A Work Project, presented as part of the requirements for the Award of a Master's degree in

Finance from the Nova School of Business and Economics.

Evaluating NOS SPGS: A Network of Opportunities – How is NOS navigating the transformative wave as telcos transition into techcos?

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Work project carried out under the supervision of:

Gonçalo Sommer Ribeiro

20/12/2023

Abstract:

The telecommunications sector is transforming due to the ongoing trend of telcos evolving into techcos. This paper attempts to assess if NOS is transitioning into a techco and the potential financial impact. Thus, the motives, challenges, and indicators that a telco is shifting will be explored. An analysis of NOS' strategic actions suggests that the firm is evolving into a techco. Additionally, results reveal that when including the tech business, the firm's share price increases by 18%. Overall, the drivers of the transformation seem to outweigh the challenges.

Keywords: Equity Research, Telecommunications, Finance, Digitalisation

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NOS SGPS, S.A. (NOS.LS)

COMPANY REPORT

TELECOMMUNICATION SECTOR

20 DECEMBER 2023

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Investment Summary

The analysis recommends a BUY for NOS.LS, supported by a comprehensive Discounted Cash Flow model featuring detailed operational forecasts, implying a target price of €4.08, equivalent to a potential upside of 19.9%. Further consideration and reflection of this recommendation is supported by alternative valuation methods, which validate the recommendation provided, albeit suggesting a wider valuation range, €3.50 - €4.39.

Competitive Market

The Portuguese telecom market has remained stable over the last decade and has a consensual low growth potential for the years to come. This is a result of its competitive, inelastic, and saturated nature, with infrequent changes in market share. Moreover, the consolidation of NOWO and Vodafone, poses a threat to NOS, introducing uncertainty as the company endeavors to maintain its market position within some of its already saturated core segments. Nonetheless, like its peers, NOS is continuously looking for new opportunities to leverage its platform.

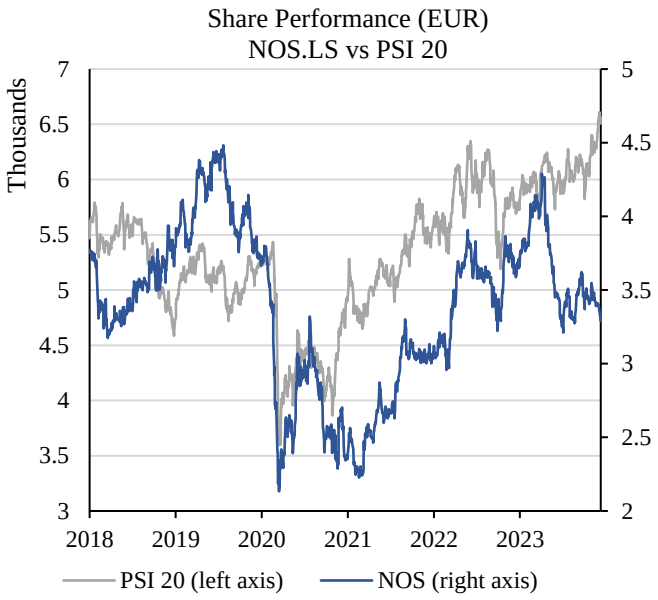
Technological Innovation

A growth driver for NOS is the deployment of 5G technology, after which NOS has recorded an increase in some of its core segments. The model also considers the development and investment in 6G, set to deploy in 2030, as a catalyst for renewed growth in key segments. NOS has also taken steps to adapt and integrate new customer preferences into its service offer, such as the integration of OTT streaming services and the creation of platforms like the UMA TV, which promise to keep NOS relevant.

Macroeconomic Conditions & ESG

The combination of elevated interest rates and inflation, along with uncertain consumer confidence, exerts significant influence. This is particularly noteworthy in the context of the inelasticity of consumers, potentially leading to a short-term decrease in margins for telecom companies. Moreover, factors such as shifting demographic and preferences are making the market more dynamic. Also relevant is NOS's commitment to ESG which promises to enhance its relations with stakeholders.

Recommendation:	**BUY**
Price Target FY24:	**4.08 €**
Price (as of 04-Dec-23)	**3.40 €**
Implied Upside:	*19.9%*
52-week range (€)	€3.21 - €4.46
Market Cap (€m)	1.672B
Outstanding Shares (m)	511.4



(in € millions)	2021	2022	2023E	2024E
Total Revenues	1,430.3	1,521.0	1,588.4	1,606.0
%YoY	*4.6%*	*6.3%*	*4.4%*	*1.1%*
Total Costs	(812.3)	(869.9)	(876.6)	(913.8)
% of Revenues	*56.8%*	*57.2%*	*55.2%*	*56.9%*
EBITDA	618.0	651.1	711.8	692.2
EBITDA Margin %	*43.2%*	*42.8%*	*44.8%*	*43.1%*
D&A	419.5	480.9	468.7	461.7
EBIT	155.6	257.1	246.5	230.0
NOPAT	143.8	224.4	231.3	192.8
% of Revenues	*10.1%*	*14.8%*	*14.6%*	*12.0%*
CapEx	458.5	625.8	476.0	469.1

Source: Bloomberg (NOS.LS)

THIS REPORT WAS PREPARED EXCLUSIVELY FOR ACADEMIC PURPOSES BY A MASTER IN FINANCE STUDENT GRUP OF THE NOVA SCHOOL OF BUSINESS AND ECONOMICS. THE REPORT WAS SUPERVISED BY A NOVA SBE FACULTY MEMBER, ACTING IN A MERE ACADEMIC CAPACITY, WHO REVIEWED THE VALUATION METHODOLOGY AND THE FINANCIAL MODEL.

(PLEASE REFER TO THE DISCLOSURES AND DISCLAIMERS AT END OF THE DOCUMENT)

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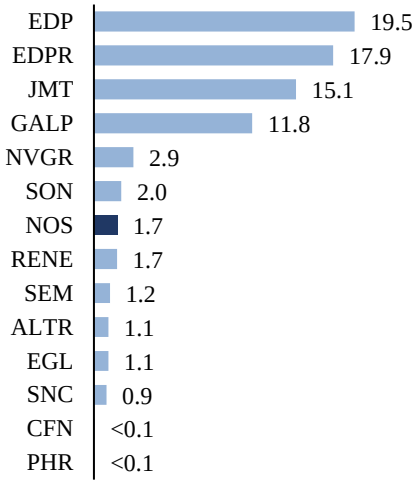
(EUR, in billions)



Source: Euronext Live

Figure 2.
Board of Directors

Position	Name	Tenure
CEO	Miguel Almeida	10
CFO	João Costa	10
CTIO	Jorge Garça	8
Ex. Member	Manuel Eanes	10
Ex. Member	Luís Nascimento	6
Ex. Member	Daniel Beato	3
Ex. Member	Filipa Carvalho	3

Source: Company Website (nos.pt)

Figure 3.
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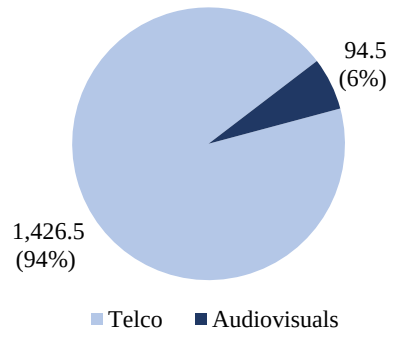
(EUR, in millions)



Source: NOS Management Report

COMPANY OVERVIEW

Company Description

NOS SGPS is a prominent Portuguese telecommunications and entertainment group known for providing fixed and mobile solutions for television, broadband, voice data and IT, while also being the leader in cinematographic exhibitions in Portugal. The company has a market cap of €1.74 bn, and revenues of €1.58 bn (TTM), making it one of the biggest companies in Portugal and the 7th largest in the PSI 20 Index[1] (Figure 1).

Formerly known as "ZON Optimus", the firm resulted from the merger of two of the country's largest communications companies at the time, ZON Multimédia and OPTIMUS Telecomunicações. The merger was announced in December 2012 and in August 2013, ZON OPTIMUS became an official company, significantly altering the landscape of the Portuguese telecommunications market as the resulting entity offered a more seamless and integrated customer experience (Brito, José, and Mesquita 2014). In May 2014, ZON OPTIMUS rebranded itself as NOS, marking a new chapter in the company's history.

The current board of directors (Figure 2) is entirely comprised of members that played a role in the merger, either at the current position or in other leadership role. Since then, NOS has been developed its core operations in Continental Portugal, Azores, and Madeira, being also present in Angola and Mozambique. Currently, the NOS Group, hereby referred to as "NOS", comprises 27 entities (NOS Comunicações, NOS Wholesale, etc.), 3 associated companies (Sport TB, Big Picture Films, etc.), and 8 jointly controlled companies (ZAP Media, Dreamia, etc.).[2]

In 2022, NOS made €1,521.0 m in revenues across two business segments: Telecom Services (Telco) and Media & Entertainment (Audiovisuals), Figure 3 presents a breakdown of NOS revenues by business segment in 2022. The company also holds non-core positions in Joint-Ventures with a combined revenue of €566.0 m.

[1] According to data retrieved from Euronext Live (live.euronext.com)
[2] A complete list is available in the "*3Q 2023 Consolidated Management Report*", pg. 99-100

Figure 4.
Telecom Service Offer and Individualized Subscriber Numbers

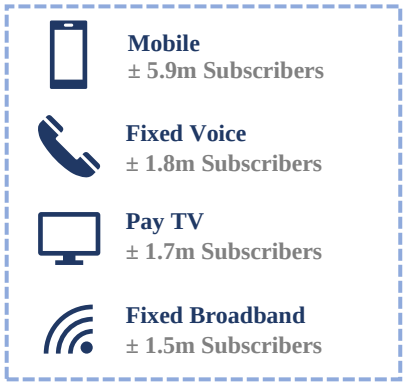


Figure 5.
Telco Revenue Breakdown
FY 2022

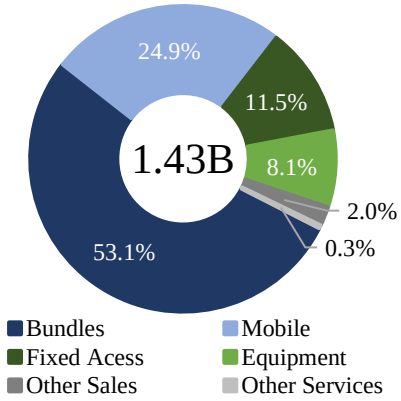
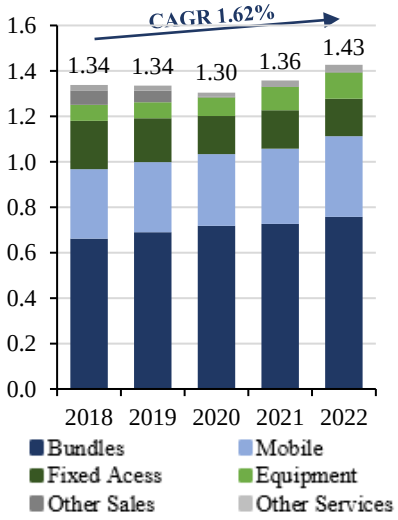


Figure 6.
Telco Revenue Breakdown 2018-22
(EUR, in billions)



Source: NOS Management Report

Telecommunications Business

Diving into the telecommunications business, it serves all market segments providing fixed and mobile solutions for television, broadband, voice data and IT to Residential, Private, Corporate and Wholesale customers. As of Q3 2023, NOS had 11.0 million Revenue Generating Units (RGUs), 15.4% of which are defined as Business RGUs and 84.6% as Consumer RGUs.[3] The four main services provided by NOS in the Portuguese Telecom market are Mobile, Fixed Broadband, Fixed Voice and Pay TV.

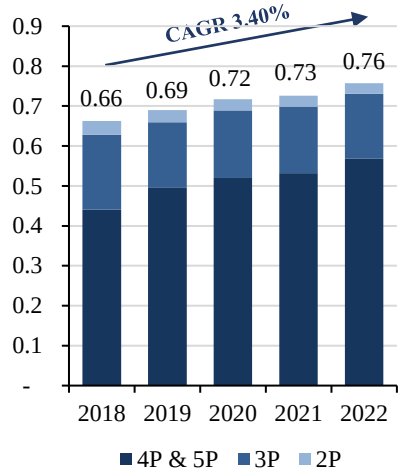
Mobile services encompass cellular communication, allowing users to make calls, send texts, and access the internet on their mobile devices. The Fixed Broadband service delivers high-speed internet access to homes and businesses via wired connections. More commonly known as home phone, Fixed Voice is a service which provides traditional telephone connections through physical lines or cables. Pay TV is a service that offers a wide range of television channels and content for a subscription fee, including premium channels and on-demand movies, not available through free-to-air broadcasts.

To provide a better and more convenient customer experience, NOS also provides the aforementioned services in several different bundles that combine those services into a single package, simplifying the billing process, often reducing individual service costs, and offering customers the flexibility to choose the services that best suit their needs. The most common bundles being offered in the market include Double Play (2P), Triple Play (3P), Quadruple Play (4P) and Quintuple Play (5P).

A 2P telecommunication package is the simplest bundle on the market and it only offers a mix of two core services, often a combination of either Pay TV and Fixed Broadband or Pay TV and Fixed Voice. As it is the most basic package, it tends to be the most budget-friendly option. The 3P bundles include three different services, being the three products offered consistently across all the telecommunication players. This package combines Fixed Broadband, Fixed Voice, and Pay TV into one offering. A Quadruple Play

[3] According to the *"3Q 2023 Aggregate Indicators"* published by NOS in its website (nos.pt)

Figure 7.
Bundles Revenue Breakdown 2018-22 (EUR, in billions)



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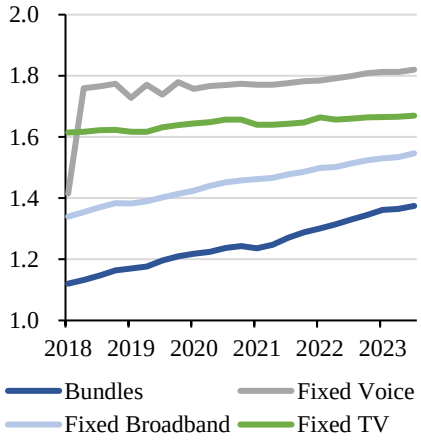

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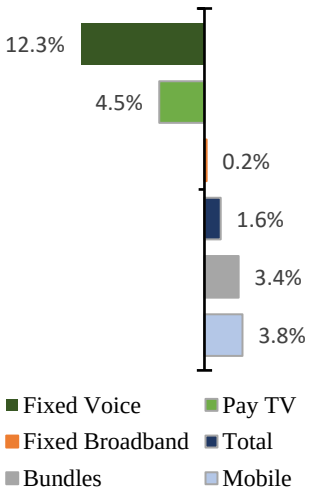


Source: NOS Management Report

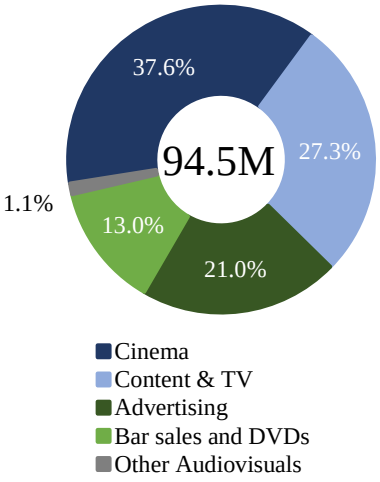
bundle expands on the 3P package by adding Mobile services to the previous mix of Fixed Broadband, Fixed Voice, and Pay TV. Usually, the Mobile services included in these packages come with a set of free SMS and calls, as well as mobile data. Finally, the 5P telecommunication packages are the most comprehensive ones available in the market, adding Mobile Broadband (such as a portable hotspot) to the aforementioned services.

Among all the existing bundles, NOS sells the 2P, 2P + Mobile, 3P and 4P packages. Additionally, NOS also provides a special package tailored for sports enthusiasts, which extends the 3P and 4P bundles by offering different sports channel options that are not included in the standard packages. Furthermore, for its business segment, NOS offers an extended portfolio of telecommunications products and services which are tailored to the specific needs of each client, including Information and Communication Technology (ICT), Internet of Things (IoT), and Cloud Solutions. Additionally, NOS's cloud solutions enable businesses to leverage scalable and cost-effective cloud infrastructure for data storage.

In addition to the previously mentioned core services, NOS has also developed NOS Alarms and Playce. The NOS alarm system captures real-time videos, sends alerts in case of incidents or break-ins, notifies the police promptly whenever deemed necessary, and allows control of the home/business via the NOS Securitas app. Playce is an advertising format created for corporations which plays their ads before scheduled or manually recorded programs on NOS, MEO, and Vodafone boxes. Not only does Playce allow corporations to reach viewers of recorded content through unskippable ads, it also offers the flexibility to select the audience, timing, and location for their advertising, enabling targeted, relevant campaigns. These ventures not only showcase NOS's diversification but also demonstrate its commitment to delivering comprehensive solutions that cater to both security and advertising needs in the market.

Inside the telecom business, the Mobile and Bundle Services have been the main growth driver of NOS Revenues, with a Compound Annual Growth Rate (CAGR) 18-22 of 3.8% and 3.4% respectively. On the other hand, Fixed Voice, and Pay TV stand out with a CAGR of -12.3% and -4.5%.

Figure 10.
Audiovisuals Rev. Breakdown FY 2022



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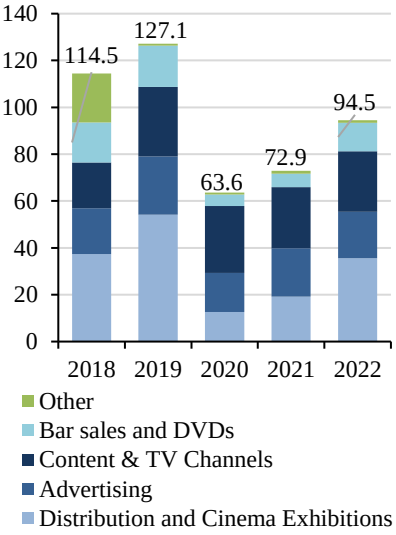
Audiovisuals Rev. Breakdown FY 2022



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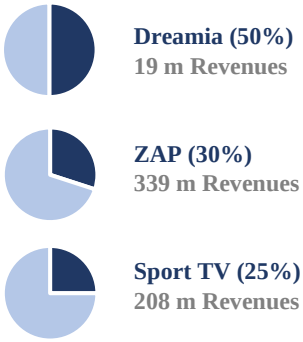


Source: NOS Management Report

Media and Entertainment Business

The Media and Entertainment Business, represents 6.2% of the total revenues (FY 2022). NOS holds a prominent position as a leader in the national cinema exhibition industry, with a 65.1% market share by admissions (ICA 2023). It also stands out for its showcase of alternative content in theatres, encompassing opera, ballet, theatre, football, concerts, and other live or recorded events. With 214 screens countrywide as of 2022, NOS Cinemas employs technologies like IMAX, 4DX, XVision, and ATMOS, enhancing the cinematic experience for its customers. Lastly, NOS Audiovisuals is also an important player in the distribution of audiovisual content, operating not only in Portugal but also extending its influence on other Portuguese-speaking regions, namely to Angola and Mozambique. By acquiring and managing their rights, this segment facilitates the distribution of films and series from independent producers and major studios to the audiences through various channels, including cinema, audiovisual platforms, and television.

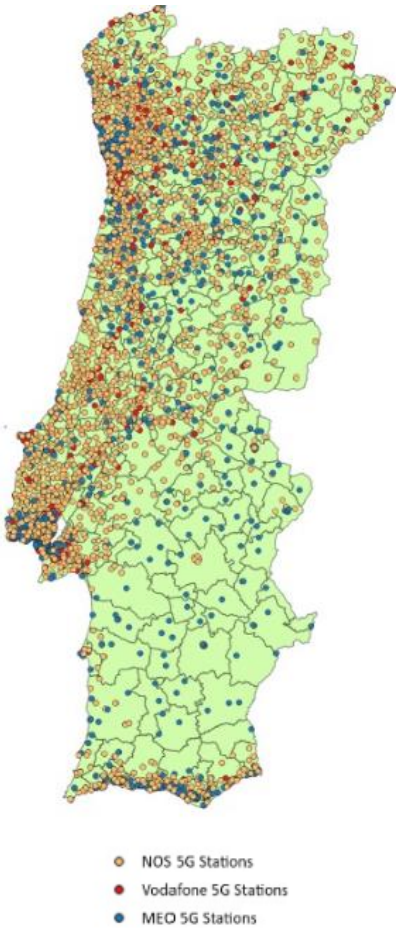
Joint-Ventures

Of the 8 jointly owned ventures, 3 are particularly relevant. Dreamia is a joint venture between NOS (50%) and AMC Networks International Iberia, that produces children's television channels, shows and films, primarily operating in Portugal, Angola, Mozambique, and Cape Verde. Some of Dreamia channels include Biggs, Panda and Hollywood. ZAP is partially owned by NOS (30%) and by SOCIP[4] (controlled by Isabel dos Santos). ZAP provides a satellite-based subscription television service that covers countries from sub-Saharan Africa to southern Angola. Sport TV is the leading Portuguese platform for premium sports content. The company is equally owned by NOS, Olivedesportos, Vodafone, and MEO and holds broadcasting rights for coverage of sports competitions, and currently has 7 high-definition channels in Portugal, and an international channel, Sport.TV Africa.

The proceeds are registered under the Equity Method and have a residual impact in the accounts of NOS (under €2.5 m per year) and high historical

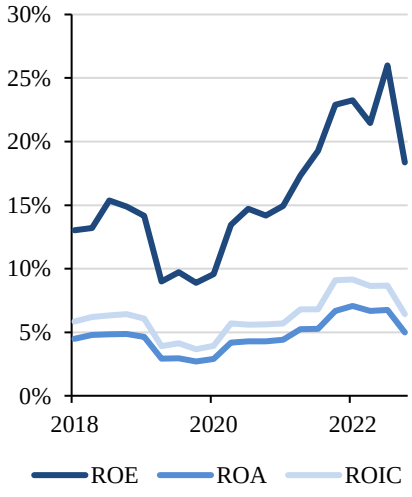
[4] Sociedade de Investimentos e Participações

Figure 13.
5G Stations by Operator



Source: ANACOM

Figure 14.
Profitability return ratios (in %)



Source: Company Website (nos.pt)

earnings volatility. However, they represent a strategic step in expanding services into Africa and securing the position as a leader provider in Portugal.

Strategy & Innovation

NOS long run financial targets are supported by 3 main pillars of NOS innovation strategy. These pillars are verified by several awards and distinctions that NOS has received over the last years.

Primarily, NOS aims to assert its dominance as the market leader in 5G, investments in this direction have propelled NOS to cover 87% of the population. The company also established the 5G Hub, a catalyst for innovation, including the creation of several solutions resulting in initiatives such like NOS Apps, and the awarded Total Wi-Fi solution. This is a testimony to NOS strategy to stay updated on any technological advancements to retain and attract new customers. More on this topic and how it correlates with its peers is analysed in the Industry Analysis section.

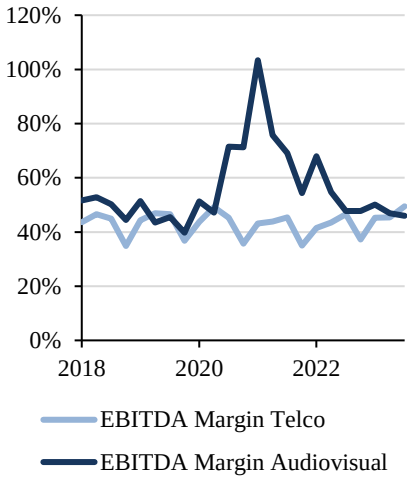
NOS has also strategically fostered the integration of product offerings, including alarms, the UMA TV platform, subscription-based content, and electronic invoices (adopted by 78% of customers). According to the management, the strategy intents to create an ecosystem, dynamizing the inclusion of advertising and OTT services, which have seen an increase in demand over the last few years. This includes the settlement of several relevant partnerships and agreements. More on this topic is discussed in the Industry Analysis and Valuation, to reflect on its effects more granularly on key operational metrics.

Finally, NOS is also dedicated to advancing sustainability initiatives and improving its ESG score across several dimensions. Examples include the establishment of a second-hand marketplace for mobile phones, emissions reduction efforts, and programs focused on employee valorisation. This topic is extensively discussed on the ESG section of this report.

Financial Analysis

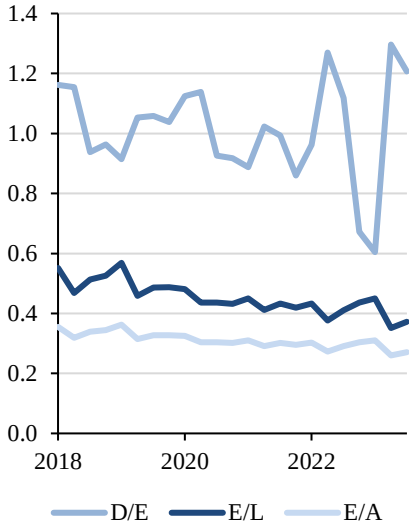
During the 1Q of 2020, NOS faced several financial challenges mainly because of the pandemic. As seen in Figure 14, key indicators such as ROE, ROA, and ROIC decreased respectively from 14%, 5% and 6% to 9%, 3%

Figure 15.
EBITDA margin across segments



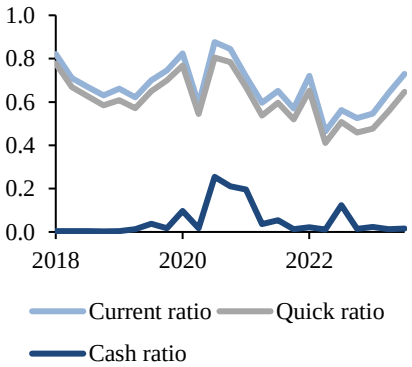
Source: Company Website (nos.pt)

Figure 16.
Capital Structure Ratios



Source: Company Website (nos.pt)

Figure 17.
Liquidity Ratios



Source: Company Website (nos.pt)

and 4%. Additionally, there was a decrease in profitability margins. Particularly, the net income margin achieved a value of -3%.

Indeed, the results of this period revealed an overall decrease in the firm's total revenues, especially in the audiovisual sector where there was a 33% drop, partially explained by the enforced closure of cinemas due to pandemic-related restrictions.

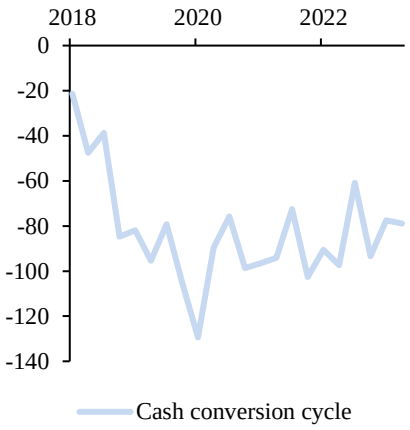
From the 4Q of 2020 until the 2Q of 2023, the firm was generally able not only to recover from the effects of the virus but also to continue improving its profitability. In fact, in the 2Q of 2023, ROE equalled 26%, marking the highest value attained since 2018. During this period, shareholders received an ordinary dividend payment of 27.8c per share and an extraordinary dividend of 15.2c associated with the sale of a tower in 2022.

Figure 15 presents the EBITDA Margin per segment. Unlike most quarters, in 3Q of 2023 the telecom segment presents a higher margin of 49.5% versus 46.0% for the audio-visual segment, resulting in a total EBITDA margin of 49.2%. The historical analysis suggests a very slight improvement in margins, with a clear seasonality effect that improves margins in the first half of the year due to inflationary price updates and other fluctuations of the business model (feudalization contracts, wages, etc.).

NOS has notably increased its capital expenditures, reaching 71% of revenues in the 4Q of 2021 related to the investment in the 5G network and respective licenses. According to the management, this investment phase is expected to have been finalized and only maintenance-level capital expenditures are foreseeable yet. However, NOS has significantly increased its debt levels as a result, reaching a high Book Value D/E ratios of 1.2 in Q3 2023. The management commented on the increase by compromising itself to keep the leverage ratio below 2.4x EBITDA (2.0x when excluding leasings), demonstrating a belief in the company capability to keep sustainable debt levels, Figure 16 shows the variation in this metric.

The quarterly current ratio remained below one (Figure 17). Even though an initial interpretation might suggest potential issues in meeting short-term obligations, it is relevant to note that the capital-intensive nature of the industry in which NOS operates hinders an improvement of these ratios.

Figure 18.
Cash Conversion Cycle (in days)



Source: Company Website (nos.pt)

In the 2Q of 2023, the solvency ratio was 0.35, the lowest value since 2018, possibly due to an increase in dividend payment, which equalled €220 m in the first half of 2023. Nonetheless, even for an industry such as telecom, finding an equilibrium between liquidity and solvency or, in other words, between investment that allows for growth and liquidity essential to maintain daily operations, is a key factor for sustainable growth.

Historical data illustrates a seasonal pattern in the cash conversion cycle, with increases observed in the first quarter and decreases in the fourth quarter. From 2018 until the first quarter of 2020, there was a negative trend in this metric, which has since reversed, suggesting a potential return of this measure to its initial value of approximately -21 days (Figure 18). NOS consistently maintained a negative cash conversion cycle, highlighting its ability to collect cash from its clients and transform its inventory into cash at a higher pace than it needs to pay its suppliers.

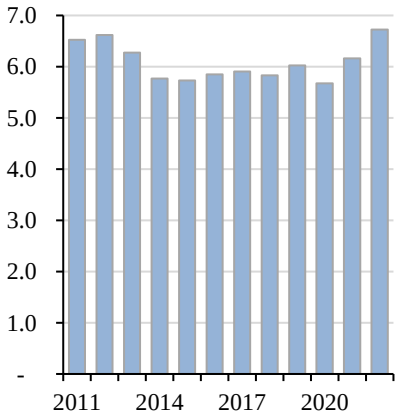
INDUSTRY OVERVIEW

Moving into the dynamics of the markets in which NOS operates, Portugal's telecom industry has witnessed significant transformation and growth, driven by technological advancements and evolving consumer behaviours. While NOS primarily operates in the telecom sector, it's worth noting that the company holds a dominant position in the Portuguese cinema industry. Therefore, this analysis will encompass both these sectors, providing a comprehensive understanding of NOS and its diverse market influence.

