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Integration in the Brazilian telecommunication industry: The case of Vivo and TIM

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Abstract

The telecommunications sector in Brazil has been facing a particular attention from international groups during the last decade. All four main players in Brazil are controlled by global telecom players and several strategic moves have taken place during the past few years in Latin America. This is the case of Telefónica ownership in Vivo, Telecom Italia participation in TIM, the recent merger between Oi and Portugal Telecom, among several asset divestitures throughout Latin America countries from both Telefónica and Telecom Italia.

Many analysts and investment bankers have suggested that a possible sell of TIM from Telecom Italia is likely to occur due to high leverage ratios from the parent company. The company has divested in several Latin American and European operations in order to reduce debt, but, the leverage continues to increase.

We foresee that an acquisition of TIM by Vivo would completely change the industry in Brazil and that the overlap between both players would create synergies above the value of TIM. We forecast a standalone valuation for Vivo and TIM of BRL 56.2 Billion and BRL 26.5 Billion, respectively, and a merged firm enterprise value of BRL 113.8 Billion, corresponding to an expected synergies amount of nearly BRL 31.2 Billion.

Nevertheless, the Brazilian regulator could impose several restrictions to the merger, since the combined firm would have market shares above 70% in several states, and, as a result, we expect that an asset by asset sale would be the most appropriate scenario in reality.

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LIST OF ABBREVIATIONS

%CostS	Percentage of Cost synergies
%RevS	Percentage of Revenue synergies
Δ	Variation
2G/3G/4G	second generation/ third generation / fourth generation
ANATEL	Agência Nacional de Telecomunicações (Brazilian Regulator)
APV	Adjusted present value
ARPU	Average Revenue per User
BC	Bankruptcy Costs
Bln/Mln	Billion/Million
BRL	ISO code for Brazilian Real
BTS	Base Transceiver station
CADE	Conselho Administrativo de Defesa Económica
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditures
CAPM	Capital Asset Pricing Model
CASH&CE	Cash and Cash Equivalents
CDS	Country Default Swap
COGS	Cost of Goods sold
D&A	Depreciations and Amortizations
DCF	Discounted Cash-Flows
EBIT	Earnings before Interests and Tax
EBITDA	Earnings before interests, taxes, depreciations and amortizations
EUR	ISO code for Euros
EV	Enterprise Value
FCFE	Free cash flow to the Equity
FCFF	Free cash flow to the Firm
FTTH	Fiber-to-the-home
G	Growth rate
G&A	General and Administrative
GDP	Gross Domestic Product
HHI	Herfindahl-Hirschman Index

IM	Instant messaging
ITS	Interest tax shields
LTE	Long term evolution - term used in telecommunications
M&A	Mergers and acquisitions
MBB	Mobile broadband
M&S	Marketing and Selling
MOU	Minutes of Usage
MRP	Market Risk Premium
NPV	Net Present Value
NW&I	Network and Interconnection Costs
NWC	Net Working Capital
OPEX	Operating expenditure
OSS/BSS	Operations support system / Business support system
PER	Price-to-earnings ratio
PV of ITS	Present value of interest tax shields
Quad Play	Term for a bundled service with television, internet, fixed and mobile voice
Rd	Cost of Debt
Re	Cost of Levered Equity
Rf	Risk-free rate
Ru	Cost of Unlevered Equity
S&D	Sales and Distribution
SH	Shareholder
Sub	Subscriber
T	Tax Rate
TI	Telecom Italia
Triple Play	Term that represents a bundled service with Television, Internet and Fixed phone
TV	Terminal Value
USD	ISO code for US Dollars
VAS	Value added services
VoIP	Voice over IP
WACC	Weighted Average Cost of Capital

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0. Introduction

Mergers and Acquisitions have been a pillar in the Telecommunications industry in the past few years. In the last decade, the industry has spent an impressive USD 1.5 Trillion on Telecom M&A deals, driven by the need of market consolidation and higher competitiveness. The last decade has faced an enormous disruption in terms of technology and communications capacity: from the introduction of the first mobile phone, to mobile broadband, through technologies such as 2G, 3G and more recently LTE, and, finally, the expansion of fiber, allowing people to browse the internet as never before and downloading entire HD movies in a matter of seconds, telecom operators have suddenly faced a strong need of high investments that were not possible if M&A did not occur.

As a result, as we have seen and we expect, M&A deals will continue to occur in the future in order to surpass all these high investment needs, and, at the same time, continue battling other disruptive competitors that have emerged, such as Google, Apple or Facebook, which are also entering in the communications industry and could become a major threat to all operators.

The telecom landscape in Brazil has been an interesting case study. Several global telecom groups have invested in the past few years in Brazilian telecom operators, given its high growth potential. This is the case of Telefónica ownership in Vivo, América Móvil stake in Claro, TIM Participações subsidiary of Telecom Italia and, more recently, Portugal Telecom stake in Oi, which, 2 years after, resulted in a merger between both. Moreover, Brazil is a 200 million people country where mobile communications are expanding at a rapid pace, from only 59% penetration in 2007 to more than 140% in 2013, and where GDP growth has been growing at an astonishing 3.6% over the past decade and is expected to keep growing at 2.5% in the long-term.

In our dissertation, we will simulate a possible acquisition of TIM Participações by Vivo. This lies on the fact that Telecom Italia is facing high capital pressure and has been increasing their debt to unsustainable levels. As a result, as predicted by many analysts and investment bankers, a sale of TIM is more than expected and, additionally, a Brazilian market consolidation is expected in order to improve *in-country* infrastructure and achieve OPEX and CAPEX synergies.

We have forecasted a Vivo enterprise value of BRL 56,211 Million and TIM Participações total enterprise value of BRL 26,451 Million, corresponding to total price per share of BRL 48.39 and BRL11.25, respectively. We forecast an expected premium paid of 40% over TIM value, resulting in a combined valuation of BRL 113,823 Million with expected synergies of nearly BRL 31,161 Million.

The dissertation is, therefore, structured in the following way. Firstly, we will present the literature review that bases our analysis, secondly, we will look at the telecommunications industry globally and in Brazil. Then, we will look at Vivo and TIM's standalone valuations, followed by a small review of the parent companies (Telefónica and Telecom Italia) and a detailed analysis on the achievable synergies with the merger. Finally, we will perform the deal and look at the new forecasted financials of the merged entity.

1. Literature Review

In this first section we will briefly discuss the main drivers for valuing a company and provide a brief guidance for valuation of synergies. We will start by explaining the cost of capital, followed by an introduction to different valuation methods, a review of valuation methods in emerging markets, and, finally, a discussion on the mergers and acquisitions topic.

1.1. Cost of capital

According to Koller et al. (2010), when we value a company, we have to take into consideration the opportunity cost that investors face when investing in a certain asset instead of another with a similar risk and return. According to Myers et al. (2011), intuitively, all other things equal, we should demand higher rate of returns for riskier projects and lower rates of return for the opposite case.

Koller et al. (2010) states that there are three different methods to estimate the cost of equity: the Fama-French three factor model, the arbitrage theory model (APT) and, the most commonly used, the Capital Asset Pricing Model. Most practitioners use the CAPM model due to its simplicity in computing the Beta and getting a rough estimate of the cost of capital. As a result, we will follow the CAPM method.

1.1.1. CAPM

The Capital Asset pricing model was developed based on Markowitz's theory (1959) of the mean-variance model. According to the author, investors chose its investment strategy according to two main guidelines: minimizing the variance of a portfolio, given the expected return, while maximizing the expected return, given its variance.

Following this baseline idea, Sharpe (1964), Lintner (1965) and Treynor (1961) introduced the CAPM theory. According to them, the expected return should follow a linear function, as described below.

$$(1) \quad R_i = R_f + (R_{market} - R_f) * \beta_{i_{market}}$$

Where R_f represents the expected return of a risk-free asset, $[R_m - R_f]$ represents the market risk premium and the β_{im} the Beta of the market or the stock's sensitivity to the market. As a result, Sharpe (1965) argues that the return of an asset corresponds to the sum of the risk-free rate (corresponding to the time value of money) with the risk premium (which is the simply the market risk premium multiplied by the firm's beta).

However, only one decade after the finding of CAPM, many authors started arguing about the verifiability of the CAPM model. Roll (1977) argues that the CAPM has never been truly tested, while Stambaugh (1982) finds that that CAPM is not sensitive to portfolios beyond common stock. Moreover, Lakonishok (1994) and Fama and French (1996) show that the average returns are not positively correlated to the Betas, while Fama and French (2004) outlines the failures imposed by the CAPM across different empirical studies.

Nevertheless, as argued by Damodaran (2002), the method is still the most intuitive and simplest method to be used by practitioners, compared to alternative solutions such as APT or Fama-French

three factor model. In addition, Kaplan and Ruback (1995) find that there is no significant improvement from using a different approach than the traditional CAPM and that “those techniques are both useful and reliable”.

As a result, we will not investigate alternatives to the CAPM and we will base our analysis with the CAPM.

1.1.2. Risk-Free rate

Koller et al. (2010) defines risk-free rate “as the return of a portfolio that has no covariance with the market”. This means that a risk-free rate is a rate that has no risk of financial losses such as long-term government bonds or a government treasury Bill from developed countries such as US or Germany.

As a result, we can relate the risk-free rate as the time value of money since this rate is almost *riskless* (Cornell and Green 1991), but the question about which maturity to use arises.

According to Koller et al. (2010), ideally we should use a risk-free rate with the same maturity time but in fact, the most commonly used risk-free rate is the 10-year government bond. In case of US valuations, the recommended risk-free rate is the 10-year US government bond yield whereas in case of a European valuation, the 10-year German Eurobond is the most appropriate. In the case of emerging markets, however, the cost of equity is slightly more difficult to calculate.

In emerging markets the concept of riskless investments in government bonds it’s not true anymore. As explained by Koller et al. (2010), the risk-free rate assumes that the investment in government bonds needs to be accessible and actively traded, thus, in the case of emerging markets, this might not be the case. In addition, emerging market’s government bonds may be traded in foreigner currency such as US Dollars or Euros, so the availability of a local risk-free rate is even more difficult due to lack of liquidity of the local currency. As a result, as we can understand, the main assumptions of the risk-free rate are not present in emerging markets, and therefore, it has to be inferred using a different method.

Koller et al. (2010) suggests one practical and easy way to arrive to an emerging risk-free rate: by starting with a common 10 year government US T-bill and then, adjusting the rate with the inflation rate difference between both countries. Using this approach, we will arrive to a reasonable estimation of the risk-free rate in emerging markets that is closer to the reality, as represented in the formula below:

$$(2) \quad Rf_{emerging\ market} = (1 + Rf_{US}) * \frac{(1+emerging\ market\ inflation)}{(1+US\ inflation)}$$

1.1.3. Beta

The Beta is the *slope* of the capital asset pricing model, or in other words, it is the systematic risk between the asset and the market. In order to calculate the Beta, we start by estimating a raw beta using the regression presented below.

$$(3) \quad Ri = a + \beta * Rm + \varepsilon$$

This formula estimates the covariance between the stock return and the market return in order to understand how correlated the stock is with the market (Ross, 1978). As a result, a Beta higher than 1 indicates a higher risk than the market and a beta lower than 1, the opposite.

According to Koller et al. (2010), three major guidelines are considered when estimating the raw beta: (1) The estimating period must be of at least 60 observations, (2) the regressions must be done using monthly returns and (3) the regression must be compared to a well-diversified market index such as the S&P 500 or the MSCI world Index.

Moreover, it is a good practice to use the peer group or industry comparable to adjust the Beta. Koller et al. (2010) argues that companies in the same industry face similar operational risks and similar capital structures, thus, it is recommended to compare our raw beta with the industry median raw beta and understand if we need to adjust the Beta to become more comparable to our peer group.

Finally, Blume (1975) states that “estimated beta coefficients tend to regress towards the grand mean of all betas over time” so high risky companies tend to lower their risk over time and approximate from one. He finds two reasons for this - (1) the riskiest projects may tend to become less risky over time and (2) new projects may be less risky than the previous ones due to management reluctance to accept risky projects. As a result, *Beta smoothing* is nowadays a standardized process to reduce the possible extreme observations when calculating the raw beta. As used by Bloomberg, the formula (4) will be used on that account.

$$(4) \quad \beta_{adjusted} = \beta_{raw} * (2/3) + \beta_{market} * (1/3), \text{ where } \beta_{market} = 1$$

On a different note, an important measure for us to define is the difference between the levered and the unlevered cost of capital.

Hamada (1972) wrote a paper where he explains the difference between using a levered and an unlevered Beta. While the levered Beta takes into account the leverage of the firm, the unlevered eliminates the debt effect. As a result, as we will see further, this distinction is extremely important for the APV valuation method, where we will separate the valuation between the unlevered firm value and the financial side effects. As a result, following the work from Harris and Pringle (1985) and Hamada (1972), they present the formula below:

$$(5) \quad \beta_{levered} = \beta_{unlevered} + (\beta_{unlevered} - \beta_{Debt}) * \frac{D}{E}$$

Where the Beta levered is made of the beta unlevered and leverage side effects. However, Hamada (1972) refers that the value of tax shields equals to multiplication of debt with the tax rate, and thus, many authors such as Damodaran (1994) or Koller et al. (2010) proposes an unlevering method that assumes that the Beta of debt equals to zero, since there is no correlation between the stock market and the risk of debt payments. Furthermore, Koller et al. (2010) states that “*the finance literature does not provide a clear answer about which discount rate for tax benefit of interest is theoretically correct*” and, as a result, the authors say that “*we leave to the reader’s judgment to decide which approach best fits his or her situation*”.

Concluding, Damodaran (1994) and Koller et al. (2010) presents an unlevering method that assumes a Beta of Debt equals to zero:

$$(6) \quad \beta_{levered} = \beta_{unlevered} * (1 + \left(\frac{D}{E}\right) * (1 - T))$$

In our dissertation, as with many practitioners, we will use formula (6) in order to unlever the Beta for the adjusted present value methodology.

1.1.4. Market risk premium

The Market risk premium (MRP) might be one of the most important and also difficult topics to conceptualize.

MRP represents the additional reward an investor has by adding risk to the investment. Thus, it is the excess return that one investor receives by investing in a risky asset, and the weight given is measured by the Beta.

According to Fernandez (2004), there are three different designations for this matter: (1) The required MRP, (2) the historical MRP and (3) the expected MRP. The first concept is the required rate of return by an investor, and thus, not necessarily what the market is rewarding, the second is an estimation based on historical data and, thus, less important in our case. And third, the expected MRP, which represents the difference between the stock market return and the risk free asset. The CAPM assumes that the required MRP and the expected MRP is the same and so, this will represent our MRP.

Additionally, Damodaran (2013) considers three main approaches to calculate the market risk premium: (1) surveys to investors (2) the historical market risk premium, where MRP is computed by annualizing the difference between expected returns and government bonds and (3) using the implied approach, where the MRP is calculated based on equity prices or “risk-premiums in non-equity markets”.

However, the calculation of the MRP is not unanimous and depends on the estimation window used. As a result, many authors have presented similar results for the value of the MRP: Van Horne (1992) recommend between 3 and 7%, Damodaran (2011) recommend 6%, Claus and Thomas (2001) recommend 3% to 4% and Koller et al. in his latest edition of 2010 presents a MRP between 4.5% and 5.5%.

According to Damodaran (2013), the author suggests a simple way of calculating the correct MRP for markets without AAA ratings. Starting with a mature market risk premium (e.g.: USA, 5% market risk premium), we have to add the estimated default spread for the country in question. The author suggests extracting the sovereign rating for the country from Moody’s and, by using the rating-based default spread, we should multiply it by the relative standard deviation between stocks and bonds from the specific country (7)

$$(7) \quad MRP_{country\ x} = MRP_{US} + CDS * \frac{(\sigma_{stocks})}{(\sigma_{bonds})}$$

1.1.5. Cost of debt

The cost of debt is the cost of owning interest-bearing liabilities. Firms use debt to finance themselves and to reduce the amount of tax payables. However, as proven by Barclay (1995) and Berk and DeMarzo (2007), different industries may have different levels of debt to value, suggesting that the asset tangibility (Bradley et al., 1984 and Mackie-Mason, 1990) and the business risk (Bradley et al., 1984) impact the level of debt used.

Modigliani and Miller (1958) stressed the importance of debt in the calculation of the Weighted Average Cost of Capital since different levels of debt can have an impact on the final cost of capital of a firm. The author suggests that firms with different levels of debt are subject to different levels of financial risk and, thus, different interest rates. In general, assuming everything else equal, the higher the leverage level, the higher the cost of debt.

Most firms can obtain interest-bearing liabilities by two main sources: through traditional bank loans or by issuing debt in the stock market such as bonds or securities. The first source of financing usually calculates the interest based on the default spread of each company's ratings, after including the risk free rate (8).

$$(8) \quad \text{Cost of Debt} = \text{risk free rate} + \text{spread}$$

However, global firms such as Vivo or TIM sometimes may have access to international financing at better terms than even the country government bonds. As a result, in the Brazilian case, although the 10-year yield rate is between 9% and 12%, both operators are able to get outside financing at lower rates than the Brazilian government bonds.

1.1.6. WACC

After explaining the concepts of cost of equity and cost of debt, we can now explain the Weighted Average Cost of Capital. As the name suggests, the Weighted Average Cost of Capital is the rate at which we discount cash-flows, proportionally weighted by the capital structure of the firm.

$$(9) \quad WACC = \frac{D}{V} * Rd * (1 - t) + \frac{E}{V} * Re$$

Modigliani and Miller (1958) were the first authors to introduce the prevailing knowledge on capital structure, which was then developed by other authors such as Myers (1974) and adjusted by Miles and Ezzel (1980).

The WACC method, as criticized by Luehrman (1997), relies on one single capital structure for the perpetuity, where financing costs follow the same risk, thus, excluding the existence of different costs of debt, covenants or collaterals that may influence the risk of different loans. The same author also refers the tax as one weak element of the WACC approach since it assumes one single tax environment, and thus, becoming a weak method for multinational firms.

Likewise, Kaplan and Ruback (1995) points out that the WACC approach assumes that the capital structure of the company is relatively stable across periods and if the company is committed to maintain a constant capital structure, then it is reasonable to use this approach.

Nevertheless, most practitioners still use the WACC approach in case the company maintains a relatively stable capital structure since it is the easiest way of calculating the firm value.

In the case of telecom operators, where technology shifts are constant and many players are now introducing new technologies such as fiber, more enterprise solutions and so on, many new investments in infrastructures make the assumption of constant capital ratio difficult to obtain. As a rule of thumb, the typical telecom firm should not be valued using a WACC discount factor if it is evident that the company is not maintaining a stable capital structure. Nevertheless, as we will see in both valuations, TIM Participações has a stable capital structure, and so, it is reasonable to assume the WACC approach to discount the cash flows.

1.2. Valuation methods

After reviewing the concepts on discount factors, we will now explain three different methods for valuing a company: the discounted cash flow method, using the WACC approach, the adjusted present value and the relative valuation. We will start by explaining a brief introduction to the free cash flow method, followed by the three valuation methods.

1.2.1. Note on Free Cash Flow method

Starting with the Free Cash flow (FCF), the FCF is the total cash that is available for Equity or Debt holders. Each firm need to compute these FCF's to compute its valuation because firms deduct non-cash items from the P&L (e.g.: Depreciations and amortizations) and may also invest in new assets which are not taken into consideration in the P&L. Moreover, sometimes firms need to invest in working capital, since the time of the purchase is not the same of the time of the cash received. As a result, according to Koller et al. (2010), Free Cash Flow to the equity is defined as the total cash flow available to equity holders (10), while Free Cash flow to the Firm is the total cash flow available for both Debt and Equity holders (11).

Kaplan and Ruback (1995) and Schweser (2012) present two distinctive ways of calculating the Free Cash Flows: starting from the net income and from EBIT. In theory, these two formulas arrive to the same result, but following different approaches. As a result, we can calculate Free Cash Flow to Equity (8) and Free Cash Flow to the Firm (9) according to the expressions below:

$$(10.1) \quad FCFE = \text{Net Income} + D\&A - \Delta\text{Net Working Capital} - CAPEX + \text{Net Debt}$$

or

$$(10.2) \quad FCFE = EBIT*(1-\text{tax rate}) + D\&A - \Delta\text{Net Working Capital} - CAPEX + \text{Net Debt}$$

$$(11.1) \quad FCFF = \text{Net Income} + D\&A + \text{Interest}*(1-\text{Tax}) - \Delta\text{Net Working Capital} - CAPEX$$

or

$$(11.2) \quad FCFF = EBIT*(1-\text{tax rate}) + D\&A - \Delta\text{Net Working Capital} - CAPEX$$

When looking to each formula we understand that the subtraction “D&A - CAPEX” can be somehow related in the long-term since if there was any investment in CAPEX, at a certain point in time, the D&A would start reducing due to low value of firm's assets. Kaplan and Ruback (1995) states that when computing the terminal value and “*assuming a growing perpetuity*”, in order for the firm to continue its operational activity in the future, “*capital expenditures should be at least as large as depreciation and amortization*”.

1.2.2. Discounted Cash Flow method using WACC

As already discussed before, the WACC-based DCF method assumes a constant capital ratio that many authors state that is not realistic. Nevertheless, many practitioners still use this method due to its simplicity and easiness for the calculation of discount factor.

$$(12) \quad \text{Enterprise value} = \sum_{t=1}^n \left(\frac{FCFF_t}{(1+WACC)^t} \right) + \frac{FCFF_n}{(WACC-g)*(1+WACC)^n}$$

As we can see by formula 10 presented above, the enterprise value comprises an explicit period forecast and a perpetuity growth rate assumption. Starting with the time frame, we must select a specific explicit period that is not too short or too long. We must take into consideration future investments that the company is doing and forecast any incremental revenues or costs that may arise. For example, in cyclical companies, a forecast of the whole cycle period is fundamental for an accurate valuation, or if the country is facing a downturn or economy boost, we should forecast a timeframe that reaches a stability period for the company. As a rule, the forecasted explicit period must ensure that the firm will reach a stability period and no more significant changes are expected in the future.

On the other hand, the perpetuity growth rate is also a key point, when making a valuation. According to Young et al. (1999), the terminal value can represent “80% to 90% of the market value estimate” so, inferring the right long-term growth rate is essential.

Damodaran (2008) argues that the growth is “the driver of future cash flows and by extension the value of these cash flows” but stressed that the type of growth is also key, since investing in more risky projects also increases the cost of capital, thus, reducing the firm value.

In a different line of thought, Chan et al. (2003) studied the long-term growth rate and points that “following superior growth in profits, competitive pressures should ultimately tend to dilute future growth” and, as a result, “earnings growth is, in general, unpredictable”. Furthermore, the authors concludes that the median estimation of growth rate is close to the Gross Domestic Product evolution and suggests that “It is difficult to see how the profitability of the business sector over the long term can grow much faster than overall gross domestic product”, suggesting that in the long term, a firm should not grow more than the expected gross domestic product evolution. As a result, many practitioners follow the same approach, where the long term growth rate should follow the expectations of the economy. We will follow the same approach for the calculation of Vivo and TIM valuations.

1.2.3. Adjusted Present Value

The Adjusted Present Value method (APV), firstly introduced by Myers (1974), appeared as an alternative method to the traditional method of Weighted Average Cost of Capital, where it assumes that the firm will maintain a constant Debt-to-value ratio. In fact, although the WACC method could be adjusted on a year-over-year basis, the process can become complex, especially when it comes to the assumption of a constant debt-to-value ratio in perpetuity.

As a result, the adjusted present value method pretends to measure the value of cash flows separately, distinguishing the value as if the company was all-equity-financed and then, valuing the present value of the interest tax shields. According to Luehrman (1997), the APV method unbundles both parts as described in the formula below:

$$Adjusted\ present\ value = \underbrace{\sum_{t=1}^{\infty} \left(\frac{FCFF_t}{(1+re)^t} \right)}_{Unlevered\ firm\ value} + \underbrace{\sum_{t=1}^{\infty} \left(\frac{ITSt}{(1+rd)^t} \right)}_{Leverage\ side\ effects} - Bankruptcy\ costs$$

(13)

1.2.3.1. Free Cash Flow valuation at unlevered cost of equity

As already described above, the APV separates the valuation into the unlevered value of operations and the value created by tax shields, but which discount rates should we use when calculating each part of the equation? The free cash flows can be obtained according to the method described by Kaplan and Ruback (1995) and the cost of equity, using the CAPM approach, as suggested by Sharpe (1964), Lintner (1965) and Treynor (1966).

Nevertheless, the CAPM uses a levered Beta, since the estimation of the Beta comes from levered firms. As a result, in order to use the correct cost of equity, as proposed by several authors such as Ruback (2002) or Modigliani and Miller (1963), we should unlever the Beta, using formula (6) or the correspondent formula below, if assumed a Beta of Debt different from zero:

$$(14) \quad \beta_{Levered} = \beta_{Unlevered} - t * \frac{D}{V} * (\beta_{Unlevered} - \beta_{Debt})$$

1.2.3.2. Leverage side effects valuation

According to Luehrman (1997), “*interest tax shields arise because of the deductibility of interest payments on the corporate tax return*”, this means that, a firm may benefit if they use debt, since it can reduce the amount of tax paid. However, at the same time, as firms become more levered, the benefits of tax shields may offset with additional costs due to increased leverage. If debt holders suspect that a firm may enter in financial distress, financing costs increase due to higher bankruptcy costs.

Although the interest tax shields represent the biggest contributor to the leverage side effects, Luehrman (1997) also suggests several types of financial effects such as subsidies, hedges or issue costs.

But how should we discount these financial side effects? There has been a debate on which rate to use. Some authors suggest it should be used the cost of debt, while others argue that the tax shields are slightly more uncertain than debt payments, so the rate should be adjusted upwards. Ruback (2002), however, suggests that the discount rate used for the tax shields should be the cost of Debt.

The last step in the valuation, when using this method, is to estimate the value of the bankruptcy costs (BC). These costs are related with direct and indirect costs associated in the case of bankruptcy such as attorney fees, claims and possible compensations to suppliers, employees and even the government. Damodaran (1996) suggests an easy way to calculate the BC based on the bond rating of each firm. Based on a studied made by Altman and Kishore (1998), the credit rating of a company gives a good indication of the default risk of a company. As a result, for instance, a company with a rating of BBB has a default probability of 2.3%.

$$(15) \quad \text{Bankruptcy costs} = \text{Probability of Default} * \text{cost of Bankruptcy} * \text{Unlevered firm value}$$

Furthermore, the costs of bankruptcy are usually a difficult value to estimate since it depends on several variables such as the social impact of bankruptcy, the creditor’s loss and all losses to all stakeholders of the firm. Although this assumption did not have the proper attention in the finance books, many banks, investors and shareholders depend a lot on how to quantify the expected loss in

case of default. Schuermann (2004) made a study where the author calculates the expected loss given default per industry. For instance, in the case of the communications industry, the average recovery is 53% of the firm value, thus, the expected costs of bankruptcy are 47% (see appendix for average recovery per industry).

Concluding, the bankruptcy costs, as proposed by Damodaran (1996), can be computed, using the formula above, where the probability of default is based on the rating¹, then the costs of bankruptcy are usually a percentage of the unlevered firm value (in our case will be 47%), and, finally, the unlevered firm value is the total unlevered firm value.

1.2.4. Multiples valuation

In the last two chapters, we have discussed two valuations methodologies that are commonly used by investors and scholars. However, most of the times, a more simple method to measure the value of a firm is the relative valuation, where investors select comparable companies to value the firm in question.

According to Goedhart (2005), “*A properly executed multiples analysis can make financial forecasts more accurate*” since it can position a DCF or APV valuation with the respective industry.

In the last two chapters, we have discussed valuation methods that are based on cash flows and on discount rates, but at this point, it is important to refer an important method that helps investors guide their valuations and extract meaningful and efficient insights.

Koller et al. (2010) argues that a multiple valuation, when computed accurately, is an important tool to understand how the market is valuing each company, prove the feasibility and plausibility of the forecasts and to understand the expectations of the market in that industry and firm.

The same author suggests three main steps to calculate multiples - choosing the right multiple, being consistent with the calculation and choosing the appropriate peer group.

Using the right multiple is a key step in order to make a reliable valuation. The EV-to-EBITDA is argued by several authors to be good performance indicator since it is less vulnerable to changes in capital structure or non-operational cash-flows (i.e.: depreciations and amortizations, one-time gain or losses or debt payments can vary from firm to firm and distort analysis) when compared with other multiples as price-to-earnings ratio or the PEG ratio.

Fernandez (2001) presents three main multiples bundles: multiples based on company's capitalization, based on company's value and based on growth.

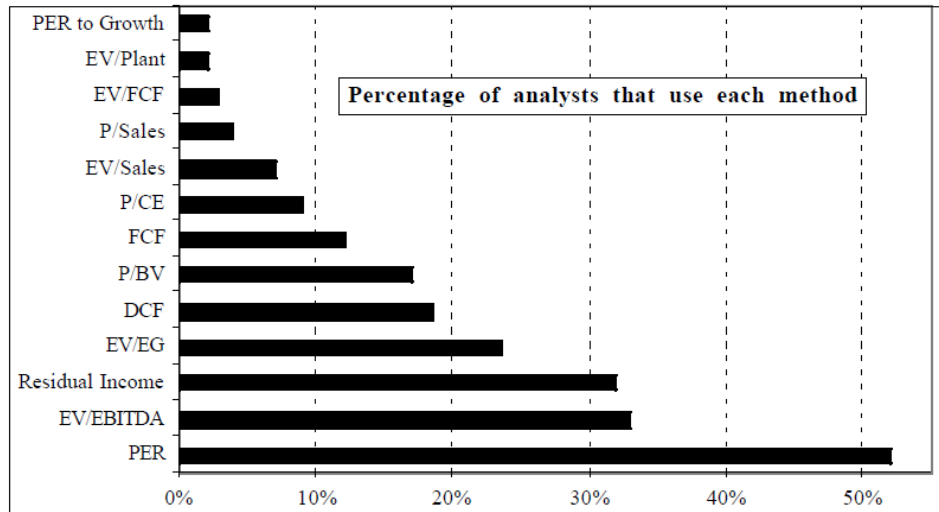
The most common multiples based on company's capitalization are the price-to-earnings ratio, price-to-cash-earnings², price to sales, price to book value, price to levered cash flow and others that relate price with operational data such as customers, output or units sold. Secondly, multiples based on company's capitalization are, for instance, EV to EBITDA, EV to sales or EV to unlevered free cash flow. Finally, according to Fernandez (2001), PER to earnings per share growth or EV to EBITDA growth are the most common multiples used under the growth category.

¹ See appendix

² Net income before depreciation and amortization

Figure 1 show the most widely used valuation methods, according to Fernandez (2001), in a study made by Morgan Stanley Dean Witter’s analysts. Surprisingly, most practitioners prefer PER and EV to EBITDA multiples, while the DCF approach is only used by slightly more than 20% of the survey. This may be caused by the easiness and efficiency that the multiples method offer, when compared with free-cash flow approaches.

Figure 1 - Most widely used valuation methods



Furthermore, Koller et al. (2010) argues that being consistent in the calculation of multiples is crucial since very often investors make mistakes on the calculation of the enterprise value or EBITDA. As suggested by Koller et al. (2010), enterprise value must only include assets that contribute to EBITDA and exclude items such as excess cash or nonconsolidated subsidiaries. When computing peer group multiples, we must exclude from enterprise value all values that do not generate cash flows to the core business.

The last but not the least, according to Koller et al. (2010), choosing the peer group can be the most challenging part of the analysis since investors have to use judgement to select a group of companies that best represent our firm. Critical thinking is essential in this step and the author suggests that the investor must answer key questions in order to understand differences across ratios such as company products, competitive advantages, economies of scale, growth capacity and so on. As suggested by Goedhart (2005), the selection must have similar expectations in terms of ROIC and growth.

Once all these assumptions and peer group formation are met, the valuation using multiples is simple and easy to perform. It is simply the multiplication of the peer group multiple by the operational indicator. The formula below illustrates with the EV-to-EBITDA multiple.

$$(16) \quad Enterprise\ value = \left(\frac{EV^{peer\ group}}{EBITDA} \right) * EBITDA\ firm$$

1.3. Valuation in emerging markets

Although valuation in developed markets seems to converge in a certain agreement between practitioners and scholars, the topic reveals more ambiguity when we value firms in emerging markets.

Many authors have suggested several solutions to the topic such as James and Koller (2000), Bekaert et al. (2003), Damodaran (2003), among others.

1.3.1. Why is emerging market valuation so important?

Bruner et al. (2002) present several reasons to explain why emerging markets valuations are usually more difficult to estimate and why it has gathered so much attention in the past few years. Firstly, since practitioners and scholars still didn't find any "consensus" for a general practice, it has been strongly debated to achieve a common solution. Issues such as how to define a "risk probability" on factors such as war, corruption or expropriation and how to value the right cost of capital are examples of how investors disagree on the right methodology.

Secondly, the emerging countries are no longer outside the investor's horizons since the capital flows to and from emerging markets are getting bigger and bigger and, currently, there are more portfolios formed by emerging stocks. Moreover, there is a need to better evaluate these assets since the right methodology can have a great impact even in social causes (the higher the transparency, the easier it is for investors to enter in emerging markets).

Finally, the last but not the least, emerging markets are much different from developed countries, since several areas present additional risks, compared to developed countries. These countries face additional risks such as liquidity, expropriation, corruption, information asymmetry, high volatility or accounting transparency. In fact, these factors represent the majority of the difficulty when discount cash flows. For instance, investors need to add a premium to the risk of corruption and control from official entities, or to the lack of transparency in the accounting procedures in emerging markets. Therefore, practitioners and scholars have spent a significant time in finding the best way to calculate all these risks.

Additionally, the author also reflects about the difference between local and global companies valuations. The author states that global firms obtain a significant portion of revenues, supplying resources and even financing from outside markets in developed countries, thus, these companies should have a different cost of capital from the local firms, where the whole business depends on the country risk. As a result, it is common for global firms to have a lower cost of equity or Weighted Average Cost of Capital from the government yields.

1.3.2. Proposed solutions

As mentioned previously, there is not a consensus on how to value an emerging market valuation, but several suggestions from several different authors.

Koller et al. (2010) suggest a an average valuation based on three different methodologies. The first method, suggests computing a probabilistic model that takes into account each risk such as war, expropriation, liquidity risks, among others. Then, the author suggests building a model that

only adds a country risk premium in the cost of capital and, finally, by using trading multiples from the peer group.

Alternatively, James and Koller (2000) suggest that adjusting an emerging market valuation must come from two different sources: the numerator (free cash flows) and the denominator (discount factor). The free cash flows must take into consideration risks of information asymmetry, cash flow volatility or even war. On the other hand, the discount factor must also add a risk premium to consider other factors such as expropriation or high stock market volatility. Therefore, a probabilistic evaluation is considered the most solid method for the valuation, since it provides a weighted valuation, depending on several scenarios and provide a deep understanding of where value might be destroyed or not.

Additionally, in the same line of thought, Damodaran (2003) proposes a three step approach to adjust the valuation in emerging markets. Firstly, the author suggests adjusting the scale to reflect any difference in accounting procedures, then we should control for country risk, and, we can use country ratings or default spreads as a proxy for added risk for the company (17). Finally, an adjustment to control for interest rates and inflation must be also taken into consideration in case the valuation is being done in a different currency from the source of cash flows.

$$(17) \quad \text{Cost of equity} = \text{risk free rate} + \text{Beta} * (\text{Mature MRP} + \text{Country risk premium})$$

Concluding, although there is not a consensus on the right way of calculating an emerging market valuation, several authors suggest some similarities on which approach to use. As a result, since the Brazilian economy had a relevant growth in the past few years, we believe that Brazil is in between an emerging market economy and a pre-developed country. Thus, a valuation that follows a probabilistic approach based on several country risks such as war, expropriation, corruption, etc. seems to be exaggerated. We will base our valuation according to the recommendations made by Damodaran, where the author includes a country risk premium in the cost of capital in order to adjust for the risks of an emerging market.

