Generally, companies who report retention rates, compare its level of revenues or number of customers relative to a year ago. These kinds of retention rates are often referred to as the annual retention rate.

Recently, a new measurement basis of retention rate is becoming popular, especially among SaaS companies. Instead of measuring their retention rates on an annual basis, they often calculate these rates on a monthly basis. In most cases[5], the annual retention rate will be (significantly) lower than the monthly retention rate, so stakeholders should make sure which timeframe a company uses in its calculation of retention rates. Table 4 illustrates the different outcomes based on a reported retention rate.

TABLE 4
REPORTED MONTHLY RETENTION RATES AND PROPORTION OF CUSTOMERS LEFT

Reported Retention Rate	Proportion of Customers left after 1 year (Annual Reported Retention Rate)	Proportion of Customers left after 1 year (Monthly Reported Retention Rate)
50.00%	50.00%	0.02%
55.00%	55.00%	0.08%
60.00%	60.00%	0.22%
65.00%	65.00%	0.57%
70.00%	70.00%	1.38%
75.00%	75.00%	3.17%
80.00%	80.00%	6.87%
85.00%	85.00%	14.22%
90.00%	90.00%	28.24%
95.00%	95.00%	54.04%
100.00%	100.00%	100.00%

As the table illustrates, it is critical to understand whether a reported customer retention rate (of say 90%) has been calculated on a monthly basis or an annual basis. With a 90% annual retention rate, just 10% of its customers ended their relationship with the company after one year, which could indicate a relatively strong subscription-based business. However, when a reported 90% retention refers to monthly retention rates, the company may be losing almost 72% of its customers in one year, which clearly indicates a weak subscription model.

For consistency, we will use the annual retention rate as our definition of retention rates throughout this paper. Therefore, if a company uses a monthly timeframe to calculate its retention rates, we should adjust this rate to the annual retention rate. Adjusting a monthly retention rate to an annual retention rate can be done by using the following formula:

$$\text{Annual retention rate} = \text{Monthly retention rate}^{12} \quad (8)$$

THE TRANSFERABILITY ILLUSION: CURRENT RENEWAL RATES MAY NOT BE INDICATIVE OF FUTURE RENEWAL RATES

The transferability illusion deals with the extent to which *realized* renewal rates can be used as a proxy for *future* renewal rates. Extrapolating realized renewal rates into the future could prove to be costly as it may result in an overly positive view of the strength of a subscription-based business.

In order to assess whether realized renewal rates may be appropriate for estimating future renewal rates, three main factors should be considered.

Homogeneity of Customer Base

In general, the more homogenous the behavior of the customer base; the more likely it will be that historical renewal rates will be a reliable proxy for future renewal rates. To analyze the level of homogeneity, we typically segment the customer base across various characteristics. For our purpose here, the most important customer segmentations are the segmentation by proportion of discounted contracts relative to non-discounted contracts and the segmentation by the customer relationship's duration.

Companies looking to acquire customers will often offer significant price discounts to incentivize them to purchase its services. Once the customer's contract is up for renewal, these customers will usually be faced with price increases as the pricing levels become more normalized. Obviously, renewal rates at such a point will be relatively low compared to contract renewal rates where a non-discounted contract is up for renewal.

The extent to which realized renewal rates can be used to estimate future renewal rates is therefore dependent on the proportion of discounted contracts relative to non-discounted contracts. Subscription-based businesses which have been recently introduced are more likely to have a higher proportion of discounted contracts. Consequently, for these businesses realized renewal rates may underestimate future renewal rates.

The duration of the customer relationship is another important factor to consider here. To which extent are customers more or less likely to renew their contract once they have a longer relationship with the company?

The key to answering that question, is to understand the kind of barriers customers face when they are inclined to switch to another supplier. Most switching barriers would decrease in power over time, causing the renewal rate to decline over time. However, switching barriers driven by a customer's customization, may result in lower churn rates over time, as the system becomes more and more customized. SAP has clearly benefitted from this effect. SAP's on-premise products have been highly customized by its customers and are often deeply integrated in customer workflows as well. As customers are actively customizing and further integrating these systems, it should be expected that the company's on-premise customer base would see higher renewal rates over the years. For SAP's on-premise products, realized renewal rates may underestimate future renewal rates.

Homogeneity of Product Portfolio

Especially when renewal rates are reported on an aggregated company level, investors need to also consider the extent of homogeneity of the company's services. For example, are the company's latest service offerings more or less likely to see customers renew their service contract compared to the company's earlier service offerings? Understanding whether customer switching barriers are higher or

lower with recent services relative to the older ones, could provide important clues as to whether renewal rates will be higher or lower compared to recent renewal rates.

Using SAP again as an example, we see that SAP has been successful in selling on-premise ERP software systems for the past few decades. These systems are highly customized and integrated with customer's processes. Consequently, their ERP-customers are facing switching barriers, resulting in high retention and renewal rates for these products. SAP's newer offerings are SaaS based and are more standardized. Hence, SaaS-based customers tend to have a lower barrier to switch compared to the on-premise product customers. Since it is expected that the proportion of SAP's SaaS services will increase relative to SAP's on-premise products, we therefore could expect that SAP's future overall renewal rate may be lower than their realized overall renewal rate. Here, the negative impact of the product mix more than offsets a further (small) rise in SAP's on-premise renewal rates.

Size of Customer Base

The size of the customer base is another important factor we need to discuss in order to understand the extent to which current renewal rates may be used to forecast future renewal rates.

With a large customer base, renewal rates tend to be more stable. This is because individual customer peculiarities will generally cancel each other out, provided they are unrelated. Therefore, with a large customer base, it will be more likely that realized renewal rates may prove to be a good indication of future renewal rates.