Telecom Industry

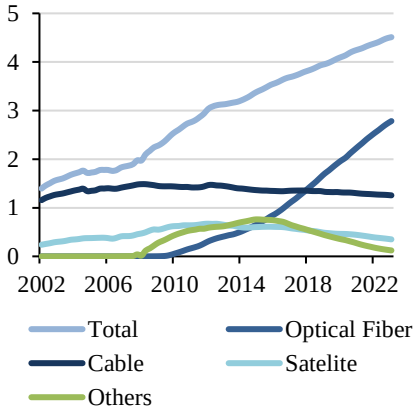
The telecommunications industry in Portugal has evolved into a dynamic and crucial component of the nation's socioeconomic landscape. In 2022, according to ANACOM (2023h), this sector generated a revenue of over €6.7 billion (Figure 19), the majority of which derived from the bundled services and the individualized mobile services. Over the past few decades, Portugal has undergone a telecommunications revolution, characterized by advancements in technology, robust competition, and a commitment to meeting the diverse needs of consumers and businesses alike.

Figure 19.
Global Revenue Telco in Portugal (EUR, in millions)



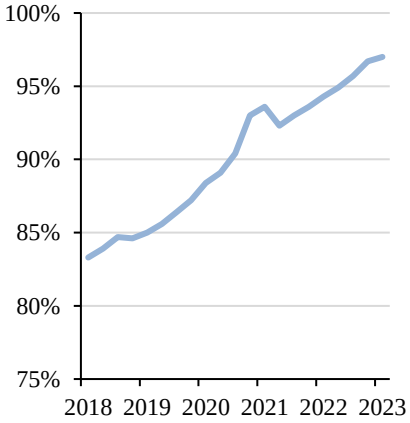
Source: ANACOM

Figure 20.
Pay TV Services Subscribers (in millions)



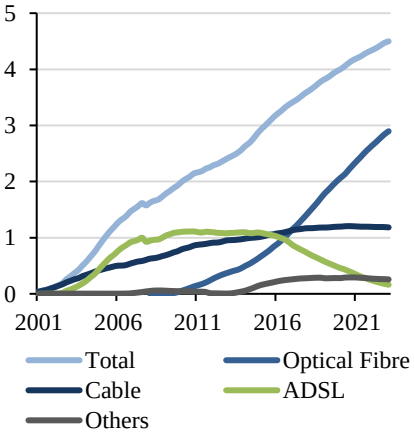
Source: ANACOM

Figure 21.
Pay TV Penetration rate per 100 households (%)



Source: ANACOM

Figure 22.
Fixed Broadband Services Subscribers (in millions)



Source: ANACOM

Digging deeper into the telecom landscape of Portugal entails an examination of the range of services offered, the regulatory frameworks in place, and the emerging trends that shape the industry's ever-changing scenery. From the rollout of high-speed broadband to the advent of 5G networks and beyond, the Portuguese telecom industry continues to pave the way for a digitally connected future. The following data was retrieved from the market regulator, ANACOM.

Pay TV

In Portugal, unlike most countries, television by subscription is the telecommunications service that is most commonly bundled in packages, rather than internet access. Additionally, consumers favour offers that include access to a wide range of channels, typically numbering between 120 to 160 (Luz 2023). Key drivers in this sector include content diversity, competitive pricing, and the shift towards over-the-top (OTT) platforms, which is increasingly becoming a major threat to the market.

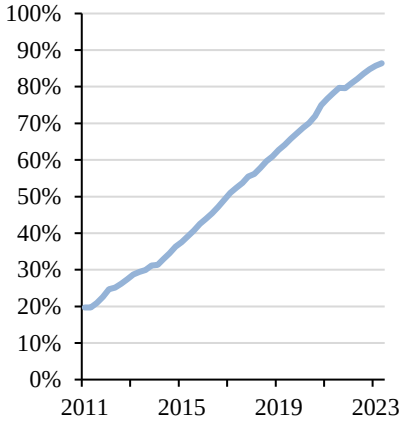
Nonetheless, this service has maintained a consistent growth trajectory since 2002 when the total number of Pay TV subscribers stood at just under 1.4 million. Over the course of 21 years, it has surged to exceed 4.5 million subscribers (Figure 20) and reached 97% of households in 2023 (Figure 21).

Since 2008, one of the primary catalysts for this growth has been the rapid adoption of optical fibre (Fiber to the Home – FttH) technology. This surge was attributed not only to the acquisition of new customers but also to existing customers transitioning from other networks to optical fibre, outpacing the growth rates of other technologies as they gradually phase out. As can be seen in Figure 20, FttH has solidified its position as the dominant access method for Pay TV services since 2018. By the close of the first quarter of 2023, it commands the lion's share, accounting for 61.7% of the total subscriber base. Meanwhile, Cable TV (27.8%), Satellite TV (7.8%), and ADSL (2.7%) maintain notable, albeit smaller, roles within the market.

Fixed Broadband

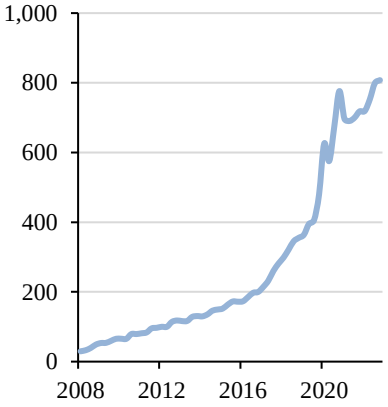
The fixed broadband industry in Portugal has witnessed remarkable growth over the years. The number of fixed broadband subscribers has steadily risen

Figure 23.
Fixed Broadband Penetration rate per 100 households (%)



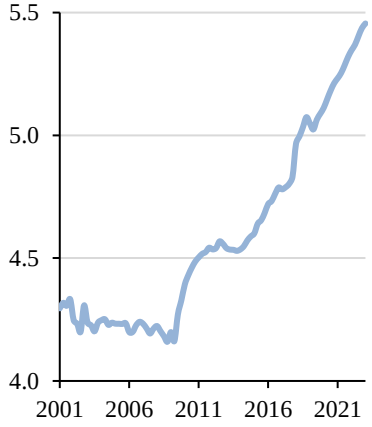
Source: ANACOM

Figure 24.
Fixed Broadband Traffic per Access per quarter (in thousands of GBs)



Source: ANACOM

Figure 25.
Fixed Voice Services Accesses (in millions)



Source: ANACOM

to 4.5 million (Figure 22), reflecting the increasing demand for high-speed internet access. Portugal boasts a high fixed broadband penetration rate, extending its coverage across both urban and rural areas, effectively reaching over 86% of all households in the country (Figure 23). This growth can be attributed to continuous infrastructure development and government initiatives aimed at bridging the digital divide. Overall, fixed broadband penetration is predicted to expand in the following years as a result of the growth of national broadband coverage.

There was also a significant and steady increase in fixed broadband traffic over the years, driven not only by the increasing number of accesses but also by the increase in usage intensity. Furthermore, the average traffic per access drastically intensified during the pandemic, as can be seen in Figure 24. However, starting from the third quarter of 2021, the pandemic's influence on the average data usage per connection decreased, and it is possible to see a gradual return to the growth patterns observed before the pandemic.

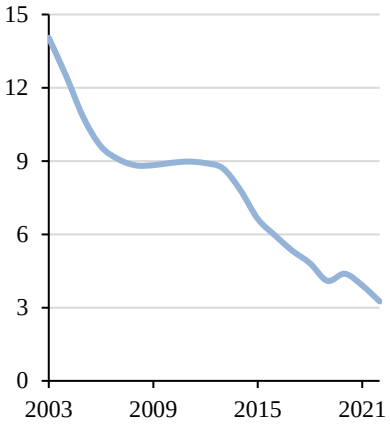
In terms of broadband speed, 89% of fixed broadband accesses were classified as ultra-fast broadband, offering download speeds greater than or equal to 100 Mbps. Portugal ranked fourth in the EU in July 2022 for the proportion of accesses with download speeds exceeding 100 Mbps. The growth in ultra-fast broadband access was primarily driven by the development of optical fibre networks (FttH).

Fixed Voice

Fixed telephone services have reached nearly every household in Portugal, with approximately 96.8% of households having access to this service. This demonstrates the widespread availability of fixed telephony in both urban and rural areas. The number of Fixed Voice Accesses remained somewhat stable until the introduction of bundled services and unlimited data offers in 2008. This introduction played a significant role in driving a positive growth trend for this service, which totalled around 5.4 million accesses in the first quarter of 2023 (Figure 25).

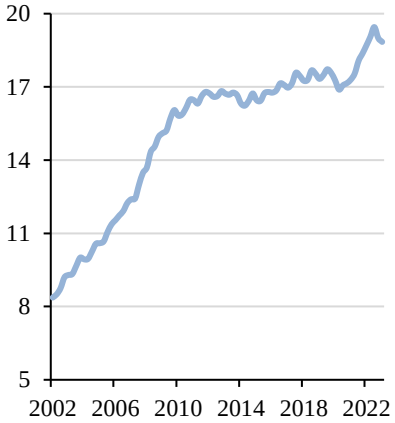
Even though the total access to this service is still showcasing positive trends, the fixed voice traffic reveals significant declines over the last two decades. Starting from 2013, there was a consistent decline in traffic generated from

Figure 26.
Fixed Voice Traffic
(in billions of minutes)



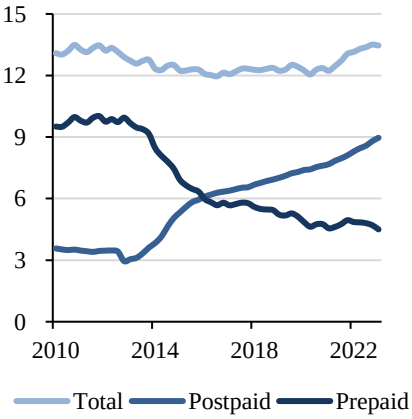
Source: ANACOM

Figure 27.
Mobile Services Accesses
(in millions)



Source: ANACOM

Figure 28.
Mobile Services Accesses
actually used (in millions)



Source: ANACOM

the fixed network (Figure 26). This was due to the increased adoption of 4/5P bundles (which include mobile services) and the growing prevalence of new communication methods through the Internet. The pandemic also had its impact on fixed telephone services, briefly disrupting this downward trend, however, as pandemic-related restrictions were gradually lifted, the traffic reverted to its declining path.

In summary, Portugal's fixed telephone services have achieved widespread accessibility but face a notable decline in fixed voice traffic due to evolving consumer preferences.

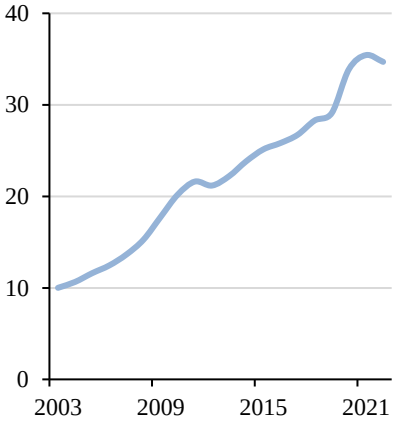
Mobile Services

Portugal has a high mobile service penetration rate, with 180.8 mobile service subscriptions per 100 inhabitants, totalling 18.8 million accesses (Figure 27). Excluding data-only connections (M2M), this rate stands at 129.2 subscriptions per 100 inhabitants, meaning that there are 13.5 million mobile accesses being used. Mobile subscription penetration in Portugal is expected to increase in the next years sustained by a continuous increase in smartphone & M2M/IoT subscriptions as well as in multi-SIM ownerships.

Over the past 10 years, the number of mobile services with actual use has remained somewhat stable, presenting a CAGR of 0.68%. Until 2013, the prepaid plans played a major role in growing these mobile services subscriptions, representing over 76% of the total subscriptions (Figure 28). However, with the introduction of 4/5P bundles, it is possible to observe a reverse trend, as postpaid plans are now responsible for the continuous growth of this service, representing more than two-thirds of all active connections.

Mobile Voice traffic has exhibited consistent growth rates over the past few decades, with a CAGR of 6.8% from 2003 to 2022. Similar to Fixed Voice, Mobile Voice traffic saw a significant upswing during the pandemic, recording a 16.4% increase in 2020. However, as the pandemic's impact on Mobile Voice traffic diminished by mid-2021, there was a noticeable decrease in total traffic in 2022, amounting to a decline of 2.1% (Figure 29).

Figure 29.
Mobile Voice Traffic
(in billions of minutes)



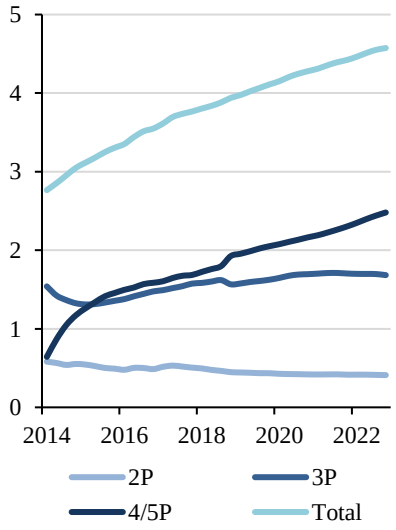
Source: ANACOM

Mobile broadband services counted a total of 9.9 million users in the initial quarter of 2023, translating to a penetration rate of 95.3 connections per 100 inhabitants. Unlike voice traffic, the pandemic had an adverse effect on mobile broadband, with reduced demand as people stayed home. However, from the first quarter of 2021 onwards, mobile broadband has witnessed substantial growth, possibly attributed to the easing of pandemic restrictions and the government's "Digital School Program", which involves equipping students with digital tools like hotspots and SIM cards.

Mobile broadband Internet traffic has seen exponential growth, fuelled by an expanding user community and heightened usage levels. In the first quarter of 2023, the average monthly data consumption per mobile broadband user reached 8.8 GB, showcasing a substantial 249% surge compared to only four years ago.

The current investments of telecom firms in 5G network enlargement are likely to create a golden occasion for both customers and businesses to leverage 5G services, as well as for operators to obtain higher ARPS due to 5G plans. As of the end of the first quarter of 2023, it is estimated that 16.3% of mobile internet users had adopted the 5G services, amounting to 1.6 million users and a penetration rate of 15.6 users per 100 inhabitants. Additionally, it is also assessed that 5G traffic accounted for approximately 7.9% of the overall mobile data traffic.

Figure 30.
Bundled Services Subscribers
(in millions)

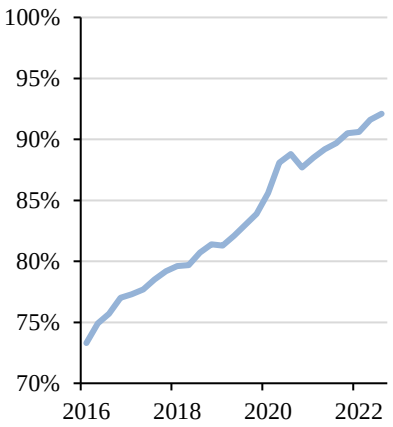


Source: ANACOM

Bundled Services

Rather than buying these services individually, consumers have the opportunity to attain all of the aforementioned services in bundles. For that reason, some individualized services' subscribers have been showcasing slower growth, as the number of bundled services subscribers has been increasing steadily, showing positive growth rates every quarter for the past 10 years. As of the end of the first quarter of 2023, it reached a total amount of 4.57 million subscribers (Figure 30), achieving an estimated residential penetration of service bundles of 92.1 per 100 households (Figure 31). Over the past years, this growth is mainly attributable to the 4/5P bundles, as more people transition from the old and smaller packages to a full plan including all the services. The 2P bundle subscriptions have been decreasing almost

Figure 31.
Bundled Services Penetration rate per 100 households (%)



Source: ANACOM

every quarter for the last decade, while the 3P bundle subscriptions have remained somewhat stable until the first quarter of 2022, when it started a downward trend. With that being said, the 4/5P packages were the most widely adopted, boasting 2.48 million subscribers (half of all bundle subscribers).

In the first quarter of 2023, bundled services generated revenues totalling €494 m, which accounted for slightly over half of the total retail revenues, at 51.9%. Following closely were retail revenues directly attributed to mobile services, making up 33.9% of the total.

Delving further into the breakdown of bundled services revenues, the 4/5P packages stood out, representing two-thirds of the total bundled services revenues. In specific terms, these packages were responsible for 34.6% of the overall revenues in the industry.

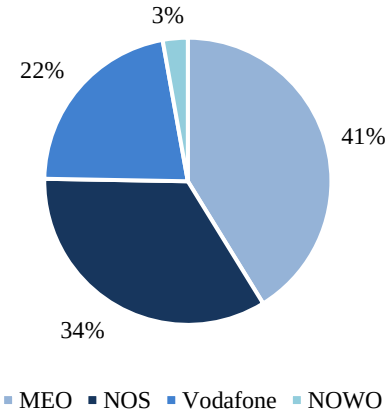
Regarding mobile services, as of the first quarter of 2023, single-play offers constituted 69.7% of the total accesses, with the remaining 30.3% being bundled with fixed services. Although the number of mobile accesses not integrated into bundled services remains notably high, there is a clear decline as more consumers opt for integrated services within bundled offers.

Competitors

Within the Telecom industry in Portugal, Altice, previously known as Portugal Telecom (PT), is one of the major players and, consequently, a significant competitor for NOS. It is a multinational cable, telecommunications, fibre, content, and media firm that operates in Western Europe, the US, and Overseas Territories. Currently, Altice Group is facing significant pressure from its investors to reduce its large debt which surpasses €55 bn. Nonetheless, during the first six months of 2023, its total revenues increased 6% compared to the same period in the previous year, which was partially the consequence of a positive performance within segments among which residential mobile services, residential equipment, business services and media.

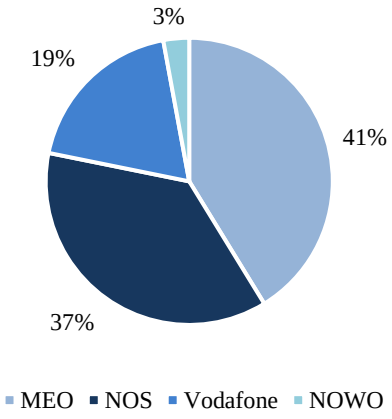
In the past, PT was the only national telecommunication operator, responsible for the first experimental emission of cable TV in the country.

Figure 32.
Fixed Broadband Internet access service



Source: ANACOM

Figure 33.
Share of subscribers to the subscriptions TV signal distribution



Source: ANACOM

However, in the mid-90s, the liberalization of the telecom market in Portugal resulted in the ending of the monopoly, creating space for competitors. Currently, it has several brands, among which Sapo, MEO, Unitel and Altice Labs. Moreover, in the first half of 2023, it attained the highest share of subscribers among all types of offers: 2P (45.1%), 3P (39.3%) and 4/5P (42%).

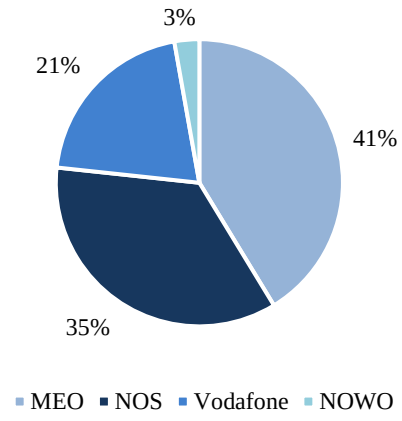
Another worth mentioning NOS's competitor is Vodafone Group, a British multinational telecommunications firm present in Europe and Africa. Its retail and service operations are divided into three business lines: Europe Consumer, Vodafone Business and Africa Consumer.

In February of 2022, Vodafone Portugal, due to a cyberattack, suffered a network outage which impacted the data network as there was a loss of some TV services, enterprise business operations, as well as voice and data services. The firm stated that the direct costs associated with the attack were not highly significant (approximately €5 m).

Although with a considerably lower market share than NOS, NOWO is typically considered as the fourth largest telecom firm in Portugal. It was established in 2016 after a rebranding of Cabovisão which was created in 1993. This rebranding resulted not only in a change in the brand image but also in the packages' prices and quality.

In September of 2022, Vodafone Portugal announced a deal for the purchase of NOWO and revealed its expectation that the transaction would be concluded during the first semester of 2023, which didn't occur. In fact, the case is still being processed by the Authority of Competition (Adc). A comprehensive inquiry is being conducted by the latter as the existing elements signal that the joining of both firms might create obstacles to the telecom competition. One issue raised was that the acquisition of NOWO might take out of the market the firm with the lowest prices. Nonetheless, Vodafone Portugal released its beliefs that the concerns regarding the purchase of NOWO are unfounded and that the acquisition will take place in the second semester of 2023.

Figure 34.
Share of bundle subscribers



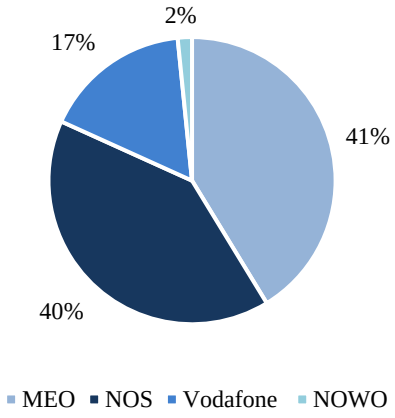
Source: ANACOM

Regarding the 4G network's quality, NOS, on average, provides the fastest internet but is followed closely by Altice Portugal and Vodafone Portugal. Nonetheless, Vodafone is considered the fastest in uploading.

As seen in Figure 32, concerning the fixed broadband Internet access service markets, in the first quarter of 2023. MEO's share of subscribers was the highest and consisted of 41%, followed by NOS, 33.9%. Still, within this period, this firm was the operator with the highest share of active mobile accesses with actual use, 38.6%, followed by NOS, 29.3%. The Herfindahl-Hirschman index, which measures the level of concentration, followed the ongoing negative trend that began in 2014, although it remained considerably high. As for shares of subscribers to the subscription of TV signal distribution services in the same period, MEO remained once again in first place (41.2%) (Figure 33).

Replacing MEO as the typical number one firm in the sector, NOS, in the first quarter of 2023, conquered the highest share of mobile broadband Internet traffic (36.3%), leaving Vodafone and Altice Portugal in second and third place with 35% and 27.8% respectively.

Figure 35.
Share of revenues from bundled services



Source: ANACOM

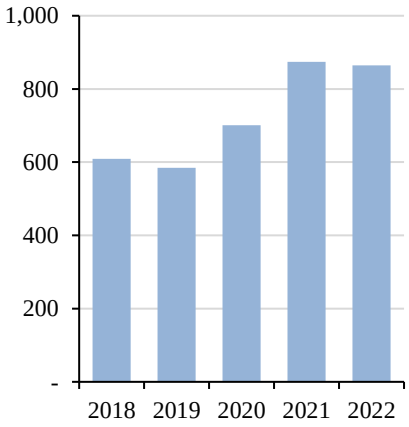
As of the first semester of 2023, as suggested by Figure 34 MEO achieved 41.3% regarding market share of bundle subscribers, while NOS positioned itself as the second firm with the highest percentage, equalling 35.4%, Both MEO and Vodafone Portugal accomplished an increase in these values when compared with the same period in the previous year. The opposite happened for NOS and NOWO, although only the latter suffered, in net terms, a decrease in bundle subscribers. Still, in the first half of 2023, MEO realized the highest share of revenues resulting from bundled services (41.2%), and NOS the second highest (40.4%) (Figure 35). Concerning the same period in the previous year, NOS increased its share of revenues, Altice Portugal didn't change, while NOWO and Vodafone suffered a decrease. Following the Herfindahl-Hirschman index, within the first half of 2023, concentration in the telecom industry didn't suffer a significant change after the start of 2018 and remains high. The type of offer 4/5P presented the highest level of concentration although with a decreasing trend.

Overall, NOS seems to position itself as the second-strongest telecom firm in Portugal. Nonetheless, it is important to notice that within this fast-changing world, there is no such thing as a safe position and, consequently, to maintain or improve in the ranking, continuous innovation is mandatory as well as being aware and anticipating the next moves of competitors. Altogether, Portugal possesses a competitive telecommunication market that allows consumers to benefit from a larger variety and increased quality of products and services.

Porter's Five Forces Analysis

To provide a comprehensive overview of the competitive landscape within the Telecom Industry, a Porter's Five Forces analysis was conducted. By examining the forces of rivalry among existing players, the bargaining power of buyers and suppliers, threats of substitutes, and barriers to entry, this analysis aims to clarify the underlying market dynamics shaping the industry.

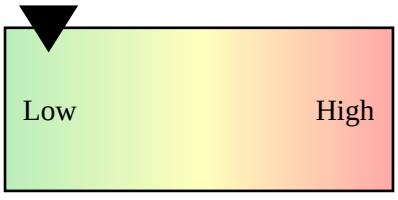
Figure 36.
Telecom Industry Investment in Portugal (EUR, in millions)



Source: ANACOM

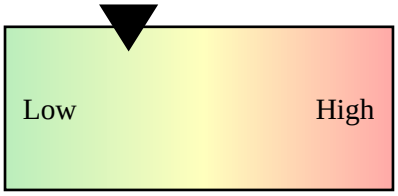
For a newcomer to establish its presence within the Telecom industry, substantial capital investments are required. In fact, in 2022, over €850 m were invested in this industry according to ANACOM (2023h). Additionally, gaining access to licenses and permits that are mandatory to operate represents complex proceedings that can take a significant amount of time to execute. Even after a firm can obtain those licenses and enough credit to invest in capital, the giant established firms highly benefit from economies of scale, translating into difficulties in meeting the offers of competition.

Figure 37.
Threat of new entrants



Firms within this sector possess a significant variety of suppliers to choose from, reducing the dependency on a small number of firms. The fact that suppliers exist in large numbers motivates competition and therefore creates better opportunities for Telecom firms to pick their providers. Nonetheless, due to the nature of the industry, Telecom equipment is essential to its performance, meaning that any disruption in the supply can cause critical consequences.

Figure 38.
Bargaining power of suppliers



For the consumers of this industry, information regarding offers from competitor firms is easily accessible. For residential buyers, the switching costs are moderate as, although the process is relatively easy, the automatic monthly payment creates in some private consumers an irrational behaviour

Figure 39.
Bargaining power of buyers

Figure 40.
Threat of new substitutes

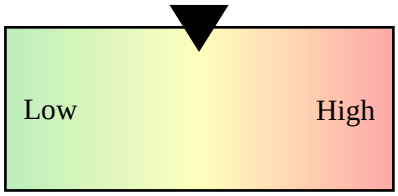


Figure 41.
Competitive rivalry

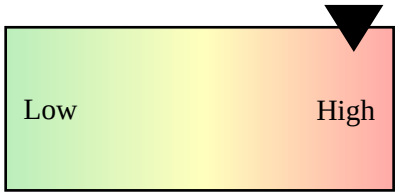
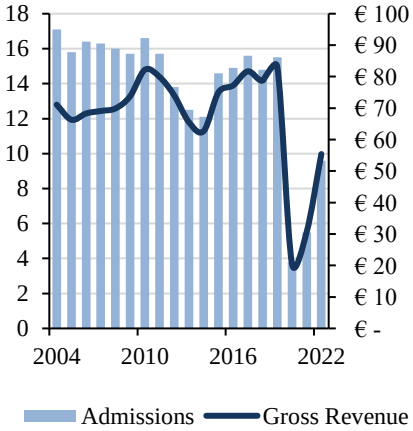


Figure 42.
Admissions and Gross Revenue Evolution (in millions)



Source: ICA

of delaying switching from one operator to another, even if they are aware of the benefits. Additionally, telecom companies often require a two-year contract, further influencing consumers' decisions. Regarding small enterprises, they tend to look out for ways to minimize costs, and so have lower switching costs. As for the corporate buyers, given that they have personalized services and products, switching costs are high.

While there are no direct substitutes for traditional telecom services like mobile and fixed-line connections, the growing availability and adoption of OTT services, such as Voice over IP (VoIP), messaging apps, and streaming platforms have introduced moderate to high substitution threats. Consumers can use these OTT services for communication, which can reduce the reliance on traditional telecom services.

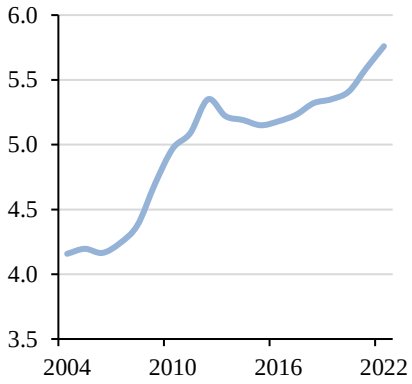
The competition within this sector is high among the few major players and often creates pricing wars to attract and retain consumers and the need for continuous technological investment.

All in all, given the abovementioned reasons, the Telecom Industry presents high barriers to entry, low to moderate bargaining power of suppliers, high bargaining power of buyers, a moderate threat of substitutes and intense competition among existing players. Thus, companies operating within this sector are advised to prioritize enhancing customer value, innovating, and differentiating themselves from their competitors in order to ensure a robust competitive position and be able to achieve a sustainable competitive advantage.

Cinema Industry

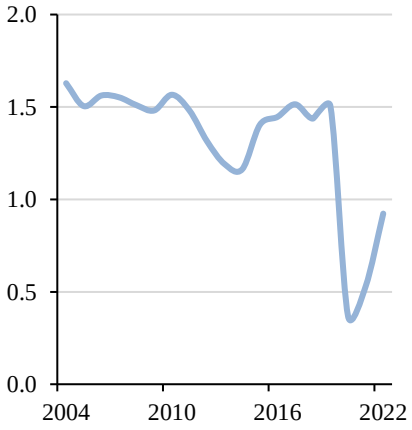
The Cinema industry in Portugal has been a prominent part of the country's cultural and entertainment landscape for decades. This industry encompasses the production, distribution, and exhibition of films, serving as a source of entertainment and cultural expression. Over the years, the industry has experienced various trends, challenges, and opportunities that have shaped its current landscape. The following data was retrieved from Instituto do Cinema e do Audiovisual (ICA).