1.4. Mergers and Acquisitions

1.4.1. Why M&A happens?

Mergers and Acquisitions are an important topic of discussion in today's business environment. As technology evolves, different industries gain more strength or new opportunities for new businesses arise, there are always opportunities for new mergers and acquisitions to occur. Mitchell and Mulherin (1996) argue that, most of the industry takeover activity is actually driven by economic shocks like technological innovations or demographic shifts. Moreover, DePamphilis (2012) presents several reasons behind this phenomenon.

Since some industries depend a lot on fixed costs (IT, R&D, infrastructures, etc.), economies of scale is a plausible reason for M&A. By increasing the sales volume, it consequently reduces the dollar amount of the fixed costs per unit sold and, as a result, the merged company might become more competitive.

Diversification is also another key reason since it allows an increase in growth opportunities of both companies. A recent example of this was the merger between Zon and SonaeCom, where the merger allowed the company to start selling bundled products (Quad play³). Moreover, it can be a good move in case a company want to shift the core product line.

Strategic realignment is also another cause for M&A. It allows companies to make fast adjustments in their business that would be, if developed internally, more difficult and time consuming to implement.

The author also suggests market power as an important driver for M&A, since it may increase their market share, profitability and, possibly, reduce the competitor's strength.

Additionally, DePamphilis (2012) also presents another type of causes for M&A as managerialism (managers augmenting their sphere of influence and power), tax (if one company is accumulating losses, it can offset with a profitable acquirer) or even misevaluation (when investors value a certain company above or below the true value).

In the case of TIM and Vivo, the main reason for the acquisition will be a technological innovation, combined with the opportunity for synergies in CAPEX investments, OPEX savings and strengthening market power in the Brazilian market.

1.4.2. Why is cross-border M&A important?

On a different perspective, Zenner et al. (2008) reflects about the new era of cross-border M&A. The author refers that more often mature market global firms are turning their strategy to emerging markets in a search for additional wealth and future growth. They suggest several reasons for this event such as Globalization, diversification and deregulation.

The first reason comes as a natural evolution of the world economy, where people are increasingly more connected through better communications, transports and information technologies. Secondly, Zenner et al. (2008) suggest diversification since firms are pursuing new sources of

³Quad play is the telecom term for a service made of television, fixed broadband, fixed voice and mobile communications

growth as well as new ways of reducing the sovereign risk of their local economies. And finally, deregulation, because it is being increasingly common to see emerging markets to leave a protectionist approach and to let the free flow of capital and goods trade freely.

This is exactly the case of Telefónica Group and Telecom Itália, where both telecom groups have had significant investments in Latin America due to deregulation and risk diversification. Telefónica group a footprint of more than 20 countries, with a special focus on Latin América, with presence in 15 countries and more than 190 million subscribers.

1.4.3. Does M&A pay?

In a different perspective, many authors have suggested that M&A sometimes does not pay off since the premium paid for the acquisition offsets any possible revenue or costs savings that may arise.

Several authors and respectable magazines⁴ have raised questions whether M&A really pays or not. Dennis Mueller (1980) states that *“the firms themselves are performing no better on average than they would have been in the absence of the mergers”* and Narayanan et al. (1992) concludes that acquiring companies don't realize significant returns.

Bruner (2003) suggests several arguments where M&A pays or not. On one hand, the author refers the expected synergies as the most important factor influencing the M&A success or failure. This may come under the form of business restructuring or economies of scale gaining's.

On the other hand, *“glamour acquiring”* does not pay since these companies may be overvalued with empirical evidence of -17% abnormal returns (Rau and Vermaelen, 1998). Bruner (2003) refers that paying with stock is costly, whereas with cash is neutral due to investors temptation to time the announcement when the stock price is high and also that M&A with the objective of building market power may not be a good source of value addition, as empirically proven by Stillman (1983) and Eckbo (1983).

Ruback (1997), together with You et al. (1986) also found that managers equity participation was lower when bidders returns were lower (zero or even negative), suggesting that when managers have more at risk, more value is created.

Regarding M&A cyclicity, DePamphilis (2012) highlights 7 waves of M&A and identifies two major explanations for this phenomenon: industry reaction to “shocks”, such as deregulation, and the emergence of disruptive technologies. Additionally, the author explains that these waves follow common economic patterns such as high GDP growth rate, declining interest rates and bull stock market, proposing that it is during these periods that most mergers and acquisitions happen and it should continue in the future.

1.4.4. Payment methods

M&A is mostly financed either with stock, cash or a mix between both. Bruner (2004) synthesises some conclusions from several studies related with the type of payment used. Usually, target companies have significant positive returns in both payment scenarios, but, in absolute terms there

⁴ Business Week wrote an article where they show that out of 302 major M&A deals from 1995 to 2001, 61% lost wealth to their shareholders

are slightly differences. When cash payments occur, target returns are significantly positive, whereas when stock payments occur, target returns are also positive but lower than with cash.

On the other hand, acquirer’s returns, in the announcement day, are significantly negative with stock payments and null or slightly positive with cash payments, as showed by Loughran and Vijh (1997).

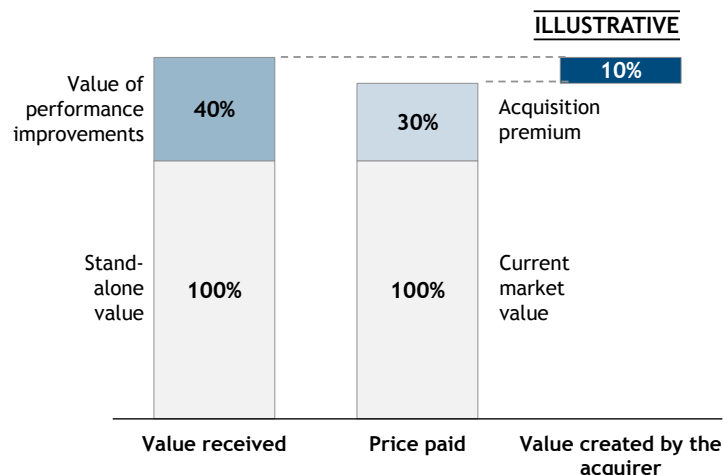
Bruner’s findings are consistent with market timing theory, where managers time the stock purchases when the price is low and sell stock when the price is high (Baker and Wurgler 2002). As briefly explained before, acquirers may have a tendency to time the stock issuance when the price is high since managers are able to raise more money with less stock issuance. Consequently, the market reacts negatively since it may indicate that the company is timing the issuance and the price is adjusted downwards. However, Korajczyk et al. (1991) suggest that managers, knowing this, tend to announce equity issuance when the market is most informed (usually followed by information releases) in order to reduce information asymmetry and reduce possible downwards stock reaction.

Bruner (2004) also refers LBOs, earnouts and collars as alternative payment methods in M&A deals. In LBOs, it is expected that large operational efficiencies and CAPEX reductions are obtained to compensate the increased amount of debt payments. Secondly, earnouts are a good clause to ensure feasibility of future performance commitments and, thirdly, collars exist as a deal cancelation option or deals restructure to prevent possible risks.

1.4.5. How to avoid the synergy trap

One of the main reasons for managers and investors to fall in the synergy trap is by not being able to oversee the above-the-premium price they pay for a deal. As illustrated by Koller et al. (2010), the value created by the acquirer is illustrated in the figure below, where if the acquirer is able to generate enough synergies above the premium paid to the business, he will be able to create value.

Figure 2 - Acquisition valuation framework



Koller et al. (2010) suggest that the value creation depends on two major factors: the performance improvements (or synergies) and the premium paid to the target company. As a result, we can compute the value created by the acquirer in the following way:

$$(18) \quad \text{Value created} = (\text{Stand - alone value} + \text{improvements}) - (\text{market value of target} + \text{premium})$$

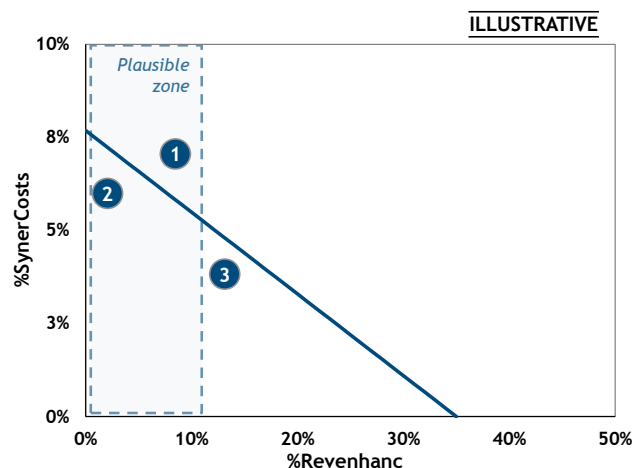
Hence, this formula will give us the foundations for the computation of the “meet the premium line”(MTP) as suggested by Sirower and Sahni (2006). The MTP line is a helpful tool to understand if investors are paying too much for the business and if they are being too optimistic.

Sirower and Sahni (2006) presents a formula that combines both efforts in costs and revenue synergies with the current profit margin and premium paid, thus, creating a frontier where the investor can “avoid the synergy trap”:

$$(19) \quad \% \text{CostS} = \frac{\text{Profit margin}}{1 - \text{Profit margin}} * (\% \text{premium} - \% \text{revS})$$

In the example in figure 3, the authors have computed a scenario where a certain company is willing to pay a premium of 35% for a business with 18% profit margin. As a result, the amount of synergies generated to pay off the investment needs to be above the blue line.

Figure 3 - Meet the premium line



Let’s look, for instance point 1. In this point, the synergies are 8% cost efficiency gains and nearly 7.5% for revenue increases, which, by modifying formula (17), we see that the amount of synergies are above the premium paid.

$$\% \text{CostS} * \frac{1 - \Pi}{\Pi} + \% \text{revS} > \% \text{premium} \Leftrightarrow 8\% * \frac{(1 - 18\%)}{18\%} + 7.5\% > 35\% \Leftrightarrow 44\% > 35\%$$

On the other hand, case 2 and 3 don’t generate enough synergies for the premium paid, therefore, investors should “avoid the synergy trap”.

Furthermore, Sirower and Sahni (2006) suggest that firms are much better reducing costs than increasing revenues due to competitor’s response or customer’s reaction to the merger. As a result, following previous studies and benchmarks made by the authors, a 10% decrease in costs and 10% increase in revenues comes as a reference in calculating both types of synergies. As explained by Sirower and Sahni (2006) , when setting the parameters by the acquirer, the *plausibility box* helps investors to better triangulate and understand if they are being too optimistic on cost reductions or in revenues enhancements.

2. Industry review and market assessment

The telecommunications industry is a broad market that throughout the past century has suffered numerous shifts. From the invention of the fixed voice line, the first steps in the world wide web, the mobile phone and lastly, the high speed broadband, it has enabled people to communicate more, better and change information faster. This industry was one sector where the companies had to adjust their business plans, invest huge amounts of money and keep innovating.

This chapter will be divided into five main categories: an introduction to the main telecom macro trends, data trends, the Brazilian market and the macro trends, how the telecom sector in Brazil is evolving and what we expect the Brazilian market to be in the next couple of years and, finally, a deep dive into Vivo and Tim service providers. We will conclude with a brief description of the revenue and cost drivers.

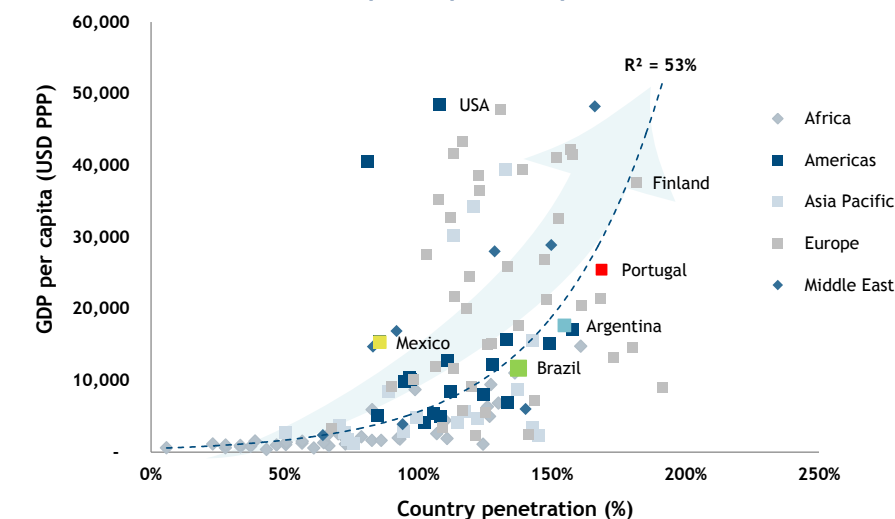
2.1. Global telecom trends

In this first chapter, we will take a look to the telecom landscape. How countries are evolving in the telecom space, take a brief look at the different rhythms per region, how the 2010's decade is reshaping the telecom industry and what should be the next challenges and improvements for operators that want to boost their competitiveness.

Using data from wireless intelligence from February 2014, we have computed the correlation between GDP per capita at purchasing power parity and country penetration. As we can see in figure 4, purchasing power is a strong indicator of mobile penetration with an explanation power of 53%.

This correlation suggests that the higher the economic growth and development, the higher the propensity for mobile phone acquisition. The African continent is still the region with the lower mobile penetration, followed by the Americas (with the exception of US and Canada) and then the Asia and Pacific. On the other hand, Europe shows already a high penetration of mobile phones with almost all countries with penetrations above 100%.

Figure 4 - Correlation between GDP per Capita and penetration



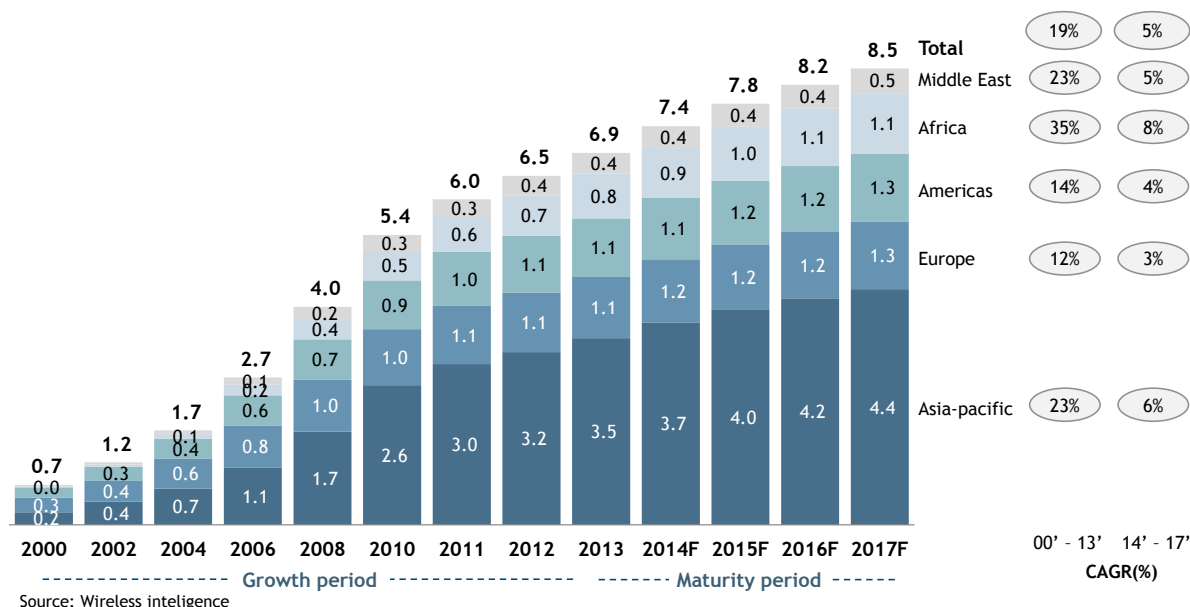
Source: Wireless intelligence

Moving to the wireless market, the global mobile subscribers have grown in the past few years from 700 million subscribers in 2000 to almost 7 billion subscribers in the end of 2013. Although this growth was mostly driven by emerging markets such as Asian-pacific countries, other continents such as Africa, the Americas and Europe have experienced significant growth between 12-14% in more developed continents and some astonishing 35% in the African country.

In figure 5, we see the growth per continent as well as the expected growth of mobile subscribers until end of 2017. Asia-pacific countries will continue to be the most relevant market worldwide, mostly driven by big markets such as India and China but also Pakistan, Philippines, Russia or Indonesia.

Moreover, one key trend is the deceleration of the mobile subscriber's growth into a more stable growth. While the first decade of 2000 was shaped by an average 20% growth rate per annum, the next 4 years will "only" have a growth rate of 5%.

Figure 5 - Mobile subscribers per continent
(Bln users)



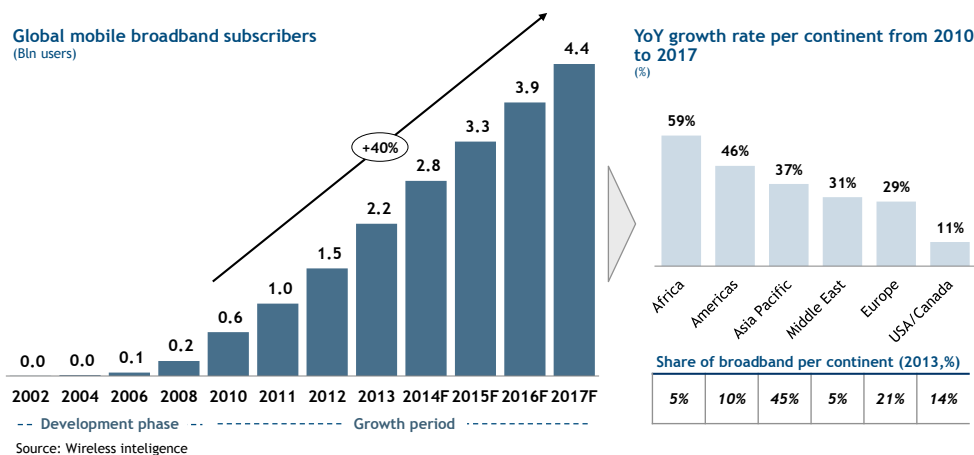
Nevertheless, this mobile deceleration is also followed by a reshape on the telecom sector through the mobile broadband (MBB). The GSM technology took his first steps in 1991, but only in late 90's it started being commercialized the first handsets with mobile broadband capabilities. According to wireless intelligence, in 2002 there was only MBB in South Korea but in 2006 it started being mass deployed by service providers while handsets were also being developed with this technology by known handset manufacturers such as Nokia or Erikson.

As a result, it was only between 2008 and 2010 that MBB subscribers started growing and from 2010 onwards, growing at a rapid pace. Figure 6 shows the MBB subscribers evolution with forecasts until 2017. As we can see, from the past 4 years until the next 3 years it will be expected an annual market growth of 40%.

In addition, again, Africa will be the continent with the highest growth rate, mostly due to the early development stage of the telecommunication sector in those countries. The Americas will also have a relevant MBB growth, of around 46%. Brazil, in this case, plays an enormous role, where it is expected, according to wireless intelligence, to growth its MBB subscriber base from 17 million in 2010, to more than 227 million in 2017.

Finally, looking to the share of MBB subscribers, it is clear that the biggest share of market will still come from the Asian countries; however developed countries such as the European or US and Canada still represent 35% of global MBB subscribers in 2013 and is expected to decrease to 27% in 2017.

Figure 6 - Global broadband evolution

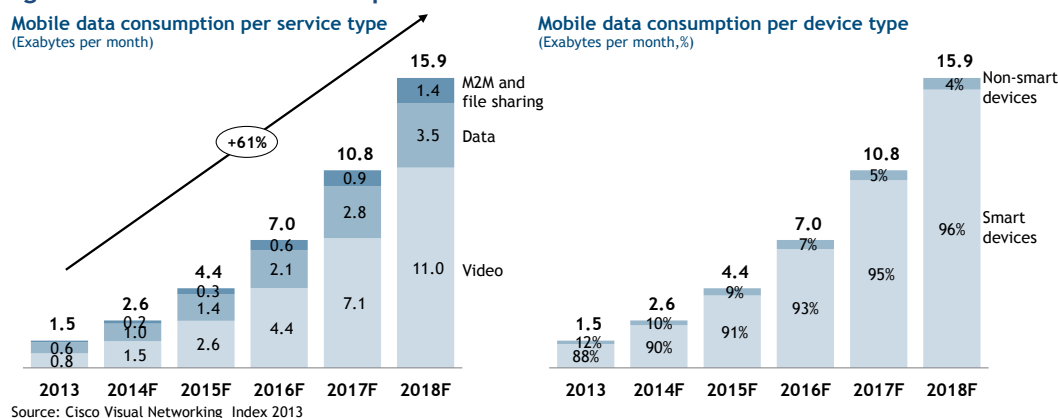


2.2. Data Trends

As we have seen previously, data is going to be a main driver for growth in the telecom sector. According to Cisco analysis, mobile data consumption is expected to increase at an annual pace of 61%, on average, and will be mainly driven by video and data traffic. In other words, data consumption will be ten times higher in 5 years than it is today.

Moreover, as data evolves, the share of data consumed by a smart device will keep rising and is expected to be 96% in 2018 (right side of figure 7).

Figure 7 - Global data consumption⁵



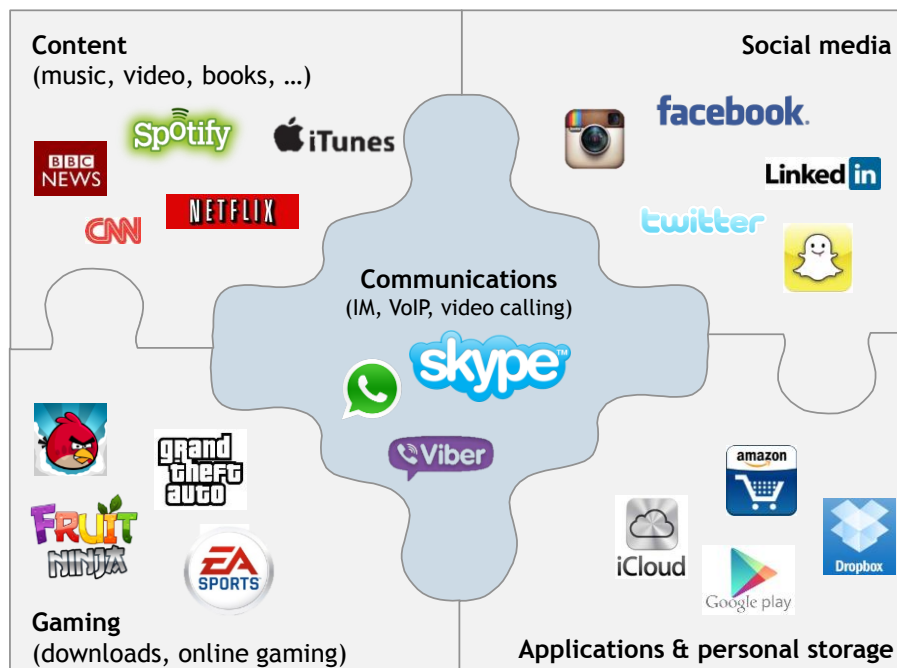
⁵ 1 Exabyte = 1 Billion gigabytes

This data explosion may be explained by a couple of factors. On one hand, the handset manufacturers are evolving and producing more data consuming smartphones and leaving feature phones, while at the same time, Telco operators are deploying faster and with higher capacity networks and, the last but not the least, internet players are growing and expanding their services.

Figure 8 shows an illustration of how internet enables all these products to be online such as content (news, music, books or video), social networks (Facebook, Twitter, etc.), online gaming, online communications (Skype, Whatsapp, Viber, etc.) and also applications and cloud services such as iCloud, Dropbox and Google Drive.

As a result, it is expected that telecom operators will move from being a fully service provider to an enabler of this new online world, where information, social networks and cloud are the new paradigm.

Figure 8 - New digital paradigm



2.3. Telecom operators trends

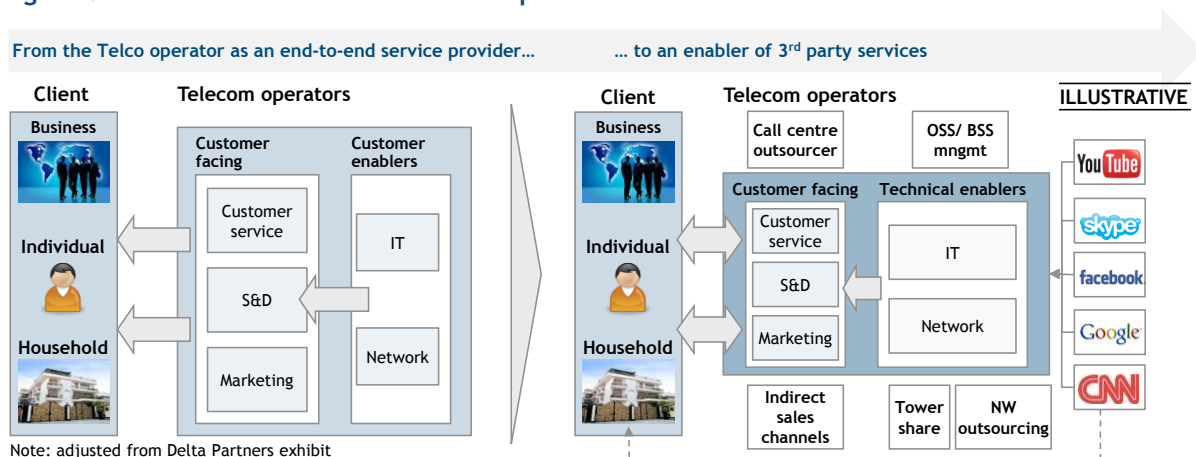
The old fixed voice line that we used to have at home has passed away a long time ago. Telecom operators, in the last 5 to 10 years were still used to sell end-to-end services. From the deployment of infrastructure, the network management and then customer facing activities such as sales, customer care or marketing, Telcos used to manage the entire supply chain.

However, with the entrance of new digital players, with requirements of faster services, the appearance of more personalized products and increase in complexity of products and technologies, telecom operators are now starting to change their business plan, from being an end-to-end service provider to an enabler of products and services.

Figure 9 pretends to illustrate this game shift that telecom operators are facing. The game is now much more complex: from a technology point of view, there are many new technologies and expertise that makes it difficult for operators to have fully control in all new technologies that are evolving. As a result, Telecom operators may outsource specific services such as OSS/BSS (operations support system and business support business) management, call centre outsourcing, tower management or even network infrastructure outsourcing.

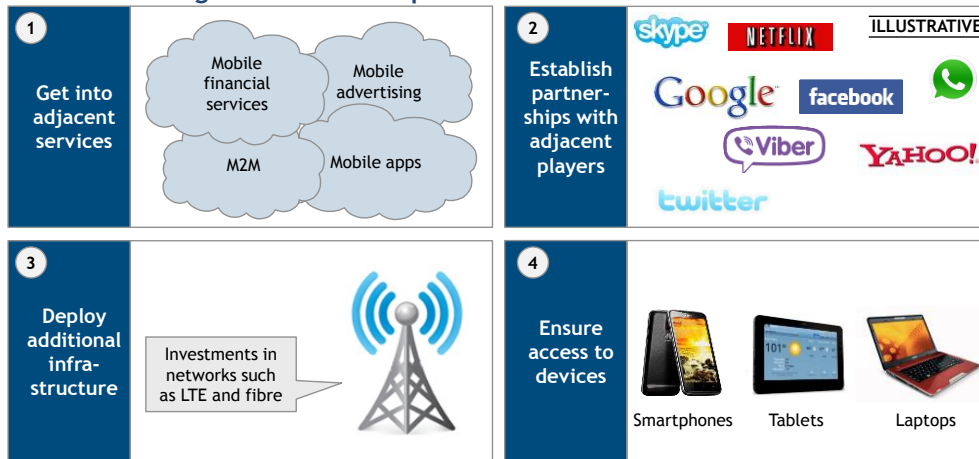
In addition, while before telecom operators could have control on all business, now, the business is much bigger. The new paradigm became the information world and so, operators operate more as a 3rd party service provider (while still outsourcing specific components of its enablement).

Figure 9 - A business model for telecom operators



This game shift makes the work of telecom operators more complex. In order to gain traction and not lose competitiveness to other communication suppliers, they need to focus on four main actions: provide adjacent services such as mobile apps, mobile advertising and mobile financial services (through partnerships with banks for instance), establish partnerships with internet players (Google, Skype, Whatsapp, etc.), deploy faster network infrastructure such as LTE towers and fiber and, the last but not the least, ensure their technology enables the usage of “smart” devices (figure 10).

Figure 10 - New challenges for telecom operators



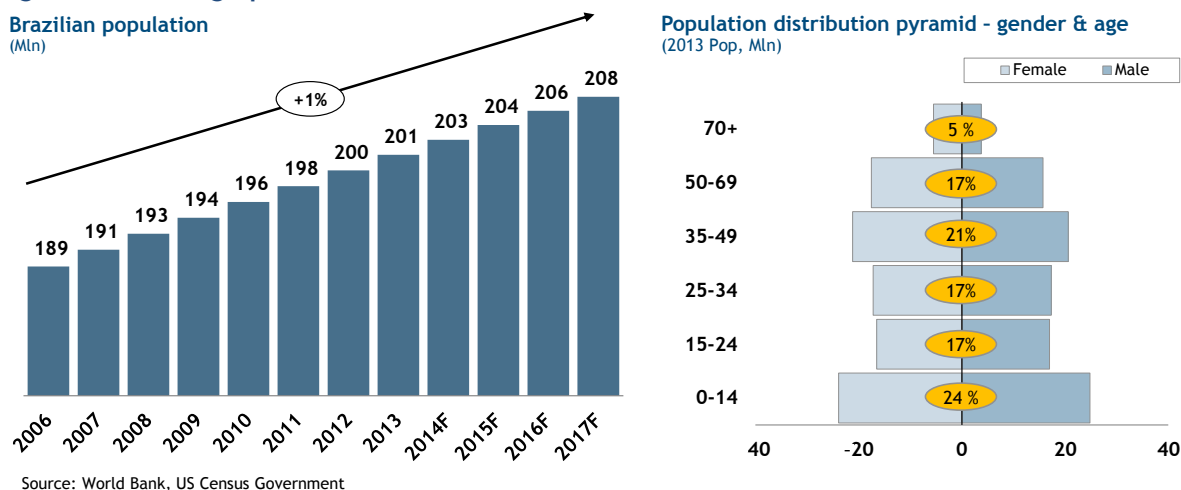
Concluding, the market is changing and telecom operators must be up-to-date with the newest technologies. As a market leader, it is important to take the first move in order to not be surpassed by another player that provides these services first with better quality. Moreover, operators need to start offering bundled services in order to get economies of scale and reduce churn. An example of this is Portugal Telecom, which was the first true Telco to offer Quad play offers, and thus, increasing the synergies of having fixed and mobile infrastructure to leverage new communication services.

2.4. Economics and demographics of Brazil

The Brazilian country is the 5th biggest country in terms of population and is expected to grow at a pace of 0.8% per year to an estimated number of 208 million people in 2017. In terms of demographics, Brazil is in the middle of the process from being a characteristic young country to an “old” country, as characterized by developed countries (right side, figure 11).

Brazil has an estimated urban population of 87%, where São Paulo and Rio de Janeiro are the biggest cities, with nearly 20 and 12 million people, respectively.

Figure 11 - Demographics of Brazil

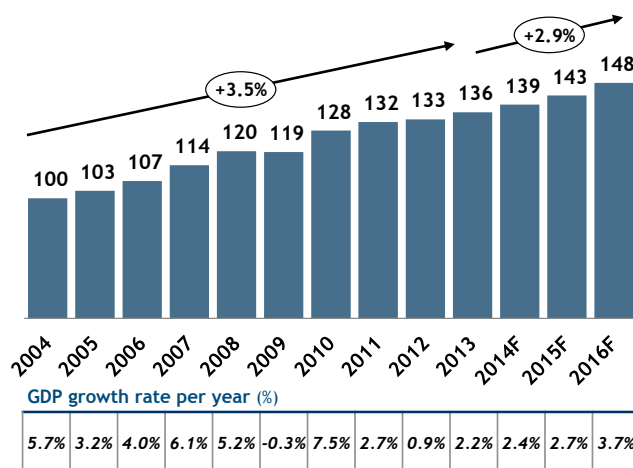


In terms of economy, Brazil is characterized by large agricultural, manufacturing, mining and service sectors and outweighs any of the other Latin American countries. It has experienced high economic growth in the past 25 years with the peak in 2010 with a GDP growth rate of 7.5%. Moreover, unemployment is at historic low (5.5% in 2012) and income disparities are reducing on a year-over-year basis since 2000.

As a result, the Brazilian economy has been growing with an average 3.5% in the last decade and is expected to keep growing in the next 4 years at 3% per year, according to World Bank (figure 12).

Figure 12 - Brazilian GDP evolution

2004 = 100



Source: World Bank

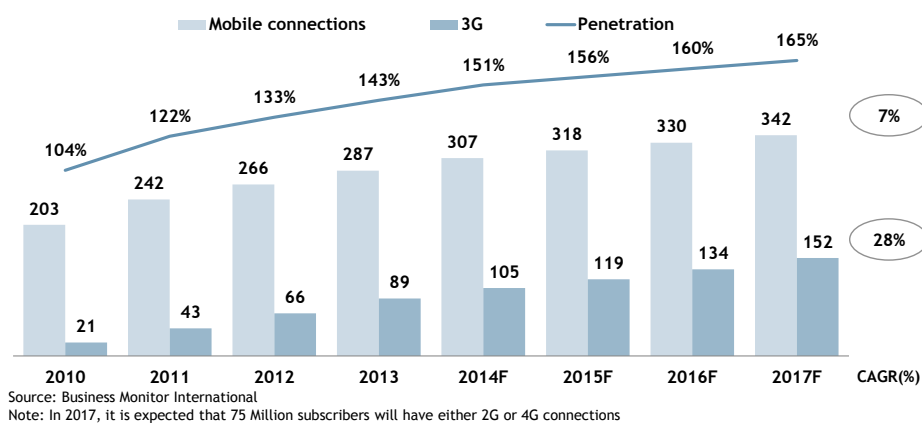
2.5. The telecommunications sector in Brazil

The telecommunications sector in Brazil is facing a strong growth outlook in 2013, following the growth showed in the last 4 years. The mobile subscribers are expected to keep growing at a rate of 7% per year. However, much of this growth has been driven by pre-paid customers with a share of 80.2% and 19.8% for post-paid customers. Following international benchmarks, there is still room for improvements in the post-paid segment, since average revenues per user (ARPU) are higher than in pre-paid customers.

The mobile market has entered into a new stage of development with all four players starting to deploy LTE and 3G infrastructures in their networks, which allowed the growth of the MBB with an expected annual compounded growth rate of 28%. Furthermore, this deployment of LTE is a great opportunity for all four players to gain new opportunities for monetization, such as value added services (VAS).