Conversely, renewal rates derived from a small customer base would be a less reliable input to forecast future renewal rates, due to their relative instability. Therefore, stakeholders should be very careful when interpreting renewal rates of subscription-based businesses that only have a limited number of customers, as is often the case with recently introduced subscription services.

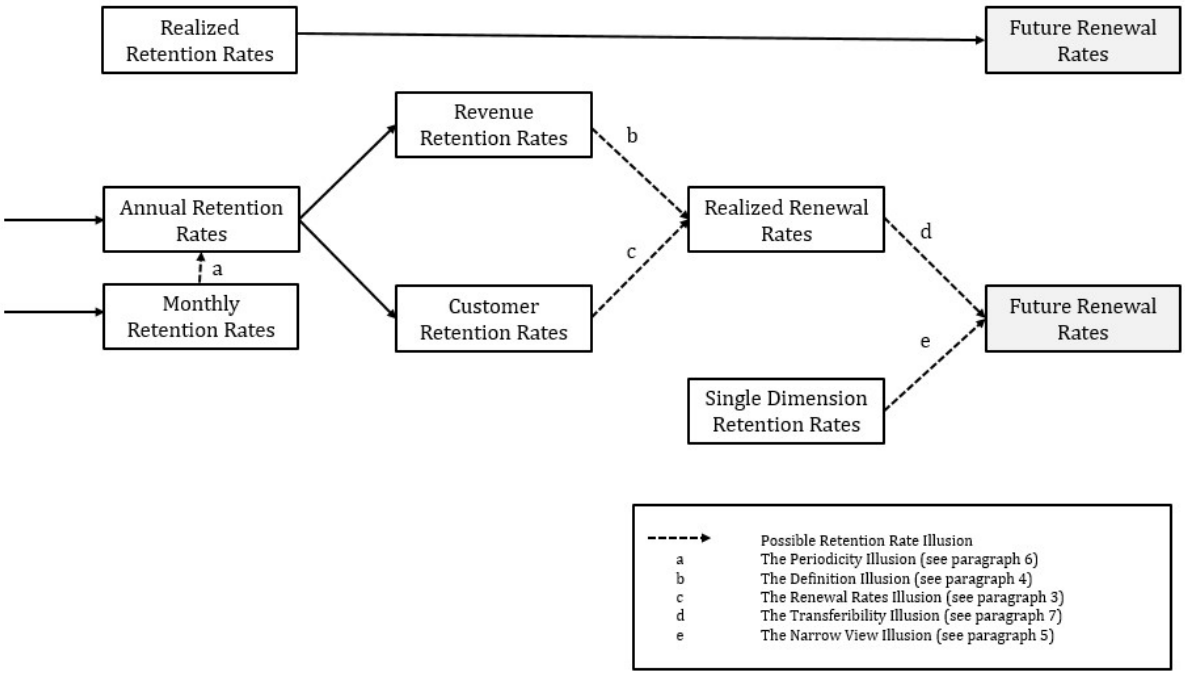
THE RETENTION RATE ILLUSIONS AND THEIR INTERCONNECTIONS

As we have discussed earlier, future renewal rates are one of the most important drivers of the overall value of a subscription-based company. In order to estimate future renewal rates, we often have to rely on reported retention rates. Therefore, *the true value of reported retention rates should be based on its ability to estimate future renewal rates*. All our five retention rate illusions could significantly lower the value of reported retention rates. To make matters worse, these illusions are often interconnected to each other, resulting in a potential accumulation of misinterpretations, which further lowers the applicability of reported retention rates. Figure 1 describes the relationship between the reported retention rate and the future renewal rate and the interconnections with our five illusions.

For example, when a company reports its monthly retention rate, according to figure 1, four illusions could potentially impact the usefulness of this metric: the periodicity illusion (a), the definition illusion (b), the transferability illusion (d) and the narrow view illusion (e).

As we have shown in the previous paragraphs, with some adjustments, we are able to improve the value of reported retention rates significantly. This will provide stakeholders with a much better perspective to assess the true longer-term strength of the subscription-based business.

FIGURE 1
OVERVIEW FIVE RETENTION RATE ILLUSIONS



CONCLUSION

We introduced a framework to evaluate the strength of a subscription service business using different customer-centric measures. We argued that stakeholders need to be careful when interpreting reported customer-centric measures as the company may do their best to create the illusion of a strong subscription service business. Using the formulae in this paper, these reported measures can often be adjusted to make them more valuable for stakeholders when evaluating reported retention rates. Most importantly, we do hope that this paper contributes to the understanding that customer-centric measures have an important role in assessing the longer-term success of subscription-based business models.

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ENDNOTES

1. There is some bias as to which companies are reporting their retention rates (accurately) and which companies do not wish to report these numbers. Obviously, companies having a hard time keeping its customers will be very reluctant to report these numbers, whereas companies having high retention rates may be more inclined to publish these rates to their (potential) investors.
2. There are several definitions of retention rates found in the (marketing) literature. Some of them focus on the total revenues, comparing those to a year earlier. We, however, focus on the stability of the number of customers as this is what resembles the renewal rate to the closest extent in our opinion.
3. We hereby assume a stable contract origination profile, which generally corresponds to more mature industries. Given the same retention rate, higher growth industries would have a lower underlying renewal rate, as their remaining average contract length tend to be higher than is the case with mature industries. For

declining industries, the reverse is true however, their renewal rates will be higher than the formula implies, as their average remaining contract length tend to be lower than with mature industries.

4. Revenue retention rates should be adjusted for the customer churn to avoid double counting, as this effect is also part of the customer retention rates measure.
5. In the case where the monthly revenue retention rate is greater than 100%, the annual retention rate will be higher than the monthly retention rate.

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