Figure 43.
Average Ticket Price (EUR)



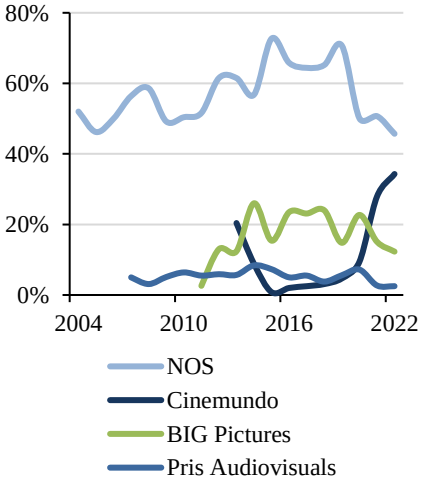
Source: ICA

Figure 44.
Average Admissions per capita



Source: ICA

Figure 45.
Distributors' Market Share Evolution Top 4 players (%)



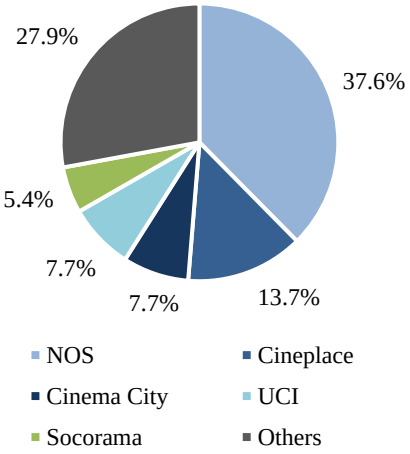
Source: ICA

The Portuguese Cinema industry has maintained a relatively steady course over the past few decades, demonstrating a CAGR of 1.05% from 2004 to 2019. Remarkably, the peak of this industry was reached in 2004, recording an all-time high in total admissions, which stood at 17.1 million (Figure 42). Following that point, the industry witnessed a modest decline until 2013, at which point this trend reversed, giving way to a new upward trajectory that persisted until the onset of the pandemic. In the context of this subdued growth, it becomes evident that the principal factor driving expansion in the industry has been the progressive increase in ticket prices (Figure 43). Over the aforementioned period, ticket prices have risen by more than 28%, playing a critical role in boosting industry revenues and offsetting the decline in the number of admissions (Figure 44). In 2020, the cinema industry experienced a significant downturn due to the closure of cinemas amid the pandemic and the subsequent imposition of restrictions. Nevertheless, the sector has since displayed a commendable recovery and is poised to continue its upward trajectory towards pre-pandemic levels.

In the realm of cinema distributors, Portugal is home to several major players. Among them, three prominent competitors, NOS, Cinemundo, and BIG Pictures 2 Films, have dominated the market, holding more than 90% of the total admissions over the past 10 years. In particular, NOS has emerged as a historical market leader, consistently occupying a prominent position in this industry. As different players have entered and exited the scene over the last two decades, NOS has demonstrated resilience, consistently securing the top spot and often commanding over 50% of the market (Figure 45).

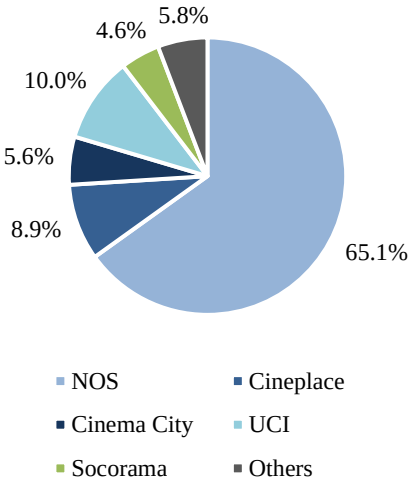
However, the onset of the pandemic in 2020 brought about a notable shift. NOS, while maintaining its top 1 status, saw a decrease in market share from 70.7% to 50.1%. Furthermore, in 2021, Cinemundo took over the distribution of the Warner Bros catalogue in Portugal, a responsibility that was previously held by NOS creating an opportunity for the competitor to seize a significant portion of the market (Marques 2021). Cinemundo's rapid ascent during the past couple of years, linked with a decrease in market share for BIG Pictures, marked a unique phase in the industry's trajectory.

Figure 46.
Screens by Exhibitors
(2022)



Source: ICA

Figure 47.
Admissions by Exhibitors
(2022)



Source: ICA

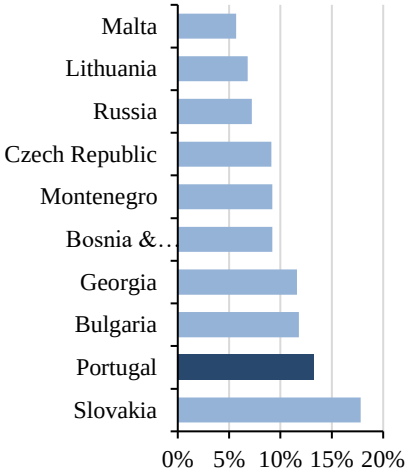
As of 2022, NOS continues to lead the pack with a 45.7% market share, facing closer than ever competition from Cinemundo, which holds 34.3%. The industry's response to the pandemic and the subsequent redistribution of market shares highlights the resilience and adaptability required for sustained leadership in this dynamic sector.

In terms of cinema exhibitors, NOS has also established itself as a market leader, managing an expansive network of over 200 screens throughout the country. This substantial presence translates to a significant 37.6% share of the total screens in Portugal (Figure 46). Notably, NOS engages in the distribution of both Portuguese and international films, providing a comprehensive cinematic experience to the audience. Alongside NOS, other major contributors to the cinema landscape include Cineplace, Cinema City, UCI Cinemas, and Socorama, collectively enhancing the diversity of film offerings available in Portugal. It's worth highlighting that NOS's screen count surpasses that of the remaining top five competitors combined, underscoring its dominant position in the market. Furthermore, while representing just above one-third of the total screens in Portugal, according to ICA, NOS commanded an impressive 65.1% market share in admissions for the year 2022 (Figure 47).

When examining a more recent timeframe, Portugal has showed significant growth in its audiovisual market, ranking among the top 10 in Europe with an average recorded growth of 13.2% from 2015 to 2019 (Figure 48). The introduction of a cash rebate incentive system in 2018 has further fuelled production activity. However, Portugal's cinema and audiovisual sector faces challenges, such as a limited domestic market, weak ties with global Portuguese-speaking markets, and low market share for Portuguese films.

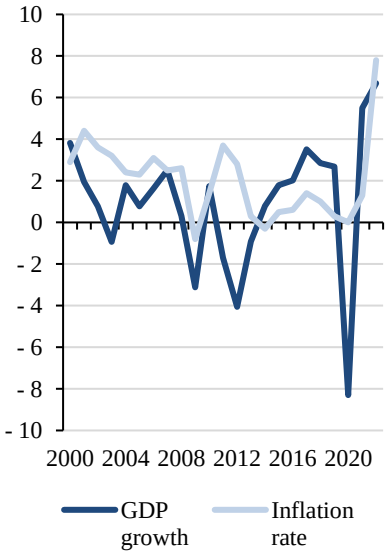
Overseas, Portugal lags in both the number of exports to other European markets and the corresponding admissions, ranking last in both metrics according to data from the European Audiovisual Observatory. The COVID-19 pandemic has exacerbated industry challenges, but ICA has played a crucial role by providing substantial support during the pandemic, allocating €5.2 m in additional funds and distributing an extra €4.3 m to programs addressing pandemic-related challenges (Olsberg•SPI 2022).

Figure 48.
Audiovisual Markets average annual growth: 2015-2019 (%)



Source: EAO (2021)

Figure 49.
GDP growth and inflation rate



Source: Pordata

Despite pandemic setbacks, Portugal possesses a strong talent pool and an attractive production landscape. In the midst of these challenges, there is potential for further investment in local filmmakers, actors, and production crews. This not only promotes homegrown talent but also increases the international visibility of Portuguese cinema. Additionally, the allure of Portugal's picturesque landscapes and historic sites has made it an attractive location for international film productions. The strategic development of film tourism can not only enhance the local economy but also contribute to the overall growth and resilience of the industry. Overcoming the identified challenges, coupled with strategic investments, presents significant opportunities for further sectoral development and growth.

MACROECONOMIC OVERVIEW

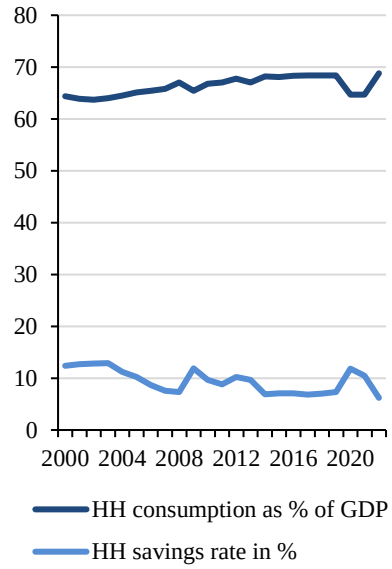
Portugal's Macroeconomic Outlook

Transitioning into the Portuguese panorama, the following macroeconomic analysis uses data exported from Pordata.

Throughout the last two decades, GDP in Portugal has been increasing almost every year, as illustrated in Figure 49. Nonetheless, relevant exceptions include the 2008 crisis, which resulted in negative growth in 2009, and the start of the pandemic in 2020. The latter represented the highest drop within the considered range. The fall of GDP in 2020 in Portugal was higher compared to the average in the eurozone contributing for that the higher weights of sectors that were significantly affected by the pandemic, as those associated with tourism. In 2021 and 2022 GDP grew, in real terms, respectively, 5.7% and 6.8%, revealing a consistent recovery from the virus. In 2022 GDP achieved a value of €242.3 bn.

Inflation remained relatively stable from 2013 to 2021, as shown in Figure 49. In 2022 it achieved its highest value of the last 2 decades: 7.8%, which was strongly influenced by the war in Ukraine. Even though Portugal shares limited contact with Ukraine and Russia, it was affected by constraints in the logistics chain, commodity prices, longer-lasting supply disruptions, souring confidence, and lower world demand for Portugal's exports. In Europe, a noticeable increase in prices due to the war concerned energy prices. Given the demand inelasticity of the energy sector, energy firms were not required

Figure 50.
HH consumption and savings rate

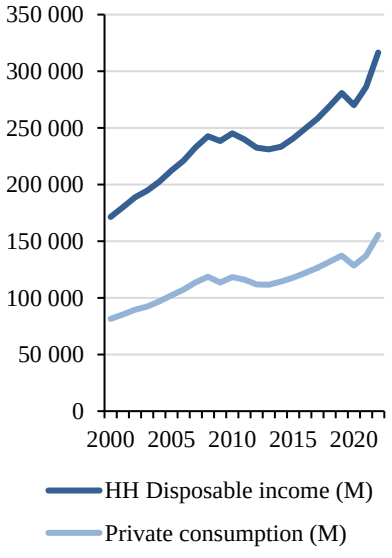


Source: Pordata

to see the consequences of inflation reflected in their margins. Ultimately, this results in consumers in this sector suffering the entire burden of the price increase. Concerning the telecommunications sector, its demand is considered to have a medium elasticity. Indeed, even though consumers increasingly view services offered by operators as commodities, such as water, they will switch to the operator that offers the most competitive prices (Deloitte 2023). Thus, telcos, unlike energy firms, partially take the burden of inflation to avoid significant losses in market share. So, inflation increases at a higher pace than the prices of telco services (Arthur D. Little 2023). However, in 2024, Vodafone, MEO and NOS announced prices will increase according to inflation (Rosa 2023). The impact of this decision will be analysed further within the report.

Household (HH) consumption in the economic territory as a percentage of GDP has not experienced significant fluctuations for the last 20 years. Nonetheless, during the years that were most affected by the pandemic, 2020 and 2021, there was a noticeable decrease. In 2022, this value recovered and achieved its highest in the last 20 years: 68.8. When analysing the savings rate by families, historical data is coherent with the decrease in consumption as it reveals an increase during 2020 and 2021 and, as life returned to normal, savings rates started to decrease in 2021 (Figure 50).

Figure 51.
Private consumption and HH Disposable income (EUR, in millions)

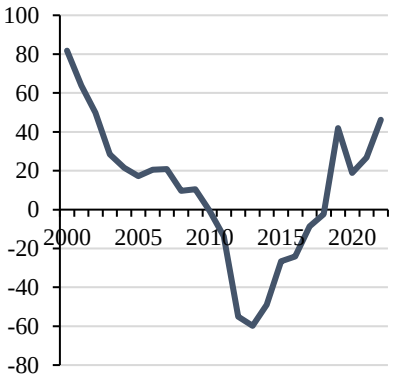


Source: Pordata

As represented in Figure 51, during the pandemic, private consumption suffered a significant reduction, as is usual to occur during crises, of approximately 6.5%. Still, unlike what commonly happens, this decrease is not associated with a decrease in disposable income. For the last 2 decades, the trend has been for HH gross disposable income to increase and public measures during COVID-19 allowed to mitigate the negative effects, and HH disposable income decreased only approximately 1.3%. This difference found between the crises of the pandemic and previous crises can be explained by the evolution of the labour market (e.g., the possibility of working from home) and public measures established to protect employment.

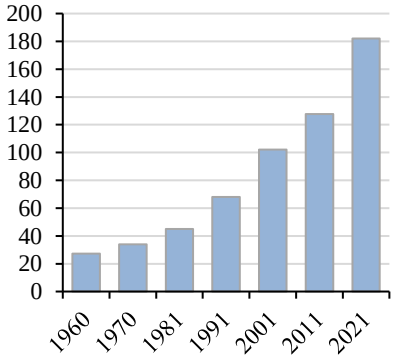
Both the pandemic and the war between Russia and Ukraine contributed to slowing the efforts that the country had made so far to improve its economy

Figure 52.
Net increase in population (in thousands)



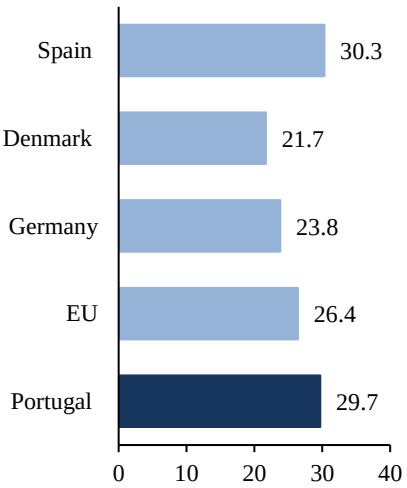
Source: Pordata

Figure 53.
Ageing Index



Source: Pordata

Figure 54.
Average age young adults leave their parental home



Source: Eurostat

and resulted in behavioural changes for consumers and negative cross-cutting effects. High levels of inflation caused a decrease in purchasing power in 2022 and Debt to GDP ratio achieved values even lower than in the pre-pandemic period. Government entities established policies aiming to resist inflation and relieve concerns for firms and families. ECB initiated a program to increase interest rates to alleviate increases in prices although it also results in an increased cost of debt.

Ageing Population

Regarding demographics, Portugal lacks a fertility rate that can ensure the replacement of generations (United Nations Population Fund 2023). Additionally, life expectancy is increasing with an improvement in the conditions of living which explains the increase in population since 2019 (Figure 52). Within an ageing country scenario, evidenced in Figure 53 with the increasing trend in the Ageing index, Portugal was part of numerous conferences regarding pensions and ageing that were conducted under the context of the EU. The country has responded to this demographic challenge by instituting several adjustments to its pension system.

Housing Bubble

Another concern related to Portugal is the prediction by several experts that it is going to be the first European country to experience a housing bubble collapse, close to 2023. Almost all the mortgages in Portugal include variable rates, unlike what happens around other parts of Europe. The rise of both inflation and energy prices contributes to augmenting the pressure on savings. As the housing crisis continues, the younger generations need to defer moving out of their parents' homes, which has consequences for several sectors of the economy, including Telecom. In this latter, an important concern regards the fact that while a young adult remains living with their parents, they might share TV services which consequently results in a potential reduction in the number of subscribers for these services. This creates a need for firms within this industry to adapt their business model to address changing consumption patterns and demographics. Figure 54 represents the average age at which young adults abandon their parental household.

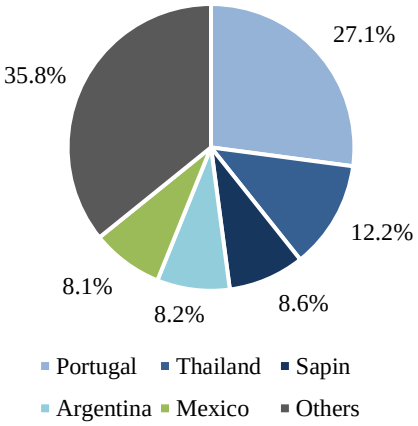
The trend of Hybrid Work and Digital Nomads

Offering a very safe, open, and peaceful environment with relatively low costs of living, Portugal has emerged as a hotspot for digital nomads (Figure 55). Indeed, these remote workers, equipped with laptops and digital skills, find Portugal's diverse and dynamic environment conducive to both productivity and personal enjoyment (Portugal News 2023).

In line with the remote working trend, COVID-19 also led to new working practices, popularizing hybrid working, which seems to be here to stay. Indeed, many companies have already introduced flexible work arrangements, allowing employees to split their time between office and remote work.

This shift has implications not only for individual career choices but also contributes to the evolving landscape of the telecommunications industry, as better and faster connectivity becomes increasingly crucial.

Figure 55.
Favourite destination for digital nomads



Source: Portugal News

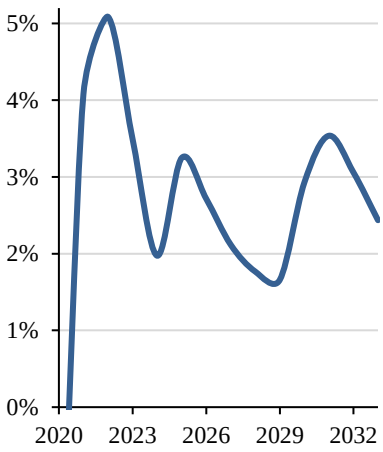
COMPANY VALUATION

Revenues Forecast

Considering the macroeconomic and market dynamic factors mentioned earlier, a thorough analysis was conducted to project NOS revenues. This analysis incorporated historical data, management estimates, and strategic changes in the company's operations, and seeks to provide a in depth reflection of the assumptions made for the forecasted period.

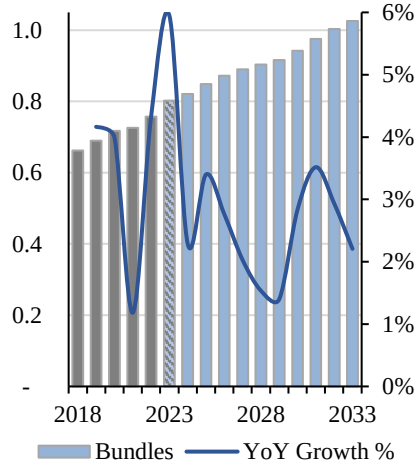
Revenues Forecast - Telco

Figure 56.
Annual Growth Rate for Total Telco Revenue



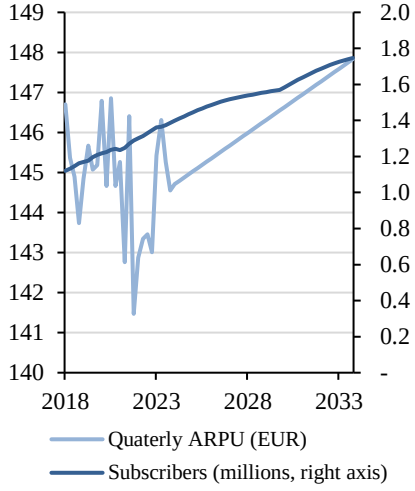
Over the past decade, bundling has emerged as a prominent trend in the industry. Customers increasingly opt for 2P, 3P, 4P, or 5P bundles instead of selecting individual services. There are three driving forces behind this phenomenon (Vdovjak 2021). First, it arises from the growing convergence and integration of services, particularly of broadband and mobile service lines, making it less likely for customers to choose services individually. Secondly, multiplay package prices are typically lower than the combined costs of the individual services. Lastly, bundling offers the convenience of streamlined configuration and billing. This strongly suggests that both

Figure 57.
Bundles Forecasted Revenue
(EUR, in billions)



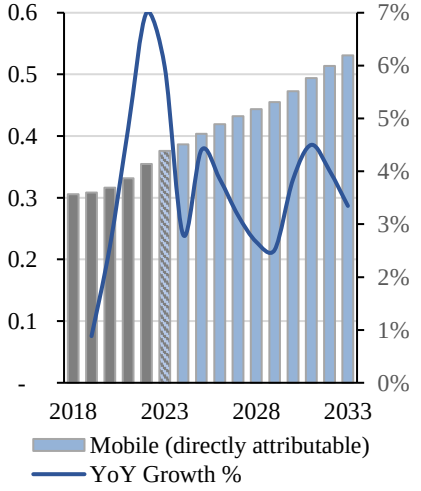
existing and new users have shifted towards bundled service offerings. Bundles are also tapping into OTT services (Amdoc Media 2020), exemplified by the soaring popularity of steaming services and their inclusion within bundles (Amirtham 2022) putting significant pressure on traditional bundled offerings. Similarly, Subscription Video-On-Demand (SVOD) services like Netflix, Amazon Prime, Disney+, Hulu, and others are favoured over traditional pay TV by younger generations. Even though there are still more pay TV subscribers than SVOD subscribers, the latter is expected to continue growing. According to Ovum, OTT TV content is expanding its reach and should be considered an integral part of bundles. (Vdovjak 2021).

Figure 58.
Evolution of ARPU and Number of Subscribers - Bundles



Mobile Network Operators (MNOs) possess a distinct advantage when it comes to attracting streaming service providers. They already have established billing systems in place and utilize pre-existing marketing channels to effectively target their audiences. Furthermore, telecom companies offer the essential infrastructure, including devices and connectivity, through which consumers access and enjoy content. Additionally, they provide a form of indirect advertising for streaming services, essentially serving as a promotional platform for these services. In return, streaming services offer added value to operators' customers. It's worth noting that when entering into contracts with streaming services, operators often seek exclusivity, aiming to be the sole providers in the market for a particular popular streaming service.

Figure 59.
Mobile Forecasted Revenue
(EUR, in billions)



Historically, the bundle service lines have exhibited a CAGR of 3.4%. However, it's important to highlight that NOS has only recently integrated OTT services into its offerings, including Netflix (2021), Prime Video (2021), Disney+ (2022), and Panda+ (2022). Therefore, in addition to the historical revenue, it is assumed that the service line will gradually increase its Average Revenue Per User (ARPU) aligning with the pricing models of OTT services, typically ranging from 5-10€ per month, and research that suggests that only 64% of customers are interested in this kind of add-on. All in all, OTT services integration is expected to gradually increase ARPU per subscriber by 4.82€ over the forecasted period (Nielsen 2022).

Figure 60.
Evolution of ARPU and Number of Subscribers - Mobile

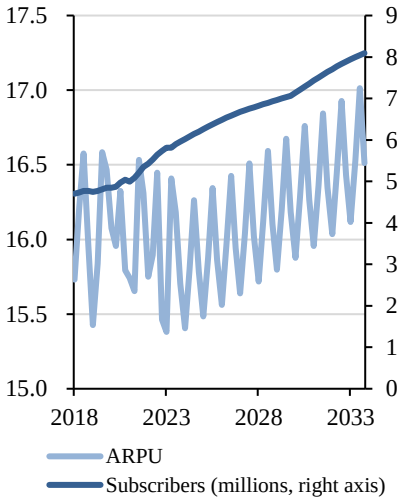


Figure 61.
Fixed Voice Forecasted Revenue (EUR, in millions)

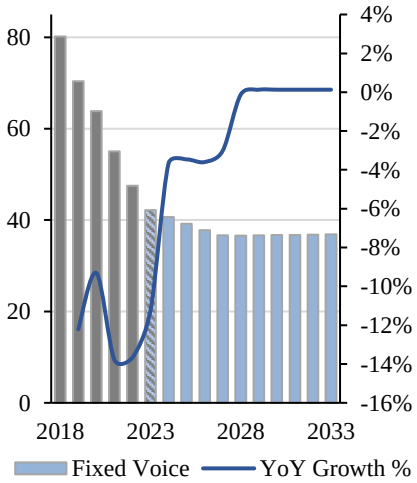
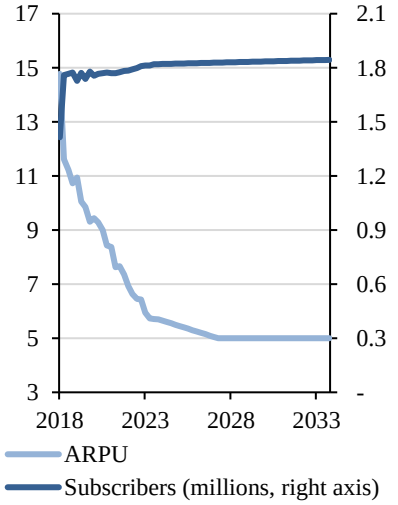


Figure 62.
Evolution of ARPU and Number of Subscribers – Fixed Voice



The number of users is also expected to rise, linked to the introduction of 5G and 6G technology (Yeh et al. 2022). This growth aligns with the trends observed in Q2 2023 and Q3 2023 and industry benchmarks (Industry Research 2023), with an initial growth rate of 3.52% (YoY). As the user base expands, the growth is expected to gradually slow down until 2030, coinciding with the anticipated commercialization of 6G. At that point, the user base is projected to increase at similar levels as experienced during the 5G rollout. Ultimately the CAGR over the forecasted period is 2.33%.

Even with European penetration rates suggesting levels approaching saturation (M. Dahlke, Alex 2019) and (GSMA 2023) the Portuguese market stands out with high expected growth in the mobile segment. While smartphones and mobile devices continue to proliferate, several factors, including improved mobile internet accessibility (5G, 6G), robust app ecosystems, and the popularity of streaming services, have collectively driven demand in the mobile service line. Remarkably, this segment has emerged as the fastest-growing area for NOS, benefitting from the company's strategic positioning to capitalize on market dynamics, such as partnerships with streaming service providers and recognition as the best 5G network in Portugal.

Consequently, it is assumed that the user base in the mobile segment will continue to increase, at a rate of 4.16% (YoY), which is aligned with market expectation (Global Data Technology 2021) and the historical trend. Similarly, to the bundle segment, it will gradually slow down until 2030, when 6G commercialization is expected to be a new tailwind. Moreover, ARPU too is expected to increase by €2.50 over the forecasted period, based on the historical trend seen in the sector and its outlined trends, and the substitute effect of bundling growth.

The fixed voice segment is shaped by two noteworthy trends (Oldham 2021). Firstly, there is a clear reduction in the use of fixed telephones, with mobile and other alternative communication methods experiencing significant growth. Secondly, the ARPU is expected to keep declining as telecom companies grapple with the difficulty of sustaining current pricing levels for fixed voice services, particularly among millennials and younger

Figure 63.
Fixed Broadband Forecasted Revenue (EUR, in millions)

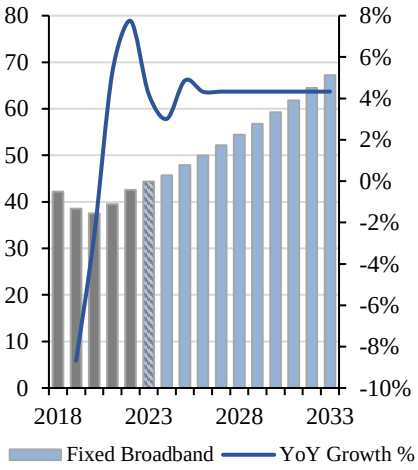


Figure 64.
Evolution of ARPU and Number of Subscribers – Fixed Broadband

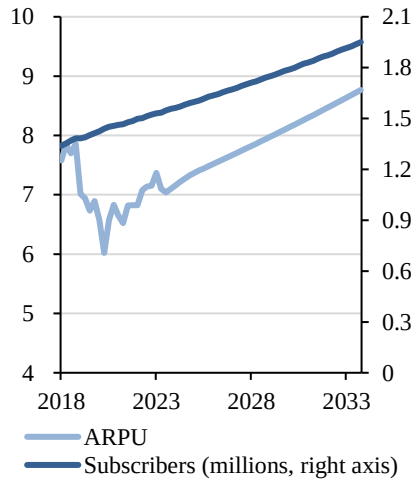
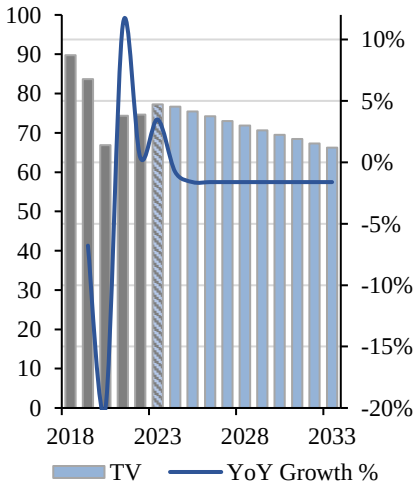


Figure 65.
Pay TV Forecasted Revenue (EUR, in millions)



generations, there is a preference for mobile over fixed voice services. However, it's worth noting that fixed voice services still find relevance in B2B (business-to-business) sales. Consequently, the ARPU and the number of users is projected to decrease but eventually level off at €5.0, supported by the business segment as seen in other developed markets (ASEAN 2023).

Much like other individualized services, the fixed broadband service line has grown very slowly, with constant or even decreasing ARPU. Nonetheless, fixed broadband, for the last 5 years, grew substantially its user base, at c. 0.6% per quarter, helped by increasing internet usage and adoption. Contrary to other segments the broadband ARPU have showed a large correlation with the post pandemic inflation, perhaps suggesting that NOS has a higher capability of transferring inflationary pressures to its subscribers. As such ARPU is expected to increase at inflation over the forecasted period. Due to increasing demand for internet usage, connectivity, and data usage, it is expected that the broadband line will increase at a CAGR of 4.46%.

The Pay TV service line experienced a significant decline in the pandemic years (Mann 2021). witnessing a 20% reduction in 2020 partially due to lower demand from the business segments (e.g. sport bars). Additionally, the service is marketed independently, often as a supplementary offering alongside traditional bundles, leading to indirect competition with on-demand streaming services (OTT) (Arunasalam 2023). As the pandemic is over, the expectation is for the pay TV line to recover to its previous levels gradually and naturally. Anticipated growth factors include a user base increase aligned with population growth rates and an ARPU in accordance with the current downward trend of the service line.