Figure 13 shows the mobile subscribers in Brazil, as well as penetration and mobile connections. As we can see, penetration level is 143% and is expected to keep growing in the next years. In part, this growth can be explained by the unconnected remote areas that Brazil still has and can help all four operators to get higher organic growth, together with the strong economic growth showed in the past few years.

Figure 13 - Mobile, 3G Connections and Brazilian mobile penetration
(Mln, %)

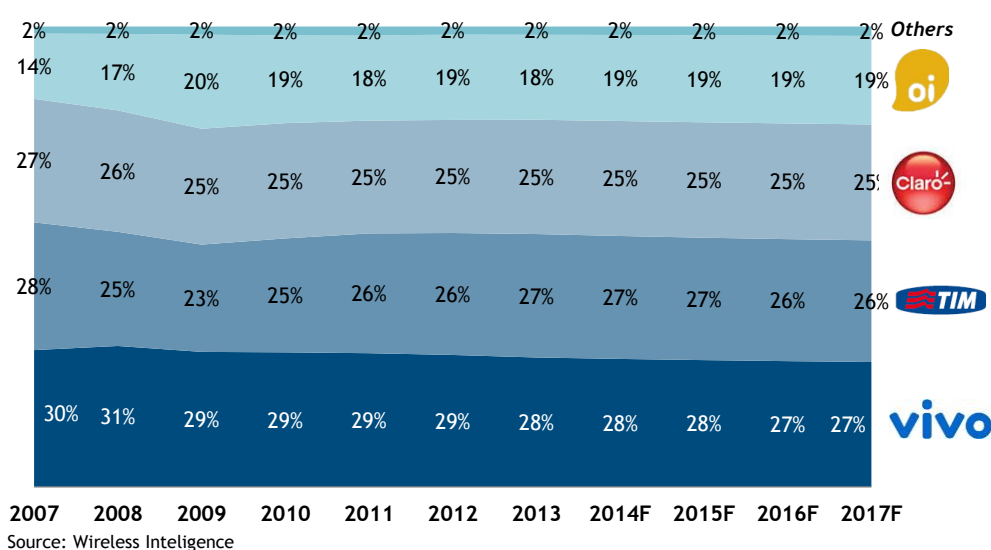


Mobile Broadband is also evolving fast. The 3G take-up has been strong and the new deployments of 4G infrastructure can help Telcos to go into the data business, while voice revenues start eroding due to new ways of communicating (Whatsapp, Skype, Viber, etc.).

The four main telecom operators in Brazil are Vivo, TIM, Claro and Oi. These four players have maintained a sustained market share in the last few years with Vivo as the market leader with 27% market share, followed by TIM and Claro with nearly 25% each and then Oi with almost 20% market share. The remaining 2% are niche players such as Nextel, Algar Telecom and Sercomtel.

Nevertheless, Vivo has been losing market share due to fierce competition from the other three players, from a solid position of 30% market share to current 27% market share, 1% higher than TIM.

Figure 14 - Market Share per operator



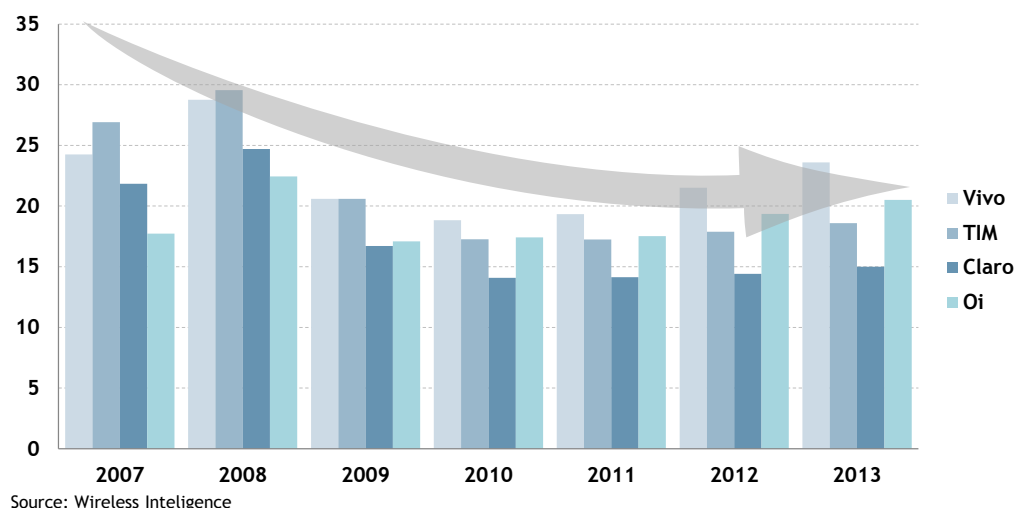
In terms of average revenues per user, according to wireless intelligence, the revenues are slightly declining since 2007. This effect is mainly caused by the increase in the number of mobile subscribers that is reaching lowered income subscribers and also the expansion to rural areas. This last cause is, in fact required by the regulatory authority, under the National broadband plan.

However, the later trends on LTE deployments can help operators to penetrate into higher segments that demand higher internet speeds and, thus, could encourage higher spending for this services.

In a nutshell, the ARPU is expected to slowly increase due to higher economic growth and additional revenue streams such as new data plans or more focus on the post-paid segment.

Figure 15 shows the ARPU per operator since 2007. As we can see, ARPU started to erode since 2008, but in 2012 and 2013 the ARPU started to increase, driven by data hungry consumers and new opportunities in bundled services.

Figure 15 - Average revenue per user per operator
(BRL, per month)

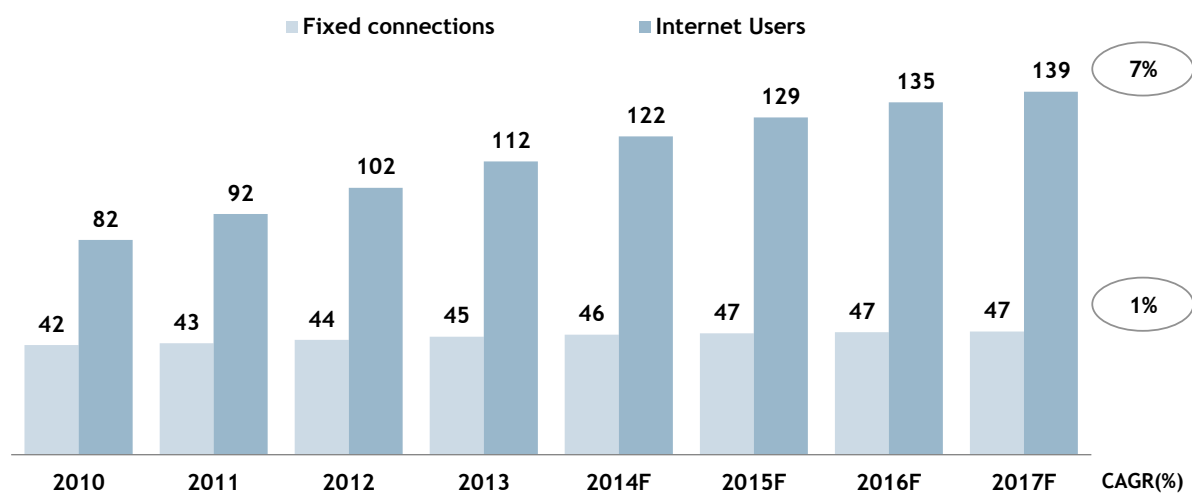


On the other hand, the fixed voice line market has experienced a flat evolution and is expected to maintain its size until 2017. This is also explained by the other technologies being deployed that can bring fixed voice with the service. This is the case of fixed broadband, that, by using this infrastructure, it enables the usage of bundled services over a fixed carrier: TV, fixed internet and fixed voice.

The Brazilian broadband market is evolving fast since income is rising and services are becoming more affordable. Moreover, as PCs and online devices are increasing, more people have access to internet, contributing to this fast growth of the internet connections.

Furthermore, the Brazilian government launched in 2010 the PNBL (“*Plano Nacional de Banda Larga*”, or National Broadband program) with the objective of “digital inclusion” and increase economic growth, which contributed to the initial growth from 82 million in 2010 to 112 million internet users in 2013.

Figure 16 - Fixed connections and internet users
(Mln)



Source: Business Monitor International

2.6. Vivo company review

Vivo is the leading telecommunications operator in Brazil with almost 80 million subscribers and it is 73.9% owned by Telefónica Group.

In 2010, when Vivo was still owned by Portugal Telecom and Telefónica (29.71% and 30.31%, respectively), Telefónica group bought Portugal Telecom shares in Vivo and became owner of Vivo with 59.42% of shares. Throughout the next months, Telefónica strengthen his position to 73.90% of all shares until mid-2011.

The Brazilian incumbent has two main businesses lines: fixed and mobile telecommunications but the fixed business is declining, while the mobile is growing at an average pace of 9% per year.

As the world is moving towards the convergence of mobile and fixed connections, the same is happening in Brazil through Vivo. The operator aims to merge the fixed and wireless entities to create a strong consolidated brand that offers bundled services such as Triple and Quad play (television + internet + fixed voice or television + internet + fixed voice+ mobile, respectively).

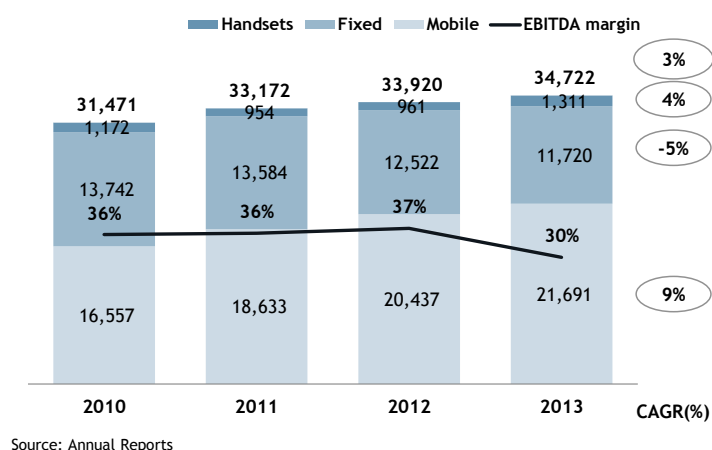
Vivo has a clear strategy for the mid-term. As presented in the last earnings announcement, Vivo brand wants to become a national leader in three main fronts: Mobile, Fixed and Corporate. In the mobile business, supported by the LTE network expansion, the incumbent has initiated a process to increase the internet adoption by subscribers. Moreover, in the fixed business, Vivo wants to double the number of homes passed⁶ in São Paulo, expand the IPTV offering, while investing more CAPEX in infrastructure and IT to improve the efficiency of the network. In addition, it is also clear to the operator the focus on the corporate segment, where Vivo want to explore opportunities in new data centers, offering tailored solutions to clients along with new opportunities in M2M (e.g.: smart cities) and in B2B such as health, security or financial services.

2.6.1. Revenues

The operator has seen a compounded annual growth rate of 3% in revenues in the overall business, which was mainly driven by the mobile market with almost 10% growth year-over-year. On the other hand, the fixed business is declining and has declined 15% in the last 3 years. Moreover, the EBIDTA margin has suffered a significant drop in 2013 mostly due to the competitive environment between Claro, TIM and Oi, together with regulatory constraints that demand the operator to provide services in less profitable rural areas.

⁶ Home passed is the technical term for a connected household with fiber

Figure 17 - Vivo Revenues per product
(BRL Mln)

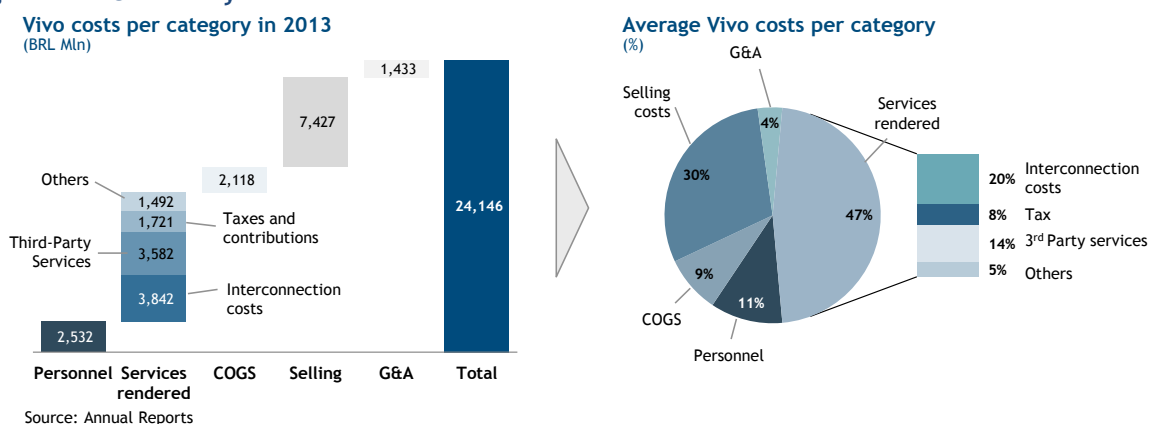


2.6.2. Costs

In terms of cost structure, Vivo is divided into 5 main components. Personnel correspond to salaries and benefits associated with all direct employees. Services rendered are all costs related with infrastructure maintenance, interconnection costs, quality assurance, TV and mobile content purchasing and all costs associated with the services offered by the operator. Costs of goods sold are the purchasing costs of mobile phones to handset manufacturers, while selling costs are all costs related to selling efforts such as marketing expenses, call centre and commissioning to 3rd party sellers. Finally, general and administrative expenses are all costs related with administrative purposes, thus, non-customer facing activities.

On the right-hand side of figure 18, we see the average percentage of costs for the last three years for each category. As we can see, services rendered and selling costs represent 77% of all operational costs, while personnel only 11%.

Figure 18 - Cost analysis



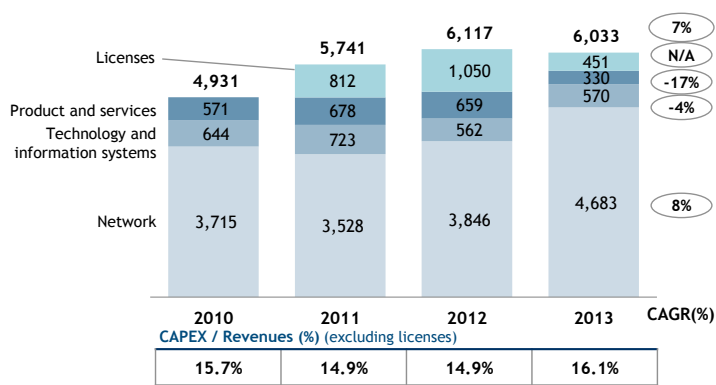
2.6.3. Capital expenditures

Vivo is increasing its absolute CAPEX investments in the past 4 years. In 2013, the incumbent has invested more than 6 Billion Brazilian reais (BRL), less BRL 84 million than in 2012.

Most of the investments were focused on quality enhancement and, more importantly, on capacity increase to support expected data traffic. Vivo is also investing in fiber infrastructures, especially in São Paulo, where they plan to connect 2.5 million homes until end of 2014.

In addition, excluding licence fees (we exclude since these costs are not constant), Vivo has been able to maintain a stable CAPEX per operational revenues, of around 15%.

Figure 19 - Vivo Capital Expenditures
(BRL Mln)



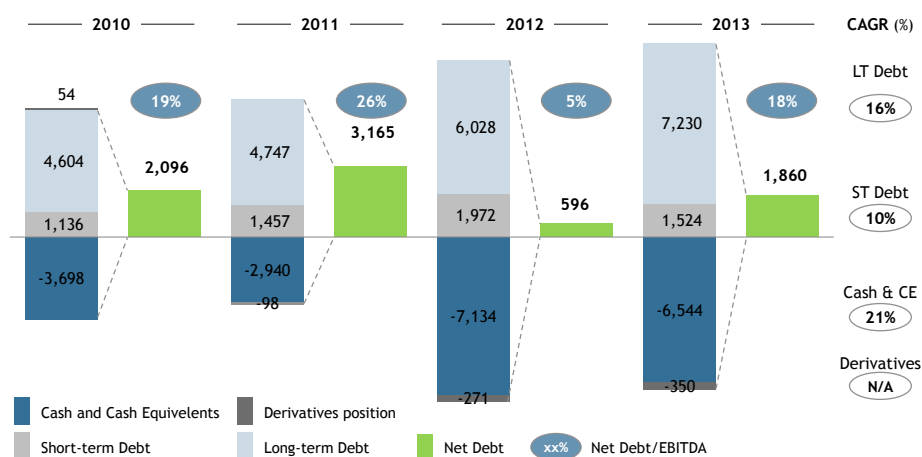
Source: Annual Reports

2.6.4. Net Debt

Vivo is experiencing solid levels of net debt in the past 4 years. The ratio of net debt to EBITDA was in 2013 below 20% and was actually more 330% than last year due to higher dividend payments from Vivo to its shareholders.

The long-term debt has increased in the past few years to more than BRL 7 Billion, however, the cash and cash equivalents have also experienced a significant growth of more than 20% per year. The short-term debt has been stable, around BRL 1 Billion and BRL 2 Billion. As a result, the growth in gross debt is offset by cash and cash equivalents, and thus, Vivo has been able to have a sustained level of debt that allows them to increase leverage and invest on new opportunities that may arise.

Figure 20 - Vivo net debt analysis
(BRL Mln)



2.7. TIM Review

TIM is the second player in the Brazilian market with a market share of 26%. It is owned by Telecom Italia Group in 66.68% and by Telefónica Group in 9.97%. In 2006, Telecom Italia received a sale proposal from América Movil (owner of Claro) but they refused, arguing that it was an asset with high strategic importance for the group. In the meantime, Telefónica also bid an offer of TIM Brasil, which was successfully achieved, having bought 6.95% of shares in the second quarter of 2007.

The stake owned by Telefónica Brazil in TIM Participações was allowed by ANATEL (the Brazilian regulatory authority) because management of both participations would remain separate. However, Telefónica managed to create partnerships between both operators and share infrastructures and gain some savings by acquiring equipment jointly. Yet, according to analysts, in the long-term, it seems likely that Telefónica will either merge both operators or leave stake in one of them. Moreover, industry analysts have suggested that parent Telecom Italia might sell his assets to relief debt pressure, but the group have denied.

TIM provides mobile, fixed and broadband services and his GSM technology covers nearly 95% of urban population in 3383 cities. Moreover, the mobile broadband coverage is quite extensive, with an estimated coverage of 72% of the urban population through its 3G network. Furthermore, analysts say that TIM Brazil has the most developed fixed broadband network and is a leader in implementing MVNOs in Brazil.

In terms of type of subscriptions, TIM has been efficient in growing the pre-paid customers, with an average growth rate of 17% per year and coming from a base of 24 million subscribers in 2007 to almost 65million by end of 2013. On the other hand, the post-paid segment has not been very successful. Although the segment has grown, it has been at a much slower pace, compared to the prepaid segment, 4.1% per year from 2007 to 2013. As a result, the post-paid segment is made of nearly 8.6 million subscribers. According to analysts, TIM strategy should continue to be on the pre-paid segment in order strengthen its position as a solid second leader.

In addition, now that TIM is launching new technologies and improving its infrastructures, the operator also wants to develop further the post-paid segment, boost data revenues and explore value added services.

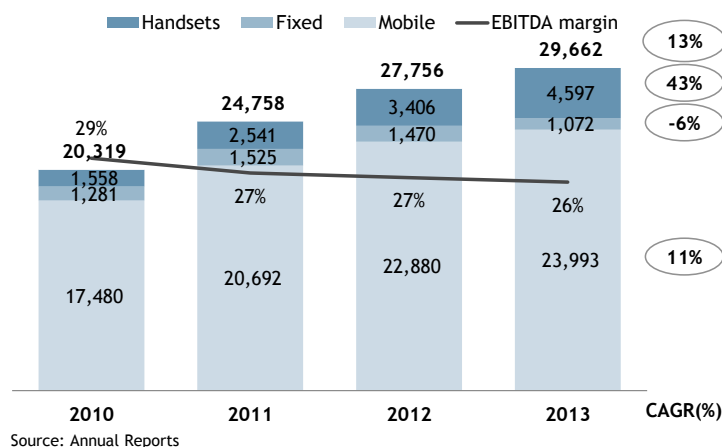
TIM presents a positive outlook for mid-term. Its investments in fixed broadband as well as LTE and also high mobile coverage create an ideal scenario for launch of bundled services and also for development of other drivers of revenue growth such as value-added services, post-paid, more premium data plans or even develop the corporate segment.

2.7.1. Revenues

The company has been reporting a strong revenue growth in the past 4 years, from nearly BRL 20 billion to almost BRL 30 Billion. While the mobile business represents the major revenue stream of TIM with a revenue growth year-over-year of approximately 11%, the fixed business is shrinking and represents as of end of 2013 less than 4% of the total business (figure 21). However, as we have seen previously, the mobile revenue growth hides important messages such as the ARPU. The

second biggest player by number of subscribers has reported the second lowest ARPU from the four competitors over the past 5 years.

Figure 21 - TIM Revenues per product
(BRL Mln)



2.7.2. Costs

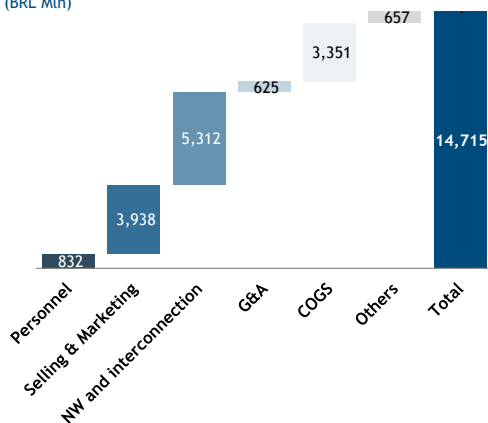
In terms of costs, TIM Participações follow a typical cost structure of a telecom operator. Almost 64% of total costs in 2013 were driven by network, interconnection and selling and marketing expenses. The first component was BRL 5.3 billion and corresponds to all operating expenses related with infrastructure maintenance, IT expenses and fees paid to other operators through interconnection costs. The second item, selling and marketing costs, are all expenses related with the sales force and marketing investments such as commissions to 3rd party sellers, marketing campaigns, TIM stores (employees, rents, electricity and water, maintenance...), among others.

The third largest cost component was costs of goods sold, with a total value of BRL 3.35 billion in 2013. This component is mostly driven by handset sales and other communication devices such as routers or fixed line phones. As a result, as we can imply from the handset revenue (the revenue item with the highest growth), it is also the operating expense with the highest growth, with an year-over-year growth of 38% since 2009.

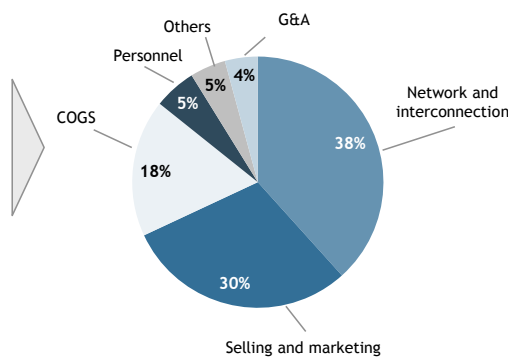
TIM had 12,167 employees in 2013, more 517 than in 2012 and its costs were BRL 832 million, while general and administrative costs were BRL 625 million and corresponds mainly to central office work, non-customer facing employees, office rentals and maintenance, water and electricity and other various office items. Finally, the last operating expense component, others, are related with all the rest of expenses not allocated to any of the remaining items.

Figure 22 - TIM cost analysis

TIM costs per category in 2013
(BRL Mln)



Average TIM costs per category
(%)



Source: Annual Reports

2.7.3. Capital Expenditures

TIM had the highest historical CAPEX per operational revenues, of around 18% to 20% due to its efforts in improving service quality and infrastructure expansion. The main strategy will be the market shift to data and, as a result, the operator has already started its fiber expansion and is expecting to pass one million homes by end of 2013. However, in the long-term, we expect the ratio CAPEX to Revenues to decrease in the long-term in order to generate cash flows to its shareholders

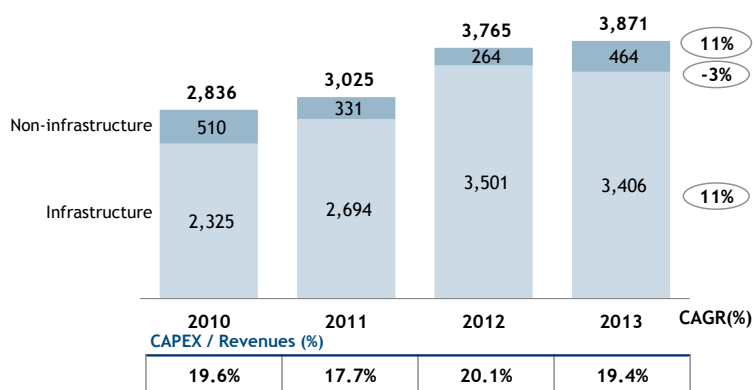
In August 2013, TIM released an investment plan for the next 3 years. The roadmap will continue to be the focus on infrastructure expansion, through investments in backhaul and targeting more than 100 cities until end of 2016, increase the fiber network from 46,000km in 2013 to more than 65,000km in 2016, and continue the mobile coverage expansion through investments in 3G and LTE base stations throughout the country⁷.

As a result, TIM's long term strategy will be focus on creating new bundled services, increase the service quality of its network through faster fixed and mobile broadband, while gaining market share in the "ultra broadband"⁸ and developing the corporate segment such as the SME segment.

⁷ See appendix for more detailed information about the slide presented by TIM with its roadmap until 2016.

⁸ Term used by TIM for internet speed above 34Mbps

Figure 23 - TIM capital expenditures
(BRL Mln)



Source: Annual Reports

2.7.4. Net Debt

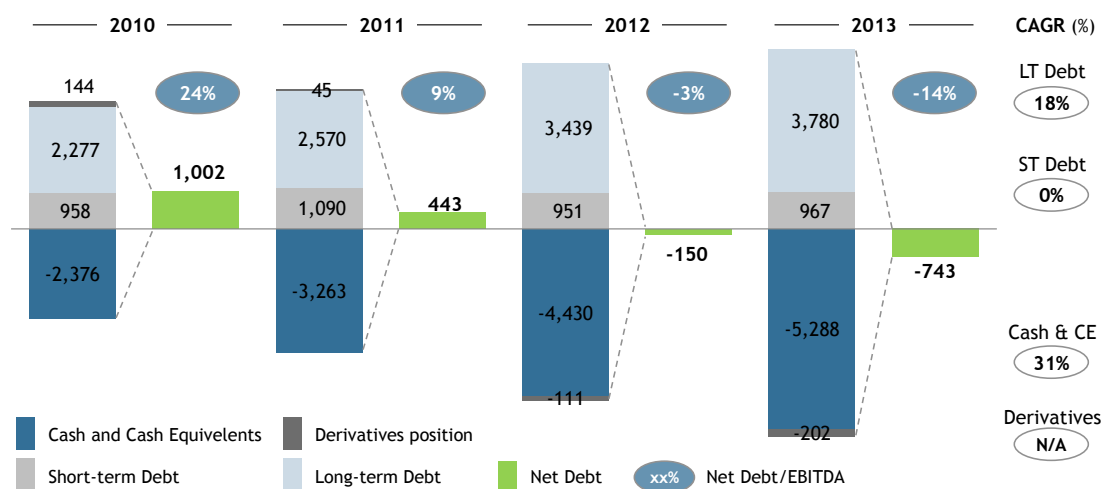
Although TIM Participações has been increasing long-term debt at a pace of 18% per year, its cash and equivalents and derivatives positions are also increasing, offsetting the net debt to minus BRL 743 million.

The investments in network infrastructure made throughout the last 4 years have been the main reason for the increase in long-term debt. Short term debt, on the other hand, has been stable and is mainly used for short-term commitments or even accounting procedures of long-term debt with less than one year maturity.

In terms of cash and cash equivalents, TIM has been able to collect significant amount of cash due to stable net cash flows in the past 3 years. The last item, derivatives position, corresponds to the net position held on the last day of the fiscal year of all derivative assets (Information on derivatives investments has not been disclosed by TIM Participações).

TIM, along with Vivo, has a big financial slack that allows the operator to invest in new opportunities and increase its leverage and, thus, it is in a good financial position.

Figure 24 - TIM net debt analysis
(BRL Mln)



2.8. Revenue and Cost Drivers

In the telecommunications industry, as in any other industry, the cost and revenue drivers depend on several factors that are impossible to predict. However, some indicators have a strong explanatory factor and, as many industry analysts use, can constitute fair assumptions to predict future revenues, costs and business evolution.

2.8.1. Revenue Drivers

The revenue of a typical operator can be decomposed through the formula below.

$$(15) \quad \text{Revenue} = \text{ARPU} * \text{number of subscribers}$$

However, this is a very simplistic way of describing the revenue. In order to be more accurate, we should detail the revenues into more categories such as data ARPU and voice ARPU (and the same for number of subscribers). Furthermore, we should also include the revenue from handsets sold and make a distinction between fixed and mobile ARPU and subscribers. As a result, the formula could be broken down into formula 16.

$$(16) \text{Revenue} = \text{ARPU}^{\text{prepaid}} * \# \text{pre subs} + \text{ARPU}^{\text{postpaid}} * \# \text{post sub} + \text{ARPU}^{\text{fixed}} * \# \text{fixed subs} + \text{Handset}$$

Thus, by looking at the formula above, we see three main categories that we need to further investigate: subscribers, ARPU and handset sales.

The number of subscribers can be predicted using elements such as country penetration forecasts, GDP evolution, infrastructure development and new products release. Coming back to figure 4, there is a good correlation between penetration and GDP per Capita (PPP), so, using forecasted GDP per capita can be a good way of measuring future subscribers.

Then, the best way to measure future ARPU, or average revenue per user, is by looking to the past and identifying possible future trends. For instance, in the Brazilian market, the ARPU is decreasing due to expansion of mobile services to lowered income people, but, at the same time, operators

are currently making efforts to increase ARPU through bundled services, premium data plans, higher penetration of the post-paid segment, and so on. Thus, it is a fair assumption to slightly increase the ARPU in the upcoming years.

Finally, handset sales are probably the easiest factor to estimate. By looking to historical data, we can easily see how many handsets are bought per year per subscriber. Let's say it is 0.25 (meaning each subscriber buys one handset every four years): by knowing the subscriber base forecasts and assuming the same prices per handset, we can predict the number of handset sales every year, and in this way, make fair estimations about the revenue coming from mobile phones.

2.8.2. Cost Drivers

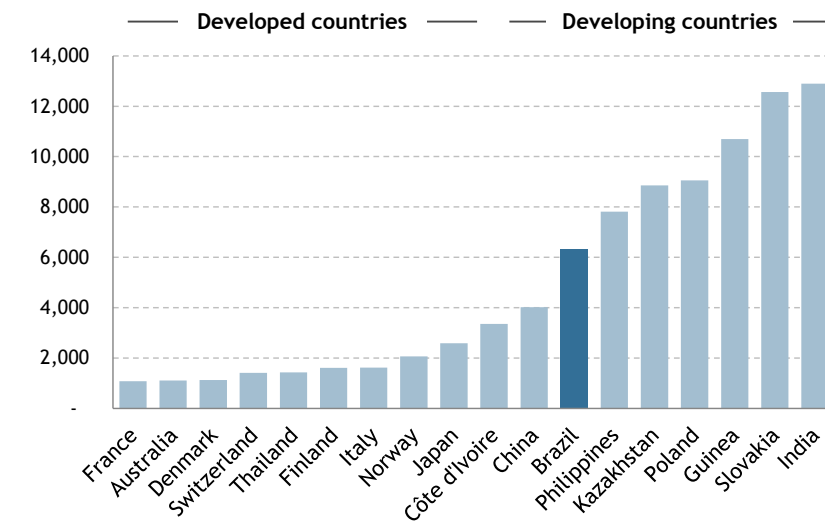
Cost drivers are more difficult to estimate because there are more categories to estimate and, hence, depend on more factors. Taking the example of Vivo and TIM, these operators follow a typical cost structure of any telecom operator. They have network and interconnection costs, selling and marketing costs, personnel, costs of goods sold, general and administrative costs and others.

Network and interconnection costs are all costs related with the service provided, such as maintenance, site rentals, electricity, IT, interconnection costs (fees paid to other operators for calls in other networks) and so on. As a result, predicting a fair estimation of these costs can be extremely difficult. One way analysts often use to predict these costs is by looking to minutes of usage or usage of data, meaning that the costs of network are linked to the usage of the network and consequently, subject to network overload and maintenance. However, network costs are usually not directly linked to the evolution of these factors (operators can create synergies), thus, we can use only a "divider" to forecast the network evolution. Another way to look at this is by looking at the age of the infrastructure (the older the infrastructure is, more maintenance should be required) however, this information is commonly not disclosed.

On the other hand, selling and marketing expenses could be seen as the *effort* to increase subscribers to the network. As a result, we can link the evolution of marketing and selling expenses to the evolution of subscribers.

Personnel, is also another difficult factor to estimate. Taking as a benchmark figure 25, where we see the number of subscribers per employee, we can conclude that, although with high dispersion, it is reasonable to assume between 2000 subscribers and 12,000 subscribers per employee. Moreover, we can also relate the country development with the number of employees since more developed countries should have fewer subscribers per employee (more services demand more employees) and also, population size makes the ratio go higher. Thus, we will use the current Brazilian ratio of subscribers per employee to predict to evolution of costs with employees, along with small differences for each operator.

Figure 25 - Number of subscribers per employee per country
 (#)



Source: 3Q 2012, Wireless Intelligence

Then, cost of goods sold, as explained before, is linked to number of handsets sold, so, we will use the forecast of mobile phones sold to predict the costs in this category.

Finally, general and administrative costs is usually not directly linked with the operational activity of the company but, since it is usually around 3-5% of revenues, we will use the average revenue percentage of the last 3 years for Vivo and TIM (3.0% and 3.1%, respectively).

3. Vivo Valuation

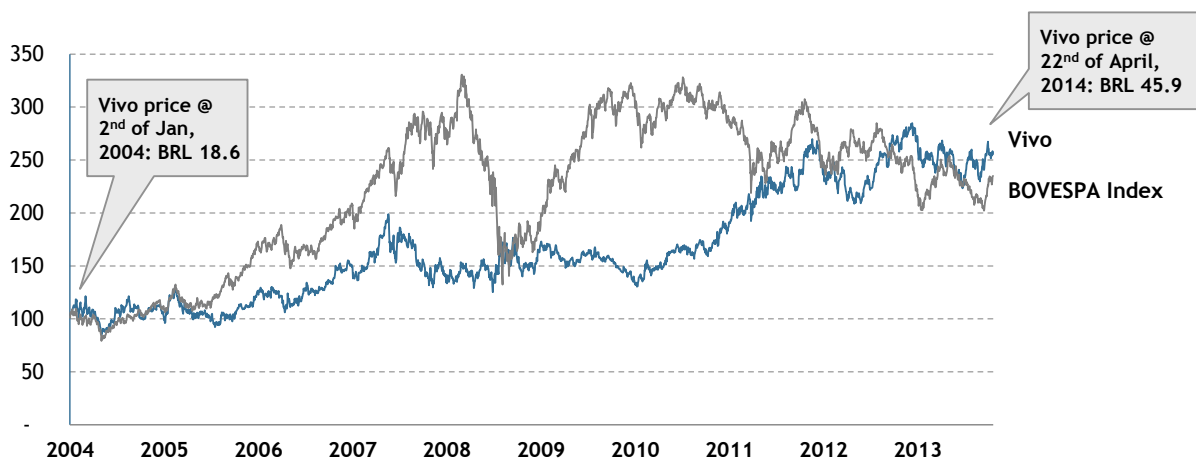
3.1. Introduction

After having a deep understanding of the telecommunications industry and the Brazilian market, we will take a look at Vivo's valuation. We will firstly have an overview of Vivo stock price and then, we will review each component of the free cash flow to the firm. Then, we will perform a sensitivity analysis to macro, operational and discount factors variables.