Other revenue lines such as Equipment sales and Other Sales are expected to grow in line with their historical performance and as a complement to the expected telecommunication services revenues, as this service lines are mostly related to support and complementary services.

Revenues Forecast - Audiovisuals

The second element of NOS's revenue stream encompasses five distinct service and product lines. At its core lies the Cinema Exhibitions segment,

Figure 66.
Evolution of ARPU and Number of Subscribers – Pay TV

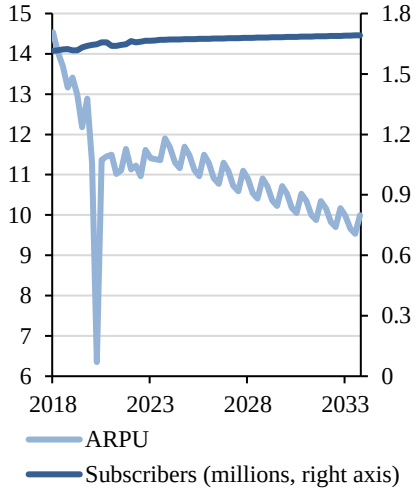


Figure 67.
Cinema Ex. Forecasted Revenue (EUR, in millions)

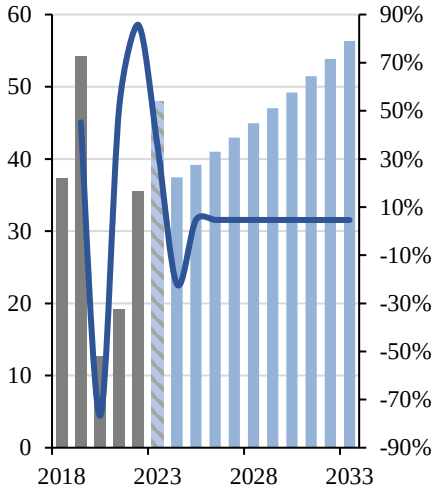
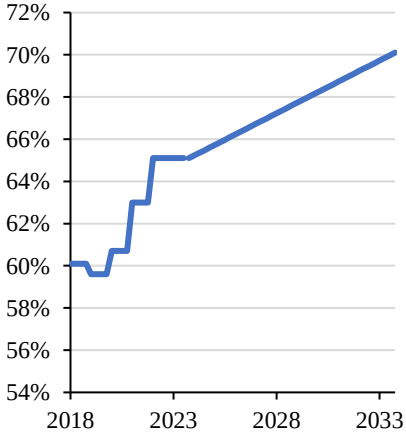


Figure 68.
Cinema Exhibition Market Share Evolution



which plays a pivotal role in driving other components, such as bar sales and advertising.

Despite global expectations for a burgeoning cinema exhibition market (Yahoo Finance 2022) the reality in Portugal tells a different story. A meticulous examination of the market's size in Portugal reveals that, despite seasonal fluctuations, it has shown minimal year-over-year growth.

Given the recent surge in on-demand streaming services, many of which offer their exclusive content to a substantial audience, consumers have been slow to return to traditional cinema experiences following the pandemic. Moreover, the market's dynamics are highly unpredictable, with the fourth quarter historically standing out as an anomaly, driven by holiday-related family outings and varying levels of public engagement with new film releases. Notably, the third quarter of 2023 was a remarkable exception as titles like "Oppenheimer" and "Barbie" achieved record-breaking global revenues, setting a new benchmark for NOS Cinema Exhibitions at €15.9 m. Nonetheless, NOS has managed to boost its revenues by steadily capturing market share from smaller regional players (ICA 2023). Figure 68 illustrates that approximately 6-8% of market share is still held by these regional entities, and it is expected that NOS will continue to gain market share, albeit at a more gradual pace. This is in part due to the company's limited expansion of cinema facilities, resulting in an anticipated 70% market share by the end of 2033.Considering that the market size is projected to remain relatively stagnant over the next decade, we anticipate NOS to achieve a steady increase in its revenues, reaching €42.9 m in 2028 and €56.3 m in 2033.

The Advertising service segment displays a consistent historical pattern of seasonality without any significant increases. This seasonality is strongly tied to the revenue generated from cinema exhibitions and Content and TV Channels, as they serve as the company's primary advertising platforms. Consequently, it is expected that the historical quarterly average (expressed as a percentage of advertising-related lines) will remain stable in the future.

Over the past five years, the Content and TV channels service line has witnessed a decline in revenues due to stiff competition from on-demand streaming services. However, NOS has implemented strategic measures,

Figure 69.
Forecasted Total Revenues
(EUR, in billions)

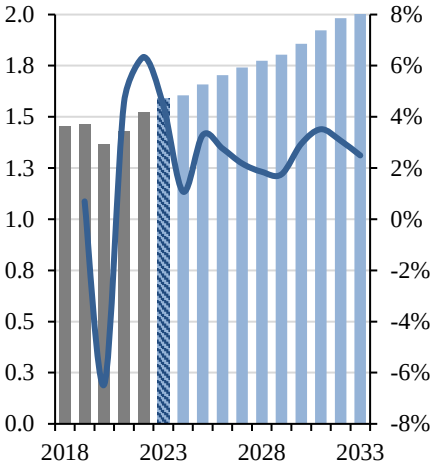


Figure 70.
Forecasted Total Costs
(EUR, in billions)

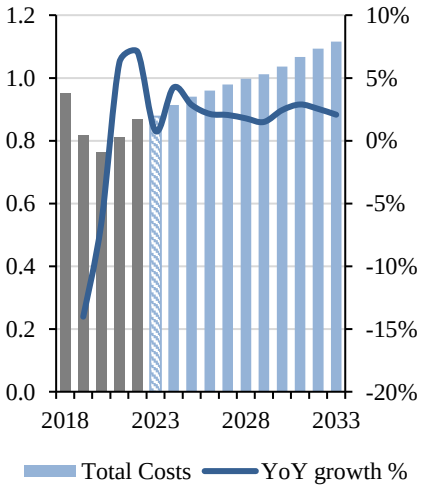
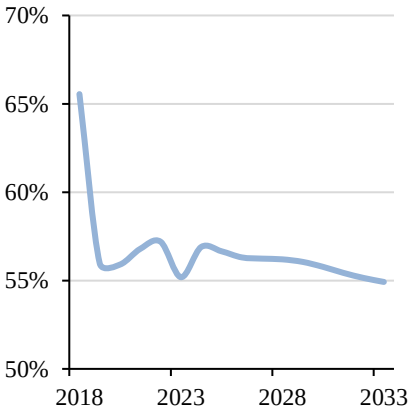


Figure 71.
Forecasted Total Costs
as a % of Revenues



such as the introduction of the UMA TV platform and enhancements to TV Cine channel content, with the aim of mitigating the contraction of this service line. These initiatives are expected to expand its user base in line with the projected population growth rate while maintaining its ARPU growth at a level not exceeding the inflation rate.

Historically, Bar Sales have exhibited a strong correlation with cinema exhibit ions, accounting for approximately 31.82% of the revenues generated over the past five years. It is assumed that this relationship will persist in the future.

Figure 69 shows the forecasted evolution of Revenues until 2033, showing the revenue growth from 6G deployment and corresponding to a CAGR of 2.2% from 2030 to 2033 (2.54% for Telco and 1.80% for Audiovisuals), implying an acceleration from the 1.8% CAGR from 2018 to 2023.

Costs Forecast

In line with the revenues projected, a comprehensive assessment was performed to forecast the respective costs of the company. NOS total costs have been slightly increasing in the past 4 years, with a CAGR (2019-2022) of 1.83%, and gaining a larger share of the total revenues generated (56.81%, when compared to 55.97% in 2019). In 2018 costs represented over 65% of total revenues, which is mainly explained by a significantly higher level of direct costs in that year.

Overall, NOS's total costs are expected to grow at a CAGR (2023-2033) of 2.30% (Figure 70). Nonetheless, its share of the total revenues is expected to slightly decrease to 55% by 2033, as revenues are projected to be generated at a higher rate (Figure 71).

Both segments of NOS, Telecommunications and Audiovisuals, have a cost structure that can be divided into several sections, all of which will be fully analysed and projected.

Costs Forecast - Telco

Predicting the trajectory of costs within the Telecom segment demands a meticulous analysis that combines historical performance with forward-

Figure 72.
Forecasted Telecom Wages and Salaries (EUR, in millions)

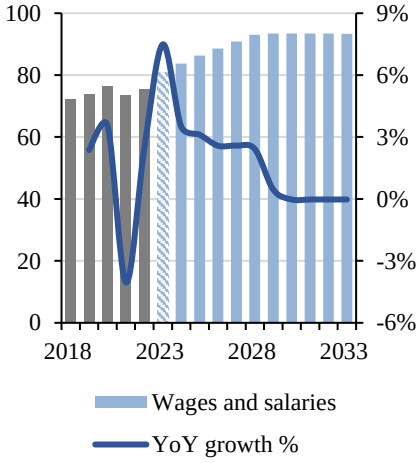


Figure 73.
Forecasted Telecom Number of employees and associated costs

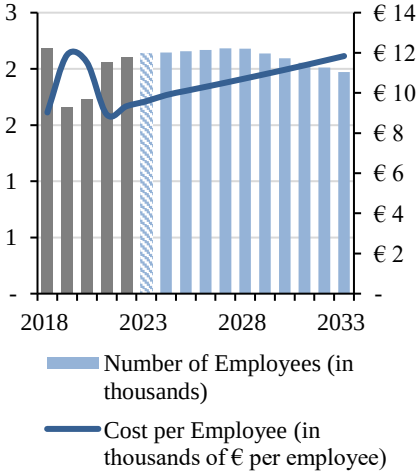
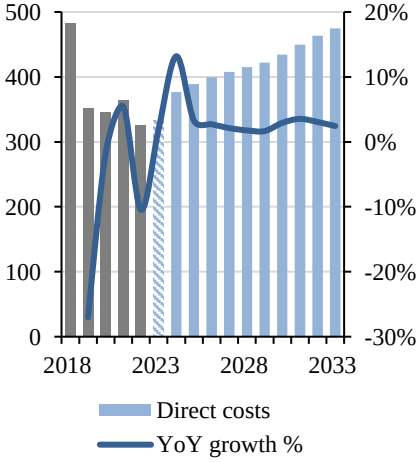


Figure 74.
Forecasted Telecom Direct Costs (EUR, in millions)



looking assumptions. This forecast aims to shed light on the intricacies of cost projection methodologies, delineating the driving factors and rationale behind the estimations.

In order to better understand how wages and salaries will grow in the firm, this expense was divided into two main drivers, the number of employees, and the cost per employee. To obtain the number of employees for each segment, it was assumed that the salaries in each segment were proportional to the number of employees.

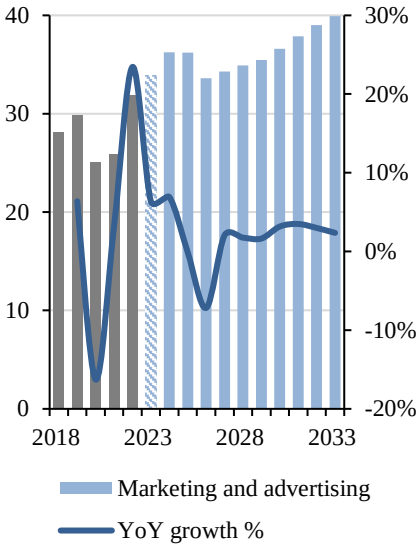
The continuous expansion and installation of new technology will require more human capital, and so, for the following five years, it was assumed that the number of employees would grow at the same rate as customers, as has happened in the last couple of years. After that, it is assumed a decreasing trend as, on the other hand, emerging technologies are adopted, and the need for employees diminishes. Finally, the cost per employee is assumed to grow with inflation.

Direct costs represent the greatest cost that the firm incurs, representing almost 40% of total costs in 2022. In fact, in previous years this cost was even more significant, representing over a quarter of the revenues produced. To estimate how these costs will behave in the future, an analysis of how these costs behave quarterly with the total revenues was performed, excluding 2018's values, as before 2019 direct costs were accounted for in a different format by the firm. It was then assumed that direct costs would represent, on average, 26.42% of the firm's revenues, as no change is expected in this cost structure.

As for the cost of products sold, a similar approach was presumed, where a more specific driver was used: equipment and product sales, as this expense is directly related to the sales of these products.

To understand how marketing and advertising costs will evolve in the following years, a more comprehensive breakdown was performed. When analysing this expense's relation with the total revenues, a clear trend is observed, as costs more than doubled in the last quarter. Hence, these expenses were forecasted taking into account its seasonality. Furthermore, in

Figure 75.
Forecasted Telecom Marketing and Advertising Costs (EUR, in millions)



the next two years, an increased level of marketing and advertising expenses are expected, as NOS intends to invest more in Digital Marketing.

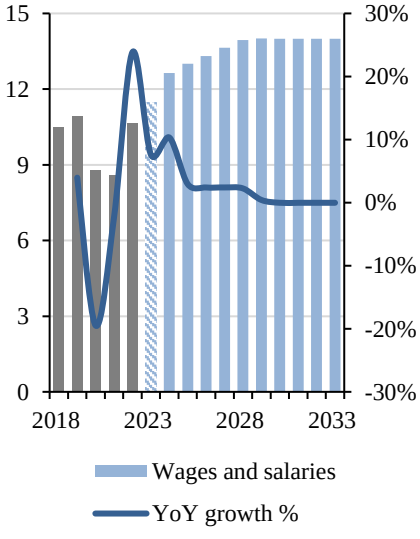
To project the support services expenses that the firm will incur, an assessment of the previous costs in relation to the total telecommunications users was undertaken. With that, it was possible to infer a seasonal trend with increased costs in the first and last quarters, which was then used to determine how these costs will navigate in the future.

Regarding supplies and external services and indirect taxes, these expenses were forecasted taking into account their relationship with total revenues in the past 5 years, as no significant shifts in this relationship are expected in the foreseeable future. Furthermore, other operating losses and gains were simply assumed as an average of the past, as these are not related to the firm's main operations.

As for provisions and adjustments, this item mainly regards impairment of accounts receivables, and so, they were estimated as a percentage of the revenues generated by the firm. Additionally, it was observed a seasonal trend, as it seems that NOS incurs in higher provisions in the last quarter of the year, and adjusts its level usually on the second quarter.

Finally, other losses and gains were also estimated as an average of the past, excluding however some outliers, as the firm occasionally realises significantly high values. As for the losses and gains in participated companies, these were assumed to remain stable throughout the years, as has been the case in the last 5 years.

Figure 76.
Forecasted Audiovisual Wages and Salaries (EUR, in millions)



Costs Forecast - Audiovisuals

The forecasting methodology employed for the audiovisuals segment is similar to that of the primary segment of the firm. Nevertheless, due to the pronounced impact of the pandemic on the audiovisuals industry, several outliers within historical data were recognized and subsequently excluded from the analysis.

Regarding wages and salaries, on the same note, the number of employees in the audiovisual segment is expected to remain somewhat stable in the

Figure 77.
Forecasted Audiovisuals Number of employees and associated costs

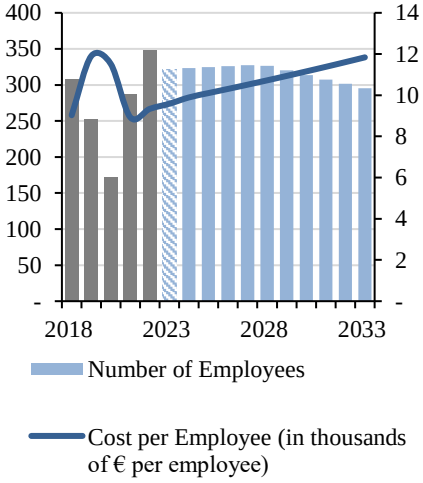


Figure 78.
Forecasted Audiovisuals Direct Costs (EUR, in millions)

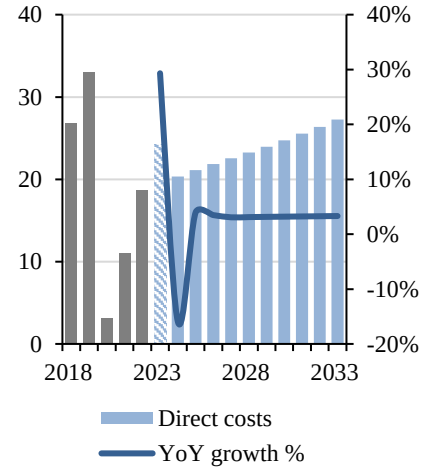
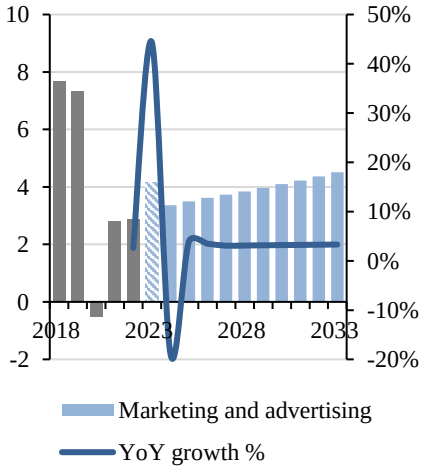


Figure 79.
Forecasted Audiovisuals Marketing and Advertising Costs (EUR, in millions)



following 5 years, increasing only marginally as revenues and demand increase. After that, a negative trend is estimated as the need for employees diminishes with the adoption of new technological trends, such as entering the cinema with QR codes instead of having employees scan their tickets. As for the cost per employee, it was also assumed to grow with inflation.

With regards to direct costs, marketing and advertising, support services, and supplies and external services, the same methodology was applied. These expenses are very related to the segment's activity and how it performs, and so, they were forecasted based on its average representation of total revenues. In doing so, the values before 2022 were excluded since most values before this year were highly affected by the pandemic. Furthermore, there are no changes expected in how these costs behave with the revenues generated by the firm.

When analysing the costs of products sold for the segment, the same logic regarding the analysed period was used, as the values before 2022 are not representative of the standard activity. For this cost, a different driver was used, as a more specific correlation was established with bar sales and DVDs, allowing for a more precise estimation of this expense.

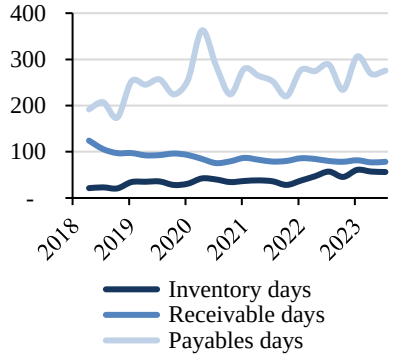
On the other hand, indirect taxes remained quite steady in relation to total revenues through the last 5 years, and so, these were forecasted taking into account the whole period in analysis.

Provisions and adjustments were analysed using a methodology akin to that applied in the telecommunications segment. This approach was adopted due to the observed trend within the firm, indicating higher costs incurred during the last quarter of the year.

Lastly, regarding other losses and gains (in participated companies and others), it was assumed that these would maintain stability over the forecasted period and were forecasted as an average of the past as these factors hold minimal representation within NOS's overall cost structure.

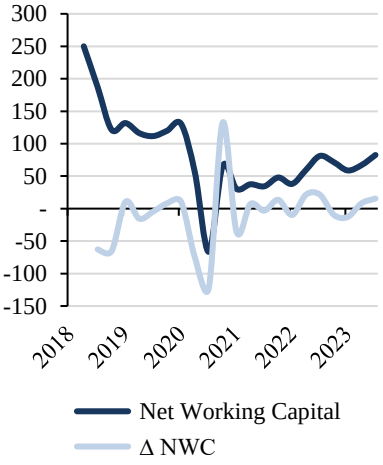
Considering all costs, it is expected that EBITDA margin to evolve according to the assumptions made. A visible decrease in 2024 is clear, explained by short term inflationary pressures and a record-breaking performance in 2022

Figure 80.
Historical Operating Cycle
(in days)



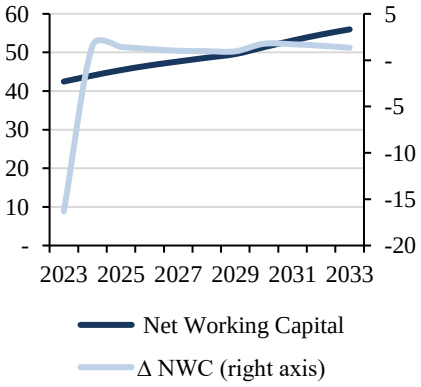
Source: NOS institutional reports

Figure 81.
Historical Net Working Capital
(EUR, in millions)



Source: NOS institutional reports

Figure 82.
Forecasted Net Working Capital
(EUR, in millions)



fuelled by 5G growth and extraordinary cinema ticket office, which the historical and market analysis suggest to not be sustainable. Nevertheless, a positive trajectory is expected in EBITDA margin (+-0.1% per year), supported by increased ARPU, streaming partnerships and cost scaling (e.g. wages and customer support).

Net Working Capital

Regarding the Net Working Capital (NWC), it was derived through a more specific approach that concentrates solely on the key components of its current assets and liabilities that are directly related to the firm's operating cycle. Following such approach provides a more dynamic and time-based perspective on NOS's working capital needs, as it considers the time it takes to sell inventory, collect receivables, and pay payables.

To derive the average number of days it takes NOS to turn its inventory into sales, the change in inventory values reported by the telecommunications firm were divided by the direct costs and costs of products sold of its segments, and then multiplied by the average amount of days in a quarter[5]. The resulting metric, NOS's inventory days, remained relatively constant over the analysed period, especially in the last 3 years, as it can be seen in Figure 80. As such, they were assumed to remain at the 3-year historical average. Then, the forecasted inventory days were used to derive the expected inventory values for the next 10 years, by multiplying them by the previously forecasted direct costs and costs of products sold that NOS would have in the future and then dividing them by 91.25.

When it comes to receivable days and payable days, these are metrics used to measure the average number of days it takes for a firm to collect payments from its customers and to pay its suppliers, respectively. To derive NOS's receivable days, the historical accounts receivable (current and non-current) were divided by the by group total operating revenue in the same period, and then multiplied by 91.25. The same logic was applied to compute the payable days but with the relevant accounts. Regarding the evolution of these metrics, on average both of them appeared to be fairly constant over the past 3 years. In this way, both receivable and payable days were assumed to remain at the

[5]365/4=91.25 average days in a quarter

3-years historical average level. Following a similar procedure as mentioned earlier, NOS's accounts receivable and accounts payable for the next 10 years were estimated by multiplying the projected group revenues by the forecasted receivable and payable days, respectively, and then dividing by the average days in a quarter.

Finally, one can reach NOS's forecasted NWC by deducting the expected accounts payable from the projected inventory levels and the accounts receivable. Such values are depicted in Figure 82, alongside the firm's forecasted changes in networking capital.

Capital Expenditures

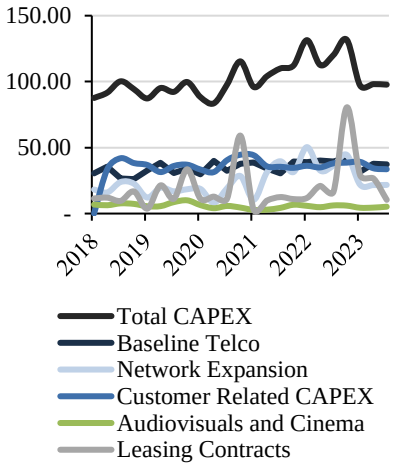
Capital Expenditures play a pivotal role in shaping the trajectory of NOS in the highly competitive Portuguese telecommunications market. Indeed, given that the firm mainly operates in such a dynamic industry that is constantly evolving with new technology, it is extremely important for NOS to keep substantially investing in CAPEX to stay modern and competitive.

Diving into its historical values, the firm's overall CAPEX levels remained relatively constant from the first quarter of 2018 up until the third quarter of 2020, as it can be observed in Figure 83. In 2021 and 2022, NOS experienced a significant increase in its total CAPEX (excluding leasing contracts, spectrum licenses and other contractual rights), reaching almost €500.0 m in the financial year of 2022, record level for the firm.

According to NOS's management team, such increase in CAPEX was a deliberate step aligned with the company's strategic vision, as it was mainly driven by the launch and implementation of 5G technology in Portugal, in accordance with NOS's 5G leadership strategy. After these peak years, NOS expects its overall CAPEX (excluding leasing contracts, spectrum licenses and other contractual rights) to decrease in line with the progressive deceleration of 5G and FttH deployment, and land between €370.0 and €390.0 m in 2023 and 2024.

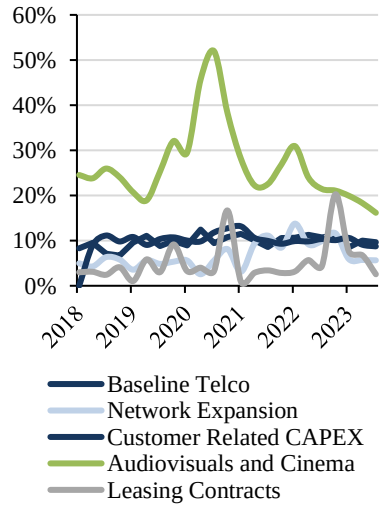
Looking deeper into the firm's CAPEX, it can be broken down into Telecommunications, Audiovisuals and Cinema Exhibition, Leasing Contracts & Other Contractual Rights, and Spectrum Licenses. As illustrated

Figure 83.
Historical CAPEX Breakdown
(EUR, in millions)



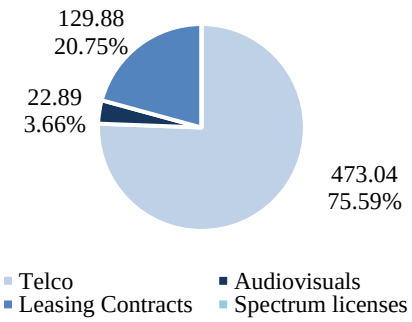
Source: NOS institutional reports

Figure 84.
Historical CAPEX Breakdown
(in % of Relevant Revenues)



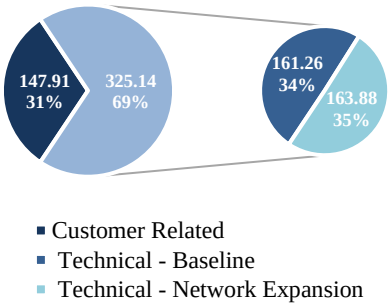
Source: NOS institutional reports

Figure 85.
2022 CAPEX Breakdown
(EUR, in millions)



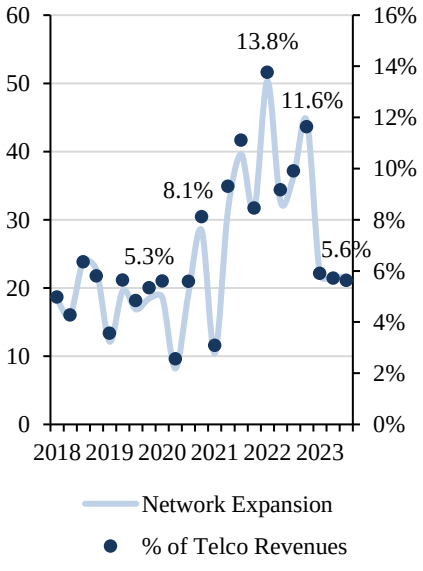
Source: NOS institutional reports

Figure 86.
2022 Telco CAPEX Breakdown
(EUR, in millions)



Source: NOS institutional reports

Figure 87.
Historical Network Expansion CAPEX
(EUR, in millions, and %)



Source: NOS institutional reports

in Figure 85, in 2022, Telecommunications CAPEX was by far the most significant CAPEX category, accounting for approximately 75.59% of the firm's total CAPEX. It was followed by Leasing Contracts & Other Contractual Rights CAPEX (around 21%), being Audiovisuals and Cinema Exhibition the least CAPEX intensive category (only 3.66%).

As depicted in Figure 86, Telecommunications CAPEX can be decomposed into Technical CAPEX and Customer Related CAPEX. When it comes to Technical CAPEX, it includes mainly network deployment, upgrade and replacement expenditures, and IT development. Within Technical CAPEX we can further distinguish Baseline Telco CAPEX and Network Expansion & Substitution and Integration Projects CAPEX.

On the one hand, Baseline Telco refers to more recurrent levels of Telco CAPEX, such as continuous replacement and modernization expenditures that occur on an ongoing basis. This means that there isn't disruptive CAPEX in this account, providing a normalized figure for Technical CAPEX. In this way, Baseline Telco CAPEX was forecasted so that it remained at its historical average proportion with respect to the firm's Telecommunications Revenues (9.8%). On the other hand, in the Network Expansion & Substitution and Integration Projects CAPEX is where very important expenditures are included, namely 5G and FttH investments.

Looking into NOS historical Network Expansion CAPEX in percentage of its Telecommunications Revenues, depicted in Figure 87, one can observe that such percentage remains relatively constant around 5% and 6%, starting to increase in 4Q of 2020, and only returning to average levels after 4Q of 2022. Considering the fact that NOS was the first firm to launch 5G in Portugal, in December 2021, those Network Expansion CAPEX variations can be directly linked to the rollout of 5G technology, and it should be highlighted that they started one year prior to its launch and ended one year after. According to NOS Earnings Calls, the majority of the 5G and FttH investments were concluded before the first quarter of 2023, as its 5G network covered 87% of the population and more than 63% of its Gigabit fixed network were covered with FttH at the end of 2022. Therefore, 2023 investment levels are the best proxy for standard levels of Network

Figure 88.
Forecasted Technical CAPEX (EUR, in millions)

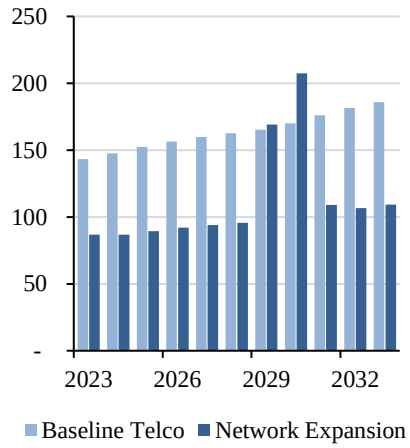


Figure 89.
Forecasted Telco CAPEX (EUR, in millions)

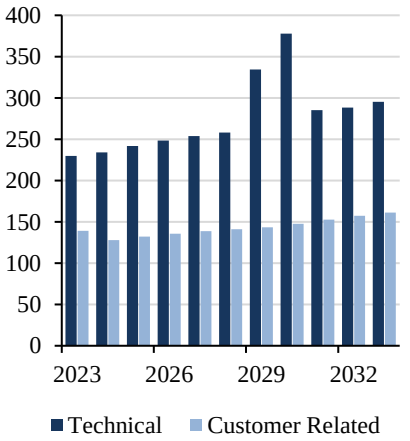
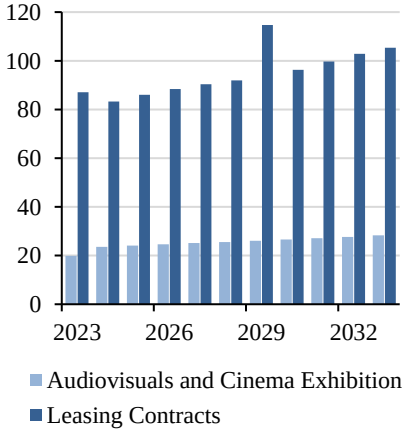


Figure 90.
Forecasted Audiovisuals and Leasing Contracts CAPEX (EUR, in millions)



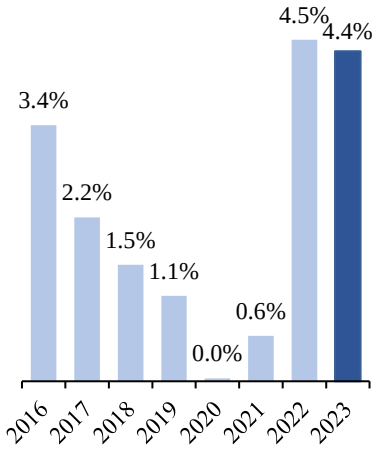
Expansion & Substitution and Integration Projects CAPEX. In this way, it was assumed that, in the following 10 years, it would maintain its 2023 average proportion with respect to the firm's Telecom Revenues (5.76%), except for the period between 1Q29 and 1Q31. Undertaking an average 10-year technological renewal cycle in mobile, it was presumed that 6G would be launched in 2030, implying an increase in Network Expansion CAPEX in the quarters around that period, similarly to what previously happened with 5G.

Moving on to Customer related CAPEX, it includes the costs associated with the production, sale, support, and installation of telecom equipment for the firm's customers. Such costs are considered CAPEX because they are capitalized to the balance sheet to match the lifetime of its customers. According to NOS, decreases in Customer Related CAPEX are reflecting the continuing low levels of churn and efficiency gains achieved by the firm, which are helping mitigate the inflationary pressures in terms of equipment unit cost and indirect salaries related to sales and installation services providers. This trend is expected to continue, as NOS keeps being distinguished as a consumer preference, being assumed that, in the next 10 years, the proportion of Customer Related CAPEX with respect to the firm's Telecommunications Revenues will decrease to a plateau rate of 8.5%.

Regarding Audiovisuals and Cinema Exhibition CAPEX, it has decreased as a percentage of Audiovisuals Revenues, excluding pandemic years which severely damaged this segment's proceeds due to the mandatory lockdown measures. This suggests that Audiovisuals and Cinema Exhibition CAPEX is related to fixed maintenance costs, so it was assumed that this value would remain at the 5-year historical average of €5.76 m per quarter and then increase with inflation during the forecasted period.

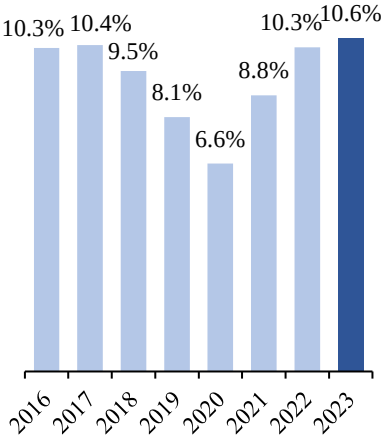
Finally, the percentage of Leasing Contracts & Other Contractual Rights CAPEX with respect to NOS total group revenues was assumed to keep in line with the 5-year historical average of 5.19%, except on the first quarter of 2029, where 10.0% was used instead to accommodate for the preparation for 6G commercialization in 2030, similarly to what previously happened with 5G.

Figure 91.
After-tax Cost of Debt Evolution 2016-2023



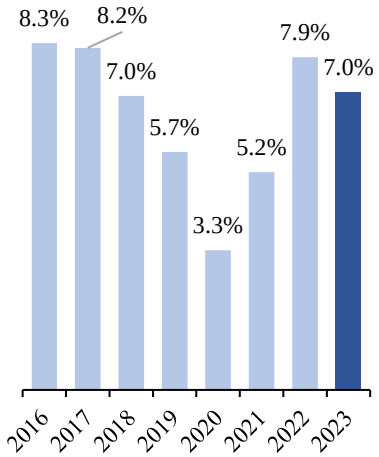
Source: Bloomberg

Figure 92.
Cost of Equity Evolution 2016-2023



Source: Bloomberg

Figure 93.
WACC Evolution 2016-2023



Source: Bloomberg

Cost of Capital

According to Maria Carrapato, director of investor's relations at NOS, the strategy of the firm includes keeping a target debt-to-equity ratio and thus the cost of capital was computed assuming NOS's capital structure will not have significant changes, remaining at a debt-to-equity ratio of 1.

To arrive at the cost of debt, the 10-year German Treasury Yield, 2.01% (Bloomberg 2023), was considered as the risk-free rate. Additionally, to account for the fact of the debt being from a Portuguese firm, a rating-based default spread of 2.04%[6] (Damodaran 2023) was also taken into consideration, along with the European corporate credit spread of the telecommunication sector of 1.60% (PWC 2023), given that the firm's revenues arrive mainly from that industry. Finally, a cost of debt of 4.37% was reached, higher than the 2022 cost of debt due to the end of 2020 moratiums (Figure 91).

Regarding the cost of equity, it was obtained using the CAPM model adjusting once again the risk-free to account for country risk premium. NOS's unlevered beta was assumed to be the weighted average of the unlevered betas concerning the sectors in which the firm operates (Bloomberg). The unlevered betas of each sector were computed using a benchmark analysis of peers in the respective industry. reach the levered beta, the corporate tax rate value considered was 22.5%, which is mentioned in the Annual Report and doesn't include de deduction of tax incentives. Cost of equity obtained equalled 10.6%, in line with the historical cost, when disregarding the pandemic years (Figure 92).

This set of assumptions resulted in a WACC of 7.00%, in line with historical values and a slight decrease from 2022 due to an increase in Book Value D/E from 1.56 to 1.88 and a recent decrease in interest rates (Figure 93).

Discounted Cash Flow

Combining the aforementioned assumptions, the expected future cash flows are derived from the firm's projected ability to generate profit during the

[6] To obtain this value the Moody's rating for Portugal was used (Baa2) to estimate the default spread over a default-free government bond rate

Figure 94.
Forecasted Revenues, Costs & EBITDA (EUR, in millions)

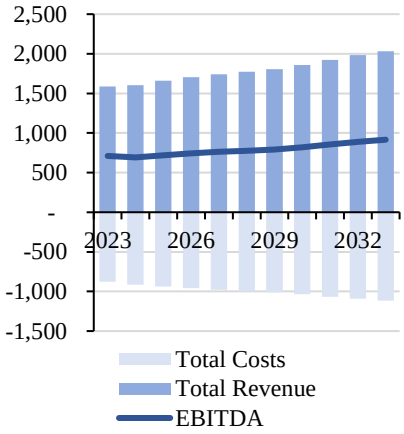


Figure 95.
Forecasted EBITDA, Dep & EBIT (EUR, in millions)

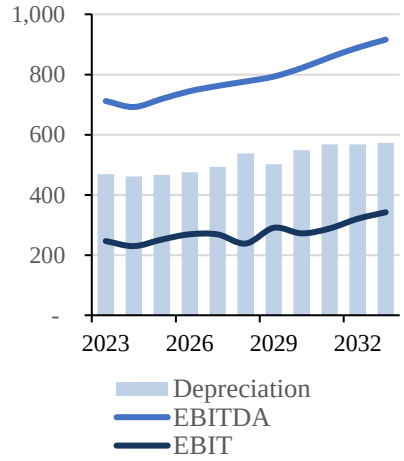
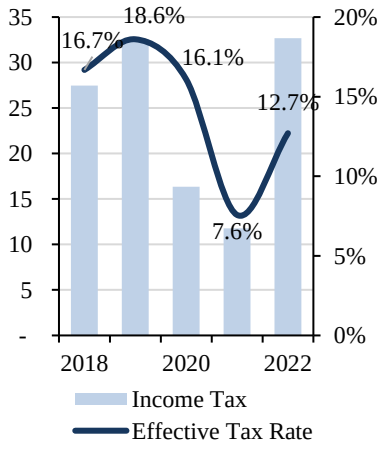


Figure 96.
Income Tax & Effective Tax Rate (EUR, in millions, and %)



Source: NOS institutional reports

forecasted period. Looking into the evolution of NOS revenues and costs forecasted for the next 10 years illustrated in Figure 94, it becomes clear that, even though both are growing, revenues are growing at a faster pace, leading to an increasing EBITDA. Indeed, the telco firm EBITDA is expected go from €711.8 m in 2023 to €916.1 m in 2033, implying a 2.56% CAGR.

Then, the firm's depreciation and amortization expenses previously forecasted can be deducted from NOS EBITDA, yielding the company's EBIT. As depicted in Figure 95, NOS forecasted EBIT appears relatively more stable than the firm's forecasted EBITDA, due to the expected slight increase in depreciation expenses. Nonetheless, EBIT still presents a positive tendency over the forecasted 10 years, reaching €342.4 m in 2033.

Subject to the Portuguese Corporate Income Tax (IRC), NOS and its subsidiaries currently operate under a tax rate of 21% on taxable profit. Furthermore, the telecommunications firm also faces an IRC surcharge at the maximum of 1.5%, resulting in a total statutory tax rate of approximately 22.5%. Nonetheless, NOS benefits from several fiscal advantages arising mainly from the attribution of tax incentives for business research and development, including the SIFIDE (Business Research and Development Tax Incentives System), as well as the RFAI (Investment Tax Incentive Regime). Additionally, NOS falls under the special tax regime designed for groups of companies, further contributing to the company's favourable tax position. Indeed, over the past five years, NOS has consistently reported an effective annual tax rate below the statutory tax rate, fluctuating between 16.7% in 2018 and 12.7% in 2022, and reaching values as low as 7.6% in 2021, as illustrated in Figure 96. Since the firm plans to keep investing in research and development initiatives, it was assumed that it would keep benefiting from such tax incentives during the next 10 years. In this way, NOS effective tax rate was forecasted to remain at the 5-year historical median, amounting to 16.1%.

Taking such tax rate, one can compute the income tax expenses and reach NOS Net Operating Profit After Tax (NOPAT). As shown in Figure 97, the telco firm NOPAT is expected to increase in the forecasted period, going from €231.3 m in 2023 to €287.30 m in 2033, implying a 2.19% CAGR.

Figure 97.
Forecasted EBIT, Inc Tax & NOPAT
(EUR, in millions, and %)

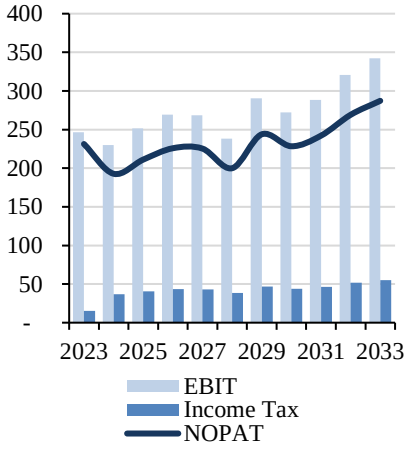


Figure 98.
Forecasted CAPEX & Depreciation
(EUR, in millions, and %)

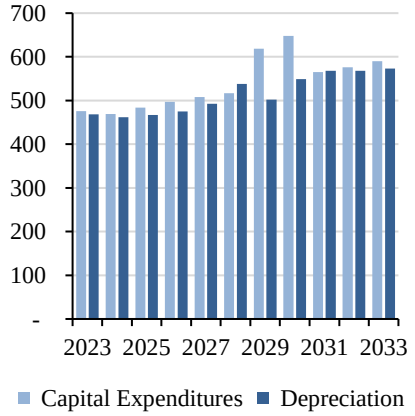
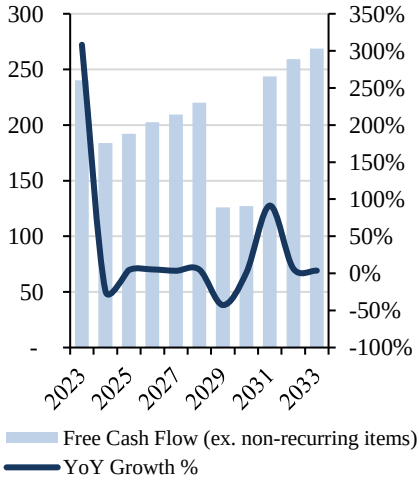


Figure 99.
Forecasted Free Cash Flow
(EUR, in millions, and %)



Then, to derive NOS Forecasted Free Cash Flows (FCFs) from the firm's NOPAT, depreciation is added back to the figure and the changes in NWC and Capital Expenditures are deducted. Subsequently, the present value of those cash flows was computed by discounting them using the previously established weighted average cost of capital (WACC) of 7.00%. This resulted in a total present value of €1,517.43 m.

Nonetheless, it is assumed that NOS will continue to operate and generate value after 2033, so the firm's terminal value must be computed to account for its long-term worth beyond the forecast period. In order to calculate the terminal growth rate, it is important to understand how both the economy and the industry in which NOS operates are expected to grow in the future. Regarding economic growth, the European Central Bank (ECB) Long Run Target Inflation Rate of 2% was used as it is more forward looking. Taking the telecommunications global revenue in Portugal from 2011 to 2022 available in ANACOM, one gets an Historical Industry CAGR of approximately 0.27%. Anticipating technological advances such as 5G and 6G to increase the telecommunications industry long term CAGR, while also recognizing that the growth rate of such a stable and mature industry is extremely likely to remain well below the long run target inflation rate, NOS terminal growth rate was forecasted as the average between the ECB Long Run Target Inflation Rate and the Historical Industry CAGR, amounting to 1.14% (Global Data 2023), in line with market analysis calculating the terminal value involved aggregating the forecasted FCFs of the last 4 quarters to obtain the terminal year FCF. Subsequently, this figure was multiplied by 1 plus the previously computed terminal growth rate and discounted as a growing perpetuity to derive its present value (€2,351.01 m).

NOS Enterprise Value can be derived from combining the present value of the forecasted cash flows with the firm's discounted terminal value, totalling approximately €3,868.45 m. The deduction of current and non-current borrowings (net debt) from this figure yields NOS Total Equity Value, which stands at €2,093.24 m.

However, since the main goal is to determine the implied share price for common shareholders, the value of preferred shares and minority interest

needs to be deducted from the firm's Total Equity Value. This adjustment serves to isolate NOS Common Equity Value, which amounts to approximately €2,086.91 m.

Upon dividing NOS Common Equity Value by the number of ordinary shares outstanding as of the 3Q of 2023 (approximately 511.4 million), the resulting implied share price stands at approximately €4.08 per ordinary share.

Comparing the intrinsic share value derived from the model with the market price of NOS shares (€3.40 as of the 4th of December of 2023), there is an upside of approximately 19.91%. This indicates that NOS shares are currently undervalued by the market, making it a favourable time for investors to consider purchasing shares.

Figure 100.
ROIC and ROE

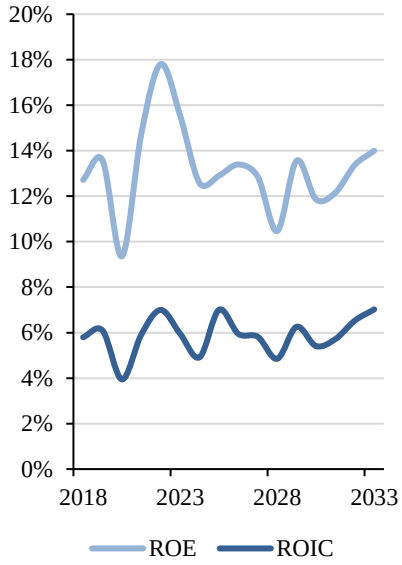


Figure 100 shows the expected evolution of ROE and ROIC during the forecasted period, showing a slight uptrend in returns over the next 10 years reaching 14.2% and 7.0% in 2033, respectively.

Sensitivity Analysis

To evaluate the resilience and viability of the company's operational framework, an in-depth sensitivity analysis was carried out, focusing on what were considered the most relevant parameters of the firm's valuation: the terminal growth rate, the WACC, and the quarterly growth rates of mobile users, and bundles users.

Terminal Growth Rate	Weighted Average Cost of Capital				
	6.30%	6.65%	**7.00%**	7.35%	7.70%
1.02%	5.02 €	4.47 €	3.99 €	3.56 €	3.17 €
1.08%	5.09 €	4.53 €	4.03 €	3.60 €	3.21 €
1.14%	5.15 €	4.58 €	**4.08 €**	3.64 €	3.24 €
1.19%	5.22 €	4.64 €	4.13 €	3.68 €	3.28 €
1.25%	5.28 €	4.69 €	4.18 €	3.72 €	3.31 €

Figure 101 – Sensitivity analysis of share price using the WACC and the Terminal growth rate

The table above (Figure 101) showcases the impact of the terminal growth rate and the WACC on the NOS's share price.

As expected, these two factors display a significant influence on the value of the firm, with particular emphasis on the WACC. In fact, a 10% increase in

the cost of capital would lead to a decrease of over 20% of the firm's share price to 3.24€, which is below the firm's current market price. Regarding the terminal growth rate, even though its impact is not as remarkable as the cost of capital, it still results in some fluctuations in the price, since a 10% drop in this rate maintains the price comfortably close to the 4€ threshold.

Mobile Users Quarterly Growth	Bundle Users Quarterly Growth					
		0.53%	0.71%	**0.88%**	1.06%	1.24%
	0.62%	3.31 €	3.54 €	3.78 €	4.02 €	4.28 €
	0.83%	3.46 €	3.69 €	3.92 €	4.17 €	4.42 €
	1.04%	3.62 €	3.84 €	**4.08 €**	4.33 €	4.58 €
	1.24%	3.78 €	4.01 €	4.25 €	4.49 €	4.75 €
	1.45%	3.96 €	4.18 €	4.42 €	4.66 €	4.92 €

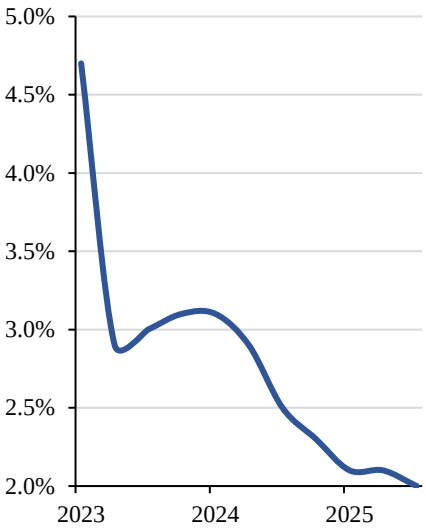
Figure 102 – Sensitivity analysis of share price using Bundle and Mobile Users' quarterly growth

On Figure 102, a different analysis was performed, focusing on the two biggest activities of the company. Bundles' revenues have represented around half of the total revenues of the firm, while revenues directly attributable to Mobile usually represent just above 20% of the total. For that reason, changes in these activities could significantly impact the firm's share price. To dive deeper into this obstacle, this sensitivity analysis takes into account the forecasted growth for the number of users of Bundles and Mobile services. As expected, NOS's price is more sensitive to changes in Bundles users' growth. Nonetheless, it should be noted that the price is not overly sensitive to a change in this rate, as a 40% decrease in this growth would result in a 11.3% decrease in the share price. As for the Mobile users' growth, the same change in this rate only results in a 7.5% decrease in the price.

Scenario Analysis: Inflationary Pressures

On the 12th of December 2023, NOS announced an increase in prices scheduled for February 2024 (ANACOM 2023a). Despite inflation adjusted price increases being an almost yearly occurrence, a quick analysis of the data analysis of the ARPU evolution clearly shows that the metric hasn't increased in line with inflation. The difference can be explained by contractual constraints, negotiation and retention strategies and more-for-more strategies. In other words, it is common for telecom companies to justify increases to their existing consumers by offering them additional

Figure 103.
Annualized HICP Inflation Forecast



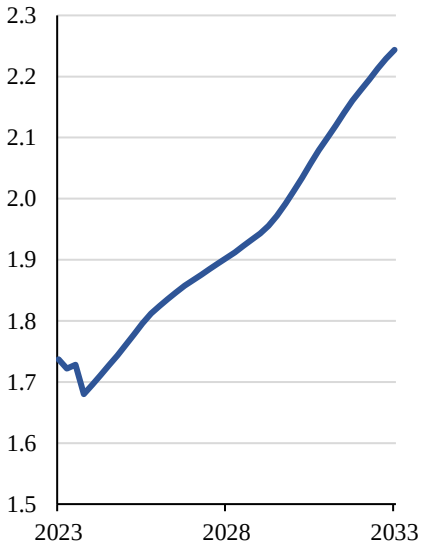
services, which explains why subscriber additions showed more variation in inflationary periods than ARPU.

Nonetheless, to acknowledge any possible price increases, a scenario where the bundle segment line grows at a higher than previously forecasted rate was considered[7]. Figure 103 shows how a yearly increase in ARPU in line with ECB forecasted inflation would impact revenue from this segment. Going from a CAGR of 2.54% to a CAGR of 4.01% in telecom segment when assuming that NOS is capable of fully transferring inflation to its customers. Implying a share price of €5.21. Please note that costs would also suffer a more accentuated cost increase when compared to the base scenario (most variables are revenue dependent) and that this scenario assumes that NOS would be able to fully transfer its price increases to costumers, without impacting its market share, which historically isn't verified.

Adjusted Present Value

To better understand how debt financing impacts the share price, the adjusted present value model was applied using the same operating assumptions stated previously. The model relies on unlevered cost of capital (8.11%), cost of debt (4.37%) and tax rate (22.5%) to calculate the tax shield generated by the financial debt held. Accordingly, 2 distinct scenarios were considered. First a permanent debt scenario was considered, under which the tax shield provided by debt held on the 3Q 2023 is assumed to be constant forever, as expected this scenario yields a lower valuation at €3.63. Then, a scenario aligned with the target leverage ratio of 2.4x was applied, implying constant increases of the level of financial debt held. In turn this method yielded a share price of 4.00, below the value reached using the WACC method due to differences between the market value and book value of debt. Nonetheless, the application of the Adjusted Present Value method helps showcase how an increase in debt has a net positive effect on the value of the company through increased tax shield, amounting to a €0.37 increase over a permanent debt scenario, assuming no additional debt related costs or increased cost of debt.

Figure 104.
Financial Debt Evolution
(EUR, in billions)



[7] The scenario can be changed in the DCF Excel Tab (cell B92)

Cash Flow to Equity

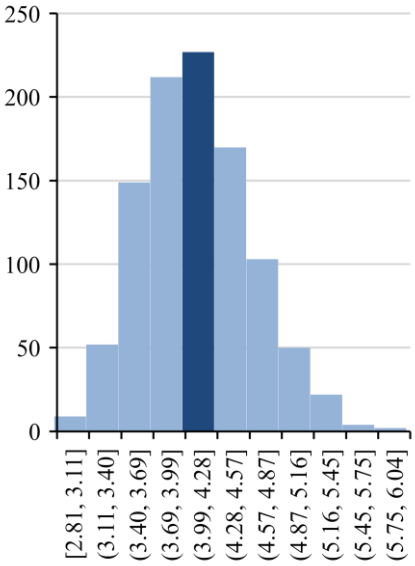
As NOS is dividend paying company, the EFCF method provides a valuable perspective into the generation of cash flow available to shareholders, and helps validate the results previously obtained. In this approach it is once again assumed that NOS will continue to increase debt in order to keep its debt levels at 2.4x EBITDA, given the expected growth in EBITDA this translates into a positive cash inflow from debt financing. Appendix 1 shows the evolution of debt over time. As expected this method yielded the same share price as the FFCF approach €4.08. It is important to note that the share price would change according to different leverage ratio targets (assuming no bankruptcy costs and a stable cost of debt).

Monte Carlo Simulation

Figure 105.
Monte Carlo Statistics

Analysis	
Max	6.04 €
Min	2.81 €
Mean	4.12 €
Std Dev	0.50 €
NOS's Share Price	**3.40 €**
BUY/HOLD	939
as a % of iterations	*93.9%*
BUY	764
as a % of iterations	*76.4%*

Figure 106.
Monte Carlo Share Prices' Distribution (nº of iterations)



To further assess the robustness of the valuation model, a Monte Carlo simulation was employed. This simulation technique is particularly valuable when dealing with uncertainties inherent in financial projections and aids in understanding the range of potential outcomes based on varying input assumptions.

By considering uncertainties in crucial parameters affecting the firm's valuation, such as the tax rate, the WACC, the terminal growth rate, and the growth of users in both bundles and mobile services, this simulation ensures a more comprehensive evaluation of the firm's value. Acknowledging that bundles and mobile services constitute the primary revenue drivers for NOS, the inclusion of these factors in the simulation aligns with the strategic focus of the valuation.

Upon generating 1,000 iterations with a standard deviation of 5% for the input variables, the Monte Carlo simulation produced a sample with a mean of 4.12€.

The results indicate a range of potential outcomes for NOS's share price, demonstrating its sensitivity to the variation in input parameters. As it can be seen on Figure 105, the wide spread between the maximum and minimum share prices underlines the significance of uncertainties in the valuation process. Moreover, the standard deviation of 0.50€ signifies the extent of

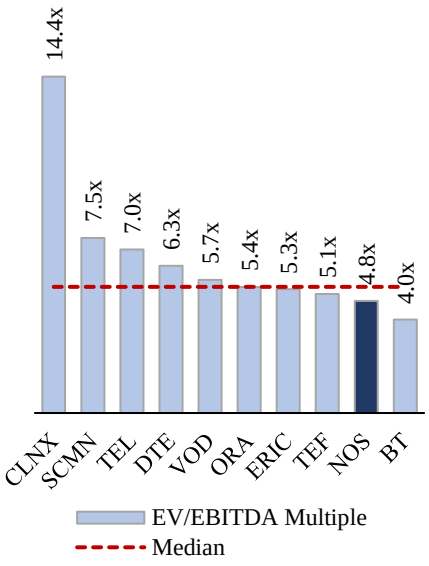
variability around the mean share price, highlighting the inherent volatility in the valuation outcome.

Figure 107.
Comparable Companies
(by Business Segment)

Name	Ticker	Country
Telco		
Cellnex Telecom	CLNX	ES
Telefonak. Ericsson	ERICB	SE
Vodafone Group	VOD	UK
Swisscom	SCMN	SW
Veon	VEON	NL
Telenor	TEL	NO
Deutsche Telekom	DTE	DE
BT Group	BT/A	UK
Telefonica	TEF	ES
Audiovisuals		
AMC Ent. Holdings	AMC	US
Cineplex Inc	CGX	CN
Kinepolis Group	KIN	BE
Cinemark Holdings	CNK	US

Source: Bloomberg

Figure 108.
EV/EBITDA Forward Looking Multiples



Source: Bloomberg

In the 1,000 iterations conducted, it is mostly important to note that approximately 76% of the total simulations projected a share price exceeding the current value by 10%. This indicates a significant upward potential in the valuation outcomes. Furthermore, over 93% of these iterations concluded with a recommendation for a BUY/HOLD decision. These findings highlight a prevalent positive trend in the simulated share prices, affirming the potential value and attractiveness of NOS shares in the simulated scenarios.

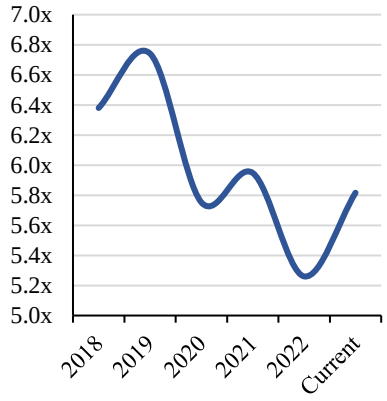
Relative Valuation: Comparable Companies

The selection of the comparable group of companies was guided by criteria such as geography (Western and Central Europe), company size (>€1B Market Cap.), business model (Fixed Line, Mobile and Other Telco Networks), and product similarity (Bundled, and individualized service offering with a focus in B2C and B2B). The list primarily features major telecom operators within the European Economic Area, with a notable focus on Spanish and other Western European markets. Recognizing the weight of the Audiovisual segment in the operations of the company (c.6-7%), a smaller peer group composed of comparable companies in the Cinema Exhibition and Distribution was considered[8]. A weighted approach was employed to achieve multiples that consider both distinct core segments.

The EV/EBITDA multiple is valuable as it provides a broad measure of a company's operational efficiency by considering earnings before certain non-operating expenses. Additionally, a historical analysis of the multiple over the last 5 years in the telecom industry reveals that it has been a consistent metric, having only decreased during the pandemic, making it a reliable valuation method. Within the specified peer segments, the EV/EBITDA multiples showcases significant variation. The telecom sector exhibits an EV/EBITDA multiple of 5.40x, while the audiovisual component displays a distinct metric at 9.70x. The audiovisual sector's higher multiple could be attributed to its strategic investments in cutting-edge content creation,

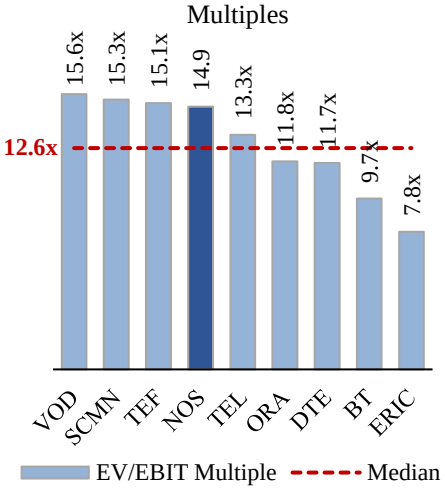
[8] Due to the small amount of publicly traded companies dedicated solely to cinema exhibition, the comparable companies may not correspond to the geographical and size criteria previously mentioned.