Vivo stock price had, in the past decade, a sustainable growth and is currently traded at nearly 46 Brazilian reais. On the other hand, while the Brazilian stock market index (BOVESPA) has been growing more in the past than Vivo's stock, by end of 2013, the Vivo stock value was worth more than the stock index (starting from a base value of 100 in the beginning of 2004).

Nevertheless, Vivo's stock price had a quite stable evolution in 2013, with a maximum peak of BRL 51.2 and a low of BRL 40.1 per share.

Figure 26 - Vivo stock price evolution
(Beginning of 2004 = 100)



3.2. FCFF projections

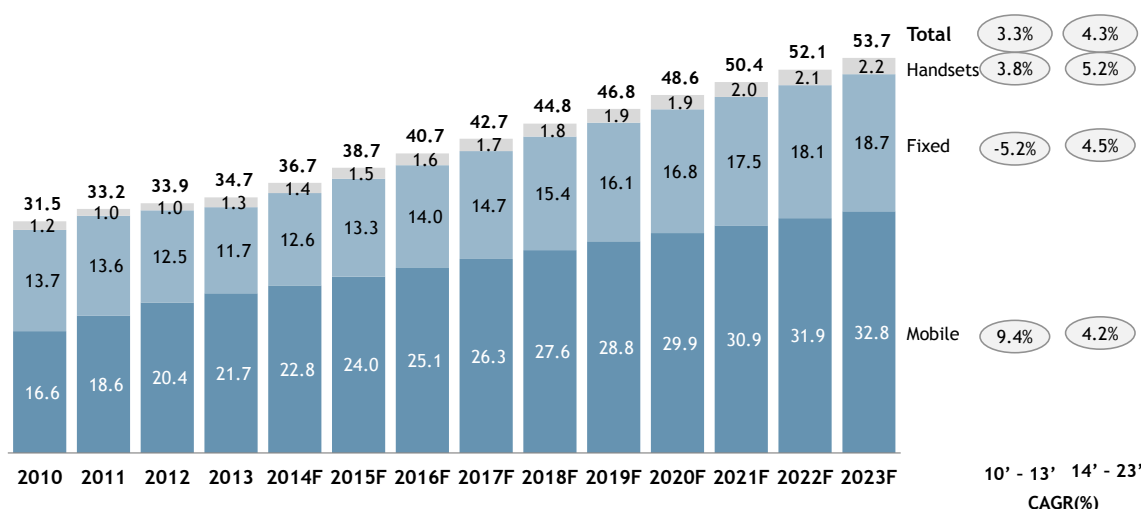
In this first section, we will present the projected cash flows for each category that makes the free cash flow to the firm. We will use a *bottom-up* approach, where each category will follow a different trend, depending on the drivers assumed and the assumptions made.

3.2.1. Revenues

In terms of revenues, we expect Vivo to keep growing the total turnover at a pace of 4.3% per year, 1% more than in the previous three years, mainly driven by an increase on the data consumption, both on the mobile and fixed businesses. As presented on the previous chapter, Vivo is increasing the LTE coverage throughout the country, while expanding the fiber footprint in São Paulo city.

We forecast that the revenues will keep increasing from BRL 34.7 Billion in 2013, to BRL42.7 Billion in 2017 and to BRL 53.7 Billion in 2023 (figure 27).

Figure 27 - Vivo revenues per category
(BRL Bln)

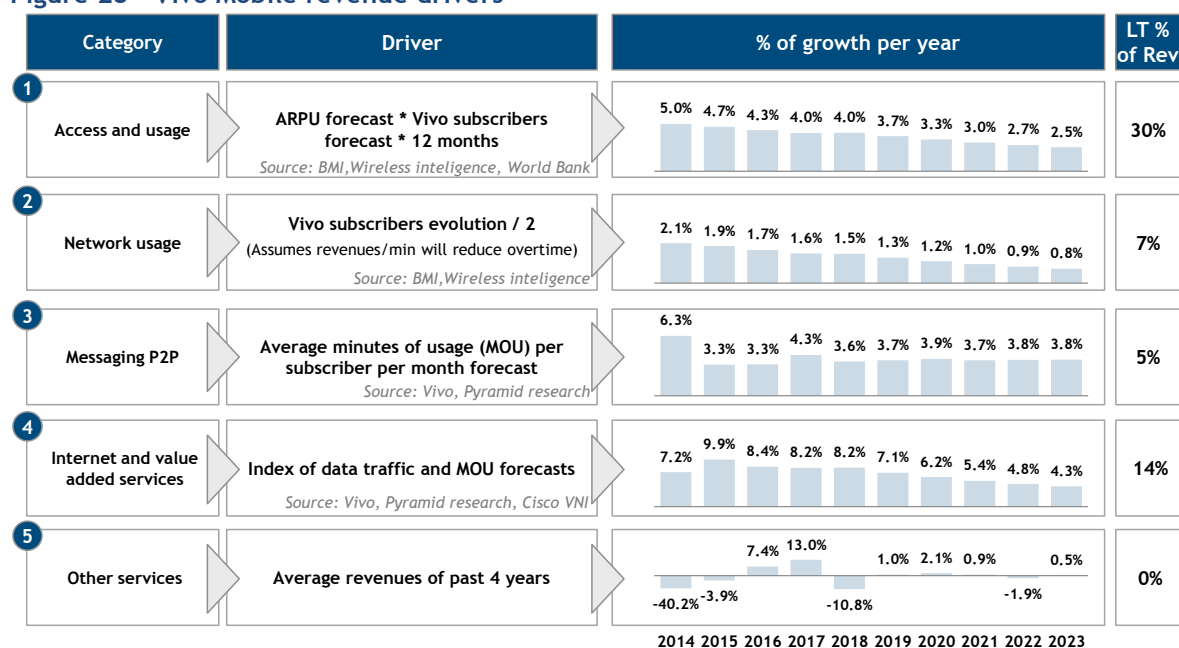


3.2.1.1. Mobile revenues

Moving to the mobile revenues, we have forecasted each revenue stream based on each growth potential. Figure 28 summarizes each revenue driver and the forecasted growth year-over-year.

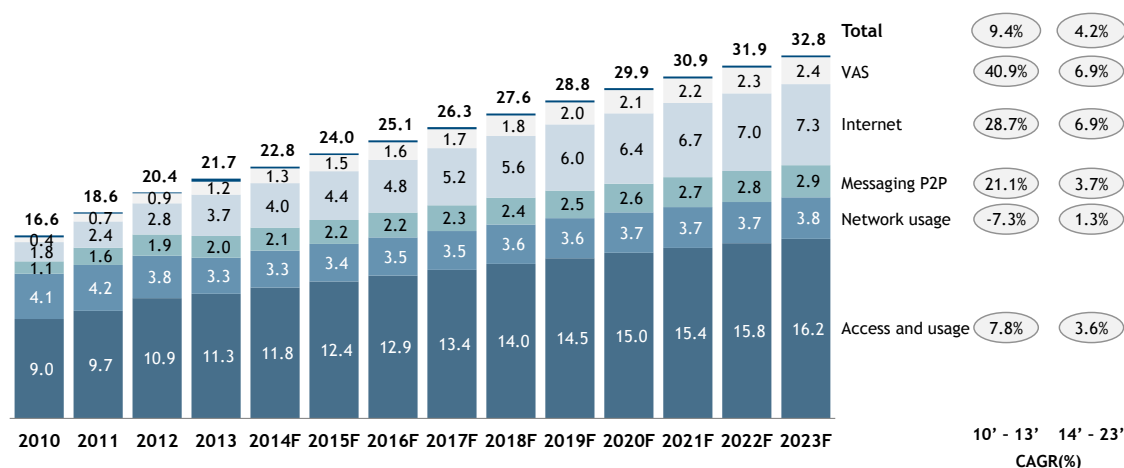
We have computed an estimation of total access and usage revenues based on the multiplication of ARPU with the number of mobile subscribers. We assume that the ARPU will start growing slowly at a pace of 0.8% in 2014, and then at an average pace of 1% each year (assumptions supported by the growth of additional services, increased data consumption and additional phone usage). Then, network usage revenues stream should follow a similar trend of the subscriber's growth, but we assume that ANATEL will enforce players to reduce the interconnection costs, so, we only consider half the growth. Messaging P2P is all the revenues from short messaging services (SMS) and we will use the subscriber's growth as a driver. Finally, Internet and Value Added Services (VAS) are the categories with the highest growth and these are computed using an index of forecasted data consumption with MOU growth. We expect that these two categories will be the major source of revenues for Vivo in the future and that Data and VAS will become the major source of revenues in the long-term.

Figure 28 - Vivo Mobile revenue drivers



As a result, we expect that the total mobile revenues will growth at an average pace of 4.2% per year until 2023, but the main drivers for this growth will be the internet and VAS, at an average year-over-year growth of 7%. Access and usage should follow subscriber’s evolution and interconnection costs will continue to be around BRL 3-4 Bn.

Figure 29 - Vivo Mobile revenues forecast (BRL Bln)



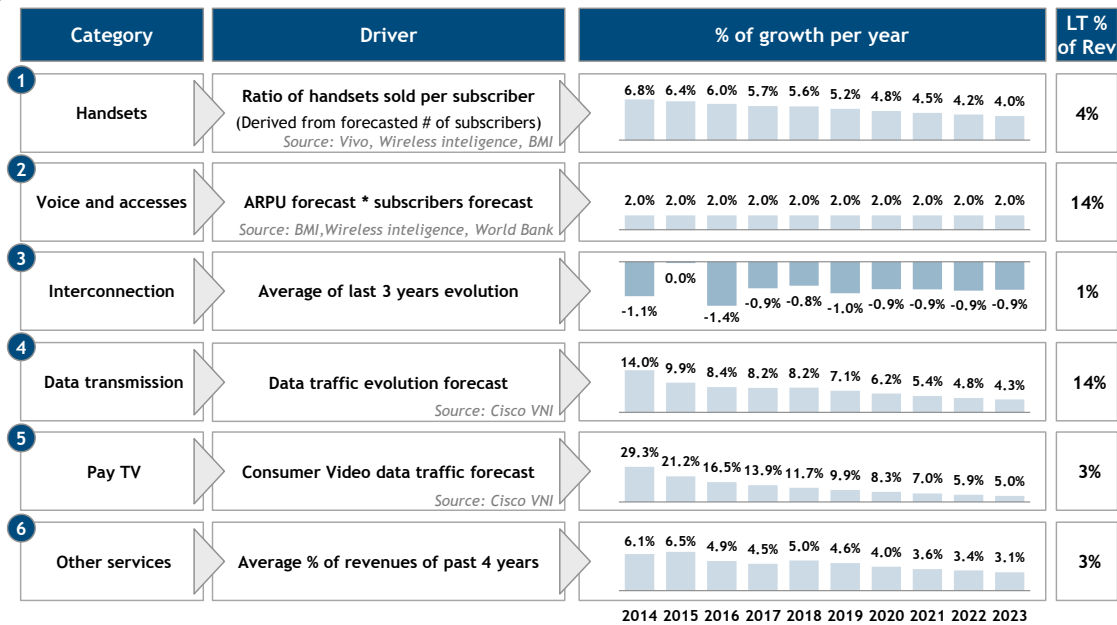
3.2.1.2. Fixed and handset revenues

On the other hand, on the fixed business, we expect that Vivo will reverse the last three years tendency. Vivo has been making significant investments to support the growth of data usage such as residential fiber, mobile 3G and LTE as well as better service for the corporate segment. Moreover, Vivo is continuing his expansion of backbone data transmission. As a result, we forecast a strong growth on data transmission and Pay TV revenues and expect Vivo to leverage its existing fixed connections to offer triple play services (hence, increasing the fixed voice year-over-year as well).

Additionally, although Vivo has never been a handset seller such as TIM, we expect an increase in their efforts to cross sell more mobile devices and we define a ratio of one handset sold for every 10 clients (a performance increase from the previous ratio of 14). Therefore, the handsets revenue stream should start growing faster than in previous years.

In figure 30, we see all the drivers for each fixed revenue stream as well as handsets revenues.

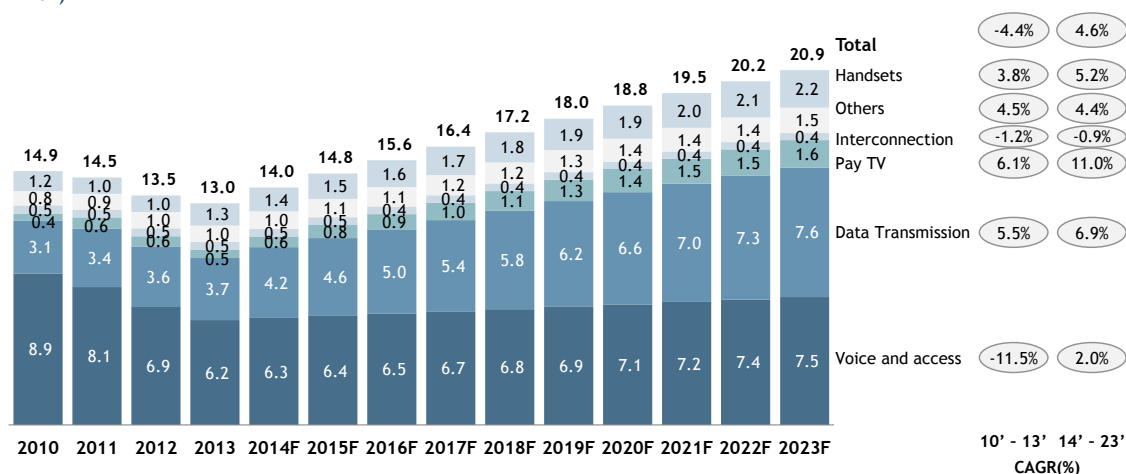
Figure 30 - Vivo Fixed and handset revenue drivers



Consequently, following other telecommunications industry, the telecom industry is expected to change the sources of revenues to a more balanced equilibrium between fixed and mobile revenues. As a result, Vivo fixed revenues should change the downward trajectory, mainly due to new source of revenues that were not possible before such as Data transmission, Pay TV, value added services or bundled products. Moreover, the appearance of these new products will allow Vivo to leverage its network and slightly increase the fixed voice revenues.

Figure 31 shows us the forecasted revenues for each year per fixed category. As we can see, both Pay TV and Data Transmission are expected to represent nearly 50% of total revenues, while fixed voice should stagnate with a conservative growth of only 2% per year. Interconnection should also decrease while handsets are expected to growth at an average pace of 5.2%. We expect that Vivo fixed revenues will be BRL 14.0 Billion in 2014 and keep growing at 4.6% each year.

Figure 31 - Vivo fixed and handset revenues
(BRL Bln)



3.2.2. Costs

In terms of costs, we have followed the same *bottom-up* approach, where we forecast each cost category, based on cost drivers and “potential” to growth. As a result, as revised previously on the industry review chapter, we have made several assumptions to estimate each cost member.

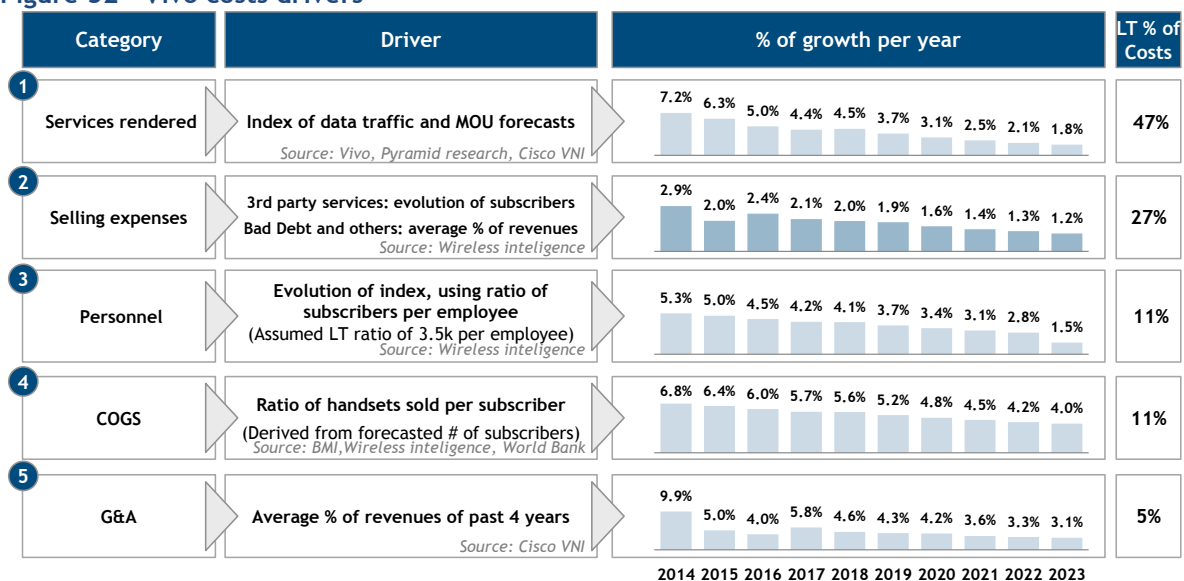
Firstly, for services rendered, we used an index made of data and MOU evolution and used this index to forecast the expected growth. However, we are also assuming that the services cost evolution should not be directly proportionate to the evolution of data traffic since economies of scale can be obtained and since maintenance does not growth on the same proportion of the data or MOU evolution. As a result, we only considered 40% of the evolution of the index comprised of data usage and MOU.

Selling expenses are all costs related with marketing and selling expenses, hence, we should link these costs to subscriber’s evolution. We considered that these costs should growth by half the speed of the customer base evolution. Personnel, on the other hand, as explained previously, will be linked to the number of subscribers per employee. Since Vivo had an average number of subscribers per employee between 3 and 4 thousand subscriber per employee, we have assumed a long-term ratio of 3.5 thousand subscribers.

Costs of Good sold, on the other hand, will follow the same pattern as the handsets sold and, finally, we have assumed for the last cost category, general and administrative expenses, an average cost of 3% of total revenues, aligned with the historical expenses.

Figure 32 summarizes these costs drivers and show for each year, the correspondent expected growth.

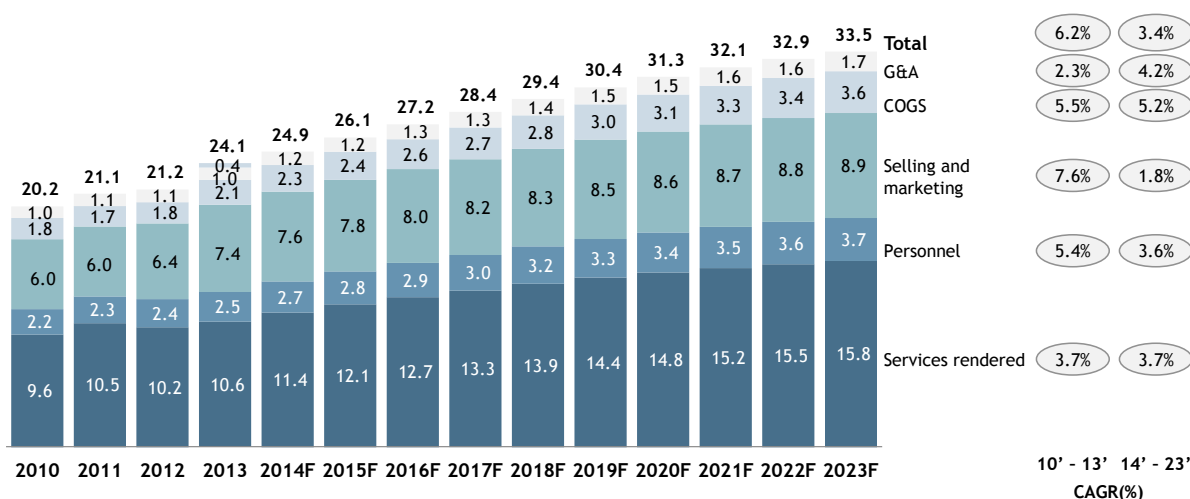
Figure 32 - Vivo costs drivers



As a result, below, in figure 33, we show the cost structure evolution until 2023, where most costs follow an average evolution between 1.8% and 5.2%. Services rendered, or network and interconnection costs, will continue to represent almost 50% of total costs, selling and marketing expenses nearly 27% while personnel and COGS are around 10% of total costs each, and finally, general and administrative expenses, around 5% of total costs.

We expect a deceleration of the costs growth to 3.4% growth year-over-year.

Figure 33 - Vivo operational costs (BRL Bln)



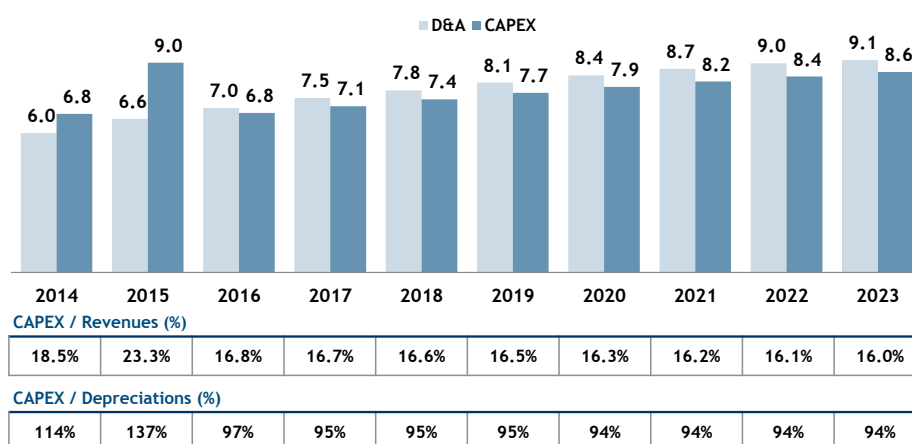
3.2.3. Depreciations, amortizations and CAPEX

As we have seen previously, Vivo is investing in new infrastructure in order to keep the lead in the telecommunications industry. The telecom operator is investing in new infrastructure, such as mobile wireless connectivity, *fiber-to-the-home* in targeted cities, while converging and simplifying certain services such as the corporate segment or leading the new digital environment.

As a result, according to Morgan Stanley, the CAPEX will increase in the next two years to 23.3% of total revenues in order to pursue its long-term strategy. Then, and in accordance with the historical CAPEX/Revenue ratio of the firm, we assume that Vivo will keep investing until it reaches the target of 16% CAPEX to revenues.

In terms of depreciations and amortizations, we have computed the weighted average life of all tangible and intangible assets and used this ratio to determine the pace of depreciation of the newly invested capital. As we can see from figure 34, the ratio CAPEX/Depreciations tends to be lower than 100% from 2016 onwards, which is in accordance with the high investment depreciations taken in the next two years. We expect that after 2023 the ratio will start growing to at least 100%.

Figure 34 - Vivo D&A and CAPEX forecast
(BRL Bln)



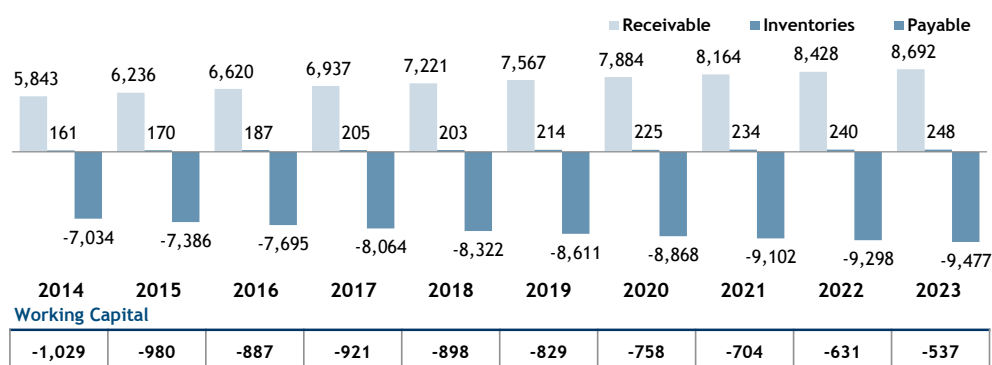
3.2.4. Working capital

In terms of working capital, in the telecom space, although the absolute amounts of receivables and payables might be high, the net value of both positions is usually less than 3% of total revenues.

For the working capital assumptions, we have assumed for account receivables and inventory, the average percentage of revenues from the past 4 years, 15.91% and 0.44% in 2014, respectively. On the other hand, for the account payables we have assumed the average percentage of costs from the past four years of total operational costs, of around 28.3%.

As a result, total working capital requirements are forecasted in figure 35. The difference between each working capital requirements constitutes the investment in working capital that will be deducted to the free cash flow to the firm.

Figure 35 - Vivo working capital
(BRL Mln)



3.2.5. Debt and interest tax shields

Vivo has been increasing the level of debt in the past few years to a total amount of BRL 8.8 Billion. Most of this increase is due to the big investments in infrastructure, as we have seen the CAPEX chapter. Vivo is able to finance with better terms than the Brazilian risk free due to overseas financing and also Telefónica group access financing. Additionally, Brazilian Development Bank (public entity) helps companies to finance at reduced interest rates if investments are proven to have economic value for the country.

In terms of short term debt, Vivo faced in the past 4 years a stable short-term Debt to EBITDA of around 13%. As a result, we forecast that short term debt will continue to be similar. Moreover, debentures are usually between 25% and 35% of debt, so we used this ratio to compute the different split between debentures and debt.

In terms of long term financing, we have assumed that debt will keep high at around 60% of debt until 2016 (year where CAPEX is expected to keep high) and then, will keep reducing until it reaches the normal average of 40% of EBITDA.

We assume that Vivo will keep being able to borrow at the average interest rate paid in the past few years, and we assume that the effective tax rate is 32%.

Table 1 - Vivo Debt and Interest tax shields forecast

(BRL Mln)

	2010	2011	2012	2013	2014F	2015F	2016F	2017F	2018F	2019F	2020F	2021F	2022F	2023F
Short term Debt	903	988	1,270	1,237	1,118	1,233	1,298	1,320	1,463	1,559	1,644	1,728	1,829	1,919
Short term Debenture	233	469	702	287	423	509	609	655	641	707	763	799	831	880
Long term Debt	3,390	3,959	3,775	3,215	4,120	4,615	5,490	5,384	5,673	5,618	5,592	5,587	5,595	5,540
Long term Debenture	1,214	788	2,254	4,015	3,627	3,317	2,579	2,673	2,484	2,547	2,595	2,585	2,542	2,541
Total	5,740	6,204	8,001	8,754	9,288	9,674	9,976	10,032	10,260	10,431	10,593	10,700	10,797	10,881
Debt / EBITDA	51%	52%	63%	83%	78%	76%	74%	70%	67%	64%	61%	59%	56%	54%
Interests	356	485	691	826	801	861	896	887	914	929	941	952	961	968
Interest tax shields	114	155	221	264	256	275	287	284	292	297	301	305	307	310

3.3. Vivo valuation using the APV approach

After computing each category of cash flows, we will finally see each the valuation using the adjusted present value. As reviewed in the literature review, this valuation separates the value of a firm between the unlevered cash flows and the tax savings from the use of debt, under the form of interest tax shields.

The free cash flows will follow a three stages approach. The first stage, from 2014 to 2023, forecasts the FCFF by estimating each category of the FCFF, namely, the explicit period. Then, the second stage, from 2024 to 2028 uses the past FCFF evolution and estimates an evolution year-over-year that will reach to the long-term GDP evolution forecasted by OECD. Then, the terminal value, or the stage 3, will assume a perpetual growth equal to the long term GDP of Brazil: nearly 2.5% per year.

Table 2 summarizes all the cash flows to arrive to the unlevered cash flows. We forecast that in 2015 the unlevered FCFF will be lower due to the increase in CAPEX explained before.

Table 2 - Vivo Free cash flow forecast

(BRL Mln)

1st stage										
BRL Millions	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
EBIT*(1-T)	3,988	4,135	4,359	4,621	5,135	5,575	6,029	6,496	6,986	7,552
growth %	18.9%	3.7%	5.4%	6.0%	11.1%	8.6%	8.1%	7.8%	7.5%	8.1%
+ D&A	5,972	6,575	7,038	7,473	7,800	8,133	8,446	8,720	8,965	9,098
growth %	5.8%	10.1%	7.0%	6.2%	4.4%	4.3%	3.8%	3.3%	2.8%	1.5%
- ΔWC	- 122	49	93	- 33	23	69	71	54	73	94
growth %	-82.3%	-140.0%	89.9%	-136.0%	-167.5%	206.2%	3.0%	-23.7%	34.3%	28.5%
- CAPEX	6,793	8,990	6,837	7,124	7,416	7,693	7,948	8,180	8,393	8,590
growth %	21.7%	32.3%	-24.0%	4.2%	4.1%	3.7%	3.3%	2.9%	2.6%	2.3%
FCFF	3,289	1,671	4,467	5,004	5,496	5,946	6,455	6,982	7,485	7,966
growth %	-19.9%	-49.2%	167.3%	12.0%	9.8%	8.2%	8.6%	8.2%	7.2%	6.4%
- Tax Shields	256	275	287	284	292	297	301	305	307	310
growth %	-2.9%	7.4%	4.1%	-1.1%	3.1%	1.7%	1.3%	1.2%	0.9%	0.7%
Unlevered CFs	3,033	1,396	4,181	4,720	5,204	5,649	6,154	6,677	7,178	7,656
growth %	-21.1%	-54.0%	199.5%	12.9%	10.2%	8.6%	9.0%	8.5%	7.5%	6.7%

2nd stage							3rd stage
BRL Millions	2024	2025	2026	2027	2028	2029	TV
FCFF	8,570	9,134	9,642	10,080	10,437	10,700	10,970
growth %	7.6%	6.6%	5.6%	4.5%	3.5%	2.5%	
- Tax Shields	309	309	309	312	316	324	333
growth %	-0.2%	-0.1%	0.2%	0.8%	1.6%	2.5%	
Unlevered CFs	8,261	8,825	9,332	9,769	10,120	10,376	10,638
growth %	7.9%	6.8%	5.7%	4.7%	3.6%	2.5%	

The discount rate was forecasted using data from Bloomberg, Damodaran and Moody's. The risk-free rate used was the 10-year US government bond adjusted by inflation (formula 2), and the correspondent adjusted Beta for Vivo, from Bloomberg. We used an adjusted market risk premium as proposed by Damodaran, where we add the country risk premium forecasted for Brazil (3.29%) and we unlevered the Beta by using formula 12. The cost of debt used was approach proposed by

Damodaran, where the author adds a default spread depending on the company rating, in this case, 2%.

Furthermore, the bankruptcy costs follow the long-term default probability used by Moody's for the correspondent Vivo's long-term debt rating and we forecasted the cost of bankruptcy by using the proposed ratio of loss given default of Schuermann (2004).

Table 3 - Cost of Equity and Debt

Cost of Equity (Ru)		Cost of Debt (Rd)	
Rf US	3.03%	Default Spread	2.00%
Brazilian Inflation	5.68%	Tax Rate	32.00%
US Inflation	1.10%	Cost of Debt (Rd)	9.70%
Adjusted Rf Brazil	7.70%		
Adjusted Beta	0.67000	Bankruptcy costs (BC)	
Beta Unlevered	0.5811	Credit rating by Moodys	BAA1
Market Risk Premium	8.29%	Probability of Default	1.664%
Cost of Unlevered Equity (Ru)	12.51%	Cost of Bankruptcy	47.00%

As a result, when discounting each cash flow at the proper discount rate, we arrive to the unlevered value of Vivo of BRL 53.2 billion, which, combined with the present value of the interest tax shields and bankruptcy costs, we estimate an enterprise value of BRL 56.8 Billion. This corresponds to a price per share of nearly 49 Brazilian Reais (Table 4), after adding the net Debt from 2013.

Table 4 - Vivo valuation and price per share

APV Valuation (Mln BRL)	
PV of Unlevered CFs	53,238
PV of ITS	3,390
Expected Bankruptcy Costs	- 416
Entreprise Value	56,211
Net Debt 2013	1,860
Equity Value	54,351
# of Shares outstanding (Mln)	1,123
Price per Share (BRL)	48.39

3.4. Sensitivity Analysis

As in every valuation, it is always subject to judgement and some sensitivity. Sometimes, small adjustments in one input may impact the value of a company and completely change the valuation results. As a result, we decided to add this chapter where we pretend to be exhaustive on the type of the assumptions that may influence the valuation. Firstly we will see three main scenarios and see the valuation results, then, we will take a look at each assumption separately to understand the impact of a 10%/25% increase or decrease in the final result, and, finally, we will perform a sensitivity analysis to the growth rate and cost of capital to understand the impact on the enterprise value.

3.4.1. Bull-Bear scenarios

We have performed three scenarios to understand the final value of Vivo, depending on the assumptions taken. We considered a bear market, where all assumptions are revised downwards and, thus, the worst case scenario. Then, we also considered a bull market, where best forecasts are taken into account - the best case scenario.

Figure 36 show us a table where we include all the assumptions taken and the respective valuation, price per share, EBITDA growth and EBITDA margin obtained, depending on the assumptions. As we can see, a review of the main assumptions downwards can result in projected valuation that is nearly 28% lower than the base case scenario, whereas high expectations of operator performance can increase the valuation by 20%.

Moreover, it is important to refer that the Brazilian market is, undoubtedly, a growing market, thus, even in a worst case scenario, we see an EBITDA growth of 3.0% year-over-year.

Figure 36 - Vivo Bear - Bull scenarios

		Bear case	Base case	Bull case
Assumptions	ARPU growth y-o-y ¹	-1%/-0.5%/1%/0%	0.8%/1%/1%/1%	2%/1.5%/1.5%/1%
	LT CAPEX (% of Rev)	15%	16%	17%
	Subs per handset sold	12	10	8
	Subs per employee	3000	3500	3800
	Data rev. divider	1.20	1.00	0.95
	Data costs divider	2.3	2.5	2.7
	LT CFs evolution	2.0%	2.5%	3.0%
Enterprise Value (BRL Mln)		40,411	56,211	67,386
Price per Share (BRL)		34.32	48.39	58.34
EBITDA Growth (2014 - 2023)		3.0%	6.1%	8.2%
EBITDA Margin (2014/2023)		31% / 31%	32% / 38%	33% / 42%

Note: 1) Values correspond to 2014, 2015, 2019, 2023 respectively

3.4.2. Sensitivity to individual variables

Figure 37 presents a sensitivity analysis for each variable that had a relevant assumption. The biggest drivers of the valuation are clearly the ratio of CAPEX per Revenues and the data revenue and costs dividers, while, surprisingly, the long-term cash flow evolution does not play such an important role as we would expect. Most of the variables make the valuation range 15% on average, between mid BRL 50 Billion and mid BRL 60 Billion, leading to the conclusion that each of these variables are certainly relevant and should be studied with caution.

Figure 37 - Vivo individual sensitivity analysis

	-25%	-10%	Base case	+10%	+25%	Range
ARPU Growth	55,029	55,735	56,211	56,691	57,418	+4.3%
Long term CAPEX	67,734	60,831	56,211	51,611	44,815	-33.8%
Subs per handset	53,673	55,360	56,211	56,910	57,754	+7.6%
Subs per employee	51,468	54,611	56,211	57,536	59,145	+14.9%
Data revenue divider	63,304	58,432	56,211	54,492	52,540	-17.0%
Data costs divider	48,848	53,826	56,211	58,111	60,331	+23.7%
Long term CFs evolution	54,710	55,588	56,211	56,867	57,920	+5.9%

As a result, these analyses serve as a basis for the assumptions made in the previous chapter, where we defined three scenarios: Bear, Base and Bull. The differences between Bear and Bull result in more pessimistic or more optimistic views of each variable and, as we realize from the individualized sensitivity analysis, we suspect that the grouping of positive or negative scenarios may have a higher impact on the final valuation, thus, ranging from BRL 40 Billion to BRL 67 Billion, as we have seen previously.

3.4.3. Sensitivity to the discount rate and growth rate

In table 5 we see the sensitivity analysis to the cost of equity and growth rate. As represented, moving to a discount rate of 7.51%, we can increase the value of Vivo by almost 60%, while, on the other hand, increasing the discount rate to 17.51%, it could also reduce the value nearly BRL 16 Billion. Thus, the discount rate used is critical in assessing the right value of Vivo.

Furthermore, the growth rate is also relevant since different assumptions can lead to different valuations, ranging between BRL 52 Billion and BRL 63 Billion, if assumed the same cost of equity.

Table 5 - Vivo sensitivity analysis to the equity discount rate and long-term growth rate

(BRL Mln)

		Cost of Equity (%)										
		7.51%	8.51%	9.51%	10.51%	11.51%	12.51%	13.51%	14.51%	15.51%	16.51%	17.51%
Long term Growth Rate (%)	0.02%	77,919	71,252	65,541	60,583	56,237	52,397	48,983	45,932	43,191	40,720	38,484
	0.52%	79,569	72,548	66,589	61,452	56,972	53,030	49,535	46,418	43,625	41,111	38,839
	1.02%	81,472	74,015	67,761	62,414	57,779	53,719	50,132	46,943	44,092	41,529	39,217
	1.52%	83,690	75,692	69,079	63,483	58,667	54,472	50,781	47,511	44,594	41,978	39,623
	2.02%	86,310	77,626	70,574	64,679	59,651	55,299	51,490	48,127	45,136	42,462	40,058
	2.52%	89,451	79,881	72,282	66,025	60,745	56,211	52,265	48,798	45,725	42,984	40,526
	3.02%	93,287	82,544	74,253	67,553	61,971	57,223	53,119	49,531	46,366	43,551	41,034
	3.52%	98,078	85,739	76,553	69,300	63,354	58,351	54,064	50,338	47,066	44,169	41,585
	4.02%	104,231	89,641	79,271	71,320	64,926	59,619	55,115	51,230	47,837	44,845	42,187
	4.52%	112,429	94,514	82,534	73,679	66,728	61,052	56,292	52,221	48,690	45,591	42,849
	5.02%	123,897	100,776	86,522	76,473	68,816	62,689	57,622	53,332	49,640	46,419	43,582

3.5. Relative Valuation

After performing the Vivo valuation using the adjusted present value approach, we have made a relative valuation to understand how Vivo compares with their peers. We have extracted data from Bloomberg for the 50 operators with the closest market capitalization from Vivo. Then, we filtered the peer group according to three main assumptions: Sales, market capitalization and CAPEX/Sales ratio between 50% and 300% of Vivo indicators. Additionally, we have taken into account the individual firms that we were selecting for the peer group and selected only companies that were present in emerging markets or with a similar financial situation as Vivo.

Figure 38 present us the multiple valuation and the equity valuation is estimated between BRL 48 Billion and BRL 64 Billion, depending on the multiple used. One explanation for this disparity is the low level of debt relative to its peers (all of them present a net debt at least 5 times higher but can be as high as 44 times the current level of Vivo). Moreover, we also note that the market seems to value the enterprise value of Vivo between BRL 56.0 and BRL 62.3 Billion, when using the EV ratios, almost BRL 6 Billion higher than APV estimation. This can be explained by the lower cost of capital from the entire peer group, compared to the cost of capital of Vivo (around 12.5%). Nevertheless, it is important to note that this is the best peer group possible to form, according to the available companies and methodology used.

Figure 38 - Vivo multiple analyses

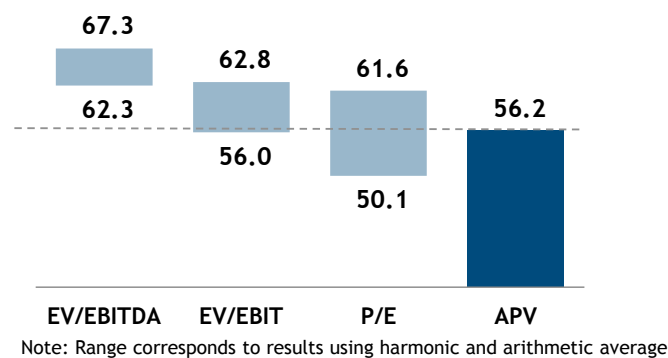
Selected peer group



	EV/EBITDA	EV/EBIT	P/E
Harmonic Mean	5.89	11.35	12.98
	EBITDA 2013	EBIT 2013	Earnings 2013
(000')	10,575,500	4,932,200	3,715,800
Enterprise Value (000')	62,299,870	55,982,373	50,077,223
Net Debt 2013 (000')	1,859,900	1,859,900	1,859,900
Equity Valuation (000')	64,159,770	57,842,273	48,217,323
# of shares (mio)	1,123	1,123	1,123
Price per Share (BRL)	57.1	51.5	42.9

In figure 39 we see the valuations, using different multiples ratio and the APV valuation. The difference between different methods can be explained by several factors. Firstly, the difference between EV to EBITDA and EV to EBIT is explained by the high depreciations in Vivo (the incumbent is having an above the average D&A due to high investments), that substantially reduces from the EBITDA to the EBIT. And then, the low leverage of Vivo also explains why the Enterprise value also reduces to values between BRL 50 and BRL 62. (As seen before, net debt of the peer group is substantially higher than Vivo).

Figure 39 - Vivo enterprise value comparison
(BRL Bln)



3.6. Conclusions

Vivo's enterprise value is worth approximately BRL 56,211 Million, which corresponds to an Equity valuation of BRL 54,351 Million, or 48.4 Brazilian Reais per share. This valuation has followed a three stages approach, where in the first stage we forecasted the Profit and Losses map to forecast free cash flow to the firm, then a second stage where we adjust the FCFF to meet the long term growth equal to the GDP long term growth. In addition, this valuation is consistent with the current stock market price, which is close to BRL 45.

Nevertheless, since small changes may have a great impact in the final valuation of Vivo, we should maintain a conservative vision and reflect in detail to the different sensitivity analysis performed.

4. TIM Valuation

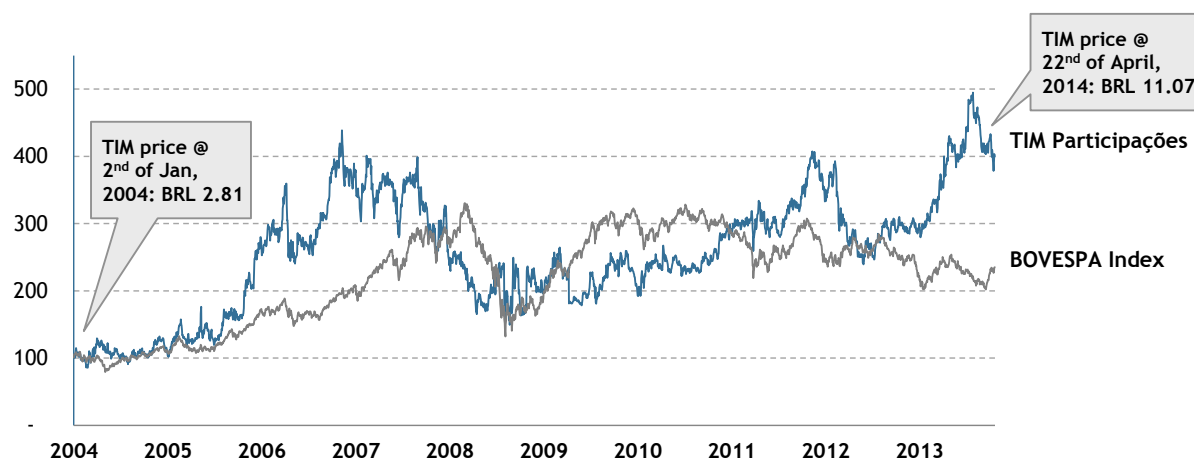
4.1. Introduction

After valuing Vivo, we will take a look at the valuation of TIM Participações. We will review each growth driver assumed for the operator, forecast revenues, costs, D&A and all the required categories for the estimation of the free-cash flow to the firm and then, after predicting TIM's valuation, we will perform sensitivity analysis to the main assumptions taken.

The Italian subsidiary has grown in the past three years more than Vivo due to the high growth of the mobile business and the value of the stock price today is worth almost four times more than the one decade ago. However, the stock price has showed a strong volatility, ranging between BRL 7.5 to BRL 13.7 in the past 16 months, which is consistent with the rumours of a possible sale from the parent company Telecom Italia.

Nevertheless, we estimate a price target for TIM Participações S.A. of BRL 11.25, a value consistent with the market expectations of TIM and within 2014's current range.

Figure 40 - TIM stock price evolution
(Beginning of 2004 = 100)



4.2. FCFF projections

Following the same approach used in the Vivo valuation, we will use a *bottom-up* approach to calculate each cash flow category.

4.2.1. Revenues

TIM has seven main revenue drivers but only three of them constitute more than 70% of total revenue: usage, VAS and handset revenues.

Usage and monthly fee revenues will follow the same approach used in Vivo, where we forecast an estimation of revenues by multiplying ARPU with total subscribers. As we have seen in the industry review, TIM had in the past 4 years the second lowest ARPU and we expect that TIM will make an effort to increase revenue per user throughout new services and more appealing tariff plans. Thus, we assume that TIM will increase 2% the ARPU in 2014 and 2015, followed by 1% growth year-over-

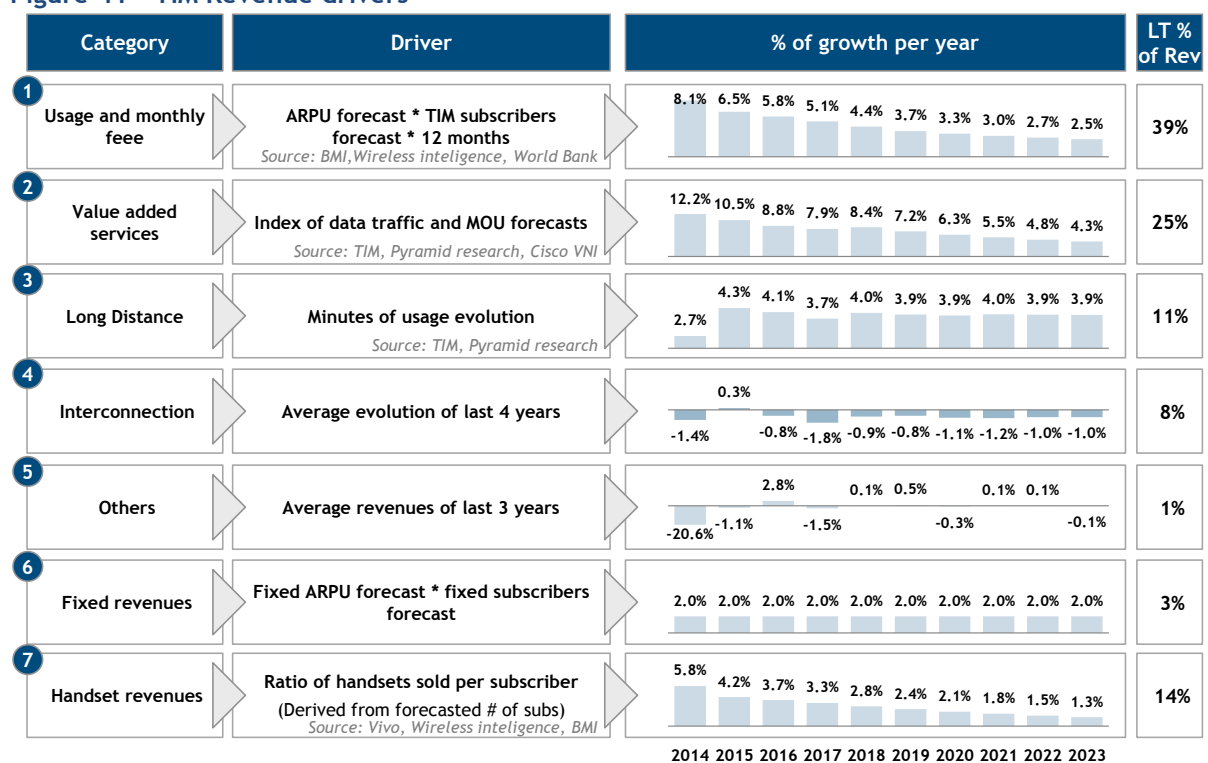
year until 2023. Mobile subscribers were forecasted by wireless intelligence until 2017, and then we assume that TIM subscribers should follow the Brazilian market growth.

Value added services are the revenue stream that should have the highest revenue growth due to new market environment and increase in internet consumption. We used the combination of Cisco Visual Networking index forecasts for Brazil with the expected MOU for TIM to forecast the expected revenues for this category. On the other hand, long distance revenues are all the revenues coming from roaming agreements with other operators. In this case we only used the MOU to forecast.

Then, interconnection costs used the average evolution of the last four years and other sources of revenues are expected to remain similar to the current values. We also assumed that fixed revenues will have a small tendency to growth due to services convergence and more corporate segmentation focus.

Finally, regarding handsets sold, TIM has been the most active player in this market, where in the past 4 years, TIM achieved a number of subscribers per handset sold of 6. We assume that TIM will keep the same performance to forecast the revenues in this segment.

Figure 41 - TIM Revenue drivers

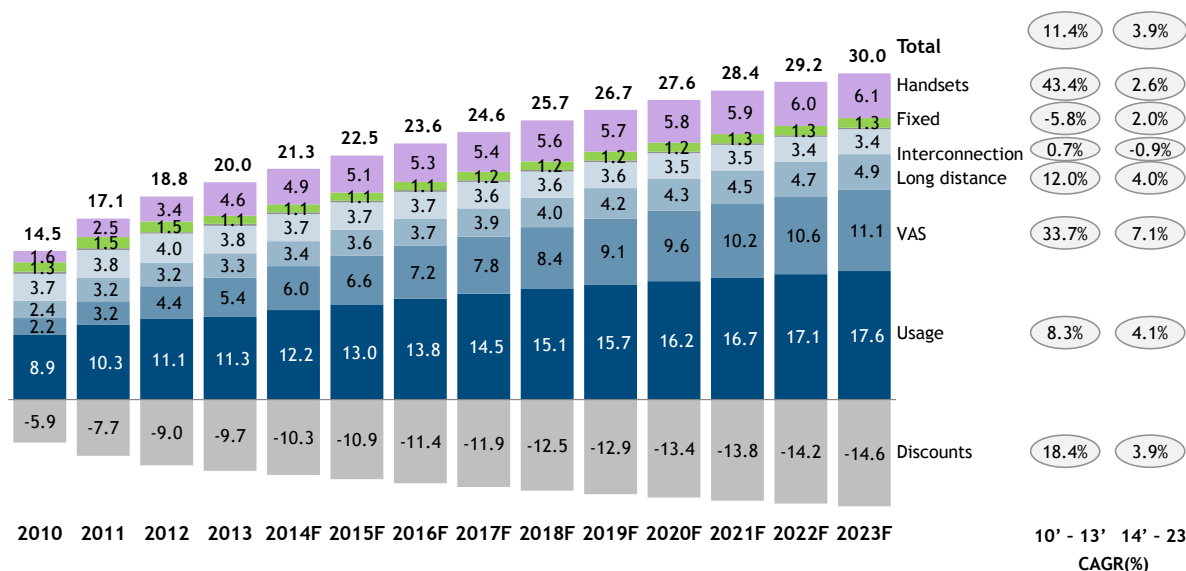


As a result, the next figure show us the revenue evolution until 2023 based on the previous assumptions. We project that TIM revenues will continue to grow but not at the same pace as in the previous years. The category that should grow the most is VAS and is expected to represent almost 25% in 2023.

Moreover, TIM does not report the discounts per category, so we have to forecast the discounts and calculate the net revenue separately. We used the average % of revenues of the past 3 years to calculate the discount every year.

As a result, and in accordance with analysts' projections, we forecast a mid-single digit growth for TIM, where it should growth from BRL 20 Billion in 2013 to BRL 30 Billion in 2023.

Figure 42 - TIM revenues per category
(BRL Bln)

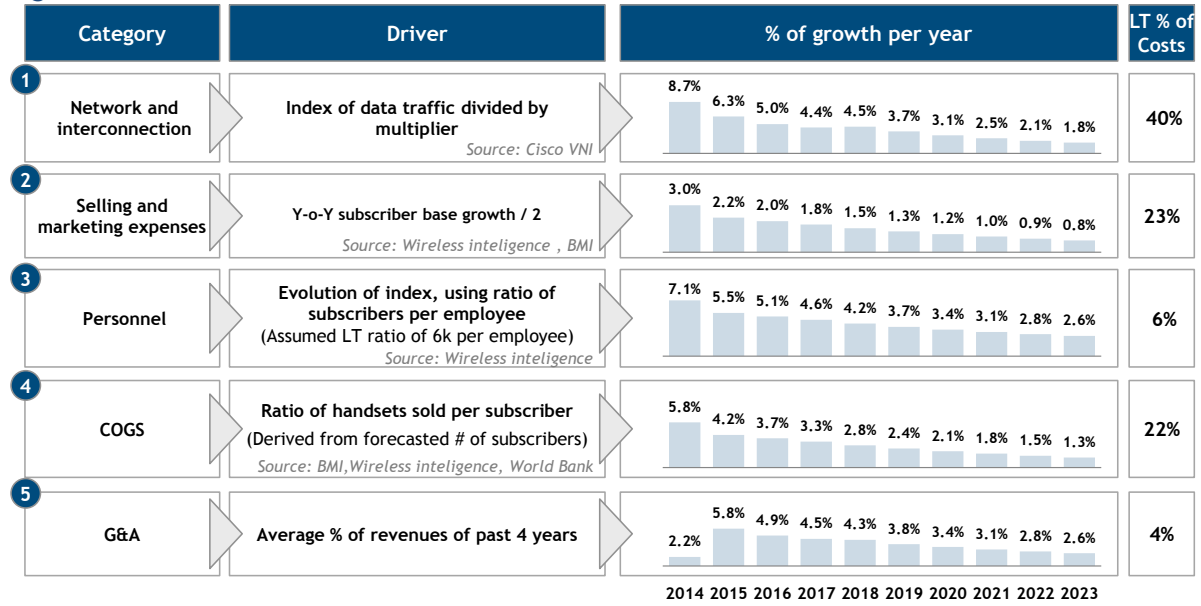


4.2.2. Costs

In terms of costs, we will use a similar approach to Vivo, where we forecast each category individually. Network and Interconnection costs are expected to growth at an average pace of 3.7% every year due to increased capacity installed and also due to higher data and MOU traffic. Selling and marketing expenses will follow the same approach of half the subscriber's evolution, whereas costs of goods sold will follow the same projection of handset sold.

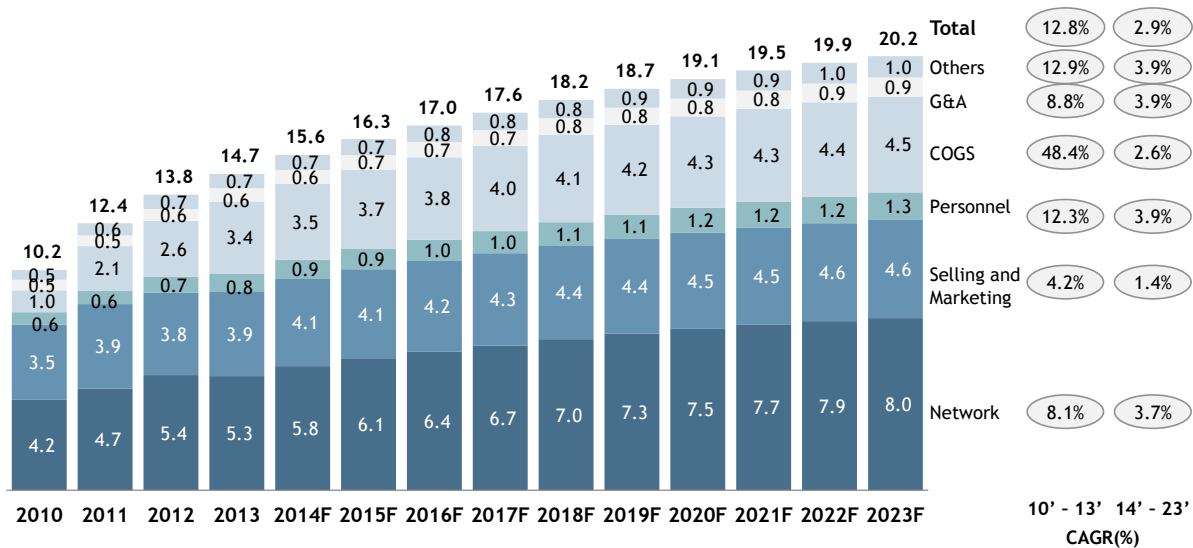
Personnel expenses, on the other hand, were projected based on a salary increase of 1% every year and assuming that TIM will be able to have one employee for every six thousand subscribers.

Figure 43 - TIM cost drivers



Concluding, figure 44 presents us the forecasted cost structure of TIM for the next 10 years, where we see that some categories growth at a higher speed (such as personnel or network). We expect TIM increase its cost structure by 30% in the next 10 years, 5 times slower than in the previous years.

Figure 44 - TIM operational costs



4.2.3. Depreciations, amortizations and CAPEX

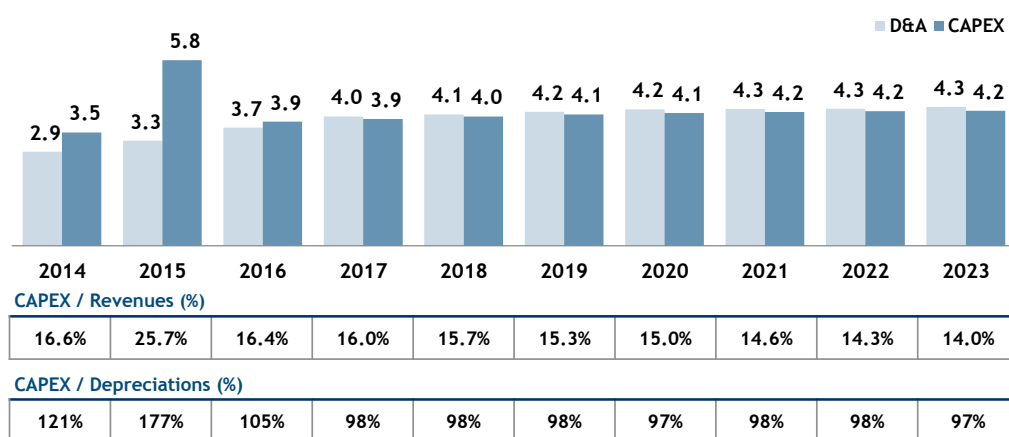
TIM is in the middle of a restructuring process where the company is investing big amounts of money to deal with the new telecommunications industry. As a result, TIM is deploying fiber to connect major cities, while continuing its expansion of 3G and 4G network throughout the country. According to the latest industrial plan released in 2013, TIM is focusing on significant network investments. We forecast that the ratio CAPEX/Revenues will reach a maximum of 25.7% in 2015 and then will keep adjusting until an average long- term target of 14% of revenues in 2023. Moreover, since TIM main business in primary mobile, we assume the operator will invest less than

the incumbent in terms of CAPEX per revenues, since Vivo also has to invest more intensively in the fixed business.

In terms of depreciations and amortizations, we have calculated the average life period of total tangible and intangible assets to an average of 8.5 years, and, as a result, we have forecasted both depreciations and amortizations according to this average life period, which can be summarized in figure 45.

Nevertheless, it is also relevant to say that the CAPEX/Depreciations ratio is slightly below 100% between 2017 and 2023 due to the high investments in 2014 and 2015, which will increase the depreciations in the following years. We expect a ratio slightly above 100% from 2023 onwards. Nevertheless, the average ratio CAPEX to Depreciations during the explicit period is 109%.

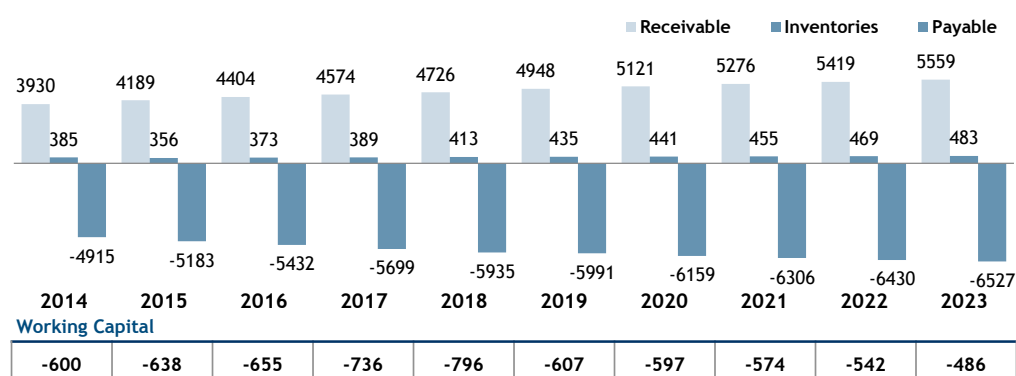
Figure 45 - TIM D&A and CAPEX forecasts
(BRL Bln)



4.2.4. Working Capital

We have forecasted the working capital requirements based on the ratios receivables or inventories to sales and also payables to operating costs. We estimated an average ratio based on historical data and used it to compute the expected working capital requirements. As a result, figure 46 shows the projected working capital needs. The difference between each working capital requirements corresponds to the investment/disinvestment required each year.

Figure 46 - TIM working capital
(BRL Mln)



4.3. TIM valuation using discounted cash flow approach with WACC

Table 6 summarizes all the components for the calculation of the free cash flow to the firm. We have used the same approach used in Vivo, comprising 3 different stages for the FCFF projections. The first stage projects each category of the Profit and Losses map as well as CAPEX and NWC. The second stage uses the compounded annual growth rate from 2019 to 2023 and slightly adjusts year-over-year until it reaches a long term growth equals to the GDP long term forecast for Brazil: 2.5% (which is used for the third stage period). In addition, we expect a negative FCFF in 2015 due to increase in CAPEX but from 2016 onwards a sustained growth of FCFF.

Table 6 - TIM free cash flows to the firm forecast

(BRL Mln)

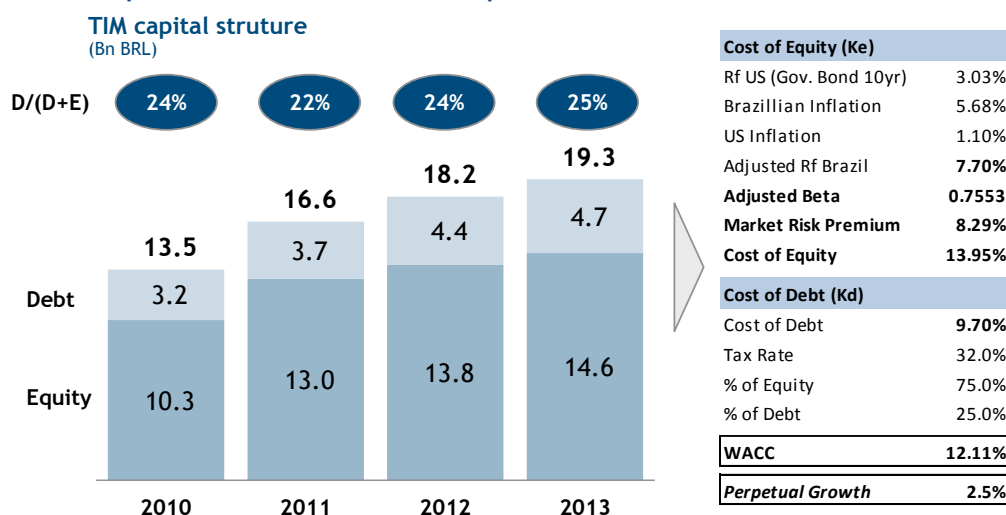
1st stage - Explicit period											
BRL Millions	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
EBIT*(1-T)	1,848	1,949	1,985	2,059	2,335	2,591	2,848	3,151	3,455	3,724	
<i>growth %</i>	9.5%	5.4%	1.9%	3.7%	13.4%	11.0%	9.9%	10.6%	9.6%	7.8%	
+ D&A	2,926	3,271	3,680	4,025	4,090	4,170	4,250	4,260	4,269	4,328	
<i>growth %</i>	5.7%	11.8%	12.5%	9.4%	1.6%	2.0%	1.9%	0.2%	0.2%	1.4%	
- ΔWC	846	38	17	81	60	189	10	23	32	57	
<i>growth %</i>	48.2%	-104.5%	-56.4%	389.6%	-26.5%	-415.5%	-94.7%	129.0%	41.7%	75.8%	
- CAPEX	3,528	5,777	3,866	3,948	4,027	4,087	4,132	4,165	4,188	4,202	
<i>growth %</i>	-8.9%	63.8%	-33.1%	2.1%	2.0%	1.5%	1.1%	0.8%	0.5%	0.3%	
FCFF	401	519	1,816	2,217	2,458	2,486	2,956	3,223	3,504	3,793	
<i>growth %</i>	2572.9%	-229.3%	-449.7%	22.1%	10.9%	1.1%	18.9%	9.0%	8.7%	8.3%	

2nd stage - adjusting period							3rd stage - TV	
BRL Millions	2024	2025	2026	2027	2028	2029	TV	
FCFF	4,216	4,613	4,968	5,264	5,488	5,626	5,768	
<i>growth %</i>	11.1%	9.4%	7.7%	6.0%	4.2%	2.5%		

According to left side of figure 47, TIM has historically shown a quite stable capital structure, varying from 22% to 24.5%. Therefore, it is reasonable to assume that TIM will keep maintaining a stable capital structure of 25%.

As a result, we computed the Weighted Average Cost of Capital using 25% of debt capital and 75% equity capital. We used the adjusted Beta of TIM Participações S.A. from Bloomberg and assumed a market risk premium in accordance with Damodaran, where the author adds the forecasted country risk premium (3.29%) to the US equity risk premium (5%). In addition, as per formula (2), we have adjusted the US risk free rate to the Brazilian forecasted inflation rate. We assumed the approach used by professor Damodaran, where the author adds a default spread to the risk-free rate in order to calculate the debt discount rate (in this case, 2%). It was used an effective tax rate of 32%.

Figure 47 - TIM capital structure and cost of capital



The value of TIM, in the end of 2013, is of BRL 26,451 Million and the equity value is of BRL 27,195 Million due to negative net debt. The price per share is BRL 11.25, in line with the stock market expectations of the past year.

Table 7 - TIM valuation using DCF-WACC approach

DCF - WACC approach	
Total Enterprise Value (BRL M)	26,451
Net Debt 2013	- 743
Equity Value (BRL M)	27,195
Shares Outstanding (Mln)	2,418
Price per Share (BRL)	11.25

4.4. Sensitivity analysis

Following the same methodology used with Vivo, we will also take a look to the effect of changing some assumptions in the final valuation to understand which variables have a higher impact. Firstly we will review the bear, base and bull scenarios, then we will take a look at the elasticity of each assumption and finally, to the sensitivity of the discount and long term growth rates.

4.4.1. Bull-Bear scenarios

In figure 48 we see the results for all three scenarios considered. There is a difference on nearly BRL 12 Billion between the best and worst scenarios, which goes in line with the type of assumptions made. For instance, the bear case scenario has a 0.3 higher discount on the revenues for data and the number of handsets sold is nearly 40% less in the bear case scenario than in the best case scenario.

We assume that the ARPU will grow in the long-term even in the bear case since TIM will start monetizing all the CAPEX currently investing with higher VAS or data services. Moreover, in line with the expectations of the telecommunications industry in Brazil, the bear case is forecasted to have an EBITDA growth of 3.8%, contrasting with 8.5% per year until 2023 for the bull case scenario.

In addition, the Bull case also tries to achieve an EBITDA margin closer to its main competitor (Vivo), of 37%.

Figure 48 - Bear - Bull scenarios

		Bear case	Base case	Bull case
Assumptions	ARPU growth y-o-y ¹	-0.5%/0.0%/1%/1%	2%/2%/1%/1%	3%/3%/1.5%/1.5%
	LT CAPEX (% of Rev)	12.5%	14.0%	15.5%
	Subs per handset sold	7	6	5
	Subs per employee	5500	6000	6500
	Data rev. divider	1.20	1.00	0.90
	Data costs divider	2.3	2.5	2.7
	LT CFs evolution	2.0%	2.5%	3.0%
Enterprise Value (BRL Mln)		19,795	26,451	32,073
Price per Share (BRL)		8.50	11.25	13.57
EBITDA Growth (2014 - 2023)		3.8%	6.3%	8.5%
EBITDA Margin (2014/2023)		25% / 27%	27% / 33%	27% / 37%

Note: 1) Values correspond to 2014, 2015, 2019, 2023 respectively

4.4.2. Sensitivity to individual variables

TIM has clearly a higher sensitivity than Vivo for each variable. Figure 49 shows the effect on TIM's valuation, if changed assumptions individually. As we can see, data costs divider and ratio of CAPEX / revenues plays the most important roles, with valuation ranging almost 40% in each case. Nevertheless, the other assumptions are also important such as Data revenue divider, subscribers per employee or subscribers per handset sold.

As a result, this high variability suggests that, when both factors combined under Bear or Bull scenarios, the difference in valuations must be relevant, as we previously presented.

Figure 49 - TIM individual sensitivity analysis to the enterprise value

	-25%	-10%	Base case	+10%	+25%	Range
ARPU Growth	25,081	25,898	26,451	27,011	27,863	+11.1%
Long term CAPEX	32,607	28,940	26,451	23,946	20,193	-38.1%
Subs per handset	24,760	25,887	26,451	26,913	27,466	+10.9%
Subs per employee	24,575	25,824	26,451	26,966	27,584	+12.2%
Data revenue divider	33,325	28,584	26,451	24,814	22,970	-31.1%
Data costs divider	21,292	24,797	26,451	27,759	29,725	+39.6%
Long term CFs evolution	25,598	26,097	26,451	26,825	27,425	+7.1%

4.4.3. Sensitivity to the discount rate and growth rate

Table 8 follows the same methodology used for Vivo. As we can see, TIM presents a much higher variability of valuations, depending on the Weighted Average Cost of Capital chosen. Thus, choosing the right discount rate is crucial for an accurate valuation of TIM Participações.

For instance, assuming the same long-term growth rate, TIM's enterprise value can go from as low as BRL 16 Billion to as high as BRL 43 Billion. On the other hand, the long term growth rate does not have the same impact as the cost of capital, where a zero growth rate only differs BRL 6 Billion from a 5% year-over-year growth in the long term.