Figure 109.
Median Peer Group EV/EBITDA 2018-2023



Source: Bloomberg

Figure 110.
EV/EBIT Forward Looking Multiples



Source: Bloomberg

Figure 111.
P/E and EV/Sales Forward Looking Multiples

Ticker	P/E	EV/Sales
NOS.LS	11.6x	2.1x
ERIC	10.2x	0.7x
BT.A.L	6.6x	1.6x
DTE.DE	11.8x	2.5x
ORA.PA	9.7x	1.6x
TEL.OL	14.7x	3.1x
TEF.MC	11.1x	1.6x
SCMN	15.2x	3.1x
VOD.L	9.6x	1.7x
VEON	n.a.	1.1x

Source: Bloomberg

technological innovation, and successful market penetration, signifying a higher growth expectation. A segmented analysis reveals that larger markets correlate with higher valuation, for example for Swisscom and Deutsche Telekom, which trade significantly higher than the average. When applying a weighted approach, resulting in a comprehensive valuation, a median valuation of €4.39 per share is reached.

The EV/SALES multiple is valuable as it offers insights into a company's efficiency in generating revenue relative to its overall enterprise value. It provides a snapshot of market sentiment regarding a company's pricing strategies, market share dynamics, and diversification efforts. An historical analysis of the multiple over the last 5 years in the telecom industry reveals consistency, making it a reliable valuation metric. When applying a weighted approach, resulting in a comprehensive valuation, a valuation of €1.59 per share is reached. The low valuation is explained by NOS high margins, meaning that it can generate more shareholder value for each euro of revenue

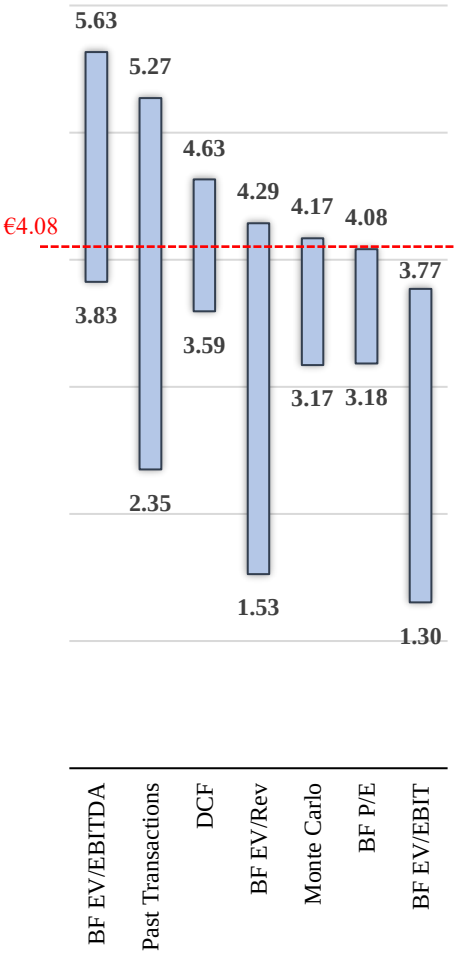
The EV/EBIT multiple is valuable as it refines the analysis by factoring in D&A, offering insights into a company operation. This metric provides the widest range of multiples, making it unreliable and of low value added.

Concluding with the P/E ratio, the segmented analysis highlights divergent market sentiments. The P/E multiples for the telecom and audiovisual components demonstrate variability, reflecting the market's expectations for future earnings potential. When applying a weighted approach, resulting in a comprehensive valuation of €3.50 per share is reached, a direct result of the low EPS growth expectation for the industry.

Relative Valuation: Comparable Transactions

To complement the public comparable data, an analysis of relevant transactions in the industry for the last 4 years was carried out using the same multiples as discussed above. Unlike in the public markets, transactions multiples clearly show a declining trend when it comes to multiple valuation, with the most pronounced being the EV/EBITDA, which gradually decreased from 10.6x in 2019 to 5.5x in 2023. According to Bain (M. Dahlke, Alex 2019), this trend can be associated with an increasing scarcity of good scale deals in the telecom industry, especially in Europe, moreover,

Figure 112.
Football Field (EUR)



increasing cost of debt with ever higher capital expenditure requirements have played a bearish role in telecom valuations. Nonetheless, this is a trend that was transversal across the entire market and NOS's peer group. Accordingly, we expect the current valuation of NOS to reflect the same market conditions.

In summary, Figure 112 provides a visualization of the range of valuation reached using multiples. The weighted valuations, floor and ceiling per share values, and the influence of company size underscore the multifaceted nature of these metrics, with higher multiples potentially reflecting strategic investments and growth prospects in the audiovisual sector. Considering the analysis made above, it should be considered that the EV/EBITDA, EV/Sales, and Past Transaction Multiples provide the best approach to the market valuation of NOS, since the provide industry consistent multiples and low variance amongst the peer group.

Football Field

When combining all valuation methods used most indicate a significant upside over the current price of €3.40, in addition, the target price of 4.08€ is supported by the range obtained in the relative valuation and past transactions approaches. Nonetheless the market sentiment is subjective to several risks and ESG practices that can significantly impact the company.

RISK ANALYSIS

Embarking on potential threats for the firm, an analysis of the risks that NOS is exposed to will be conducted, dividing them into economic, financial, and legal. Additionally, solutions to mitigate risks will be discussed.

Figure 113.
Risk 1.1

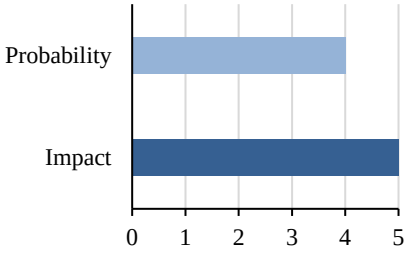
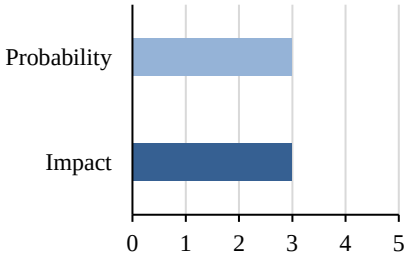


Figure 114.
Risk 1.2.



Economic Risks

1.1. Economic environment: NOS's performance might be limited by the socio-economic environment among which unemployment, strikes and demographics, and variations in economic conditions. To tackle the increasing costs, the firm, among others, renegotiated supply contracts.

1.2. Competition: New entries within the telecom industry associated with the auction for the acquisition of 5G frequencies impose challenges upon NOS's market share and its ability to attract and retain customers.

Figure 115.
Risk 1.3.

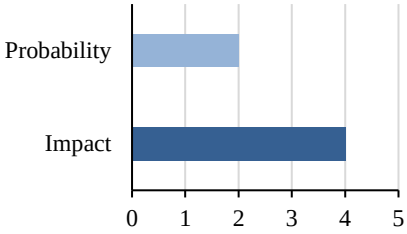


Figure 116.
Risk 1.4.

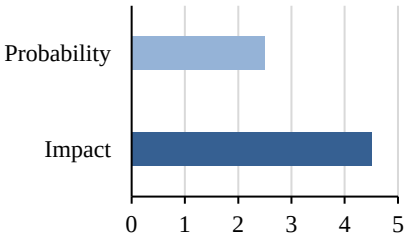


Figure 117.
Risk 1.5.

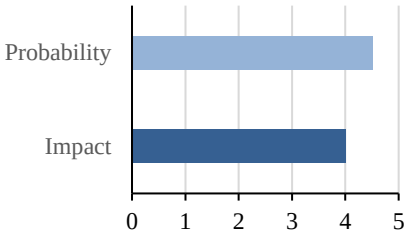


Figure 118.
Risk 1.6.

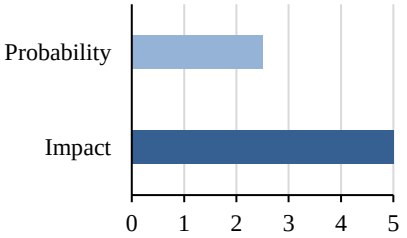
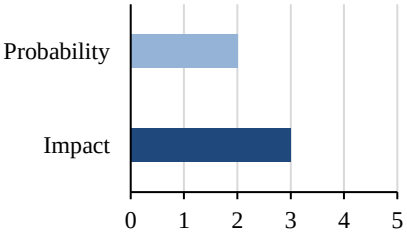


Figure 119.
Risk 1.7.



Continuously investing in innovation (e.g., NOS alarms), increased quality, and diversification of offers enables the minimization of this risk.

1.3. Talent Recruitment and Retention: Owning appropriate recruitment and retention policies is increasingly difficult given the present increased demand for technology backgrounds by firms. Thus, NOS continuously attempts to improve recruitment processes by, for instance, investing in the Talent Acquisition team. Additionally, programs such as Alfa Biz and Alfa Tech select and recruit highly skilled graduates.

1.4. Product & Service Performance: Products or services revealed to be below a customer's expectations along with possible complaints might decrease customer loyalty. To tackle this, the firm is, for instance, strengthening the capacity of mobile and fixed networks, and re-evaluating policies in communications network infrastructures.

1.5. Cybersecurity: Crucial resources such as systems and platforms may be subject to security flaws and, consequently, prone to threats as destruction, attacks, and alterations deriving from both internal and external sources. The current national and international increase of cyber-attacks endangers the information security of customers and is the origin of several interruptions in services. NOS's cybersecurity team is improving its strategy, cyber architecture and cyber capabilities as well as strengthening its policies.

1.6. Technological Innovation: Not only investment is required to achieve success but also the capability of monetizing technological advances responsible for enabling a firm to sustain competitive advantage. This creates pressure on firms and a risk that some will stay behind. NOS makes efforts to address this issue by establishing programs with the goal of ensuring long-term competitive differentiation among which NOS Hub 5H, an innovation centre aiming to strengthen firms, partners, universities, and start-ups providing the most advanced technical capabilities, teams and resources associated with 5G.

1.7. Customer/Third-Party Fraud: Fraud, either from customers or third parties, presents a common risk within the telecom industry. Fraudsters recognize and exploit potential weaknesses regarding business operations, network infrastructure or communication services. In response, NOS owns

Figure 120.
Risk 1.8.

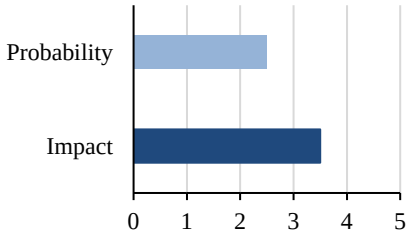


Figure 121.
Risk 2.1.

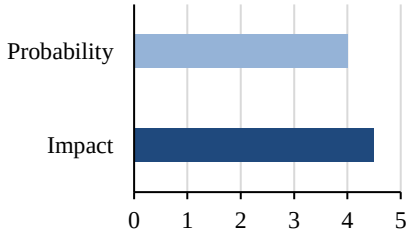


Figure 122.
Risk 2.2.

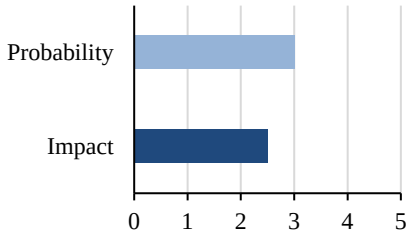


Figure 123.
Risk 2.3.

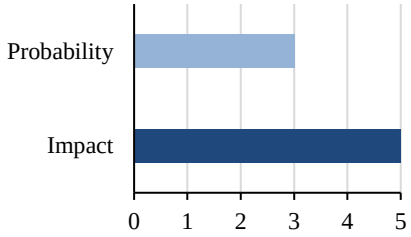
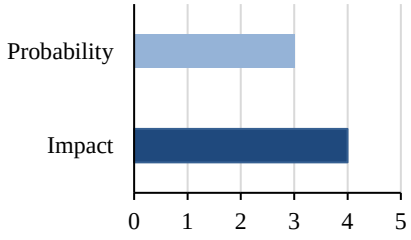


Figure 124.
Risk 3.1.



specialized teams that aim to minimize several types of fraud among which consumption, subscription, and content fraud. Fraud controls avoid fraudulent consumption and misuse of services and positively impact customer satisfaction as diminish phishing through SMS directed at NOS customers.

1.8. Environmental impacts: Operations of NOS might result in environmental threats related with, for instance, the production of waste which is currently one of the main national environmental challenges. The firm created a programme to reuse equipment previously owned by residential customers, among many other policies that aim to protect the environment as increased energy efficiency of its operations.

Financial Risks

2.1. Liquidity and interest rates: The current economic environment include a rise in interest rates along with increased uncertainty regarding financial markets and debt costs vulnerable to excessive volatility in the future constitutes a risk for the firm. Additionally, it may result in shortfalls in cash flows or their timing being imprecise and difficulties meeting financial obligations. To battle this, NOS's liquidity position was improved through refinancing operations that count with less volatile market conditions.

2.2. Credit and collections: There are a potential revenue loss deriving from ineffective collection procedures or changes in service-related legislation impacting debt recovery. NOS assesses this risk by launching a monthly plan of recovery, monitoring and validation actions, and evaluation of possible outcomes.

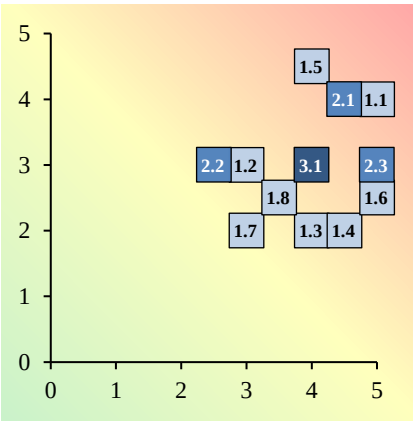
2.3. Taxation: NOS is exposed to variations in tax legislation and diverse interpretations of tax and related regulations. To tackle this, the firm presents dedicated tax teams that are responsible for monitoring all tax regulations and are challenged to optimize tax efficiency.

Legal Risks

3.1. Legal and Regulatory: Alterations in specific Portuguese or European legal and regulatory frameworks may significantly affect the activities of the firm. Thus, NOS entities are subject to potential penalties from sector-

specific regulators such as ANACOM and ERC. Legal departments of NOS face this challenge by monitoring evolving legal and regulatory landscapes.

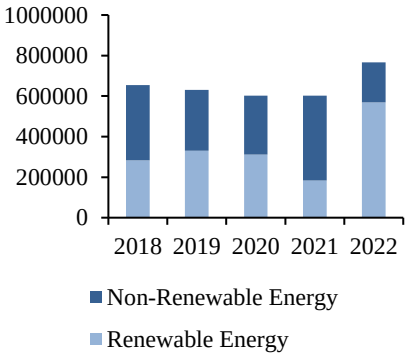
Figure 125.
Risk Heat Map



Risk Heat Map

Overall, considering the likelihood and the impact of each risk, the economic environment, cybersecurity and liquidity and interest rates constitute the main sources of risk for the firm (Figure 125). Therefore, NOS should address them by continuously investing in new solutions to mitigate its impact, such as considering investing in new revenue streams to decrease dependence in specific economic contexts, increasing frequency of regular audits, set targets for liquidity ratios that allow the firm to smooth an emergency requirement and hedging against variations in interest rate by using interest rate derivatives.

Figure 126.
Energy Consumption (in gigajoules)

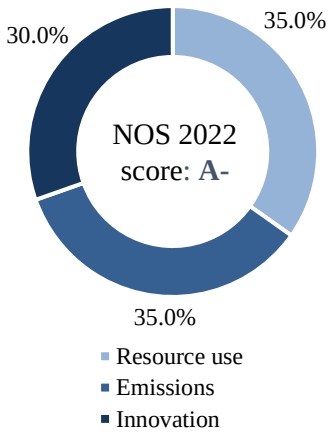


Source: Refinitiv

ESG ANALYSIS

Navigating towards an analysis concerning the environmental, social and governance (ESG) dimensions, NOS's business model includes a diligent management of its resources, evaluating every risk and opportunity involved in a decision-making process to achieve a positive impact on society. Therefore, the dimensions of ESG are incorporated into their 2021-2025 strategic plan through four sustainable strategic pillars that together aim to f tackle ESG issues. Each category of ESG will be analysed in the following paragraphs, next to Figures 127, 129 and 131 that include weights attributed to the components of each pillar to compute the respective score.

Figure 127.
Environment Pillar Refinitiv Weighs

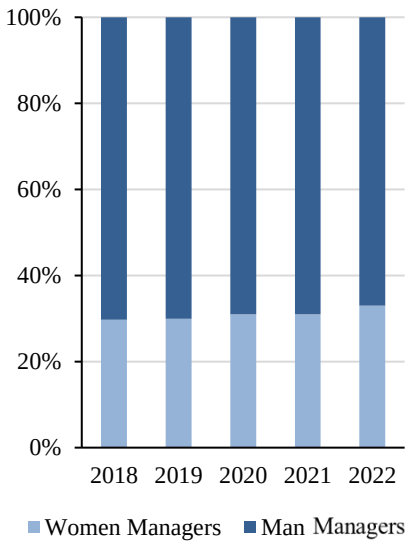


Source: Refinitiv

Environment

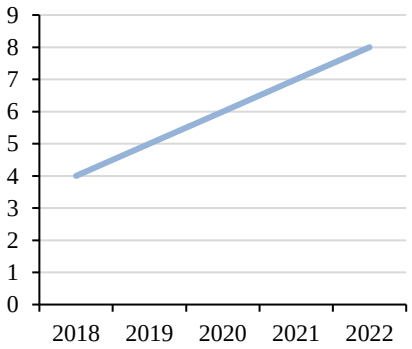
The first pillar included in the strategy of NOS is referred to as "In the name of the planet" and its goal is to fight against climate change and to incentivize circular economy. Actions related to this include using renewable energy and recycling old equipment. Since 2011, the firm started including emission reduction initiatives and climate change policies while only in 2020 did the firm began discussing consistently both risks and opportunities regarding climate change. A milestone worth mentioning took place in June of 2023, when NOS and 11 other global operators and GSMA committed to decrease e-waste, which is considered the main environmental problem that the country is facing. The main waste of the firm's activities arises from end-of-

Figure 128.
Gender distribution of managers



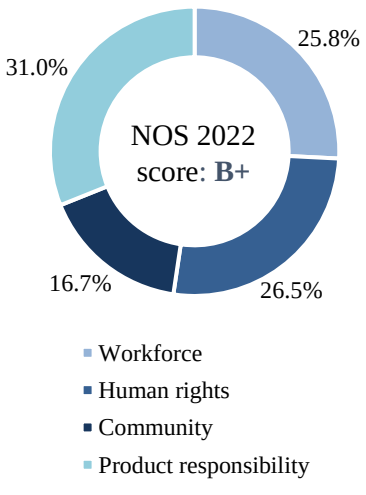
Source: Refinitiv

Figure 130.
Auditor Tenure (in years)



Source: Refinitiv

Figure 129.
Social Pillar Refinitiv Weighs



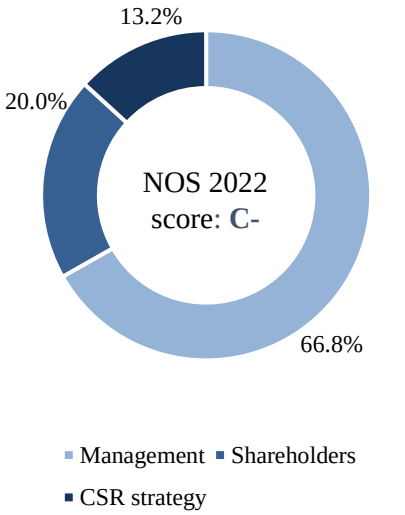
Source: Refinitiv

life electrical and electronic equipment and its packaging and batteries. Thus, a goal established to fight against it consists of collecting, by 2030, a minimum of 20% of used mobile devices through take-back schemes, as well as guaranteeing that all the received devices are either repaired, reused, or transferred to institutions responsible for recycling. Energy efficiency policies led to the vast majority of energy used being renewable. In 2022 the company achieved its highest level of total energy consumption which consisted of 765,979.2 gigajoules and total CO_2 emissions increased by approximately 12%, which is likely associated with the quick expansion of the installed capacity for the 5G network (Figure 126). The environment overall score remained stable from 2021 to 2022, being the most well-ranked category of ESG.

Social

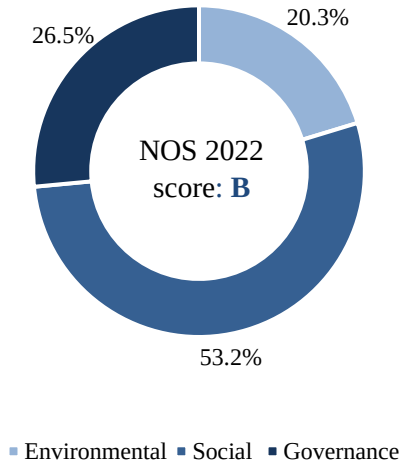
Another pillar is called "For a Digital Future" and, as the name suggests, aims to boost the digital transformation of society through democratic access to technology and inclusion of the most vulnerable groups. It proposes to generalize digital access through the expansion of network coverage and services and to promote the sustainable development of firms through their digital transformation. The third pillar, "More for our people", involves setting NOS as the best firm to work in by incentivizing equality of opportunities, inclusion, diversity, and physical equilibrium. Thus, along with the formation of an inclusive mindset and many other aspects, it redefines a well-being program aiming to promote a more sustainable and healthier lifestyle. Therefore, NOS presents several policies regarding health, safety, career development, human rights, data privacy and diversity. As presented in Figure 128, in 2022 the percentage of woman managers followed the ongoing increasing trend and achieved 33%, revealing that within this metric the efforts of the firm to promote diversity are shown in its results. In the same year, donations increased 150%, which might be related with the firm being in a comfortable financial position. As Figure 129 reveals, in 2022, the overall ESG score of the social pillar was B+.

Figure 131.
Governance Pillar Refinitiv Weighs



Source: Refinitiv

Figure 132.
Refinitiv score components



Source: Refinitiv

Governance

Finally, the fourth pillar, "Ethical and Responsible Management", intends to place NOS as an example regarding the establishment of better management practices that focus on ethics, government, management risk and continuous evaluation of the supply chain. Following this, it aims to encourage reflection on the current government model along with acting in an ethical manner that reveals accountability towards its employees, suppliers, and partners.

NOS counts with a Corporate Governance and Sustainability Committee, which is a Board Committee including non-executive Directors specialized in ESG issues. It has the responsibility of analysing business operations in matters of corporate governance, environmental sustainability, and others. As shown in Figure 130, the auditor tenure has been increasing which, although might provide auditors a better understanding of the firm, it can also impact their objectivity.

According to Figure 131, Governance is the worst-ranked pillar of ESG. The firm seems to not being exploring the full potential of already created policies related with this pillar, as there is a lot of room for improvement and the firm could, for instance, contribute to more SDGs. The investigation of Isabel dos Santos, who presents a significant stake in NOS, could potential contribute to a decline in the governance score through controversies, conflicts of interest and her impact on essential governance issues which might endanger the perception of transparency and ethical practices of the firm.

Threats & Opportunities

As recorded in Figure 132, Refinitiv attributes a B to the overall ESG score of NOS. According to another well-known rating agency, Moody's ESG Solutions, NOS accomplished the fourth-highest ESG score within European Telecoms in 2022, which consisted of 66 out of 100. Not only was there an improvement of 3 points in the final score when compared to 2021, but that improvement was in the performance of all areas evaluated – environmental, social, and governance.

NOS acknowledges risks concerning ESG issues among which are: current and emerging regulation risks, as operational costs are affected by climate

change regulation that influence energy prices; technology risks, due to the difficulty of keeping up tech trends that might compromise energy efficiency measures in operations; and reputation risks, because if the firm fails to deliver to the public its well-intended commitment concerning ESG, the negative perception affects the firm's reputation and allows for market loss, a decrease in interest of investors and of brand value. Nonetheless, there are also associated opportunities. Indeed, with the increasing energy needs of NOS, the firm must continue investing in green energy sources in order to benefit from the establishment of energy management programmes to raise energy efficiency enabling to reduce operating costs. Additionally, the rise in interest regarding carbon reduction solutions allows to strengthen NOS's low carbon P&S portfolio and use this new potential market to increase revenues.

The strong position in Moody's ranking along with the actions that NOS has undertaken so far and plans to perform in the future, reveal a possible source of competitive advantage as it attracts customers who are increasingly aware and concerned about sustainability and ethical business practices, and for the already existing customers, it might even strengthen customer loyalty. Additionally, it can contribute to risk mitigation as focusing on areas such as cybersecurity can prevent possible network outages and distinguish them from competitors who are more vulnerable to cyberattacks (e.g., Vodafone cyberattack February 2022). Nonetheless, as competitors are also aware of the benefits associated with focusing on ESG issues, it is of extreme importance to continue to innovate within this area.

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Appendix

Appendix 1.

Forecasted Balance Sheet (EUR, in millions)

ASSETS	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
NON - CURRENT ASSETS:												
Tangible assets	1,107.1	1,098.3	1,105.6	1,123.0	1,145.2	1,160.0	1,138.8	1,255.6	1,354.9	1,351.7	1,360.1	1,377.2
Investment property	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Intangible assets	1,209.6	1,209.1	1,209.1	1,209.1	1,209.1	1,209.1	1,209.1	1,209.1	1,209.1	1,209.1	1,209.1	1,209.1
Contract costs	160.6	159.0	159.0	159.0	159.0	159.0	159.0	159.0	159.0	159.0	159.0	159.0
Rights of use	297.7	309.6	309.6	309.6	309.6	309.6	309.6	309.6	309.6	309.6	309.6	309.6
Jointly controlled companies	39.0	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2
Tax receivable	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other financial assets non-current	5.2	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Deferred income tax assets	89.6	92.0	92.0	92.0	92.0	92.0	92.0	92.0	92.0	92.0	92.0	92.0
Derivative financial instruments	11.2	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8
TOTAL NON - CURRENT ASSETS	**2,920.8**	**2,916.5**	**2,923.8**	**2,941.2**	**2,963.4**	**2,978.2**	**2,957.0**	**3,073.7**	**3,173.1**	**3,169.9**	**3,178.2**	**3,195.4**
CURRENT ASSETS:												
Inventories	67.2	63.2	65.4	67.5	69.2	70.6	71.8	73.1	75.8	78.3	80.6	82.4
Accounts receivable - trade	362.2	358.6	371.3	382.9	392.7	400.7	408.1	415.2	430.5	445.1	457.9	468.5
Contract assets	60.1	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0
Tax receivable	6.9	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8
Prepaid expenses	52.2	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4
Derivative financial instruments	-	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Cash and cash equivalents	15.2	43.4	124.0	248.9	330.8	386.1	466.9	415.5	430.9	577.0	698.0	788.8
TOTAL CURRENT ASSETS	**563.9**	**587.6**	**683.1**	**821.7**	**915.1**	**979.7**	**1,069.2**	**1,026.1**	**1,059.5**	**1,222.9**	**1,358.9**	**1,462.1**
TOTAL ASSETS	**3,484.7**	**3,504.1**	**3,606.9**	**3,762.9**	**3,878.5**	**3,957.9**	**4,026.2**	**4,099.9**	**4,232.6**	**4,392.8**	**4,537.2**	**4,657.5**
SHAREHOLDER'S EQUITY												
Share capital	855.2	855.2	855.2	855.2	855.2	855.2	855.2	855.2	855.2	855.2	855.2	855.2
Capital issued premium	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Own shares	- 16.0	- 15.1	- 15.1	- 15.1	- 15.1	- 15.1	- 15.1	- 15.1	- 15.1	- 15.1	- 15.1	- 15.1
Legal reserve	1.0	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Other reserves and accumulated earnings	- 22.9	90.9	217.0	291.2	331.7	366.5	390.4	409.7	460.5	512.7	560.1	600.8
Net Income	224.6	18.6	23.7	27.7	29.3	23.0	23.3	30.5	26.3	32.0	36.9	39.9
Non-controlling interests	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
TOTAL EQUITY	**1,052.3**	**964.5**	**1,095.8**	**1,173.9**	**1,216.0**	**1,244.5**	**1,268.7**	**1,295.2**	**1,341.8**	**1,399.7**	**1,452.0**	**1,495.8**
LIABILITIES												
NON - CURRENT LIABILITIES:												
Borrowings	1,210.2	1,547.0	1,505.3	1,570.9	1,634.0	1,676.7	1,713.1	1,752.8	1,822.7	1,909.5	1,988.1	2,053.6
Provisions	81.3	83.4	83.4	83.4	83.4	83.4	83.4	83.4	83.4	83.4	83.4	83.4
Deferred income	2.8	-	-	-	-	-	-	-	-	-	-	-
Deferred income tax liabilities	50.1	50.8	50.8	50.8	50.8	50.8	50.8	50.8	50.8	50.8	50.8	50.8
TOTAL NON - CURRENT	**1,344.4**	**1,681.3**	**1,639.5**	**1,705.1**	**1,768.2**	**1,810.9**	**1,847.3**	**1,887.0**	**1,956.9**	**2,043.8**	**2,122.3**	**2,187.8**
CURRENT LIABILITIES:												
Borrowings	427.5	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
Accounts payable - trade	541.1	379.3	392.7	404.9	415.2	423.5	431.3	438.6	454.9	470.3	483.9	494.9
Tax payable	38.8	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Accrued expenses	212.4	222.3	222.3	222.3	222.3	222.3	222.3	222.3	222.3	222.3	222.3	222.3
Deferred income	38.2	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5
Derivative financial instruments	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL CURRENT LIABILITIES	**1,258.4**	**858.3**	**871.6**	**883.9**	**894.2**	**902.5**	**910.2**	**917.6**	**933.8**	**949.3**	**962.9**	**973.9**
TOTAL LIABILITIES	**2,602.8**	**2,539.6**	**2,511.1**	**2,589.0**	**2,662.4**	**2,713.4**	**2,757.5**	**2,804.6**	**2,890.8**	**2,993.1**	**3,085.1**	**3,161.7**
TOTAL LIABILITIES AND SHAREHOLDER'S EQUITY	**3,484.7**	**3,504.1**	**3,606.9**	**3,762.9**	**3,878.5**	**3,957.9**	**4,026.2**	**4,099.9**	**4,232.6**	**4,392.8**	**4,537.2**	**4,657.5**

Appendix 2.