Table 8 - TIM sensitivity analysis to the cost of and long-term growth rate

(BRL Bln)

		Cost of Capital (%)							
		9.1%	10.1%	11.1%	12.11%	13.1%	14.1%	15.1%	16.1%
Long term Growth Rate (%)	0.02%	36,943	31,767	27,631	24,269	21,494	19,175	17,216	15,545
	0.52%	37,917	32,452	28,124	24,630	21,763	19,378	17,370	15,664
	1.02%	39,011	33,212	28,666	25,024	22,054	19,596	17,536	15,791
	1.52%	40,249	34,062	29,264	25,455	22,370	19,832	17,714	15,927
	2.02%	41,662	35,016	29,928	25,928	22,715	20,087	17,905	16,073
	2.52%	43,289	36,095	30,670	26,451	23,092	20,364	18,112	16,229
	3.02%	45,183	37,327	31,503	27,032	23,506	20,666	18,336	16,397
	3.52%	47,416	38,746	32,446	27,680	23,964	20,996	18,579	16,578
	4.02%	50,087	40,398	33,521	28,408	24,472	21,359	18,844	16,775
	4.52%	53,341	42,346	34,760	29,233	25,040	21,761	19,134	16,988
5.02%	57,390	44,675	36,203	30,173	25,677	22,206	19,453	17,221	

4.5. Relative Valuation

TIM multiples valuation goes in line with the results obtained in the DCF valuation, when compared the EV to EBITDA or the EV to EBIT. However, as explained in Vivo multiples valuation, the price-to-earnings is slightly lower than the real equity value due to a lower net debt of TIM.

We used a harmonic mean to calculate the multiples average and multiplied each by the correspondent value by end 2013. The selection of the peer group follows the same methodology used in Vivo, where we select the 50 operators from Bloomberg with the closest market cap and then, we filter to obtain only operators that are within 50% and 300% of TIM's indicators, being them the market capitalization, the level of sales and the CAPEX / Revenues ratio. Additionally, we have filtered for some operators that did not represent the TIM business reality, such as a French operator (Iliad) or a Taiwanese operator (Chunghwa Telecom). The selected peer group is represented by its logo on the left side of figure 50.

Figure 50 - TIM multiple analysis

Selected peer group



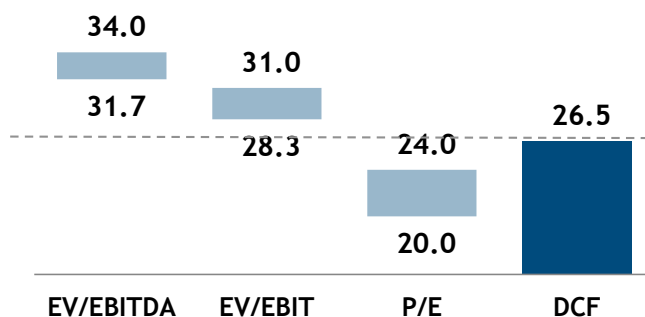
	EV/EBITDA	EV/EBIT	P/E
Harmonic Mean	5.90	11.09	12.72
	EBITDA 2013	EBIT 2013	Earnings 2013
	5,250,654	2,482,782	1,569,755
Enterprise Value	30,972,715	27,536,222	19,225,097
Net Debt 2013	(743,433)	(743,433)	(743,433)
Equity Valuation	31,716,147	28,279,654	19,968,529
# of shares	2,418	2,418	2,418
Price per Share	13.1	11.7	8.3

Finally, figure 51 compares both multiples methodologies with the DCF approach. The range in each column represents the results obtained by using two different methodologies: arithmetic average and harmonic average.

Furthermore, by looking at the figure below, we understand that the valuation using the Price to Earnings leads to a different valuation results, compared with the Enterprise value multiples. This difference lies on the fact that TIM is one of the few mobile operators with negative net debt, and, as a result, given that the peer group has a positive net Debt between -1.4 to 3.8 Net Debt to EBITDA and an average of 1.6, it was expected that the equity value of TIM was not estimated correctly.

Figure 51 - TIM enterprise value comparison

(BRL Bln)



Note: Range corresponds to results using harmonic and arithmetic average

4.6. Conclusions

TIM Participações S.A. has an equity value of BRL 26,451 Million, or an estimated price per share 11.25 Brazilian Reais. However, we should be extremely cautious on the valuation's final result since TIM presents a high volatility to small changes in assumptions, consistent with the stock market price volatility.

5. Parent companies review

In this section we will briefly look at both parent companies of Brazilian telecom operations: Telecom Italia and Telefónica. We will briefly understand the current state of each Telco Group, which will give us the base for a possible acquisition of TIM Participações by Vivo.

5.1. Telecom Italia

Telecom Italia is the Italian incumbent with 34.2% market share. However, it has faced strong competition from Vodafone and Wind, and have lost nearly 5% market share in the past six years.

Figure 52 shows the evolution of the stock price of Telecom Italia Group, compared to the Italian stock market index and S&P500. As we can see, Telecom Italia has fallen more than the Italian index and today is worth nearly 25% of the stock price from the beginning of 2004.

The group has been facing strong pressure to reduce its debt level and, as a result, the stock price has been falling since mid-2005 until 2013, to an approximate value of 70 cents per share. Nevertheless, the Italian incumbent has also been able to maintain a stable value per share from 2009 to 2014, through its divestment plan to reduce debt.

Figure 52 - Telecom Italia stock comparison with FTSE MIB and S&P500
(Beginning of 2004 = 100)



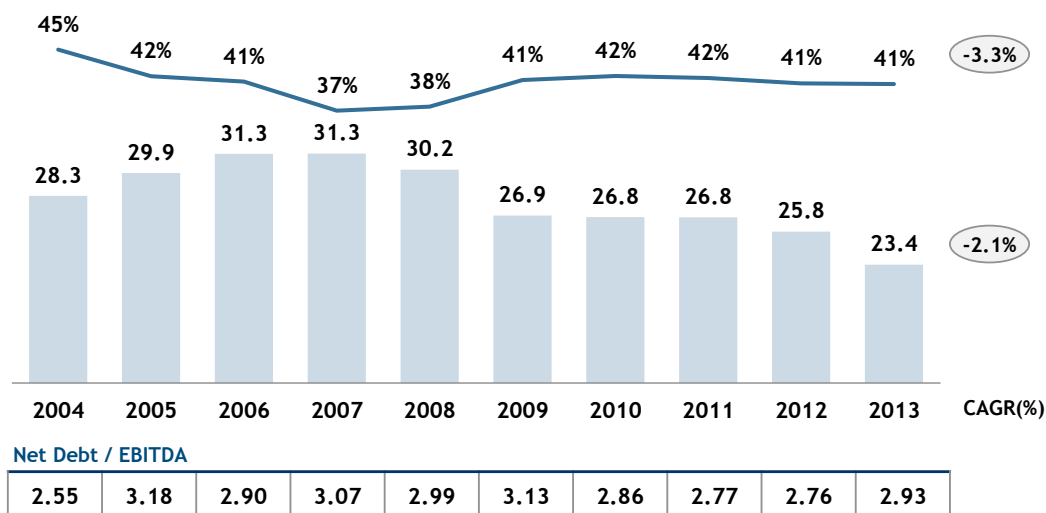
The Italian incumbent is facing strong pressure from many fronts. Firstly, the fixed-line business is declining due to broadband/mobile substitution, second, the heavy pre-paid subscriber base is lowering the ARPU, and, the last but not the least, the domestic market is facing an economic downturn. Furthermore, Telecom Italia future growth may be compromised due to lack of opportunities and high levels of debt.

As a result, the incumbent is facing strong revenue erosion, where it has lost nearly 10% in revenues year-over-year from 2012 to 2013. Following these results, Telecom Italia had had its long-term debt rating downgraded to BBB- by Fitch in 2013 and analyst's forecasts that in 2014 the outlook may be even worse.

Additionally, the Regulatory authority is making pressure to separate the fixed and mobile business units, which disable possible future opportunities to sell bundled services within Italy (e.g.: Triple or Quad play).

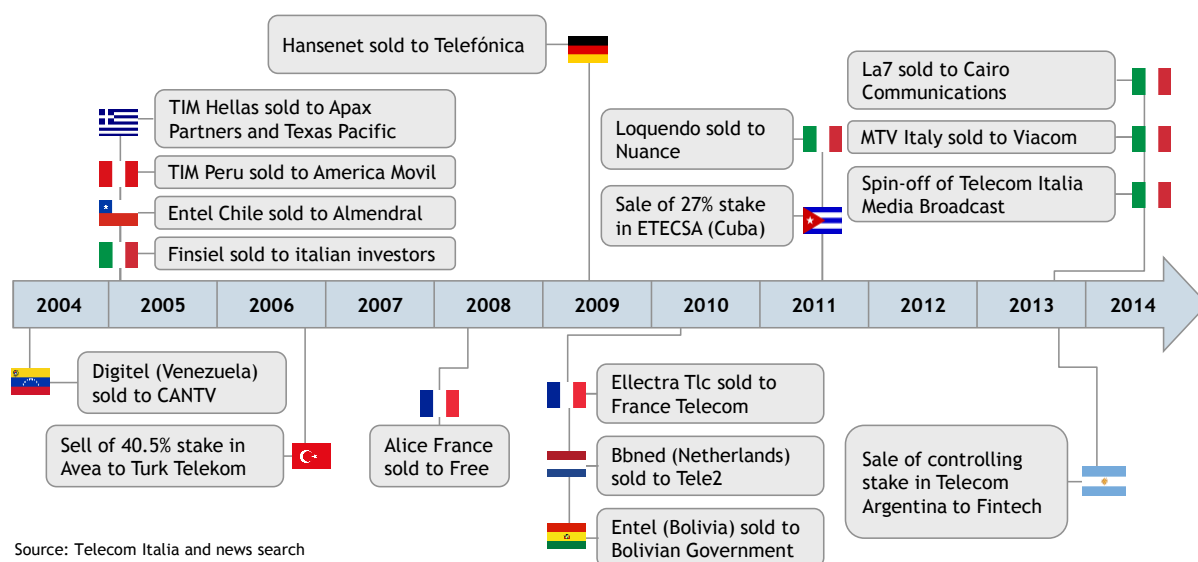
Figure 53 show us the Italian incumbent revenues, EBITDA margin and ratio of net debt-to-EBITDA. As we can see, net debt is currently at 3 times the EBITDA value and the liabilities represent more than 70% of total asset values at book market.

Figure 53 - Telecom Italia Revenues and EBITDA margin
(EUR Bln, %)



In the past few years, Telecom Italia has been divesting in many core assets from the group in order to generate cash to pay the Debt. Figure 54 represents the last divestures made from Telecom Italia Group. As shown in the figure below, a natural thought would be the sale of TIM Brazil.

Figure 54 - Historic divestiture of Telecom Italia



Source: Telecom Italia and news search

In 2013, several newspapers admitted the possibility of TIM Brasil sale⁹ as a way of reducing debt level of the parent company but it was denied due to the strategic importance of TIM in the group.

⁹ Teletime (2nd of August 2013), Il Sole 24 Ore (31st of August 2013), Reuters (4th of September 2013) or Milano Finanza (5th of September 2013)

Our main dissertation assumption is that Telecom Italia is deferring TIM sale in order to optimize business strategy and find maximum price upon sale. As a result, if Telecom Italia sells TIM at the moment, a higher multiple would not be achieved.

5.2. Telefónica

Telefónica is one of the largest telecoms operators in the world, and it has a footprint of more than 310 million subscribers in 22 countries and is the fourth biggest mobile operator group by revenues, after China Mobile, Vodafone Group and América Movil. The group provides access services to customers in the mobile, fixed line, broadband, Pay TV and business segments. It was founded in 1924 as a governmental company but became private in 1997.

Telefónica Spain is the Spanish incumbent with a market share of 37.6%. In the past 10 years it has been doing relevant investments in Spanish speaking countries such as Argentina, Chile, Uruguay and Brazil. Telefónica is focusing on mobile market growth, but also in some selected fixed segments, through expansion of its infrastructure in the region, both wireless and wireline.

In the past few years, Telefónica share price has fallen to nearly 12 Euros per share, almost 50% less than from the beginning of 2010. However, this evolution is consistent with the economic downturn that Spain has been facing in the past years. Nevertheless, the Spanish index IBEX 35 in the past year has recovered almost 25% of value, while Telefónica remained at 75% of the value presented in 2004, mostly due to the high level of Debt and recently divestures.

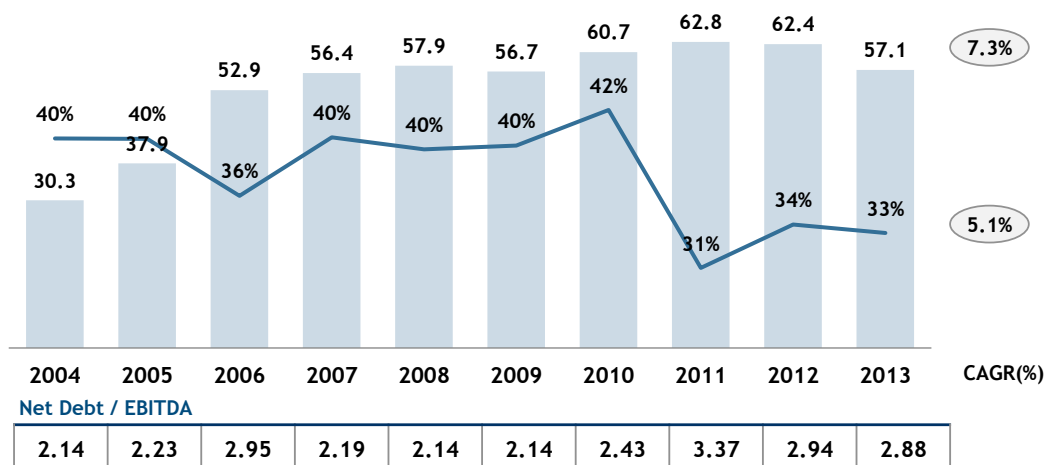
Figure 55 - Telefónica Group stock comparison with IBEX 35 and S&P500
(Beginning of 2004 = 100)



The group has showed a year-over-year revenue growth of more than 7%, which is consistent with the investment strategy that it has implemented in the past years. However, the EBITDA margin has fallen from 42% in 2010 to 33% in only 3 years, mostly due to higher competition in countries with operations, as well as economic crisis in the European countries. Nevertheless, the group continues to have nearly EUR 60 Billion in revenues and is one of the largest mobile telecommunication companies in the world with an estimated enterprise value of EUR 110 Billion.

Additionally, Telefónica group has an estimated net debt to EBITDA of 2.88, ratio close to the Telecom Italia ratio of 2.93, which can harm the group in terms of strategic acquisition opportunities. As a result, since Telefónica has a strong asset base, in 2011, Telefónica Group started to divest in some European and Central America subsidiaries such as O2 in Ireland, Czech Republic, Slovakia or small subsidiaries in Central America: Panama, Nicaragua, El Salvador and Guatemala.

Figure 56 - Telefónica Group revenues and EBITDA margin
(Eur Bln, %)

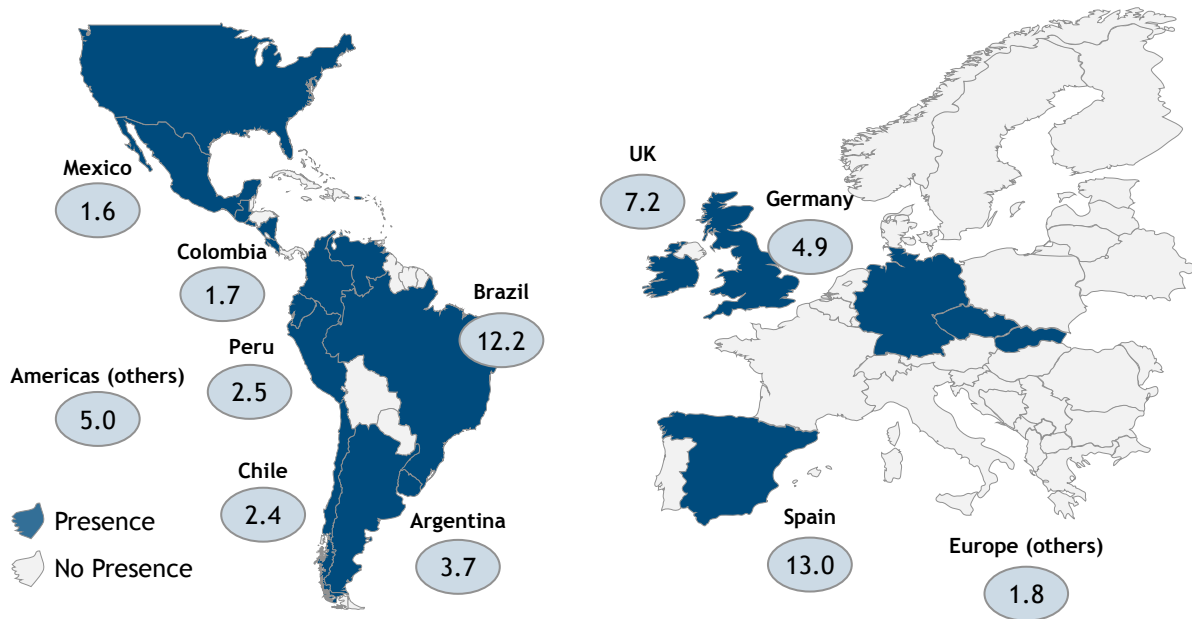


The Spanish incumbent is one of the largest telecom operators in the world and is the largest company by country footprint. As a result, figure 57 shows the group footprint and, as we can see, Telefónica has a big footprint in most of the Latin American countries, with the exception of countries such as Paraguay or Bolivia.

In terms of revenues, Brazil represents almost 25% of total group revenues and, as a result, it constitutes a key asset in Telefónica strategy. Nevertheless, the group has a participation in both Vivo and TIM (73.9% and 10.0%, respectively) and many analysts refer that in the long term, Telefónica must divest an operation in the Brazilian country, either in TIM or in Vivo, or buy TIM operations to Telecom Italia.

In our dissertation, we will assume that Vivo will buy all 100% shares to all shareholders, including Telefónica.

Figure 57 - Telefónica footprint and revenues per continent
(Eur Bln)



6. The Synergies analysis

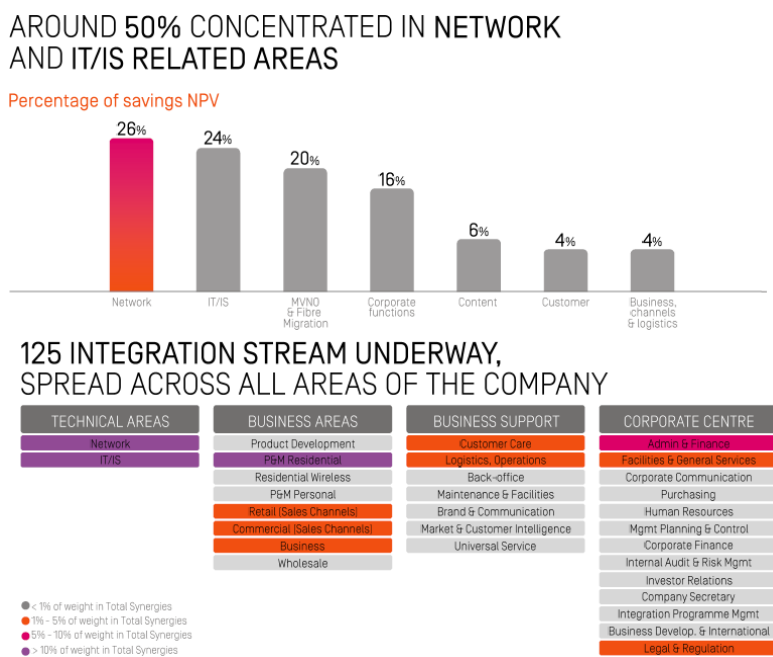
6.1. Some selected benchmarks

In this first chapter we will take a brief look at four benchmarks of Telecom operator's mergers and acquisitions to understand where synergy's value come from and how operators can reduce/increase significant cash flows on several categories. The first example will provide us some conclusions regarding the type of synergies that two telecom operators in the same country can achieve, the second will illustrate the economies of scale achieved by merging two global telecom groups, then, we will show an example of how integration costs play a significant role in the first year after the merger and, finally, a Brazilian example that will work as a benchmark for the synergies split between OPEX, CAPEX and Revenue.

Starting with a Portuguese example, the merger between ZON and Optimus, 2 years ago, was an example of a merger between two entities in the same country. As a result, the synergies are much higher since both companies can reduce significant OPEX in interconnection fees, network, marketing or selling expenses. Figure 58 presents a snapshot of the press release held last year by the merged entity.

The merged company identified several areas of cost reduction but network and IT represented almost 50% of total expected synergies. Moreover, other areas of cost reduction are lower fees paid to content providers, marketing expenses but also other categories such as administration and general expenses, customer care or sales and distribution channels.

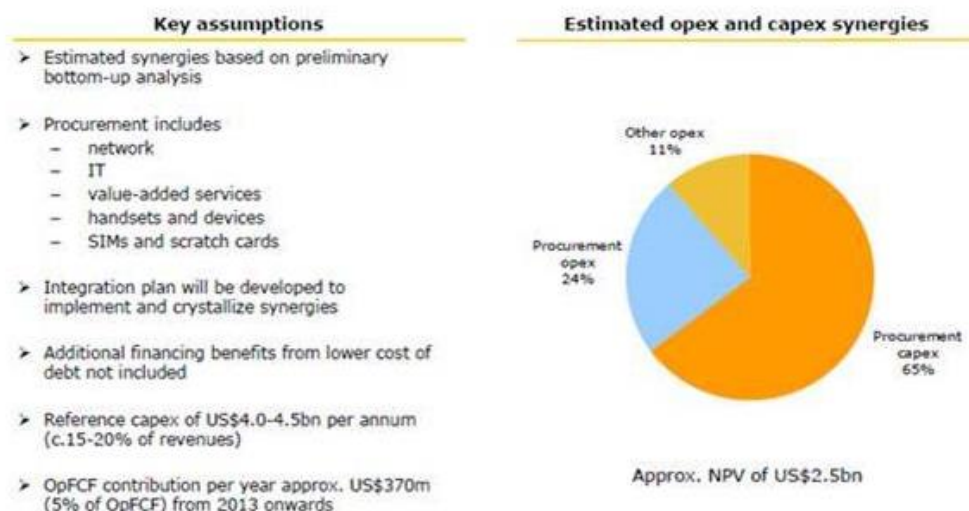
Figure 58 - Synergies summary between ZON and Optimus merger



The merger between VimpelCom and Orascom in 2010 occurred in order to gain scale and to become a global group in the telecom industry. Since both companies had operations in multiple countries (and were present in the same countries in some of them), the synergies achieved were related with economies of scale, OPEX infrastructure and CAPEX investment. As a result, the type

of synergies identified were in the COGS category (handsets, SIM cards and scratch cards), some IT and Network and, most importantly, CAPEX, in areas such as less investment needs in new infrastructure or IT improvements.

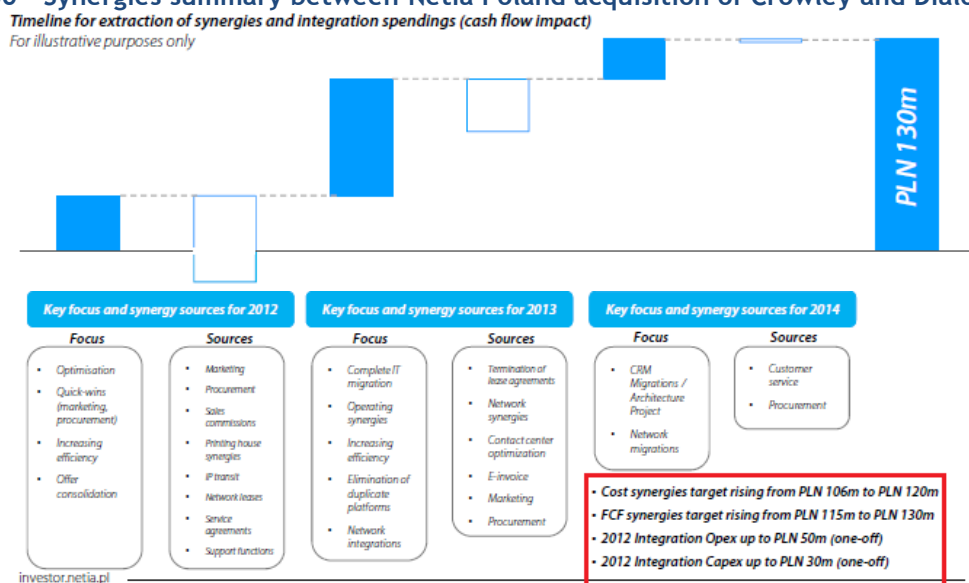
Figure 59 - Synergies summary between VimpelCom and Orascom



Then, the third case study is the Poland example of Netia Group acquisition of Crowley and Dialog.

By looking at figure 60, the “focus” in 2012 and 2013 was about optimization and efficiency increase in multiple areas such as sales and marketing, procurement, network and other supporting functions. Furthermore, this case is interesting because the deal released some information regarding integration costs and we understand that the merged entity had integration costs related with the merger of different IT platforms. By looking at the merger timeline, we see that during the merger, the first year had higher integration costs than synergies achievements and thus, this might work as a reference in our forecasts.

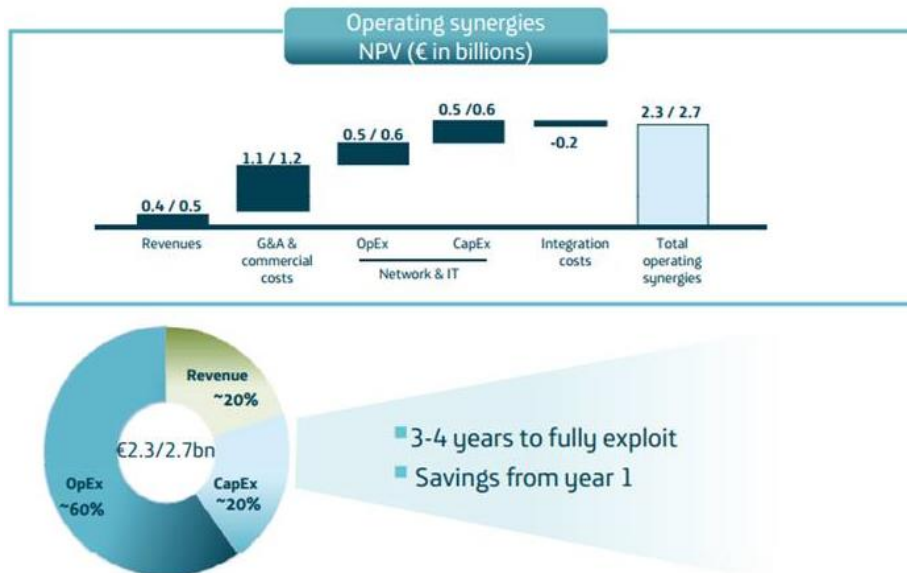
Figure 60 - Synergies summary between Netia Poland acquisition of Crowley and Dialog



Finally, the last but not the least, the fourth example is a Brazilian example of the merger between Vivo and Telesp (Telecomunicações de São Paulo) in 2012. Figure 61 provides us a split between

Costs, CAPEX and Revenue synergies achieved with the merger and we conclude that OPEX savings plays the most important role. Nevertheless, Revenue and CAPEX synergies still represent nearly 20% each. Moreover, the exhibit also gives us some sensitivity in terms of time to exploit synergies. As used in this case, we should also expect three to four years to fully accomplish the maximum level of synergies, and we will base our assumptions accordingly.

Figure 61 - Synergies summary between Vivo and Telesp merger



6.2. Synergies analysis

In this section we will finally look at the different synergies the merger can achieve, both in terms of operational expenditures, CAPEX, revenues enhancements and integration costs and then, we will summarize all the potential operational synergies as well as define a methodology for synergies split.

6.2.1. Cost synergies

In order to calculate the cost synergies, we have followed the same bottom-up approach, where we forecast each cost category according to each potential for cost savings. Figure 62 give us an overview of the cost categories, which we will now explain.

As we can see, different categories follow different approaches on cost savings, thus, leading to different long-term savings, between 4% and 12%.

Figure 62 - Cost synergies overview

Category	Driver	Old reference in 2016	New reference in 2016	LT savings
1 Personnel	Enhanced number of subscribers per employee	Vivo: 3.72k subs/emp. TIM: 6.02k s/e Combined: 4.59k s/e	New Ratio: 5k subs/emp.	12%
2 Selling and Marketing expenses	% savings in TIM	Vivo: BRL 7.98 Bln TIM: BRL 4.23 Bln Combined: BRL 12.2 Bln	Savings: 20%/year in TIM Combined: BRL 11.4 Bln	6.8%
3 General and administrative	% of revenues	Vivo: 3.1% of Rev TIM: 3% of Rev Combined: 3.1% of Rev	New reference: 2.75% of revenues	10.6%
4 Cost of Goods sold	% savings with economies of scale + effect of higher # of handsets sold	Vivo: BRL 2.5 Bln TIM: BRL 3.8 Bln Combined: BRL 6.4 Bln	5% savings from 2016 onwards due to higher bargaining power	3.7%
5 Network and Interconnection	Overlap of Base Stations per state in TIM	Vivo: 15,418 BTS TIM: 14,479 BTS Combined: 29,897 BTS	Savings: 3,230 BTS Combined: 26,667 BTS	10.8% ¹

Note: 1) savings in network and IT costs, excluding interconnection costs

Personnel synergies assume that the new merged company will have a ratio of subscribers per employees somewhere in the middle between Vivo and TIM ratio. Since the combined ratio is 4.59 thousand subscribers per employee, we made a conservative assumption of 5 thousand subs per employee from 2016 onwards, which corresponds to a long-term savings of 12%, compared to the combined expenses without synergies. Table 11 summarizes the main calculations. Moreover, by using the benchmark showed in the industry review (figure 25), it is reasonable to assume that ratio of subs per employee will be slightly lower than the old Brazilian average, getting closer to mature markets ratios below 4 thousand.

Table 9 - Personnel synergies

BRL Millions/ # of employees	2012	2013	2014F	2015F	2016F	2017F	2018F	2019F	2020F	2021F	2022F	2023F
TIM + VIVO	31,264	32,417	34,224	35,858	37,420	38,906	40,369	41,723	42,974	44,130	45,201	45,888
Combined Ratio	4.69	4.67	4.64	4.61	4.59	4.56	4.53	4.50	4.47	4.44	4.41	4.41
Total # of employees	31,264	32,417	33,450	34,379	34,843	36,002	37,107	38,093	38,971	39,749	40,437	41,044
Using new Ratio Subs/employee	4.69	4.67	4.77	4.89	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Difference in Employees	-	-	774	1,479	2,577	2,904	3,263	3,630	4,003	4,381	4,764	4,845
Personnel Expenses without synergies	3,132	3,364	3,557	3,738	3,913	4,081	4,251	4,409	4,558	4,698	4,829	4,914
growth %	7.8%	7.4%	5.7%	5.1%	4.7%	4.3%	4.1%	3.7%	3.4%	3.1%	2.8%	1.8%
Personnel Expenses with synergies	3,132	3,364	3,474	3,577	3,624	3,752	3,877	3,989	4,090	4,180	4,260	4,334
growth %	7.8%	7.4%	3.3%	3.0%	1.3%	3.5%	3.3%	2.9%	2.5%	2.2%	1.9%	1.7%
Sinergies	-	-	82	161	289	329	374	420	468	518	569	580

Selling and Marketing expenses, on the other hand, will also have a conservative savings on nearly 20% of TIM marketing and selling expenses. These cost savings come from less investment in marketing activities but also from lower content payments to services such as Pay TV, mobile applications, among others. However, we could even assume a higher rate of cost savings from TIM since the new operator does not require doubling the marketing investments, but the 20% assumption comes from the fact that both operators will maintain the same selling efforts and commissions to third party sellers, and thus, we only decrease one fifth of TIM expenses.

Table 10- Selling and marketing synergies

BRL Millions	2012	2013	2014F	2015F	2016F	2017F	2018F	2019F	2020F	2021F	2022F	2023F
Total Selling expenses	10,287	11,364	11,700	11,940	12,213	12,454	12,680	12,895	13,083	13,250	13,403	13,539
<i>growth %</i>	3.9%	10.5%	3.0%	2.1%	2.3%	2.0%	1.8%	1.7%	1.5%	1.3%	1.2%	1.0%
Synergies achieved in TIM	-	-	7%	13%	20.00%	20%	20%	20%	20%	20%	20%	20%
New Total Selling expenses	10,287	11,364	11,430	11,387	11,367	11,594	11,806	12,009	12,187	12,346	12,491	12,620
<i>growth %</i>	3.9%	10.5%	0.6%	-0.4%	-0.2%	2.0%	1.8%	1.7%	1.5%	1.3%	1.2%	1.0%
Absolute synergies achieved	-	-	270	553	846	861	874	885	896	905	912	919

Thirdly, general and administrative expenses will also achieve some synergies. The combined ratio of G&A was 3.06% of total revenues and we assume a combined ratio of 2.75%, nearly 10% lower than the previous combined cost structure.

Table 11 - General and administrative synergies

BRL Millions	2012	2013	2014F	2015F	2016F	2017F	2018F	2019F	2020F	2021F	2022F	2023F
Old combined % of Revenues	3.12%	3.06%	3.09%	3.08%	3.06%	3.08%	3.07%	3.07%	3.08%	3.07%	3.07%	3.07%
% of Revenues with Synergies	3.12%	3.06%	2.95%	2.85%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
New G&A	1,643	1,674	1,712	1,745	1,767	1,851	1,938	2,019	2,096	2,169	2,237	2,302
<i>growth %</i>	5.3%	1.9%	2.3%	1.9%	1.3%	4.8%	4.7%	4.2%	3.8%	3.4%	3.1%	2.9%
Synergies	-	-	79	142	201	221	229	237	248	256	264	272
<i>% savings</i>	0.0%	0.0%	4.4%	7.5%	10.2%	10.7%	10.6%	10.5%	10.6%	10.5%	10.5%	10.6%

On the other hand, Cost of Goods sold represents the amount spent by the operators on mobile handsets, routers, etc. We assume that the combined operator will be able to get a higher bargaining power and economies of scale with its suppliers. As a result, they will achieve a higher discount on handset shipping, of nearly 5% of total combined cost. Moreover, the new COGS also reflect the increased number of handsets sold, thus, the amount of synergies achieved is in fact lower than 5%, close to 3.7%, due to an increase of handset sold of nearly 1.5% in the long term.

Table 12 - Cost of Goods sold synergies

BRL Millions	2012	2013	2014F	2015F	2016F	2017F	2018F	2019F	2020F	2021F	2022F	2023F
Total COGS	4,407	5,469	5,805	6,099	6,382	6,654	6,917	7,164	7,395	7,612	7,817	8,010
<i>growth %</i>	16.3%	24.1%	6.2%	5.1%	4.6%	4.3%	4.0%	3.6%	3.2%	2.9%	2.7%	2.5%
Total COGS with Synergies	4,407	5,469	5,548	5,897	6,211	6,462	6,711	6,942	7,156	7,356	7,542	7,716
<i>growth %</i>	16.3%	24.1%	1.4%	6.3%	5.3%	4.0%	3.9%	3.4%	3.1%	2.8%	2.5%	2.3%
Synergies	-	-	258	203	171	192	206	222	239	257	275	294
<i>% savings</i>	0.0%	0.0%	4.4%	3.3%	2.7%	2.9%	3.0%	3.1%	3.2%	3.4%	3.5%	3.7%

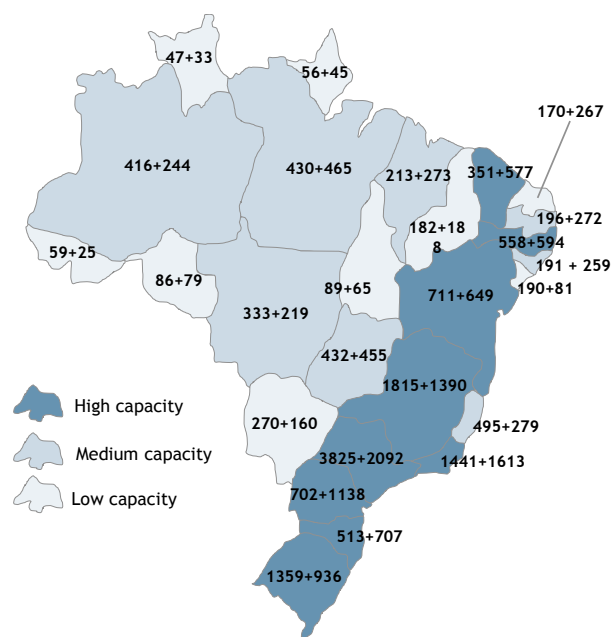
In order to calculate the network and interconnection synergies, we have extracted the public information on BTS's¹⁰ from ANATEL website. Figure 63 show us the BTS population per state.

¹⁰ Base transceiver station is the technical term for the structure containing the antennas that provide wireless and mobile communications

Although we have not performed a BTS by BTS analysis to understand how close these antennas might be, we have assumed that the combined firm will decommission 25% of the infrastructure with the lowest footprint. For instance, in Rio de Janeiro, Vivo has 1,441 BTS's and TIM has 1,613, thus, we have estimated a decommissioning of 347 BTS's, corresponding to 25% of Vivo BTS's.

As a result, we forecast an expected decommissioning of 3,230 BTS's across the whole 27 states, which will be sold to external entities, other players or simply dismantled and sold piece by piece. We expect that this decommissioning will take approximately 3 years to complete, and, as a result, we expect additional cash flows from the selling of these BTS's during the same period.

Figure 63 - Number of BTS per operator per state
 (# of BTS, Vivo + TIM)



In addition, Interconnection costs also play a relevant role in synergies. Since TIM pays the incumbent and Vivo also pays TIM for using their infrastructure, the combined firm will be able to reduce the costs in almost BRL 2 Billion per year. Nevertheless, this is just an accounting procedure, since the costs of one operator are the revenues of the other, and thus, the revenues should decrease in the same amount.

Table 13 provide us the synergies per year for the merged firm. We assume that the decommissioning of infrastructure will be concluded in three years, by end of 2016 and then, the expected savings of 10.8% (percentage corresponding to the number of BTS decommissioned over the number of old number of BTS) in Network and IT should be the same until the end of the explicit period.

We forecast that the synergies will be nearly BRL 2.15 Billion in 2014 and should growth to almost BRL 2.7 Billion by end of 2023, including interconnection costs.

Table 13 - Network and Interconnection synergies

BRL Millions	2012	2013	2014F	2015F	2016F	2017F	2018F	2019F	2020F	2021F	2022F	2023F
Total NW costs	15,518	15,949	17,182	18,258	19,163	20,001	20,904	21,679	22,342	22,911	23,400	23,823
Network and IT	39.5%	36.1%	36.1%	36.1%	36.1%	36.1%	36.1%	36.1%	36.1%	36.1%	36.1%	36.1%
Others	60.5%	63.9%	63.9%	63.9%	63.9%	63.9%	63.9%	63.9%	63.9%	63.9%	63.9%	63.9%
Network and IT	6,125	5,761	6,207	6,595	6,922	7,225	7,551	7,831	8,070	8,276	8,452	8,605
Interconnection costs	9,392	10,188	10,976	11,663	12,241	12,776	13,353	13,848	14,271	14,635	14,947	15,218
% of synergies achieved in NW and IT	0%	0%	3.60%	7.20%	10.80%	10.80%	10.80%	10.80%	10.80%	10.80%	10.80%	10.80%
Total NW costs with synergies	15,518	15,949	15,035	15,857	16,508	17,348	18,236	19,001	19,660	20,232	20,723	21,153
Network and IT with Synergies	6,125	5,761	5,983	6,120	6,174	6,444	6,735	6,985	7,198	7,382	7,539	7,676
Interconnection with Synergies	9,392	10,188	9,052	9,736	10,334	10,904	11,501	12,016	12,462	12,850	13,184	13,477
Total NW and Inter Synergies	-	-	2,147	2,402	2,655	2,653	2,667	2,678	2,681	2,680	2,677	2,671
NW Synergies	-	-	224	475	748	781	816	846	872	894	913	930
Interconnection Synergies	-	-	1,924	1,927	1,907	1,872	1,851	1,832	1,810	1,786	1,763	1,741

6.2.2. Revenue synergies

In terms of revenue synergies, we forecast a total increment in revenues of nearly BRL 1 Billion per year from 2016 onwards (excluding interconnection fees since it is simply an accounting procedure). The revenues should come from four different sources: mobile and fixed usage, handsets and value added services.

Since the merged company has an estimated market share of 51.8% in 2014, this creates a telecom operator that enables its subscribers to make low-cost calls between each other (since there are no interconnection fees, the price per call is lower). Therefore, we forecast that the pace of subscriber growth will be higher than in other players due to this network effect. We assume 0.5% additional growth in 2014 and then 1% growth in 2015. As a result, the forecasted mobile usage revenues should increase by this percentage from 2014 onwards, which is reflected in figure 64.

Moreover, value added services and data revenues should also have an increased performance due to bigger and better quality network. We forecast 0.5% additional growth in 2014 and 2015, and then, 0.25% additional growth in 2016 and 2017.

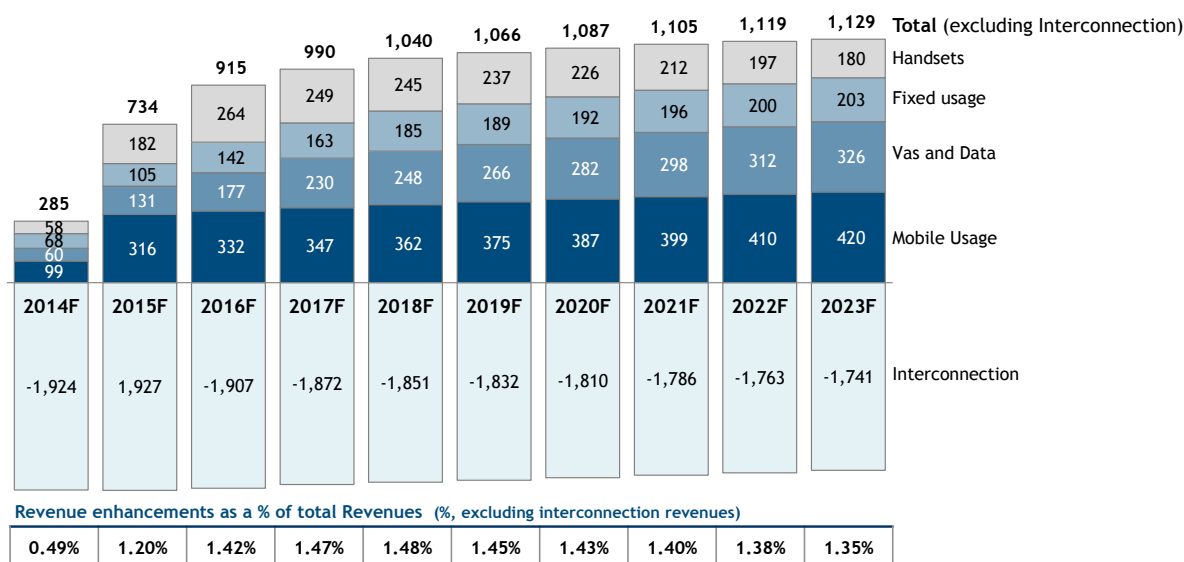
In the same line of thought, the fixed infrastructure will also suffer revenue enhancements. In this case, a bigger fixed infrastructure also means more people having access to the fixed network, fast broadband and Pay TV. As a consequence, the merged entity should have 1% growth in 2014, followed by 0.5% in 2015 and 2016 and then, at a slower pace, a revenue increase of 0.25% in 2017 and 2018.

The last but not the least, for the handset revenues, we estimate that Vivo will leverage the best practices made by TIM in terms of handset selling. We estimate a ratio of 7.75 subscribers per each handset sold, below the ratio of Vivo (12.8) and, obviously, above TIM ratio (5.9).

On the other hand, as we explained before, we should also have interconnection revenues erosion due to fewer fees paid from operators. However, we only consider this impact as an “accounting” impact, since the revenue erosion is also followed by a cost reduction from the other merged party, and thus, it is no longer taken into account.

Concluding, revenue enhancements should have an impact of almost 1.5% of the combined firm in 2016 onwards, reflecting the adjustments explained previously, which corresponds to more than BRL 1.1 Billion in the mid-long term.

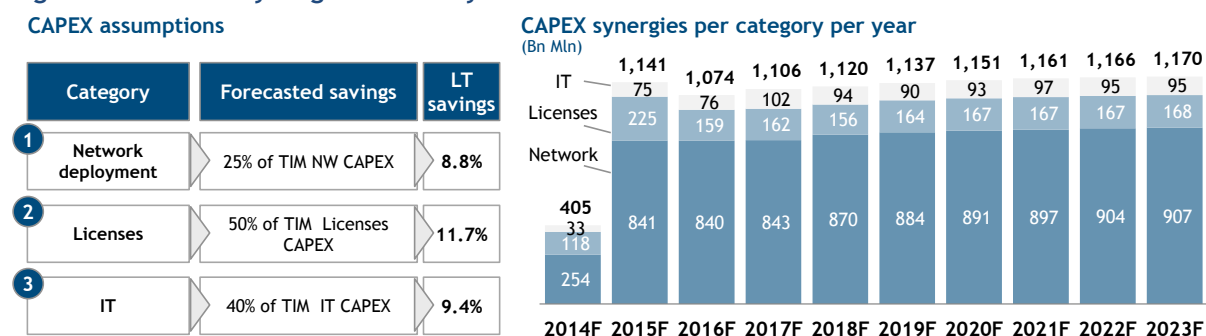
Figure 64 - Revenue synergies per category
(BRL Mln)



6.2.3. CAPEX synergies

The CAPEX synergies account for more than BRL 1 Billion each year and is mostly driven by the savings in network deployment. Figure 65 summarizes the forecasted savings per CAPEX type and the long term forecasted savings. As we can see, following the same approach used in the network decommissioning, we assume 25% decrease in TIM CAPEX due to overlap of infrastructure deployment. On the other hand, Licenses have a CAPEX savings of 50% of TIM, since the merged operator will not have the same spectrum requirements as the two standalone operators and finally, IT CAPEX expenditures are expected to reduce to nearly 9.3% in the long-term, corresponding to 40% of the expected CAPEX of TIM in IT. We forecast additional expenditures in IT, due to the combination of two complex IT platforms with more than 50 million subscribers each, nevertheless, once the platform is together, we expect IT CAPEX synergies to become more evident.

Figure 65 - CAPEX synergies summary



6.2.4. Incremental cash flows with merger

Following the explanation about where the merged entity will obtain synergies, it is also important to refer the expected incremental gains and investments due to the merger.

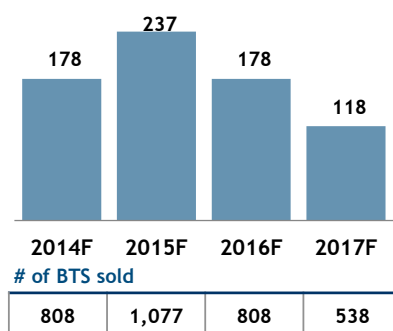
6.2.4.1. Incremental gains

Starting with the incremental gains, since we will decommission 3,230 BTS's, a well-defined dismantling plan has to be put in place. We expect that this procedure will take 4 years to be accomplished, thus, the gains should only be fully obtained by end of 2017.

Nevertheless, these gains should account for BRL 710 Million, distributed along 4 years (Figure 62).

We forecast an estimated selling price per BTS of nearly BRL 220,000, which is in accordance with telecom benchmarks of nearly USD 100,000 per tower¹¹.

Figure 66 - Gains with BTS sold
(BRL Mln)



6.2.4.2. Incremental expenses

In terms of additional expenses, we forecast three main sources of additional expenses. Firstly, as in every merger, consulting and investment banking support is essential to successfully accomplish the right deal. We assume 40 consultants and investment bankers in the first year, with an estimated fee per resource of BRL150,000 per month. Then, we estimate that the fees paid to these firms will reduce until it reaches a marginal expense of BRL 5 Million in 2017, corresponding to implementation fees.

Moreover, we also forecast a substantial increment of expenses related with marketing campaigns and IT investments. The first category will be responsible for the “education” of both Vivo and TIM subscribers, where a strong marketing campaign must be in place to ensure the new merged entity is recognized in the market. Furthermore, IT investment is also crucial, since the new entity will have to make a strong effort to combine both IT platforms and ensure the merger runs smoothly and without any disruption. As a result, we forecast an increase in IT expenses of 20% in the first year, which will reduce in the following years to marginal BRL 89 Million in 2017.

¹¹ Figure based on Delta Partners insights

Table 14 - incremental expenses summary

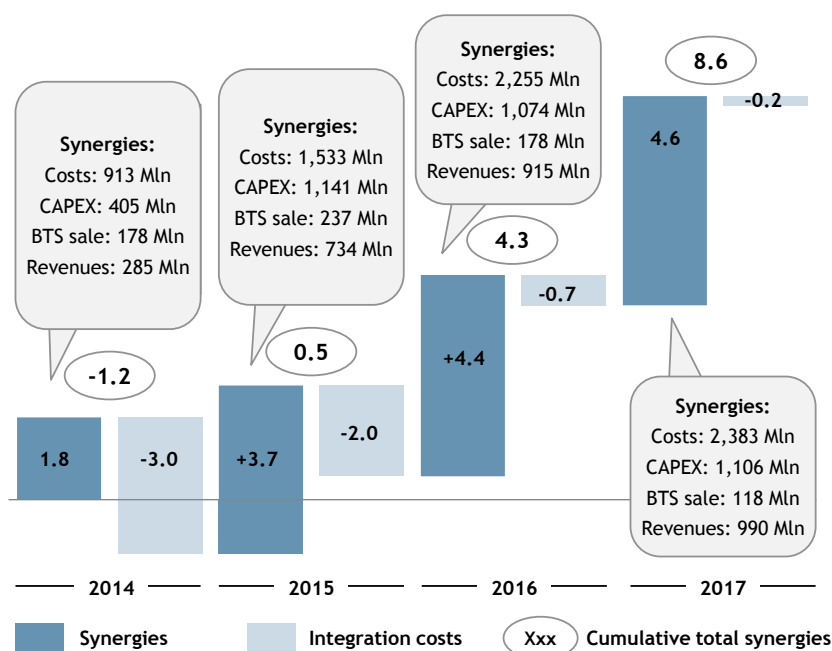
	2014F	2015F	2016F	2017F
Consulting	72	48	16	5
Marketing	1,714	1,143	381	127
IT investment	1,197	798	266	89
Total	2,983	1,989	663	221

6.2.5. Synergies summary

Concluding, we forecast a loss in the first year due to high integration costs (especially Marketing and IT integration), and reduced synergies gains but, in the second year after the merger, we already start achieving significant synergies, with an expected cumulative value of BRL 0.5 Billion. Most of these synergies will come from cost synergies, such as selling and marketing expenses, as well as personnel, but CAPEX synergies are also expected to be relevant, with a total amount in the first year of BRL 428 Million.

Figure 67 summarizes the dynamics during the first four years of the merger. We expect that the synergies will be fully achieved in the third year.

Figure 67 - First 4 years of synergies and integration costs overview (BRL Bln)

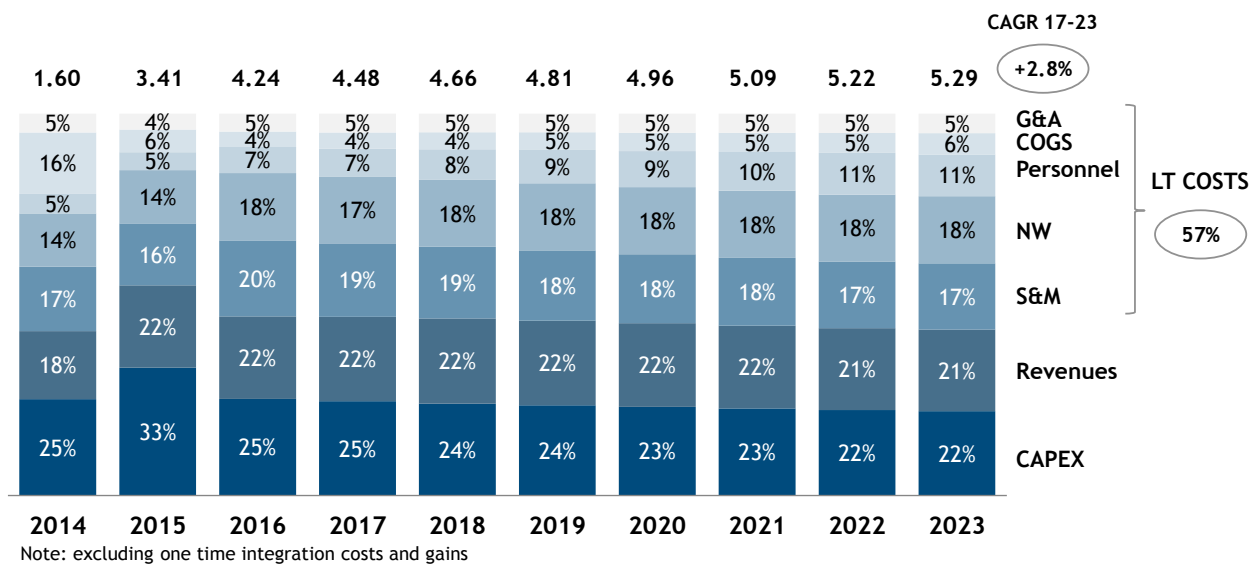


In terms of division between the different categories, in accordance with several benchmarks reviewed before, we forecast that the cost synergies will represent nearly 57% of total synergies, whereas CAPEX 22% and revenues slightly above 20%.

We have excluded integration costs from this analysis since it would distort the overall picture and since these are only one-time cash flows that do not account for the main purpose of the merger.

As a result, as stated before, we expect that the synergies impact is fully obtained only in 2017 and should grow at a similar pace as the overall business, 2.8%.

Figure 68 - Synergies split per category
(BRL Bln, %)



6.2.6. Synergies split analysis

In order to compute the synergies assigned to each operator, we have analysed each cost, revenue and CAPEX category to understand the specific weight of each operator in the total cash flows. In Table 15, we have included all the divisions for both operators per cash flow category. As we can see, there are different splits depending on the class analysed. For instance, while personnel expenses have a split Vivo/TIM of 75%/25%, the fixed revenues has a split of 96%/4%, or handsets, on the other hand, has a bigger weight in TIM Participações, with a split of 28%/72%.

The overall business split between Vivo and TIM, is 63.4%/36.6% and we will use this ratio as a reference when defining the premium paid to TIM Participações in the deal chapter.

Table 15 - Synergies split per operator per category

(BRL Mln, %)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Costs	913	1,533	2,255	2,383	2,498	2,610	2,723	2,829	2,933	2,995
Personnel expenses	82	161	289	329	374	420	468	518	569	580
Vivo	75%	75%	75%	75%	75%	75%	75%	75%	75%	74%
TIM	25%	25%	25%	25%	25%	25%	25%	25%	25%	26%
Selling & marketing expenses	270	553	846	861	874	885	896	905	912	919
Vivo	65%	65%	65%	65%	66%	66%	66%	66%	66%	66%
TIM	35%	35%	35%	35%	34%	34%	34%	34%	34%	34%
Network & interconnection	224	475	748	781	816	846	872	894	913	930
Vivo	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%
TIM	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%
General & administrative	79	142	201	221	229	237	248	256	264	272
Vivo	64%	64%	64%	64%	64%	64%	65%	65%	65%	65%
TIM	36%	36%	36%	36%	36%	36%	35%	35%	35%	35%
Cost Of Goods Sold	258	203	171	192	206	222	239	257	275	294
Vivo	39%	39%	40%	41%	41%	42%	42%	43%	44%	44%
TIM	61%	61%	60%	59%	59%	58%	58%	57%	56%	56%
Revenues	285	734	915	990	1,040	1,066	1,087	1,105	1,119	1,129
Mobile - Usage	99	316	332	347	362	375	387	399	410	420
Vivo	59%	59%	59%	58%	58%	58%	58%	58%	58%	58%
TIM	41%	41%	41%	42%	42%	42%	42%	42%	42%	42%
Mobile - VAS	60	131	177	230	248	266	282	298	312	326
Vivo	62%	61%	61%	60%	60%	59%	59%	59%	59%	59%
TIM	38%	39%	39%	40%	40%	41%	41%	41%	41%	41%
Fixed	68	105	142	163	185	189	192	196	200	203
Vivo	96%	96%	96%	96%	97%	97%	97%	97%	97%	97%
TIM	4%	4%	4%	4%	3%	3%	3%	3%	3%	3%
Handsets	58	182	264	249	245	237	226	212	197	180
Vivo	28%	28%	29%	29%	30%	31%	31%	32%	33%	33%
TIM	72%	72%	71%	71%	70%	69%	69%	68%	67%	67%
CAPEX	405	1,141	1,074	1,106	1,120	1,137	1,151	1,161	1,166	1,170
Vivo	66%	61%	64%	64%	65%	65%	66%	66%	67%	67%
TIM	34%	39%	36%	36%	35%	35%	34%	34%	33%	33%
Synergies for Vivo	982	2,081	2,664	2,831	2,963	3,076	3,186	3,287	3,382	3,442
Synergies for TIM	621	1,327	1,580	1,648	1,696	1,738	1,776	1,808	1,836	1,851
% of synergies for Vivo	61%	61%	63%	63%	64%	64%	64%	65%	65%	65%
% of synergies for TIM	39%	39%	37%	37%	36%	36%	36%	35%	35%	35%

7. The Merged Company and the Deal

This last chapter will integrate all the analysis made before, present the new merged firm with the synergies effect and we will spend some time explaining all the details of the deal such as the premium paid, the payment methods and the impact to both Vivo and TIM shareholders. In the end, we will also look at some sensitivity analysis to some important assumptions as the premium, the split between stock and cash payment to Telecom Italia and also the discount rate. Finally, we will look at some regulatory challenges that may be at stake if the deal happened in reality.

7.1. The financials with synergies

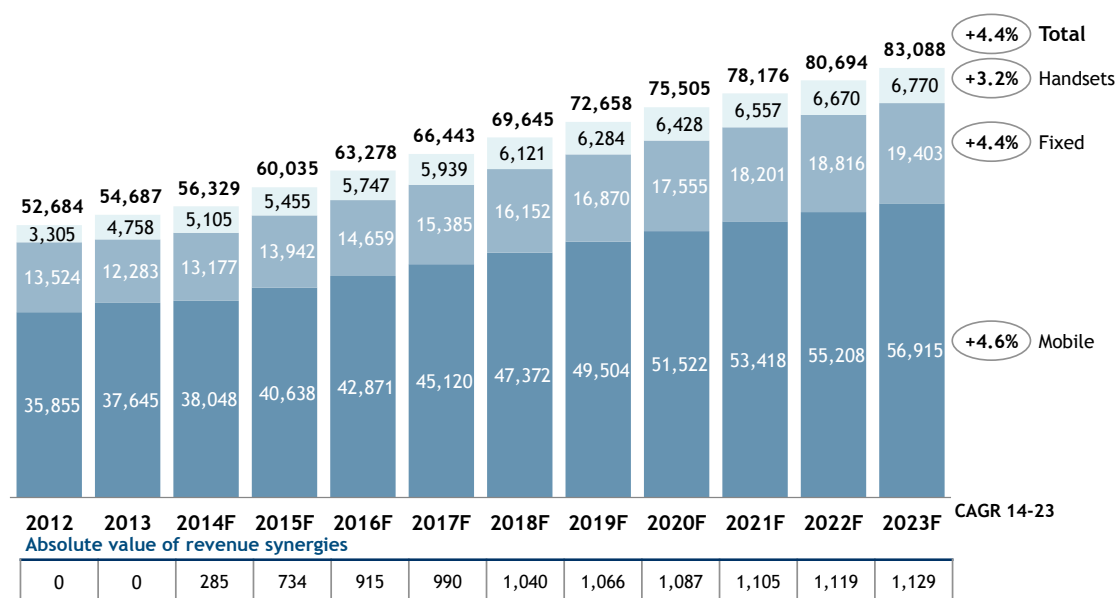
In this chapter, we will review all the components of the free cash flow to the firm. We will start by looking at revenues, followed by the costs, an update on the new depreciations and amortizations and finally, a comparison between the old and new EBIT under synergies effect.

7.1.1. Revenue

As reviewed in the last chapter, the merged firm is expected to generate a combined revenue enhancements of nearly BRL 1 Billion per year. Figure 69 shows the new revenue forecasts and, as we can see, the total revenue evolution is expected to be closer to 4.4% per year, more 0.3% per year, compared with the sum of parts revenue before.

The mobile business will continue to be the major source of revenues, but the fixed business and handsets will still represent almost one third of the business.

Figure 69 -Revenues of merged company with synergies
(BRL Mln)



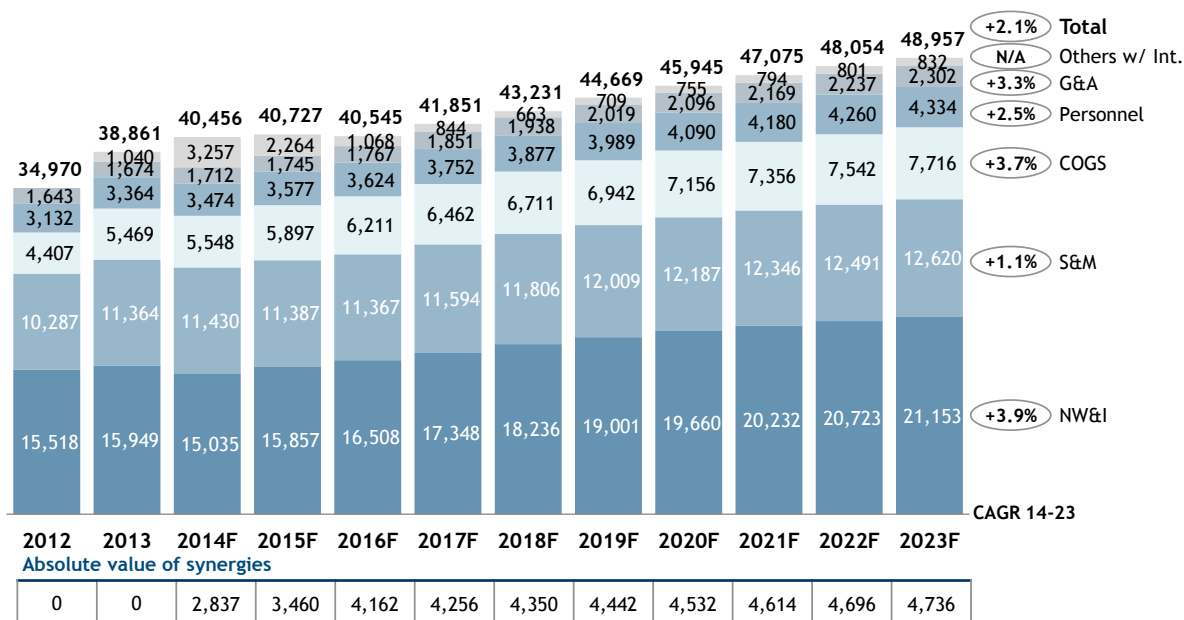
7.1.2. Costs and EBITDA

In terms of cost structure, we forecast a year-over-year growth of 2.1% during the explicit period. The combination of cost and revenue synergies is forecasted to provide a long term EBITDA margin of 41%, 4% higher than the highest EBITDA margin achieved by Vivo two years ago. By observing

figure 70, the synergies seems to have a low impact, but the effect is more clear in the Network and Interconnection and Selling and Marketing expenses during 2014, 2015 and 2016.

In the low end of the same figure, we also see the absolute value of synergies saved each year and it represents almost 10% of total costs.

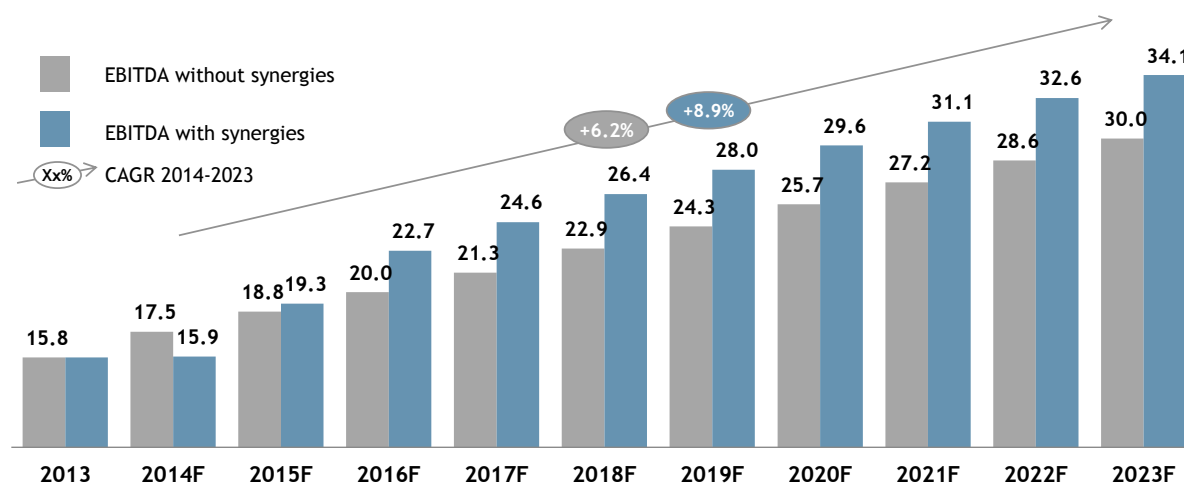
Figure 70 -Costs of merged company with synergies
(BRL Mln)



Note: Including Interconnection costs effect

As a result, figure 71 shows the EBITDA comparison between a sum of parts EBITDA without synergies and the combined firm under the synergies effect. The revenue enhancements and cost reductions enables an additional year-over-year growth of 2.7%, thus, it will have a big difference in terms of FCFF, and, as a consequence, in the final firm value.

Figure 71 - EBITDA comparison with and without synergies
(BRL Bln)

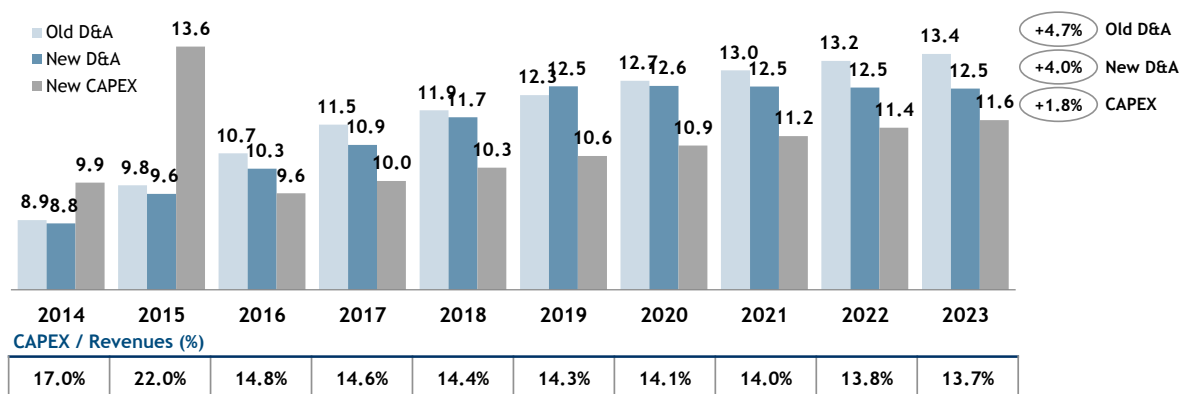


7.1.3. Depreciations and Amortizations

In order to forecast the new Depreciations and Amortizations of the merged firm, we had to recalculate all the D&A again because there are adjustments in the CAPEX investments. As a result, the new asset average life period is 8.7 years and we have used this weighted average to estimate the depreciations over time. Following the same approach used for Vivo and TIM Participações, in figure 72 is represented the new depreciations (dark blue), compared with the sum of parts from Vivo and TIM. As observed, the depreciations are slightly lower in the long term because the investments are lower than if both companies were operating separately.

In terms of CAPEX, we forecast a big increase in CAPEX in 2015, both in fixed and mobile infrastructure as well as quality improvement, but, in the following years, a substantial decrease, approaching a ratio of 13.7% in the mid-term. In addition, as explained in Vivo and TIM standalone valuations, we forecast a slightly lower ratio of CAPEX to D&A, which is in line with the big increase in CAPEX in the next 2 years.

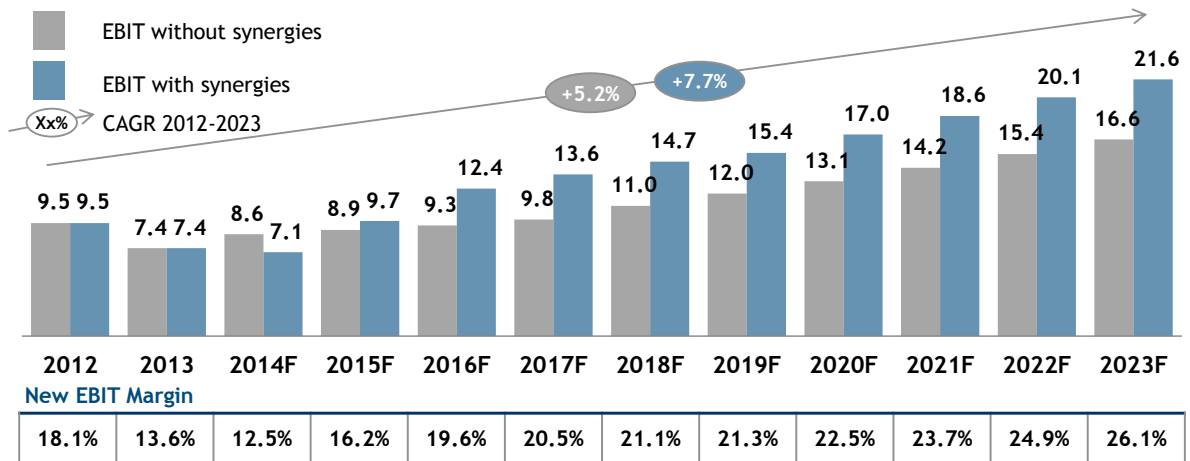
Figure 72 - Depreciations and Amortizations of merged firms
(BRL Bln)



7.1.4. EBIT

In terms of EBIT, it is expected that the firm will be able to achieve significant enhancements from 2016 onwards. The merger should have a great impact on the EBIT margin, since the new merged company is able to increase revenues, reduce costs, and reduce depreciations and amortizations. As we will see further, this difference will have a big impact on the final valuation, with expected synergies close to the value of TIM Participações.