Forecasted Free Cash Flow Map (EUR, in millions)

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Revenues												
Telco												
Bundles	757.3	802.4	820.3	848.2	871.6	889.3	903.0	915.6	941.6	974.7	1,003.3	1,025.5
Mobile	354.8	376.0	386.5	403.5	419.1	432.3	443.9	455.0	472.5	493.8	513.6	530.8
Fixed Voice	47.5	42.2	40.6	39.2	37.8	36.7	36.6	36.7	36.7	36.8	36.8	36.9
Fixed Broadband	42.6	44.4	45.7	47.9	50.0	52.2	54.4	56.8	59.2	61.8	64.5	67.3
Pay TV	74.6	77.2	76.6	75.4	74.2	73.0	71.8	70.7	69.5	68.4	67.3	66.2
Other Services	4.7	7.4	8.7	9.0	9.3	9.5	9.6	9.8	10.1	10.4	10.7	11.0
Equipment & Sales	115.8	98.9	100.6	103.8	106.6	108.8	110.8	112.6	116.0	120.1	123.7	126.7
Other Sales	29.2	27.9	26.4	27.3	28.0	28.6	29.1	29.6	30.5	31.5	32.5	33.3
Telco Revenues	**1,426.5**	**1,476.4**	**1,505.5**	**1,554.4**	**1,596.6**	**1,630.4**	**1,659.2**	**1,686.7**	**1,736.1**	**1,797.5**	**1,852.4**	**1,897.6**
YoY Growth %	*5.1%*	*3.5%*	*2.0%*	*3.2%*	*2.7%*	*2.1%*	*1.8%*	*1.7%*	*2.9%*	*3.5%*	*3.1%*	*2.4%*
Audiovisuals												
Cinema Exhibitions	35.5	48.0	37.4	39.2	41.0	42.9	44.9	47.0	49.2	51.5	53.9	56.3
Advertising	19.9	22.5	23.7	24.7	25.5	26.2	27.0	27.8	28.6	29.5	30.4	31.3
Content & TV Channels	25.8	24.0	26.0	26.7	27.1	27.1	27.1	27.2	27.2	27.2	27.3	27.3
Bar sales and DVDs	12.3	16.5	11.9	12.5	13.1	13.7	14.3	15.0	15.7	16.4	17.1	17.9
Other	1.1	1.0	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1
Audiovissuals Revenues	**94.5**	**112.1**	**100.0**	**104.0**	**107.6**	**110.9**	**114.3**	**117.9**	**121.7**	**125.6**	**129.7**	**134.0**
YoY Growth %	*29.7%*	*18.6%*	*-10.7%*	*3.9%*	*3.5%*	*3.1%*	*3.1%*	*3.2%*	*3.2%*	*3.2%*	*3.3%*	*3.3%*
Total Revenue	1,521.0	1,588.4	1,605.5	1,658.3	1,704.2	1,741.3	1,773.5	1,804.6	1,857.8	1,923.1	1,982.2	2,031.6
YoY Growth %	*6.3%*	*4.4%*	*1.1%*	*3.3%*	*2.8%*	*2.2%*	*1.9%*	*1.8%*	*2.9%*	*3.5%*	*3.1%*	*2.5%*
Costs												
Wages and salaries	(85.9)	(92.3)	(96.4)	(99.3)	(101.9)	(104.5)	(107.0)	(107.5)	(107.5)	(107.4)	(107.4)	(107.4)
Direct costs	(345.0)	(357.0)	(396.9)	(409.9)	(421.2)	(430.3)	(438.2)	(445.9)	(459.0)	(475.1)	(489.7)	(501.9)
Costs of products sold	(114.6)	(96.5)	(95.5)	(98.6)	(101.3)	(103.5)	(105.5)	(107.3)	(110.6)	(114.5)	(118.0)	(121.0)
Marketing and advertising	(34.7)	(38.0)	(39.6)	(39.7)	(37.2)	(38.0)	(38.7)	(39.4)	(40.7)	(42.1)	(43.4)	(44.4)
Support services	(83.5)	(93.5)	(94.1)	(94.6)	(95.2)	(95.8)	(96.4)	(97.1)	(97.7)	(98.4)	(99.1)	(99.8)
External Services	(155.2)	(144.4)	(136.4)	(140.9)	(144.8)	(147.9)	(150.6)	(153.3)	(157.8)	(163.3)	(168.4)	(172.5)
Other operating losses	(0.8)	(0.9)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)
Indirect Taxes	(35.0)	(36.1)	(36.9)	(38.1)	(39.2)	(40.0)	(40.7)	(41.4)	(42.6)	(44.1)	(45.5)	(46.6)
Provisions	(15.2)	(18.0)	(17.1)	(17.7)	(18.1)	(18.5)	(18.8)	(19.1)	(19.7)	(20.4)	(21.0)	(21.5)
Total Costs	(869.9)	(876.6)	(913.6)	(939.6)	(959.7)	(979.3)	(996.8)	(1,011.6)	(1,036.2)	(1,066.1)	(1,093.2)	(1,115.8)
EBITDA	651.1	711.8	691.9	718.7	744.5	761.9	776.8	793.0	821.5	857.0	889.0	915.8
% of Total Revenues	*42.8%*	*44.8%*	*43.1%*	*43.3%*	*43.7%*	*43.8%*	*43.8%*	*43.9%*	*44.2%*	*44.6%*	*44.8%*	*45.1%*
D&A Expenses	(480.9)	(468.7)	(461.7)	(466.6)	(474.9)	(492.9)	(537.9)	(501.9)	(548.8)	(568.0)	(567.8)	(573.0)
EBIT	257.1	246.5	229.7	251.6	269.1	268.6	238.3	290.6	272.2	288.5	320.7	342.2
Income Tax	(32.7)	(15.3)	(37.0)	(40.5)	(43.3)	(43.2)	(38.3)	(46.7)	(43.8)	(46.4)	(51.6)	(55.1)
EBIAT	224.4	231.3	192.8	211.1	225.8	225.3	200.0	243.8	228.4	242.1	269.1	287.2
(-) Capital Expenditures	(625.8)	(476.0)	(469.0)	(484.1)	(497.1)	(507.6)	(516.7)	(618.6)	(648.2)	(564.8)	(576.2)	(590.1)
(-) Change in NWC	20.7	(16.3)	1.5	1.4	1.2	1.0	1.0	1.0	1.8	1.7	1.6	1.3
(+) D&A Expenses	(480.9)	(468.7)	(461.7)	(466.6)	(474.9)	(492.9)	(537.9)	(501.9)	(548.8)	(568.0)	(567.8)	(573.0)
Free Cash Flow	58.9	240.3	184.0	192.2	202.4	209.6	220.2	126.1	127.3	243.5	259.2	268.7
% of Total Revenues	*3.9%*	*15.1%*	*11.5%*	*11.6%*	*11.9%*	*12.0%*	*12.4%*	*7.0%*	*6.8%*	*12.7%*	*13.1%*	*13.2%*

Appendix 3.

Forecasted Free Cash Flow Map (EUR, in millions)

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Telco	473.04	368.96	362.18	373.93	384.09	392.22	399.15	477.90	525.21	437.86	445.64	456.50
% of Total CAPEX	*95.4%*	*94.9%*	*93.9%*	*93.9%*	*94.0%*	*94.0%*	*94.0%*	*94.8%*	*95.2%*	*94.2%*	*94.1%*	*94.2%*
Technical	325.14	229.96	234.21	241.81	248.38	253.64	258.12	334.53	377.65	285.07	288.18	295.20
Baseline	161.26	143.21	147.53	152.32	156.46	159.77	162.59	165.29	170.13	176.14	181.53	185.95
Network Expansion	163.88	86.75	86.68	89.49	91.92	93.87	95.53	169.24	207.52	108.93	106.65	109.25
Customer Related	147.91	139.00	127.97	132.12	135.71	138.58	141.03	143.37	147.56	152.78	157.46	161.29
Audiovisuals	22.89	19.87	23.53	24.13	24.61	25.10	25.60	26.11	26.63	27.17	27.71	28.26
% of Total CAPEX	*4.6%*	*5.1%*	*6.1%*	*6.1%*	*6.0%*	*6.0%*	*6.0%*	*5.2%*	*4.8%*	*5.8%*	*5.9%*	*5.8%*
Leasing Contracts	129.88	87.13	83.27	86.01	88.38	90.31	91.98	114.64	96.35	99.74	102.80	105.37
Spectrum licenses	-	-	-	-	-	-	-	-	-	-	-	-
Total Group CAPEX	**625.81**	**475.97**	**468.97**	**484.06**	**497.08**	**507.63**	**516.73**	**618.65**	**648.20**	**564.76**	**576.15**	**590.13**

Appendix 4.

Forecasted Income Statement (EUR, in millions)

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Revenues												
Telco												
Bundles	757.3	802.4	820.3	848.2	871.6	889.3	903.0	915.6	941.6	974.7	1,003.3	1,025.5
Mobile	354.8	376.0	386.5	403.5	419.1	432.3	443.9	455.0	472.5	493.8	513.6	530.8
Fixed Voice	47.5	42.2	40.6	39.2	37.8	36.7	36.6	36.7	36.7	36.8	36.8	36.9
Fixed Broadband	42.6	44.4	45.7	47.9	50.0	52.2	54.4	56.8	59.2	61.8	64.5	67.3
Pay TV	74.6	77.2	76.6	75.4	74.2	73.0	71.8	70.7	69.5	68.4	67.3	66.2
Other Services	4.7	7.4	8.7	9.0	9.3	9.5	9.6	9.8	10.1	10.4	10.7	11.0
Equipment & Sales	115.8	98.9	100.6	103.8	106.6	108.8	110.8	112.6	116.0	120.1	123.7	126.7
Other Sales	29.2	27.9	26.4	27.3	28.0	28.6	29.1	29.6	30.5	31.5	32.5	33.3
Telco Revenues	**1,426.5**	**1,476.4**	**1,505.5**	**1,554.4**	**1,596.6**	**1,630.4**	**1,659.2**	**1,686.7**	**1,736.1**	**1,797.5**	**1,852.4**	**1,897.6**
YoY Growth %	*5.1%*	*3.5%*	*2.0%*	*3.2%*	*2.7%*	*2.1%*	*1.8%*	*1.7%*	*2.9%*	*3.5%*	*3.1%*	*2.4%*
Audiovisuals												
Cinema Exhibitions	35.5	48.0	37.4	39.2	41.0	42.9	44.9	47.0	49.2	51.5	53.9	56.3
Advertising	19.9	22.5	23.7	24.7	25.5	26.2	27.0	27.8	28.6	29.5	30.4	31.3
Content & TV Channels	25.8	24.0	26.0	26.7	27.1	27.1	27.1	27.2	27.2	27.2	27.3	27.3
Bar sales and DVDs	12.3	16.5	11.9	12.5	13.1	13.7	14.3	15.0	15.7	16.4	17.1	17.9
Other	1.1	1.0	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1
Audiovissuals Revenues	**94.5**	**112.1**	**100.0**	**104.0**	**107.6**	**110.9**	**114.3**	**117.9**	**121.7**	**125.6**	**129.7**	**134.0**
YoY Growth %	*29.7%*	*18.6%*	*-10.7%*	*3.9%*	*3.5%*	*3.1%*	*3.1%*	*3.2%*	*3.2%*	*3.2%*	*3.3%*	*3.3%*
Total Revenue	1,521.0	1,588.4	1,605.5	1,658.3	1,704.2	1,741.3	1,773.5	1,804.6	1,857.8	1,923.1	1,982.2	2,031.6
YoY Growth %	*6.3%*	*4.4%*	*1.1%*	*3.3%*	*2.8%*	*2.2%*	*1.9%*	*1.8%*	*2.9%*	*3.5%*	*3.1%*	*2.5%*
Costs												
Wages and salaries	(85.9)	(92.3)	(96.4)	(99.3)	(101.9)	(104.5)	(107.0)	(107.5)	(107.5)	(107.4)	(107.4)	(107.4)
Direct costs	(345.0)	(357.0)	(396.9)	(409.9)	(421.2)	(430.3)	(438.2)	(445.9)	(459.0)	(475.1)	(489.7)	(501.9)
Costs of products sold	(114.6)	(96.5)	(95.5)	(98.6)	(101.3)	(103.5)	(105.5)	(107.3)	(110.6)	(114.5)	(118.0)	(121.0)
Marketing and advertising	(34.7)	(38.0)	(39.6)	(39.7)	(37.2)	(38.0)	(38.7)	(39.4)	(40.7)	(42.1)	(43.4)	(44.4)
Support services	(83.5)	(93.5)	(94.1)	(94.6)	(95.2)	(95.8)	(96.4)	(97.1)	(97.7)	(98.4)	(99.1)	(99.8)
External Services	(155.2)	(144.4)	(136.4)	(140.9)	(144.8)	(147.9)	(150.6)	(153.3)	(157.8)	(163.3)	(168.4)	(172.5)
Other operating losses	(0.8)	(0.9)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)
Indirect Taxes	(35.0)	(36.1)	(36.9)	(38.1)	(39.2)	(40.0)	(40.7)	(41.4)	(42.6)	(44.1)	(45.5)	(46.6)
Provisions	(15.2)	(18.0)	(17.1)	(17.7)	(18.1)	(18.5)	(18.8)	(19.1)	(19.7)	(20.4)	(21.0)	(21.5)
Total Costs	(869.9)	(876.6)	(913.6)	(939.6)	(959.7)	(979.3)	(996.8)	(1,011.6)	(1,036.2)	(1,066.1)	(1,093.2)	(1,115.8)
EBITDA	651.1	711.8	691.9	718.7	744.5	761.9	776.8	793.0	821.5	857.0	889.0	915.8
% of Total Revenues	*42.8%*	*44.8%*	*43.1%*	*43.3%*	*43.7%*	*43.8%*	*43.8%*	*43.9%*	*44.2%*	*44.6%*	*44.8%*	*45.1%*
D&A Expenses	(480.9)	(468.7)	(461.7)	(466.6)	(474.9)	(492.9)	(537.9)	(501.9)	(548.8)	(568.0)	(567.8)	(573.0)
EBIT	257.1	246.5	229.7	251.6	269.1	268.6	238.3	290.6	272.2	288.5	320.7	342.2
Interest Expenses	(31.58)	(64.3)	(73.3)	(74.6)	(77.5)	(79.6)	(81.2)	(82.9)	(85.2)	(88.9)	(92.4)	(95.4)
Income Tax	(32.7)	(47.4)	(25.2)	(28.5)	(30.8)	(30.4)	(25.3)	(33.4)	(30.1)	(32.1)	(36.7)	(39.7)
Net Income		**182.3**	131.2	148.5	160.8	158.6	131.8	174.3	156.9	167.5	191.6	207.1

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Buy	Expected total return (including expected capital gains and expected dividend yield) of more than 10% over a 12-month period.
Hold	Expected total return (including expected capital gains and expected dividend yield) between 0% and 10% over a 12-month period.
Sell	Expected negative total return (including expected capital gains and expected dividend yield) over a 12-month period.

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Introduction

The telecommunications sector has undergone significant changes. In recent years, some firms in this domain began embracing technology-driven solutions and introducing innovative services, such as edge computing and smart home integration. This has led to a shift as traditional telecommunication companies (telcos) are evolving into technology companies (techcos). Operators like Orange and Telefónica constitute examples of firms that embarked on this transformation (STL Partners 2023a).

This paper will focus on understanding the impact of this trend on NOS. In an attempt to answer, an analysis will be conducted to understand why and how the environment in the telecommunications sector is changing, along with eventual signs that NOS is transitioning and the forecasted outcome in its results.

Dynamics of telcos and techcos

Before diving into the reasons behind the appearance of this trend, it is relevant to distinguish between the mentioned telcos and techcos. Telcos generally provide elementary connectivity solutions like voice, video, and data. Techcos deliver more holistic and complete solutions that allow them to give additional value to their customers and succeed in the increasingly digital era. This is shown in Graph 1, given the better performance in profitability return ratios of the European Technology index compared to the European Telecommunication index (Bloomberg).

Even though the essence of techcos that evolved from telcos remains rooted in connectivity, they additionally deliver advanced services such as artificial intelligence (AI), augmented reality (AR) and automation (Cloud Sense 2023).

Transformation drivers

Embarking on the forces driving the transition of telcos into techcos, one could mention that investors are willing to pay a premium for techcos compared to telcos. As represented in Graph 2, the European Tech Index presents a higher price-to-earnings ratio than the European Telecom Index (Bloomberg), possibly due to high expectations concerning future earnings growth in the tech sector. Despite the importance of Telecommunications for society, digital disruption translates into an inability of this sector to match its influence on its financial rewards. In fact, due to digitalisation, consumers perceive telcos as firms that provide utility services, such as electricity, and not as firms responsible for delivering premium services. (Deloitte 2023).

Additionally, techcos are considered more strategically agile, as they can make changes quicker than telcos. This is due to several factors, among which their usual horizontal structure, permitting quick decision-making, and their culture of innovation that encourages employees to take risks (STL Partners 2023b). Moreover, cloud-native processes pave the way for system-level automation, ultimately enhancing speed. This, in turn, enables firms to become increasingly efficient and reliable (Bamforth 2023). Telcos that navigate the wave of digitalisation interpret speed as a KPI and thus are 2.3 times more likely to provide agile services (KPMG 2023).

Another reason that explains the desire of telcos for transformation is that doing so potentially improves customer retention. B2B customers prefer to purchase comprehensive solutions to their problems instead of handling separate components from different suppliers. Therefore, to retain these customers in the rising competitive environment, the goal of telcos should be to provide tailored integrated solutions (Ward 2023). Additionally, consumers increasingly demand high-quality, flexible, and user-friendly services. Highlighting this, a study among German customers revealed that 82% consider connectivity stability the foremost requirement

for their broadband service. Still, performance differentiation can be challenging for telcos, given that, in most developed markets, network quality does not tend to exhibit significant differences (Deloitte 2023). Moreover, consumers require more transparency concerning billing. All of these requirements become more easily manageable through the transition from telco to techco as it entails cultivating a network of partners, which facilitates providing diverse services, co-creating solutions to the mentioned concerns (e.g., billing), fostering intimate customer engagements and thus delivering more tailored solutions, improving business-side innovation and, ultimately, evolving into an organisation more agile than a regular telco. Transformative telcos are 2.1 times more likely to deliver intentional experiences to their customers (KPMG 2023).

Transitioning into a techco could additionally result in more easily attracting talent. In recent years, the digital disruption has made telcos perceived as less appealing. Given the choice, people prefer to work in firms responsible for innovating. Traditional telcos stopped being inserted into that category (Hatem Dowidar, 2022). Firms that shift from a telco into a techco might attract a pool of talent looking forward to being part of a cutting-edge field, as the tech sector is more associated with driving changes and creating a higher impact in society, which can ultimately result in more growth opportunities for employees (KPMG 2023).

Additionally, AI and automation streamline processes and minimise manual intervention requirements. There is an opportunity for firms to use AI to reduce their wage costs by, for instance, automating customer support through chatbots (Quintino 2019). This decreases the requirement for big customer support teams and might culminate in significant cost savings on wages as costs per employee are rising. Highlighting the lower dependency on employees, the telco's worldwide headcount equalled 5.18 million in 1Q of 2014 and decreased to 4.55 million in 1Q of 2023 (Menon 2023).

Shifting to virtual networks and cloud-based services empowers a more efficient allocation of resources, as they allow for flexible and scalable infrastructure management, possibly reducing costs such as overprovisioning expenses and capex. Indeed, virtualisation decreases the dependence on physical hardware, catalysing resources to adapt dynamically to changing needs through on-demand access to computing resources in cloud-based services (Arogundade and Palla 2023).

Thus, transforming into tech firms enables telcos to leverage technology to automate processes, boost efficiency, and reallocate resources toward innovation, contributing to shrinking costs.

Nonetheless, in a survey conducted in 2023 to telcos in the EMEA region to understand how they planned on improving profitability by transitioning to techcos, only 7% answered "decreasing costs", while 93% considered "increasing revenues" (STL Partners 2023b). This suggests that improving revenues is a more common motive for the transformation.

Working in the telecommunication market requires an understanding that revenue growth can be constrained by regulatory actions (e.g. block of mergers) and that revenue streams suffer changes over time. Showcasing the latter fact, Graph 3 demonstrates that the usage of fixed-line phones in Portugal has been decreasing (ANACOM 2023), emphasising that services that were once among the principal sources of revenue can negatively evolve, demanding firms to adapt and explore new revenue streams. Moreover, research reveals that telcos are under pressure to generate a return on invested capital (ROIC) that surpasses the weighted average cost of capital. (WACC). Indeed, in 2022, WACC for European telcos outweighed ROIC. (Deloitte 2023), suggesting no value creation. Thus, telcos must create strategies to increase the portion of the revenue they generate by data flowing through their networks to sustain required investments in infrastructure, as digital disruptors are currently able to reach a higher percentage. Illustrating this, revenue per employee in 2021 of firms included in European

Telecommunication Network Operators (ETNO) amounted to 0.46 million euros, while Netflix, a techco, achieved a value of 2.33 million for the same ratio (ETNO 2023). Several European telcos, like Telefónica and Deutsche Telekom, revealed their dissatisfaction by encouraging EU regulators to mandate Big Tech to remit a "fair" contribution for taking advantage of their networks (Mersinoglu and Espinoza 2023).

The transformation of the telecom sector enables firms to explore new sources of revenues, as transitioning into a solutions provider allows telcos to leverage the strengths of digital disruptors. Rising competition among telcos is another reason why additional revenue streams are required. An increased number of firms entering the market provides more options for customers. Cloud computing and IoT represent possible new income streams for operators. Graph 4 showcases the positive trend in the forecasted number of IoT-connected devices in Portugal, suggesting a valuable new revenue stream for telcos.

Finally, shrinking ESG risk might also justify the attractiveness of techcos. In 2022, the ESG risk score of these firms was 22.5 points, while telcos presented a value of 26.1. Even though firms in both sectors fall under the category of a medium score, techcos had fewer units of unmanageable ESG risk (Morningstar Sustainalytics 2023). This supports the belief that technology is expected to be part of the transition towards a greener economy (Dowidar 2022).

Challenges in the transition

Evolving into a techco also entails challenges that must be addressed to minimise risks. First, transitioning from a rigid control culture to one that embraces flexibility can be difficult. Evidencing this, a study disclosed that willingness to support enterprise change decreased from 74% in 2016 to 43% by 2022 (Morain and Aykens 2023). Many organisations struggle to embrace more agile methodologies due to resistance to change, a reduced integration between

development and operations, and hierarchical processes. Additionally, telco failures regarding IT transformations increase risk aversion in operators, challenging innovation. Finally, the absence of clearly articulated transformation goals at the top-level executives hampers the smooth integration of the transition throughout other levels of the organisation.

Furthermore, shifting towards a techco requires sophisticated IT skills, which might be out of supply or above the telco's budget. As most telcos were used to outsourcing IT, developing software is unexplored ground for them. Although, as previously mentioned, it is expected that the transformation of telcos will increase talent acquisition, the issue regards having the technical capabilities to perform the transformation. For that, telcos will need to ensure their potential employees that they are committed to innovating and that there are significant growth opportunities. Indeed, telcos are competing for talent with tech firms that are typically perceived to be linked towards innovation. Still, as techcos decrease the number of required employees due to automation, telcos might more easily recruit digital talent. (Crawshaw 2022).

The advanced state of existing techcos challenges the transformation of telcos, given, for instance, the difficulty associated with meeting customer expectations and establishing a competitive market position in the tech sector. To tackle this, several telcos are partnering with hyperscalers, as seen in Table 1 (Ali 2020), to leverage their advanced cloud infrastructure, enhance network capabilities and quicken the launch of innovative products/services.

Finally, several telcos grew through acquisitions, resulting in operations with siloed IT structures and duplicated applications through business lines and countries. These legacy systems are costly to maintain, and the required changes can also be expensive. Additionally, transforming a complex structure into an agile system is demanding (Crawshaw 2022).

Despite the several challenges regarding the transformation towards techco, the ongoing trend of transitions suggests that the motives outweigh the obstacles.

Indicators of the transformation

Certain strategic moves might signal that a telco is under a transformation process. Perhaps the most obvious is if a telco offering services goes beyond the ones traditionally provided in the communication sector. Several firms that assumed being in a transformation process launched digital services, such as IoT solutions and cloud services. It is important to note that the investment in 5G by itself does not necessarily imply the firm is evolving into a techco, as that can remain integral to the core business of connectivity. Still, while 5G might be aligned with the core business of a telco, firms ambitioning to turn into techcos may strategically invest in higher frequencies within the 5G spectrum to unlock advanced technological services. Shifting into a techco requires development in both network and non-network capabilities (STL Partners 2023a).

Moreover, telcos tend to allocate more money in capital expenditures (CAPEX), linked to their spending on networks, and less in operational expenditure (OPEX) in domains such as novel service creation. Both telcos and techcos spend approximately 10-20% of revenues on CAPEX. However, as techcos operate under a higher degree of automation, more resources can be allocated towards R&D (Bamforth 2023). Telcos invest less than 3% of revenues in R&D OPEX, while techcos spend around 10-25% (Warren 2022). To succeed, telcos should spend more on OPEX. This does not only mean they should invest in cloud and software development, even though that provides them agility in the long run. They should also devote more to service development OPEX, to generate new products/services and possibly gain a competitive advantage. Overall, if a telco starts spending more on OPEX, particularly in new service development, that might mean the firm is evolving into a techco.

Even though acquisitions are frequent in the telecommunication sector, a telco focused on doing partnerships or acquiring firms related to technology is possibly searching for tools, such as talent/skills, to transition to techcos. Indeed, the transformation involves changing the business framework from vertical integration to an open ecosystem, as that generates new opportunities (Boasman-Patel and Smyth 2021).

Telcos increasing their investments in technologies that allow for a better understanding of customer needs represents another indicator of a shift towards techco, as techcos are considered to operate through a more customer-centric approach. Additionally, telcos in transformation are working to improve customer engagement through digital channels (Boasman-Patel and Smyth 2022).

Finally, a telco evolving its culture towards one that encourages its employees to embrace innovation and to be less risk-averse might ambition to transition into a techco. This cultural shift can be seen through, for instance, policies launched by the firm. Indeed, improving employee empowerment by encouraging employees to share their views in relevant decisions for the firm contributes to creating a more flexible culture (Singh 2019).

Indicators that NOS is transitioning

After analysing signs that a telco might be transitioning into a techco, it is relevant to use those criteria to understand the position in which NOS stands.

NOS' annual report for 2022 included a goal of extending into non-telco businesses. The launch of NOS Alarms and other services related to Cloud and Managed Services showcases a broader focus on technology-driven solutions. Moreover, the firm increased its portfolio of services concerning companies' sustainable transformation, including novel solutions with AR technology. Additionally, the fact that NOS contributed, through its engagement with 5G, to

applications such as autonomous driving journeys highlights the firm's dedication towards expanding beyond traditional telecom services.

In addition, NOS created the NOS Hub 5G, which consists of an innovation centre developed as a central space where several partners collaborate. It accelerates the usage of 5G's full potential since it develops tangible solutions and services that create added value for society. The launch of NOS Hub 5G and the investments in technology-driven startups suggest a transition into a tech company.

Ultimately, NOS made public its commitment towards cultural transformation by leadership through the establishment of the LeaderShift program. It consists of many initiatives to support the desired change into a culture of greater autonomy and flexibility. The CEO of NOS revealed his ambition to deliver "what no one has yet done" and continuously improve the customer experience, converging into a customer-centric model, in the Annual Report 2022. The firm deployed sophisticated analytical solutions in its operation model to meet customer needs more efficiently, suggesting its desire to deepen the relationship with customers and explore innovative elements regarding products, services, and customer experience (NOS 2022). All in all, the desired cultural changes reveal an ambition to transition towards an agile techco culture.

Given these signals, NOS is believed to be evolving into a techco.

Impact of tech on NOS' results

Previously in this report, revenues, costs, and capex were forecasted, considering NOS would continue integrating technology to improve its operations. Nonetheless, the possibility that NOS would have a significant revenue stream from the tech sector was not exploited because, even though the firm already counts with tech services, exact revenues associated with it were never disclosed, as they were mixed with other services. Thus, the previous forecast considered

that revenues concerning "Other Services" (including tech services), as a percentage of revenues from communication services, would remain equal to the historical average due to the lack of more detailed information. Nonetheless, as represented in Graph 5, revenues from "Other Services" as a percentage of revenues from communication services have been increasing. This might be linked to a rise in tech service revenues. Additionally, due to the signals previously analysed concerning NOS being in a transition to a techco, the following model will consider that NOS will have a more significant revenue stream deriving from the tech sector. For the sake of this model, it will be assumed that the previous forecast did not include tech services. This is reasonable given that "Other Services" were previously forecasted to account for a residual percentage of revenues, and there is no information regarding the proportion of non-tech services incorporated. Thus, this novel approach will reach the total free cash flows (FCF) of NOS by adding the FCF of the tech sector to the previously forecasted FCF. Revenues of the tech sector will be estimated as a varying percentage of revenues from the rest of the business.

In the new model, it was assumed that, as NOS is already under a technological ecosystem through NOS Hub 5, but specific tech revenues are not disclosed, they will account for 1% of revenues until the end of 2024 as the firm continues its path towards making strategic partnerships and investing in R&D. To get a benchmark of a percentage of revenues from the tech sector that a firm in a transition from telco to techco is expected to have, a peer analysis was conducted. For that, some firms, globally known for their transformation process into techcos, were analysed (Table 2-5). Then, an average concerning the percentage of revenues these firms obtain from tech was computed, reaching a value of 10% (Table 6). It is expected that, around 2028, most telcos transitioning into techcos will gain more substantial returns from the tech sector, offsetting current investments (Hatem Dowidar 2022). Therefore, it was

considered that NOS will only attain 10% of revenues from tech, converging with the current level of the considered telcos in Table 6, in 2028, by growing at a quarterly rate of 15% since the beginning of 2025, given the expected increased relevance of the tech sector. Then, the percentage of revenues from tech would remain stable until the end of 2029 as the firm recovers the previously made investments and adapts towards its new business structure. Due to the expected launch of 6G around 2030, it was considered that the percentage of revenues from tech would increase until it achieves 20%, the current level of some advanced Asian telcos, in the 1Q of 2033 (Telecom Review 2023).

To forecast NOS' EBITDA for the tech sector, the EBITDA margin of the STOXX Europe 600 Technology index in 2022, 20,3% (Bloomberg 2023), was used as a benchmark and adjusted throughout the forecasted years. Until the end of 2028, it was assumed that the EBITDA margin would be lower, 15%, given that NOS would be spending more on R&D. Then, the EBITDA margin was forecasted to be 20.3%, as provided by the index. The fact that the tech sector has a lower margin than the rest of the business does not indicate that it is less valuable. In fact, according to an article from McKinsey, a firm with lower margins but high revenue growth and the potential to improve profitability is preferred compared to one with comfortable margins but low revenue growth (Gnanasambandam, Miller, and Sprague 2017).

STOXX Europe 600 Technology was also used to estimate the percentage of revenues allocated to CAPEX in the tech sector (7%) and D&A as a percentage of CAPEX (73%). To reach Net working capital (NWC), the difference between current assets (CA) and current liabilities (CL) was employed (Graph 6). CA and CL as a percentage of sales were also estimated from the same index (65% and 46%, respectively).

A dynamic WACC was considered, given that the percentage of revenues from tech was changing each quarter. Thus, a weighted average of unleveled betas from European Tech peers,

Table 7, was computed, and an unleveled beta for the sector of 0,99 was obtained. Following, beta unleveled for the entire firm was calculated using a weighted average concerning the percentage of revenues from tech and non-tech. The rest of the WACC computation followed the procedure for the previous model. This resulted in a rising WACC through the years, reflecting the increased risk of the newly included sector (Graph 7).

The terminal growth rate used in the previous model was adjusted to account for the growth in the tech sector. To do so, the CAGR of the historical Portuguese revenues in tech components (Graph 8) was computed and assumed to be the growth of the tech sector (Statista 2023). Then, the weighted average of the CAGR for tech and non-tech businesses was calculated. Finally, the mean between the obtained value and the European Central Bank target inflation rate of 2% resulted in a terminal growth rate of 1,48% (Table 8).

This set of assumptions led to an enterprise value (EV) of €4237.8 m when integrating the tech sector, higher than the previous model (Graph 9). Finally, the share price increased by 18%, achieving €4.80, revealing a positive impact of the newly integrated business.

Still, it is relevant to consider that although this model attempts to forecast tech results with currently available information, the future is highly uncertain. Thus, multiple scenarios should be explored. For simplicity and space constraints, it was considered that the tech sector inclusion would not impact the already existent businesses. Nonetheless, it could be the case that it would result in a smaller allocation of resources to the other segments and thus negatively impact them. However, the scenario that as the tech business expands, the rest of the segments would be positively affected is also possible. Indeed, B2B customers, as previously mentioned, increasingly look for one supplier that can provide several services. Thus, including a tech sector could bring additional B2B customers to the telco business.

Despite inherent limitations, the presented model fulfilled its objective by providing valuable insights concerning the potential financial impacts of transitioning from a telco into a techco.

Conclusion

As a final point, research supports the conclusion that telcos can benefit from evolving into techcos despite the associated challenges. Regarding NOS, the provided analysis suggests that the firm is transitioning into a techco. Moreover, by integrating the tech sector, the presented model led to an increase in the share price of 18%. All in all, telcos are redefining their purpose by navigating the transformative wave. Within an economy of uncertainty, one undeniable truth prevails: markets are dynamic, demanding that firms adapt for survival.

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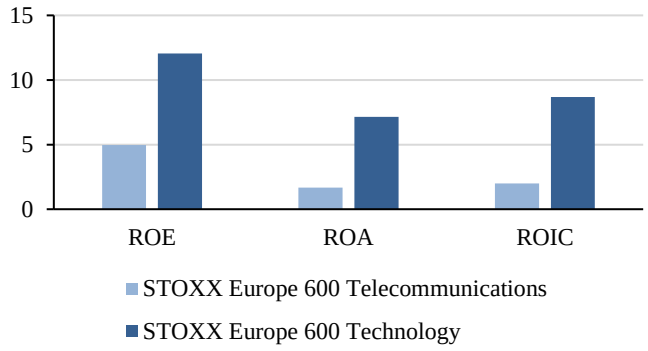
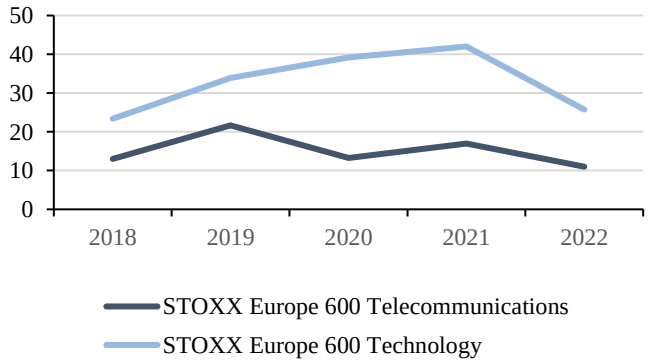
Appendix

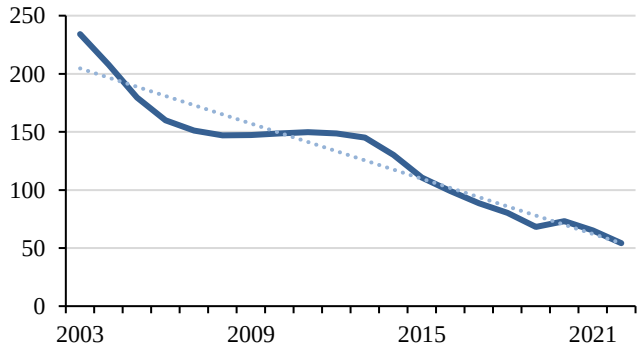
Graph 1: Profitability ratios (in %)



Graph 2: P/E (in euros)



Graph 3: Total traffic originated on the fixed network (in millions of hours) in Portugal



Graph 4: Number of IoT connections in Portugal (millions)

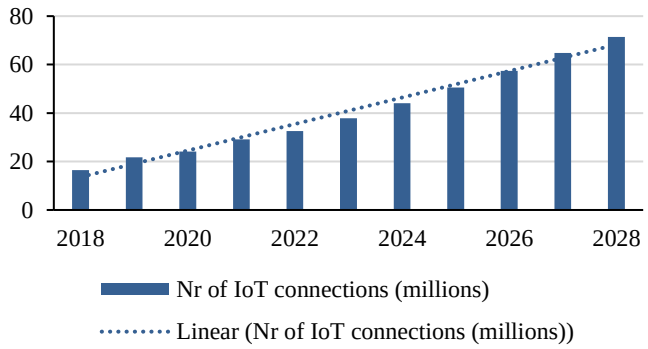
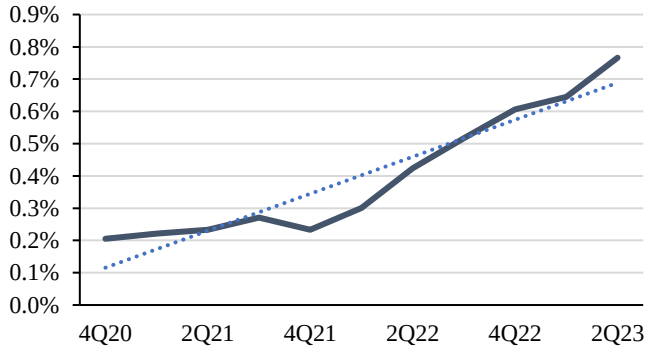


Table 1: Partnerships between hyper scalers and telcos (Ali 2020)

Telco	Hypercalers	Region	Examples of use cases
AT&T	Google Cloud, Microsoft Azure	US	Video analytics, AI/ML
Vodafone	AWS, Microsoft Azure	UK	Video analytics, AR
Telefonica	Google Cloud, Microsoft Azure	Spain	Automotive (assistive driving)

Graph 5: Other services as a percentage of communication services



Tables 2-5: Individual percentage of revenues from tech

Vodafone Group: Annual Report 2022 (bn of euros)	
Service revenue	38,20 €
Tech platforms as % of service revenue	13%
Tech revenue	4,97 €
Total revenue	45,58 €
% of revenue from tech	10,90%

MTN: Annual report 2022 (Rm)	
Consolidated revenue	181 646,00 ZAR
Network services	133 529,00 ZAR
Mobile devices	9 825,00 ZAR
Interconnect and roaming	13 976,00 ZAR
Digital and fintech	19 170,00 ZAR
Other	4 747,00 ZAR
Revenue from contracts with customers	181 247,00 ZAR
Interest revenue	399,00 ZAR
% of revenue from tech	10,55%

Orange: Annual Report 2022 (bn of euros)	
Year	2022
Total revenues	43 480,00 €
Revenues in Tech	3 817,00 €
% of revenues in Tech	8,78%

Telefonica Capital Markets Day 2023	
% of B2B revenue	21%
% of tech in B2B revenue	40%
% of revenue from tech	8,40%

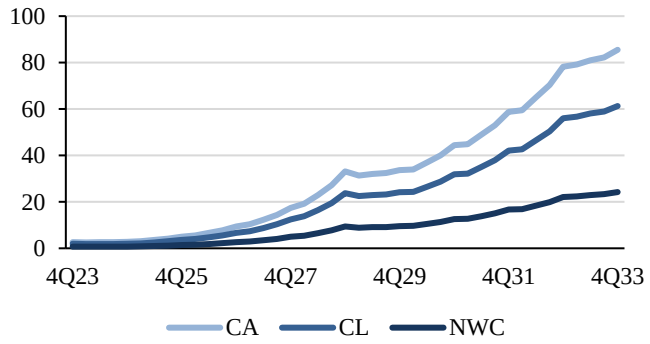
Table 6: Average percentage of revenue from tech

Firm	% of rev from tech
Vodafone Group	11%
MTN	11%
Orange	9%
Telefonica	8%
Average	10%

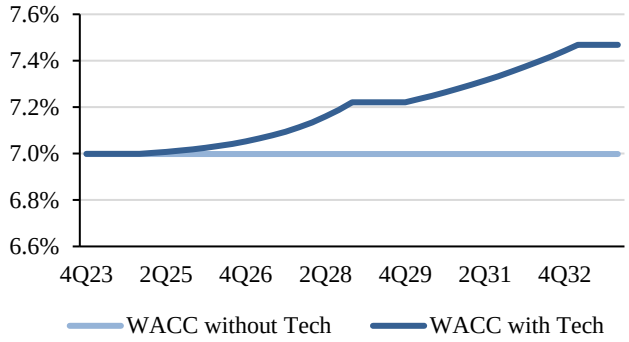
Table 7: Tech Peers Unlevered Beta (Bloomberg)

Firm	Mkt Cap (EUR)	Unlevered Beta	Weight
SAP SE	180590,12	0,75	26,16%
ABB LTD-REG	69901,82	0,82	10,13%
SIEMENS AG-REG	124848,00	0,90	18,09%
ASML HOLDING NV	257000,73	1,35	37,23%
DASSAULT SYSTEMES SE	57900,09	0,58	8,39%

Graph 6: Forecasted NWC for the Tech sector (in millions of euros)



Graph 7: WACC evolution (in %)



Graph 8: Tech revenues in Portugal (in millions of euros)

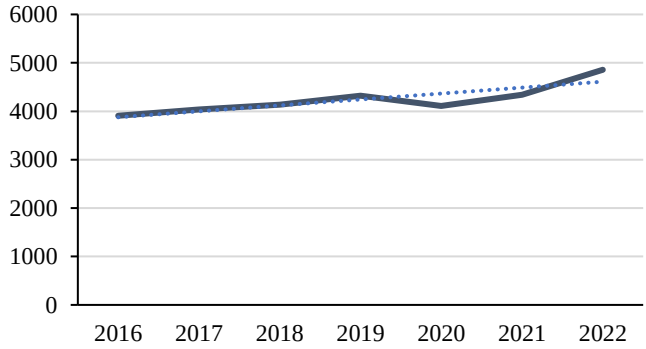
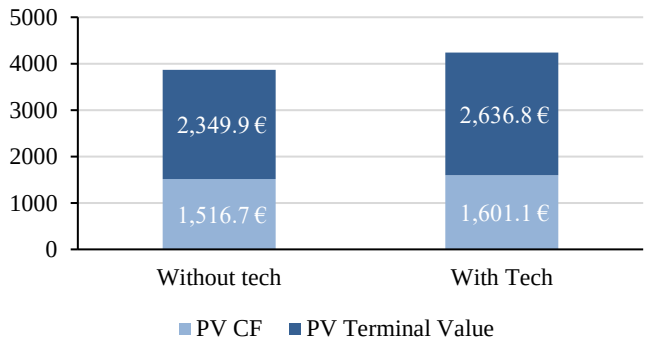


Table 8: Terminal growth rate computation

Terminal growth rate	
Historical growth business (before tech)	0,27%
Historical growth tech	3,69%
ECB Target inflation rate	2,00%
Growth business	0,96%
Terminal growth rate	1,48%

Graph 9: EV components with and without the Tech sector (in millions of euros)



NOS FCF Forecast: 4th Quarter of 2023 until 4th Quarter of 2026 (in millions of euros)

In Millions of EUR	4Q23	1Q24	2Q24	3Q24	4Q24	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26	3Q26	4Q26
Previous Forecast[1]													
% Revenues	**99,0%**	**99,0%**	**99,0%**	**99,0%**	**99,0%**	**98,8%**	**98,7%**	**98,5%**	**98,2%**	**97,9%**	**97,6%**	**97,3%**	**96,8%**
Revenues	405,5	387,1	396,3	402,6	420,0	400,3	409,6	415,7	433,1	412,2	421,3	427,0	444,2
Operational costs	-249,6	-219,6	-214,6	-221,8	-257,7	-226,5	-221,2	-228,4	-263,8	-231,3	-225,7	-232,9	-270,0
EBITDA	156,0	167,5	181,7	180,8	162,3	173,9	188,4	187,3	169,3	180,9	195,6	194,1	174,2
D&A	115,0	115,4	115,3	115,4	115,6	116,2	116,4	116,8	117,3	118,1	118,4	118,9	119,5
Net losses of affiliated companies	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6
Other losses, net	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
EBIT	40,8	51,9	66,3	65,3	46,5	57,5	71,9	70,4	51,9	62,7	77,1	75,0	54,6
Income Tax	-6,6	-8,4	-10,7	-10,5	-7,5	-9,3	-11,6	-11,3	-8,4	-10,1	-12,4	-12,1	-8,8
EBIAT	34,2	43,6	55,6	54,8	39,0	48,3	60,4	59,1	43,6	52,6	64,7	63,0	45,8
CAPEX	117,0	114,2	116,2	117,6	121,1	118,1	120,0	121,3	124,8	121,5	123,4	124,5	127,9
Change NWC	-53,0	13,0	10,1	-5,1	-16,5	13,4	10,4	-5,4	-17,0	13,7	10,6	-5,6	-17,6
FCF	85,2	31,7	44,6	57,7	50,0	33,0	46,3	59,9	53,1	35,5	49,1	63,0	55,0
Tech													
% Revenues	**1,0%**	**1,0%**	**1,0%**	**1,0%**	**1,0%**	**1,2%**	**1,3%**	**1,5%**	**1,8%**	**2,1%**	**2,4%**	**2,7%**	**3,2%**
Revenues	4,1	3,9	4,0	4,1	4,2	4,7	5,5	6,5	7,8	8,6	10,2	12,0	14,5
Operational costs	-3,5	-3,3	-3,4	-3,5	-3,6	-4,0	-4,7	-5,5	-6,7	-7,3	-8,7	-10,2	-12,3
EBITDA	0,6	0,6	0,6	0,6	0,6	0,7	0,8	1,0	1,2	1,3	1,5	1,8	2,2
D&A	0,2	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,4	0,5	0,5	0,6	0,8
EBIT	0,4	0,4	0,4	0,4	0,4	0,5	0,5	0,6	0,8	0,8	1,0	1,2	1,4
Income Tax	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,1	-0,2	-0,2	-0,2
EBIAT	0,3	0,3	0,3	0,3	0,3	0,4	0,5	0,5	0,6	0,7	0,8	1,0	1,2
CAPEX	0,3	0,3	0,3	0,3	0,3	0,3	0,4	0,5	0,6	0,6	0,7	0,9	1,1
Change NWC	0,0	0,0	0,0	0,0	0,0	0,1	0,2	0,2	0,2	0,1	0,3	0,3	0,5
FCF	0,3	0,3	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,4	0,3	0,4	0,4
Total													
Revenues	409,6	391,0	400,3	406,7	424,2	405,0	415,2	422,2	441,0	420,8	431,5	439,0	458,7
Costs	-253,0	-222,9	-218,0	-225,3	-261,3	-230,4	-225,9	-233,9	-270,5	-238,7	-234,4	-243,1	-282,3
EBITDA	156,6	168,1	182,3	181,4	162,9	174,6	189,3	188,3	170,5	182,2	197,1	195,9	176,4
D&A	115,2	115,7	115,5	115,6	115,9	116,5	116,7	117,1	117,7	118,6	118,9	119,6	120,3
Net losses of affiliated companies	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6
Other losses, net	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
EBIT	41,2	52,3	66,7	65,6	46,9	58,0	72,5	71,0	52,7	63,5	78,1	76,2	56,0
Income Tax	-6,6	-8,4	-10,7	-10,6	-7,5	-9,3	-11,7	-11,4	-8,5	-10,2	-12,6	-12,3	-9,0
EBIAT	34,6	43,9	56,0	55,1	39,4	48,6	60,8	59,6	44,2	53,3	65,5	63,9	47,0
CAPEX	117,3	114,5	116,5	117,9	121,4	118,4	120,4	121,8	125,4	122,1	124,1	125,4	128,9
Change NWC	-53,0	13,0	10,1	-5,1	-16,4	13,5	10,6	-5,2	-16,8	13,8	10,9	-5,3	-17,1
FCF	85,5	32,0	44,8	57,9	50,3	33,2	46,5	60,1	53,4	35,9	49,4	63,4	55,4
WACC	7,0%	7,0%	7,0%	7,0%	7,0%	7,0%	7,0%	7,0%	7,0%	7,0%	7,0%	7,0%	7,1%
Discounted CF	85,2	31,4	43,2	54,9	46,8	30,5	41,9	53,2	46,4	30,7	41,6	52,4	45,0

[1] Groupt Forecast refers to the initial forecsat made in the Group component of the Report, where the transition towards techco was not considered.

NOS FCF Forecast: 1st Quarter of 2027 until 2nd Quarter of 2030 (in millions of euros)

In Millions of EUR	1Q27	2Q27	3Q27	4Q27	1Q28	2Q28	3Q28	4Q28	1Q29	2Q29	3Q29	4Q29	1Q30	2Q30
Previous Forecast														
% Revenues	**96,3%**	**95,8%**	**95,1%**	**94,4%**	**93,5%**	**92,5%**	**91,3%**	**90,0%**	**90,0%**	**90,0%**	**90,0%**	**90,0%**	**89,5%**	**88,9%**
Revenues	421,9	430,6	436,1	453,2	429,7	438,6	444,1	461,6	437,3	446,4	451,9	469,6	446,7	458,3
Operational costs	-236,4	-230,4	-237,6	-275,2	-240,6	-234,6	-241,9	-279,9	-244,4	-238,1	-245,4	-283,9	-248,7	-243,3
EBITDA	185,5	200,2	198,5	178,0	189,1	204,1	202,2	181,7	192,9	208,2	206,5	185,7	198,0	215,0
D&A	120,4	120,8	121,4	130,4	136,5	134,4	133,9	133,3	126,2	122,3	125,3	128,2	132,3	136,3
Net losses of affiliated companies	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6
Other losses, net	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
EBIT	64,9	79,3	77,0	47,5	52,5	69,5	68,2	48,2	66,5	85,8	81,1	57,3	65,5	78,6
Income Tax	-10,4	-12,8	-12,4	-7,6	-8,4	-11,2	-11,0	-7,8	-10,7	-13,8	-13,0	-9,2	-10,5	-12,6
EBIAT	54,5	66,6	64,6	39,9	44,0	58,4	57,2	40,5	55,8	72,0	68,0	48,1	55,0	65,9
CAPEX	124,3	126,0	127,1	130,4	126,6	128,3	129,4	132,6	154,9	144,1	153,7	166,1	170,5	165,1
Change NWC	13,9	10,8	-5,8	-17,9	14,0	11,0	-5,9	-18,2	14,1	11,2	-6,0	-18,5	14,5	11,9
FCF	36,8	50,5	64,6	57,8	40,0	53,4	67,6	59,3	13,0	39,0	45,6	28,7	2,3	25,3
Tech														
% Revenues	**3,7%**	**4,2%**	**4,9%**	**5,6%**	**6,5%**	**7,5%**	**8,7%**	**10,0%**	**10,0%**	**10,0%**	**10,0%**	**10,0%**	**10,5%**	**11,1%**
Revenues	16,0	19,0	22,3	27,0	29,8	35,6	42,1	51,3	48,6	49,6	50,2	52,2	52,7	57,4
Operational costs	-13,6	-16,1	-19,0	-23,0	-25,4	-30,2	-35,8	-43,6	-38,7	-39,5	-40,0	-41,6	-42,0	-45,7
EBITDA	2,4	2,8	3,3	4,1	4,5	5,3	6,3	7,7	9,9	10,1	10,2	10,6	10,7	11,7
D&A	0,8	1,0	1,2	1,4	1,6	1,9	2,2	2,7	2,6	2,6	2,6	2,7	2,8	3,0
EBIT	1,6	1,8	2,2	2,6	2,9	3,5	4,1	5,0	7,3	7,5	7,6	7,9	8,0	8,7
Income Tax	-0,3	-0,3	-0,4	-0,4	-0,5	-0,6	-0,7	-0,8	-1,2	-1,2	-1,2	-1,3	-1,3	-1,4
EBIAT	1,3	1,6	1,8	2,2	2,4	2,9	3,4	4,2	6,2	6,3	6,4	6,6	6,7	7,3
CAPEX	1,2	1,4	1,6	2,0	2,2	2,6	3,0	3,7	3,5	3,6	3,6	3,8	3,8	4,2
Change NWC	0,3	0,5	0,6	0,9	0,5	1,0	1,2	1,7	-0,5	0,2	0,1	0,4	0,1	0,9
FCF	0,7	0,6	0,8	0,8	1,3	1,2	1,4	1,5	5,7	5,1	5,3	5,2	5,5	5,3
Total														
Revenues	437,9	449,6	458,4	480,2	459,6	474,2	486,2	512,9	485,9	496,0	502,1	521,8	499,4	515,7
Costs	-249,9	-246,5	-256,6	-298,1	-266,0	-264,8	-277,7	-323,5	-283,1	-277,6	-285,4	-325,5	-290,7	-289,0
EBITDA	187,9	203,1	201,8	182,1	193,6	209,4	208,5	189,4	202,8	218,3	216,7	196,3	208,7	226,7
D&A	121,3	121,8	122,5	131,8	138,1	136,2	136,1	136,0	128,8	124,9	127,9	131,0	135,1	139,3
Net losses of affiliated companies	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6
Other losses, net	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
EBIT	66,5	81,2	79,1	50,1	55,4	73,0	72,3	53,2	73,8	93,3	88,7	65,2	73,5	87,2
Income Tax	-10,7	-13,1	-12,7	-8,1	-8,9	-11,7	-11,6	-8,6	-11,9	-15,0	-14,3	-10,5	-11,8	-14,0
EBIAT	55,8	68,1	66,4	42,1	46,5	61,3	60,7	44,7	62,0	78,3	74,4	54,7	61,7	73,2
CAPEX	125,4	127,4	128,7	132,3	128,7	130,9	132,4	136,4	158,5	147,7	157,3	169,9	174,4	169,3
Change NWC	14,1	11,4	-5,1	-17,1	14,5	12,1	-4,7	-16,5	13,6	11,4	-5,8	-18,1	14,6	12,7
FCF	37,5	51,1	65,4	58,6	41,3	54,5	69,0	60,8	18,7	44,1	50,9	33,9	7,8	30,6
WACC	7,1%	7,1%	7,1%	7,1%	7,1%	7,2%	7,2%	7,2%	7,2%	7,2%	7,2%	7,2%	7,2%	7,2%
Discounted CF	29,9	40,1	50,4	44,4	30,7	39,8	49,5	42,8	12,9	29,9	34,0	22,2	5,0	19,3

NOS FCF Forecast: 3rd Quarter of 2030 until 4th Quarter of 2033 (in millions of euros)

In Millions of EUR	3Q30	4Q30	1Q31	2Q31	3Q31	4Q31	1Q32	2Q32	3Q32	4Q32	1Q33	2Q33	3Q33	4Q33
Previous Forecast														
% Revenues	**88,3%**	**87,6%**	**86,9%**	**86,2%**	**85,5%**	**84,7%**	**83,8%**	**83,0%**	**82,0%**	**81,0%**	**80,0%**	**80,0%**	**80,0%**	**80,0%**
Revenues	466,4	486,9	462,8	474,7	482,7	503,4	477,9	489,6	497,3	518,0	490,7	502,2	509,4	529,9
Operational costs	-251,9	-292,6	-256,0	-250,4	-259,1	-300,9	-262,8	-256,8	-265,6	-308,2	-268,6	-262,3	-271,0	-314,2
EBITDA	214,5	194,3	206,8	224,3	223,6	202,5	215,1	232,8	231,7	209,8	222,1	239,9	238,4	215,7
D&A	139,2	141,1	142,4	142,2	141,8	141,7	142,0	141,8	142,0	142,2	142,9	143,0	143,4	143,9
Net losses of affiliated companies	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6
Other losses, net	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
EBIT	75,2	53,0	64,3	82,0	81,6	60,7	72,9	90,9	89,6	67,4	79,0	96,8	94,9	71,7
Income Tax	-12,1	-8,5	-10,3	-13,2	-13,1	-9,8	-11,7	-14,6	-14,4	-10,8	-12,7	-15,6	-15,3	-11,5
EBIAT	63,1	44,5	53,9	68,8	68,5	51,0	61,2	76,2	75,2	56,6	66,3	81,2	79,6	60,2
CAPEX	158,5	154,2	141,6	138,6	140,3	144,3	140,5	142,9	144,5	148,4	144,2	146,5	147,9	151,7
Change NWC	-5,8	-18,8	15,0	12,3	-6,0	-19,5	15,4	12,6	-6,3	-20,2	15,7	12,8	-6,5	-20,7
FCF	49,6	50,2	39,8	60,1	76,0	67,8	47,3	62,5	78,9	70,6	49,3	64,8	81,6	73,1
Tech														
% Revenues	**11,7%**	**12,4%**	**13,1%**	**13,8%**	**14,5%**	**15,3%**	**16,2%**	**17,0%**	**18,0%**	**19,0%**	**20,0%**	**20,0%**	**20,0%**	**20,0%**
Revenues	62,0	68,8	69,5	75,8	82,0	91,1	92,1	100,6	109,0	121,2	122,7	125,5	127,4	132,5
Operational costs	-49,4	-54,8	-55,4	-60,4	-65,3	-72,5	-73,4	-80,1	-86,8	-96,5	-97,7	-100,0	-101,4	-105,5
EBITDA	12,6	14,0	14,1	15,4	16,7	18,5	18,7	20,5	22,2	24,7	25,0	25,5	25,9	27,0
D&A	3,3	3,6	3,6	4,0	4,3	4,8	4,8	5,3	5,7	6,4	6,4	6,6	6,7	7,0
EBIT	9,4	10,4	10,5	11,4	12,4	13,8	13,9	15,2	16,5	18,3	18,5	19,0	19,2	20,0
Income Tax	-1,5	-1,7	-1,7	-1,8	-2,0	-2,2	-2,2	-2,4	-2,6	-2,9	-3,0	-3,0	-3,1	-3,2
EBIAT	7,9	8,7	8,8	9,6	10,4	11,5	11,7	12,7	13,8	15,4	15,5	15,9	16,1	16,8
CAPEX	4,5	5,0	5,0	5,5	5,9	6,6	6,7	7,3	7,9	8,8	8,9	9,1	9,2	9,6
Change NWC	0,8	1,2	0,1	1,2	1,1	1,7	0,2	1,6	1,5	2,2	0,3	0,5	0,3	0,9
FCF	5,8	6,1	7,3	6,9	7,6	8,1	9,7	9,2	10,1	10,7	12,8	12,9	13,3	13,2
Total														
Revenues	528,4	555,7	532,3	550,5	564,7	594,5	570,0	590,2	606,3	639,2	613,4	627,7	636,8	662,4
Costs	-301,2	-347,4	-311,4	-310,7	-324,4	-373,5	-336,2	-336,9	-352,4	-404,7	-366,3	-362,3	-372,5	-419,7
EBITDA	227,1	208,3	221,0	239,7	240,3	221,1	233,8	253,3	253,9	234,4	247,0	265,5	264,3	242,7
D&A	142,5	144,7	146,1	146,2	146,1	146,5	146,8	147,1	147,7	148,6	149,4	149,6	150,1	150,8
Net losses of affiliated companies	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6	-0,6
Other losses, net	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
EBIT	84,5	63,4	74,8	93,4	94,0	74,5	86,8	106,1	106,1	85,7	97,6	115,7	114,1	91,7
Income Tax	-13,6	-10,2	-12,0	-15,0	-15,1	-12,0	-14,0	-17,1	-17,1	-13,8	-15,7	-18,6	-18,4	-14,8
EBIAT	70,9	53,2	62,7	78,4	78,9	62,5	72,9	89,0	89,0	71,9	81,9	97,1	95,7	77,0
CAPEX	163,0	159,2	146,6	144,1	146,3	150,9	147,2	150,2	152,4	157,2	153,1	155,6	157,1	161,3
Change NWC	-4,9	-17,6	15,1	13,4	-4,9	-17,9	15,6	14,1	-4,7	-17,9	15,9	13,4	-6,2	-19,7
FCF	55,3	56,4	47,1	67,0	83,6	75,9	56,9	71,7	89,0	81,3	62,2	77,7	94,9	86,3
WACC	7,3%	7,3%	7,3%	7,3%	7,3%	7,4%	7,4%	7,4%	7,4%	7,4%	7,5%	7,5%	7,5%	7,5%
Discounted CF	34,4	34,3	28,1	39,4	48,2	42,9	31,6	39,0	47,5	42,5	31,8	39,1	46,9	41,8