Figure 73 - EBIT comparison with and without synergies
(BRL Bln)



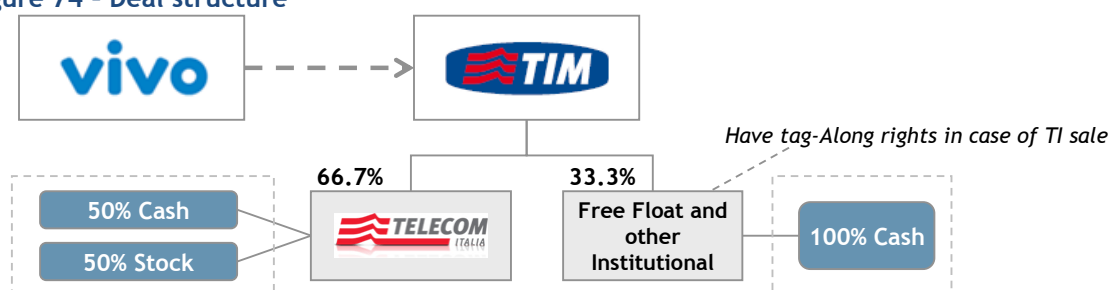
7.2. The Deal

7.2.1. Structure of the acquisition

As we have seen previously, Telecom Italia has a relevant position in the Brazilian market but, at the same time, has been making significant divestments in numerous assets in order to reduce their debt. As a result, the proposed deal will ensure that Telecom Italia still keeps a strategic participation in the Brazilian market, through the combined firm, but, at the same time, divests some of his Brazilian participation due to debt reduction reasons.

The deal will consist of an equity acquisition from Vivo to TIM Participações S.A. to all its 100% shareholders. The participation of Telecom Italia will be split between 50% Vivo stock issuance and 50% cash payment, whereas the minority shareholders will be bought only through cash.

Figure 74 - Deal structure



As a result, as observed in (1) from table 16, Vivo will acquire 2.4 Billion shares, 67% to Telecom Italia and 33% to other institutional shareholders and free float.

We have defined this scenario (another possible solution would be to only buy the stake from Telecom Italia) since TIM Participações is the only operator in Brazil with tag-along rights to all its minority shareholders, and, as a result, Vivo is obliged to purchase all 100% shares.

We have chosen a 40% premium, which goes in line with the split of synergies offered to each shareholder. In order to better understand the rationale for the premium offered, we will look with more detail afterwards.

Vivo will have to issue shares corresponding to BRL 13.1 Billion and also pay the same amount with cash to Telecom Italia shareholders. At the same time, Vivo will reward each minority shareholder with BRL 16.29 per share, or a similar amount of BRL 13.1 Billion.

In terms of number of new shares issued by Vivo (3), we used the corresponding exchange ratio of the date of the deal, 31st of December 2013, which is 37.8%, corresponding to division between the acquisition offer, BRL 15.75, and the stock price of Vivo, BRL 43.15, and then, multiplied by the number of TIM shares to acquire with stock (805 million shares). As a result, Vivo will have to issue a total number of 304.3 Million new common stock shares.

Regarding the cash transaction, Vivo will have to pay 66% of the deal with cash. Therefore, the total cash required is BRL 26.26 Billion. Since the Vivo has only BRL 6.54 Billion in cash, and, assuming the operator will keep 5% in cash reserves for working capital requirements, the total cash available for the transaction will be BRL 6.22 Billion. Thus, Vivo will have to issue new debt in

order to complete the transaction (4). The Brazilian incumbent will have to issue BRL 20.04 in new debt, increasing the total Vivo debt to nearly BRL 28.79 Billion.

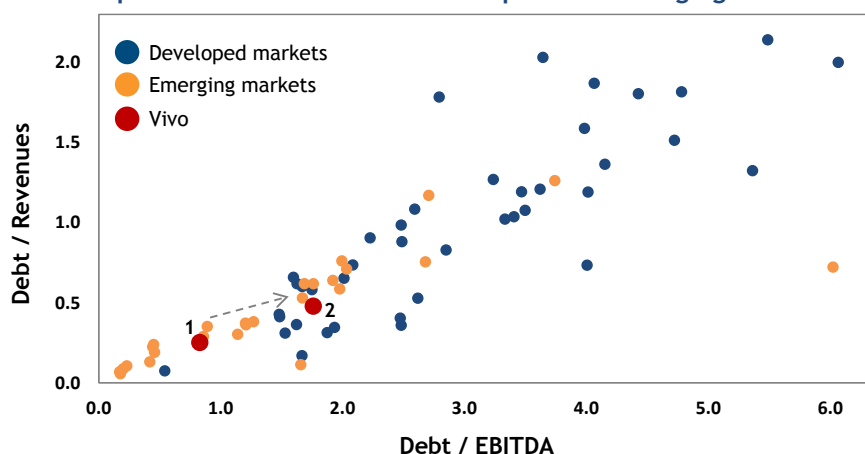
Table 16 - Deal structure and main calculations

(1) Onwership division in TIM		(3) # of shares issued calculation	
# of shares	2,417,632,647	Vivo current price per share	43.15
% owned by Telecom Italia	66.7%	Acquiring offer	15.75
% Onwed by free float	33.3%	Exchange ratio	36.5%
Equity value of TIM	27,194,807	# of shares to acquire to TI	805,984,973
Premium	40.0%	# of new shares issued	294,137,046
Equity acquisition value	38,072,730	Vivo New # of shares	1,417,406,290
Absolute premium value	10,877,923		
Acquisition value per share	15.75		
(2) Acquisition parts		(4) Additional Debt to pay transaction	
Value to acquire:	38,072,730	Total Cash :	6,543,900
To acquire to Telecom Italia	25,385,204	Assumed cash reserves	5.00%
Free float and others institutional	12,687,527	Cash reserves	327,195
Acquisition to Telecom Italia		Cash available for transaction	6,216,705
Value in stock	12,692,602	Existing Debt	8,753,600
Value in cash	12,692,602	Cash required for acquisition	25,380,129
Acquisition to free float + other institutionals		Debt increase	19,163,424
Amount in cash	12,687,527	New Debt	27,917,024
		Total Debt / Revenues	47.9%
		Total Debt / EBITDA	1.76

Moreover, we assume that the Debt increase made by Vivo will have consequences in terms of costs and credit rating. We assume that the operator will be downgraded in one level, from Baa1 to Baa2, and, as a result the new debt will have to be financed at a higher cost. We used the approach used by Damodaran to estimate the cost of debt, depending on the credit rating, and we added 0.5% to the estimated cost of debt.

Nevertheless, this debt increase is still quite low, compared with other telecom operators. In the figure below, we have extracted 71 telecom operators' data across the world (the ones that had information regarding debt issued) and categorized the operators, depending if the country of origin is a developed or an emerging market. The first main conclusion is that emerging market operators have clearly lower levels of debt, compared with developed countries, with an average debt to EBITDA of 3.18 in developed countries and 1.45 in emerging markets. As we have seen previously in the literature review, emerging markets are more risky than developed markets due to risk of expropriation, war or even corruption. Thus, it is normal to see lower leverage in emerging markets, compared with developed countries. Secondly, when looking to Vivo, point 1 represents the previous levels of debt to EBITDA before the merger in 2013 (0.83 debt to EBITDA and 0.25 debt to revenues), while point 2 represents the new level of debt after the merger (1.76 debt to EBITDA and 0.48 debt to revenues). As a result, we see that, even with an increase of nearly BRL 19 Billion in debt, the ratio of Debt-to-EBITDA still remains inside the emerging market cluster.

Figure 75 - Telecom operators debt levels for developed and emerging markets



In table 17, we have included the forecasted debt and expected Interest tax shields from the new merged firm.

We are assuming that the previous Vivo will keep having the same financing needs, and so, we simply added the forecasted debt from the standalone Vivo. Then, regarding TIM's debt, we assume that Vivo will make the debt perpetual or will keep updating the debt by issuing new one at the same rate, so, we estimate this debt constant in the future. Finally, the additional debt is also assumed to be perpetual since the company gain significant interest tax shields and, as a result, the merged firm will be interested in maintaining this new leverage ratio.

As a result, these three different debts will have different interest rates, and so, we have computed the interest rates separately. After that, we have computed the expected interest tax shields, which will be used to calculate the present value of interest tax shields, through the APV approach.

Table 17 - New Debt with merger and expected ITS

	2014F	2015F	2016F	2017F	2018F	2019F	2020F	2021F	2022F	2023F
(1) Vivo debt	9,288	9,674	9,976	10,032	10,260	10,431	10,593	10,700	10,797	10,881
(2) TIM debt	4,747	4,747	4,747	4,747	4,747	4,747	4,747	4,747	4,747	4,747
(3) Additional debt with Acquisition	19,163	19,163	19,163	19,163	19,163	19,163	19,163	19,163	19,163	19,163
Total (1) + (2) + (3)	33,198	33,584	33,886	33,942	34,170	34,341	34,503	34,610	34,707	34,791
<i>Debt / EBITDA</i>	<i>2.1</i>	<i>1.7</i>	<i>1.5</i>	<i>1.4</i>	<i>1.3</i>	<i>1.2</i>	<i>1.2</i>	<i>1.1</i>	<i>1.1</i>	<i>1.0</i>
Interest from (1) @ 8.87% (avg.)	801	861	896	887	914	929	941	952	961	968
Interest from (2) @ 6.70%	318	318	318	318	318	318	318	318	318	318
Interest from (3) @ 10.20%	1,954	1,954	1,954	1,954	1,954	1,954	1,954	1,954	1,954	1,954
Interest tax shields @ 32%	983	1,002	1,014	1,011	1,020	1,024	1,028	1,032	1,034	1,037

7.2.2. Discount rate

In order to estimate the value of the new firm, we have to first calculate the new cost of capital, both the cost of equity and the cost of debt.

We started by calculating the new combined levered beta, which is the weighted average beta of both TIM and Vivo betas, based on their enterprise values. Then, by looking at the new ratio of

Debt to Equity, 56.82%, we estimated the Beta unlevered. As a result, adding the Brazilian risk free rate (7.7%) and the multiplication between the Beta unlevered with the Brazilian market risk premium, we obtain a total cost of equity of 11.86%.

In terms of cost of debt, we as stated before, we assumed that the new firm, by increasing the leverage, will be downgraded to Baa2, according to Moody's rating scale, and, as a result, the previous credit default spread of 2.% should be increased to 2.5%. Therefore, the forecasted cost of debt will be 10.20%.

Table 18 - Discount rates of new merged firm

Risk Free rate (BR)	7.70%	New Cost of Capital with new Debt effect	
Market Risk Premium	8.29%	Combined beta levered	0.697
Vivo Discount rate		D/E	56.82%
Enterprise value (Mln)	56,211	New Beta unlevered	0.503
Beta levered	0.670	New cost of Unlevered Equity (Ru)	11.86%
Old cost of unlevered Equity	12.51%		
TIM Discount rate		New credit Rating	Baa2
Enterprise value (Mln)	26,451	Implicit spread for cost of Debt	2.50%
Beta levered	0.755	Cost of Debt (Rd)	10.20%
Old cost of unlevered Equity	12.82%		

7.2.3. Merged Firm Valuation

The calculation of the free cash flows to the firm follow the same approach used in TIM and Vivo valuations. We have computed three forecasting stages, where the first one corresponds to the forecasted explicit period, then, on the second stage, we adjust the FCFF growth rate until it reaches the forecasted long-term growth rate of 2.5% in the third stage.

Table 19 summarizes the free cash flow to the firm as well as the expected interest tax shields to the merged firm. As we can see, we expect that in 2016, the year where we forecast the full accomplishment of total synergies, the FCFF to triple the amount to nearly BRL 9 Billion, and then, expanding at an average pace of 5.6% per year.

In terms of working capital, we have added both values from Vivo and TIM to calculate the future working capital requirements.

Furthermore, for the terminal value calculation, we estimate a year-over-year growth rate of 2.5%, the expected long term GDP growth rate of Brazil.

Table 19 - Free cash flow to the Firm of the merged firm with synergies

1st stage - Explicit period											
BRL Millions	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
EBIT*(1-T)	4,805	6,594	8,455	9,278	10,005	10,503	11,564	12,625	13,690	14,721	
growth %	-4.7%	37.2%	28.2%	9.7%	7.8%	5.0%	10.1%	9.2%	8.4%	7.5%	
+ D&A	8,807	9,610	10,299	10,949	11,700	12,544	12,554	12,535	12,508	12,483	
growth %	4.7%	9.1%	7.2%	6.3%	6.9%	7.2%	0.1%	-0.2%	-0.2%	-0.2%	
- ΔWC	723	11	76	- 115	- 37	258	81	77	105	150	
growth %	-141.0%	-98.5%	602.3%	-250.3%	-67.6%	-792.4%	-68.5%	-5.1%	36.5%	43.0%	
- CAPEX	9,916	13,626	9,629	9,966	10,324	10,642	10,929	11,185	11,415	11,621	
growth %	4.9%	37.4%	-29.3%	3.5%	3.6%	3.1%	2.7%	2.3%	2.1%	1.8%	
FCFF	2,973	2,568	9,049	10,375	11,419	12,147	13,108	13,898	14,678	15,432	
growth %	-48.4%	-13.6%	252.3%	14.7%	10.1%	6.4%	7.9%	6.0%	5.6%	5.1%	
- Tax Shields	983	1,002	1,014	1,011	1,019	1,024	1,028	1,032	1,034	1,037	
growth %	1.9%	1.1%	1.1%	-0.3%	0.9%	0.5%	0.4%	0.3%	0.3%	0.2%	
Unlevered CFs	1,990	1,566	8,035	9,364	10,400	11,122	12,080	12,867	13,643	14,395	
growth %		-21.3%	413.2%	16.5%	11.1%	6.9%	8.6%	6.5%	6.0%	5.5%	

2nd stage - adjusting period							3rd stage - TV	
BRL Millions	2024	2025	2026	2027	2028	2029	TV	
FCFF	16,390	17,287	18,105	18,829	19,443	19,934	20,437	
growth %	6.2%	5.5%	4.7%	4.0%	3.3%	2.5%		
- Tax Shields	1,028	1,021	1,020	1,026	1,041	1,067	1,094	
growth %	-0.9%	-0.6%	-0.1%	0.6%	1.5%	2.5%		
Unlevered CFs	15,362	16,266	17,086	17,804	18,402	18,867	19,343	
growth %	6.7%	5.9%	5.0%	4.2%	3.4%	2.5%		

In terms of bankruptcy costs, we also used the same methodology used in Vivo valuation. Table 20 shows us the expected bankruptcy costs, assuming the downgrade of the credit debt to Baa2, the probability of default increases to 2.575%.

By discounting the free cash flow to the firm as well as interest tax shields at the proper discount factor, and, after subtracting the expected bankruptcy costs, the total enterprise value is estimated at BRL 113,883 Million. In terms of net debt, the amount of BRL 26,846 Million corresponds to the new debt value, net of the cash available, which is in this case the cash available by TIM and the 5% cash reserves assumed in Vivo before the transaction.

Therefore, we estimate an equity valuation for the merged firm of BRL 86,976 Million, which corresponds to a total share price of BRL 61.26.

Table 20 - APV valuation for the merged firm

(1) Value unlevered (BRL 000')	104,194,499	APV Valuation (1) + (2) - (3)	
PV of explicit period	69,746,021	Total Enterprise Value (BRL 000')	113,822,890
TV	34,448,478	Net Debt 2013(BRL 000')	26,846,396
(2) PV of ITS (BRL 000')	10,889,405	Equity Value (BRL 000')	86,976,494
PV of explicit period	7,872,862	Shares Outstanding (000')	1,417,406
TV	3,016,543	Price per Share (BRL)	61.36
(3) Bankruptcy costs (BC) (BRL 000')	1,261,014		
Credit rating by Moodys	Baa2		
Probability of Default	2.575%		
Cost of Bankruptcy	47.00%		

7.2.4. Synergies valuation and shareholder's gain

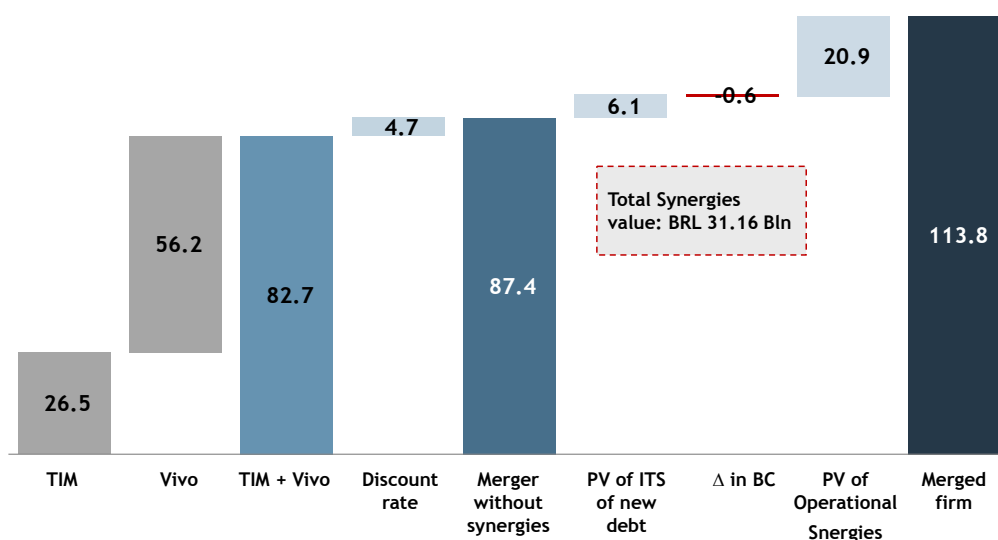
After estimating the new value of the firm, BRL 113.8 Billion, we can estimate the value of synergies and study the origin of these synergies. As a start, the sum of total synergies is BRL 31.16 Billion, corresponding to the difference between the value of the new firm and the sum of standalone valuations from TIM and Vivo (BRL 82.7 Billion).

In Figure 76 we observe the valuations and synergies breakdown. The merged firm is expected to gain significant value by simply changing their cost of asset to 11.86%, from the previous 12.51% from Vivo and 12.11% from TIM. The difference in the discount rate, as explained before, has a great impact on the present value of the cash flow today, and, as a result, we estimate an additional BRL 4.7 Billion only by having different cost of unlevered capital. This amount was computed by adding the free cash flows without synergies and discounting at the new unlevered cost of capital (we have unlevered it taking into account the new Debt to Equity of 57%) and previous cost of debt (since in this scenario we are still not considering the new debt acquisition, we still discount at the old cost of debt, 9.7%).

Moreover, the issuance of perpetual debt will also achieve significant savings, corresponding to the tax value of the debt issued (32%), in this case, BRL 6.1 Billion. Nevertheless, a higher debt value also implies higher risk, thus, the expected bankruptcy costs should increase, reducing the value by nearly BRL 600 Million.

In any case, the present value of the operational synergies, such as CAPEX reductions, cost efficiencies or revenue enhancements must improve the value of the firm by BRL 20.9 Billion.

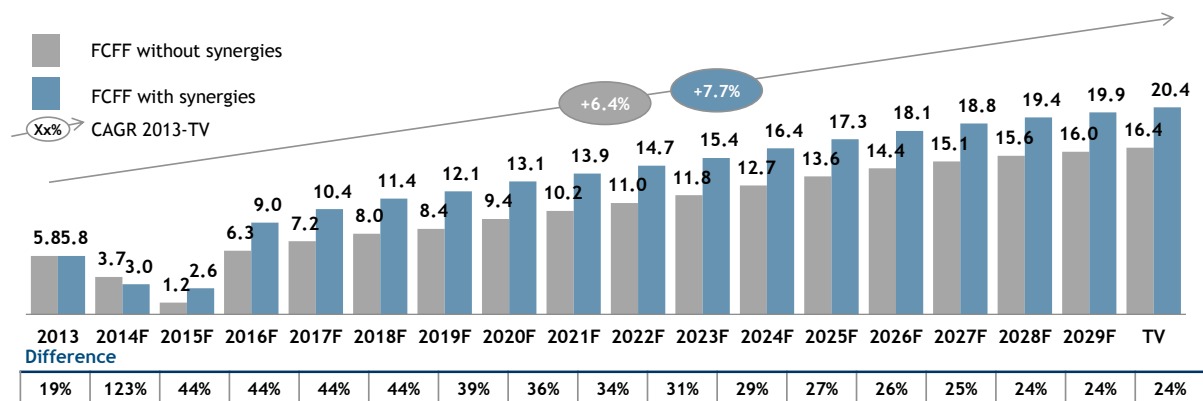
Figure 76 - Present value of Synergies and breakdown
(BRL Bln)



In fact, the BRL 20.9 Billion in operational synergies is quite significant and can be explained by several factors more or less correlated. Firstly, by looking to the free cash flow to the firm with and without synergies, we see a significant difference between 40% and 25% every year (figure 77). Moreover, by only summing the difference in cash flows between both scenarios, the difference is above BRL 50 Billion, even without adding the terminal value difference.

Moreover, this big difference in the FCFF can be also explained by other factors such as the EBIT margin. While in the original case, the combined EBIT margin was between 15% and 20%, the new enhanced EBIT margin is between 20% and 26%, reducing the financial pressures that both companies were facing before.

Figure 77 - Difference in free cash flow to the firm with and without synergies
(BRL Bln)



In terms of synergies split, using the forecasted split in chapter 6.2.6, we have divided the synergies for both operators, using a Vivo/TIM ratio of 63.4%/36.6%.

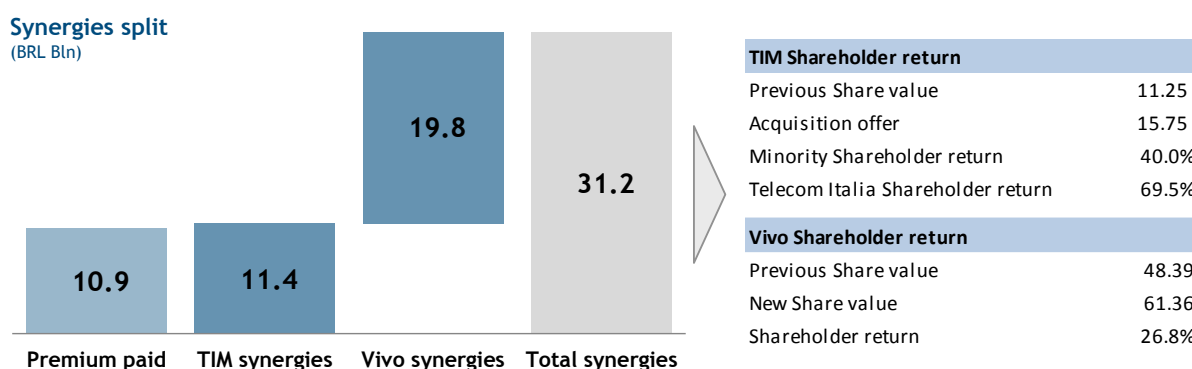
As a result, figure 78 summarizes the synergies *attributable* to each operator and compares it with the premium paid by Vivo to TIM shareholders. On one hand, we can see that Vivo probably are paying the minimum amount to TIM shareholders, on the other hand, TIM shareholders are being extremely well rewarded, compared with Vivo shareholders, only 27%.

Moreover, since Telecom Italia is facing strong financing needs, Vivo has some bargaining power to decide which premium to offer to TIM, and thus, Vivo decided to pay the *minimum* acceptable amount.

In terms of shareholder returns, we forecast an average shareholder return to Telecom Italia of nearly 70%. This return lies on the fact that the operator will be able to get the standard 40% premium and, since the performance is now linked to Vivo stock price, it will also get additional return due to the synergies achieved.

On the other hand, minority shareholders from TIM Participações will get a return equal to the premium paid, 40%, and Vivo shareholders will achieve an expected return of 27%, corresponding to the difference between the old share price, BRL 48.39, and the new share price, BRL 61.36.

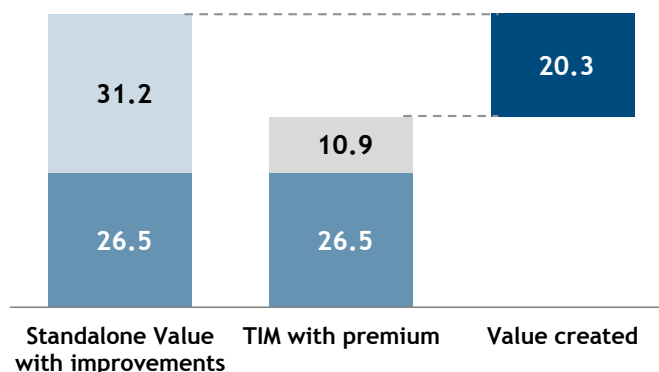
Figure 78 - Synergies split and shareholder's return per share



7.2.5. Value created and “Meet the premium line”

In the literature review, we have looked at some good practices that identifies from where value comes from to understand if investors are being too optimistic or too pessimistic. Starting with the value created, replicating figure 2, the figure below presents the forecasted value and the value created to Vivo shareholders. As we can see, we have added all the synergies achieved with the merger, BRL 31.2 Billion, and the premium paid to all TIM shareholders. As a result, Vivo will achieve a value created of nearly BRL 20.3 Billion, almost double the amount of the premium paid, which goes in line with the expected Vivo synergies allocated in the previous chapter.

Figure 79 - Value created to Vivo shareholders
(BRL Bln)



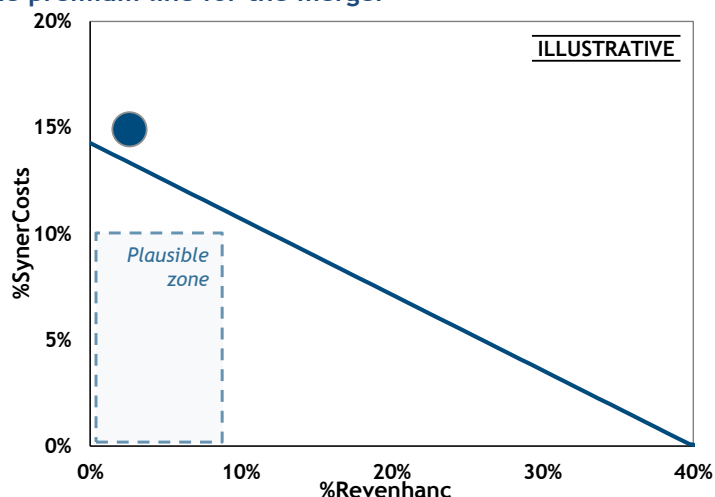
On a different perspective, we have also computed the “Meet the premium line” presented in the literature review. However, it is important to reflect that this model does not take into account several important synergies that arise from the merger, such as a lower discount rate, higher interest tax shields and a significant reduction in CAPEX. Therefore, although the model is a good tool to set boundaries on the premium paid, at the same time, it is a too simplistic tool that, unfortunately, does not consider value created through other sources. As a result, we should remain cautious about the model presented below, since it may distort the overall picture.

In terms of calculations, we have assumed cost synergies to be all the costs synergies divided by TIM standalone total costs in the long term (BRL 2,995 Million in synergies divided by TIM costs, BRL 20,209 Million) and, in terms of revenue synergies, also all revenue enhancements divided by total TIM revenues (BRL 1,129 Million in revenue enhancements divided by TIM revenues, BRL 30,014

Million). We assumed the EBITDA margin from 2013 as the operational profit for the model calculation.

In our case, and since we are dealing with a merger in the telecom industry in the same country, the synergies in terms of infrastructure and marketing and selling expenses are higher than in a traditional merger or acquisition since there are several categories that can be halved. We believe that 15% synergies are more than reasonable and that this percentage could even increase if we take more aggressive assumptions. Therefore, under the model suggested by Sirower and Sahni (2006), we fall outside the plausibility box. Nevertheless, under our estimations, we still achieve a combined value above the premium line, which demonstrates a good indication that the premium paid is not too high (and still, without considering other variables such as the discount rate, interest tax shields or lower CAPEX).

Figure 80 - Meet the premium line for the merger



7.2.6. Sensitivity analysis

7.2.6.1. Bull-Bear scenarios

Following the same approach used in the standalone valuations, we have computed three scenarios for the merged firm.

In terms of assumptions, we estimate that, in the bear case, the number of subscribers, value added services and fixed business will not change from previous forecasts and that ARPU will slightly reduce. In terms of cost synergies, COGS will only have a marginal cost saving, of nearly 2.5% and that the marketing will be 18% synergies and network decommissioned will be 17%.

On the other hand, in the bull case scenario, we include in all the assumptions a more optimistic view on the synergies, where subscribers and ARPU should grow and cost synergies should be higher. Figure 79 presents the main synergies assumptions for each scenario selected.

The difference between a Bear case scenario and a Bull case scenario can impact the final valuation in almost BRL 20 Billion, corresponding to a Vivo shareholder return of approximately 16% or 46%, respectively.

Figure 81 - Bull-Bear scenarios for the merged company

		Bear case	Base case	Bull case
Assumptions	Subs change ¹	0%/0%/0%/0%/0%/0%	0.5%/1%/0%/0%/0%/0%	2%/2%/1%/0.5%/0.5%/0.25%
	ARPU change ¹	-0.5%/-0.5%/-0.25%/-0.25%/0%/0%	0%/0%/0%/0%/0%/0%	0.5%/0.5%/0.25%/0.25%/0%/0%
	Mobile VAS change ¹	0%/0%/0%/0%/0%/0%	0.5%/0.5%/0.25%/0.25%/0%/0%	0.75%/0.75%/0.5%/0.25%/0%/0%
	Fixed services change ¹	0%/0%/0%/0%/0%/0%	1%/0.5%/0.5%/0.25%/0.25%/0%	2%/2%/2%/2%/2%/2%
	Subs / Employee	4.75	5	5.25
	Subs per handsets	8.00	7.75	7.50
	COGS synergies	2.5%	5.0%	7.5%
	Marketing synergies	18%	20%	22%
	G&A expenses	3%	2.75%	2.5%
	% network synergies	27%	25%	23%
	% NW CAPEX reduced	27%	25%	23%
	% IT CAPEX reduced	45%	40%	35%
	% Licenses CAPEX red.	55%	50%	45%
	Additional Marketing	16% in the first year	15% in the first year	14% in the first year
	Additional IT	21% in the first year	20% in the first year	19% in the first year
	Enterprise Value (BRL Mln)	106,479	113,823	126,857
Synergies Value (BRL Mln)	23,817	31,161	44,195	
Shareholders returns (Vivo/TI/TIM)	16% / 61% / 40%	27% / 70% / 40%	46% / 84% / 40%	

Note: 1) Values correspond to 2014, 2015, 2016, 2017, 2018 and 2019 respectively

7.2.6.1. Sensitivity to Premium, Stock issuance and discount rate

After reviewing the impact of Bull-Bear scenarios, it is also important to understand how different premiums and different payment methods can influence the final Vivo valuation. A higher premium implies that the firm will require more cash to pay and, therefore, more debt issuance, and, as a result, higher interest tax shields.

In addition, a different Cash/Stock split for telecom Italia shareholders can also have a great impact on the cash required for the acquisition and so, it also impacts the total new debt issued and the ITS achieved.

The discount rate, as we have seen in the individual valuations, also plays an enormous role and has a great impact in the synergy's value. Therefore, we also considered it for analysis.

In the next three tables, we have computed a sensitivity analysis to all these three variables. We have included the enterprise value of the new firm, as well as the synergies forecast, shareholder's returns and also two commonly used ratios to evaluate the leverage of the firm - debt to EBITDA and debt to revenues.

In the first table, we see that a different premium paid, does not impact the enterprise value of the firm in a significant value, since the increase amount to pay in the premium will be financed with additional debt. As a result, the small differences are related with additional interest tax

shields obtained. On the other hand, the leverage changes from a minimum of 1.47 to 2.04, which in any case is still a reasonable debt to EBITDA, as we have seen previously in figure 75.

Table 21 - Sensitivity analysis to the premium paid

	% Premium paid										
	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
<i>Value of Merged Firm (BRL Bln)</i>	113.6	113.6	113.7	113.7	113.8	113.8	113.9	113.9	114.0	114.0	114.1
<i>Synergies (BRL Bln)</i>	30.9	30.9	31.0	31.1	31.1	31.2	31.2	31.3	31.3	31.4	31.4
<i>Return of Vivo SH's (%)</i>	38.2%	35.8%	33.5%	31.3%	29.0%	26.8%	24.7%	22.5%	20.4%	18.3%	16.3%
<i>Return of TIM SH's (%)</i>	15.0%	20.0%	25.0%	30.0%	35.0%	40.0%	45.0%	50.0%	55.0%	60.0%	65.0%
<i>Return of Telecom Italia SH's (%)</i>	46.6%	51.4%	56.1%	60.7%	65.2%	69.5%	73.8%	78.0%	82.1%	86.2%	90.1%
<i>Debt to EBITDA</i>	1.47	1.53	1.59	1.64	1.70	1.76	1.82	1.87	1.93	1.99	2.04
<i>Debt to Revenues</i>	41.5%	43.1%	44.7%	46.3%	48.0%	49.6%	51.2%	52.8%	54.4%	56.0%	57.6%

On the other hand, a different split between stock and cash payment to Telecom Italia also have a marginal impact on the value of the merged firm (only through higher ITS). However, in terms of leverage, the debt to EBITDA ratio in this case can go up to 2.56, if the transaction was paid with 100% cash. On the other hand, a 0% stock payment highly rewards existing Vivo shareholders since there is no stock dilution, while with 100% purchase of Telecom Italia shares with Vivo stock, it could dilute the stock price due to additional 52.3% issued shares.

Table 22 - Sensitivity analysis to the percentage of stock payment to Telecom Italia

	% Stock payment										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
<i>Value of Merged Firm (BRL Bln)</i>	114.6	114.4	114.3	114.1	114.0	113.8	113.7	113.5	113.4	113.2	113.1
<i>Synergies (BRL Bln)</i>	31.9	31.8	31.6	31.5	31.3	31.2	31.0	30.9	30.7	30.6	30.4
<i>Return of Vivo SH's (%)</i>	38.1%	35.4%	32.9%	30.7%	28.7%	26.8%	25.1%	23.5%	22.1%	20.7%	19.4%
<i>Return of TIM SH's (%)</i>	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
<i>Return of Telecom Italia SH's (%)</i>	40.0%	47.3%	53.7%	59.6%	64.8%	69.5%	73.8%	77.7%	81.3%	84.5%	87.5%
<i>Debt to EBITDA</i>	2.56	2.40	2.24	2.08	1.92	1.76	1.60	1.44	1.28	1.12	0.96
<i>Debt to Revenues</i>	72.1%	67.6%	63.1%	58.6%	54.1%	49.6%	45.1%	40.5%	36.0%	31.5%	27.0%

As we have seen in the standalone valuations of Vivo and TIM, the discount rate have a big impact in the enterprise value of the firm. As a result, from a discount rate of 14.4% to 9.4%, the EV almost doubles the amount from BRL 87.2 Billion (with marginal synergies of only BRL 4.5 Billion) to BRL 161.3 Billion. In terms of Debt ratios, the discount rate variability is not expected to have any impact, as we can see empirically in the table below.

Table 23 - Sensitivity analysis to the cost of equity

	Discount Rate										
	9.4%	9.9%	10.4%	10.9%	11.4%	11.9%	12.4%	12.9%	13.4%	13.9%	14.4%
<i>Value of Merged Firm (BRL Bln)</i>	161.3	149.1	138.5	129.2	121.1	113.8	107.3	101.5	96.3	91.5	87.2
<i>Synergies (BRL Bln)</i>	78.6	66.4	55.9	46.6	38.4	31.2	24.7	18.9	13.6	8.9	4.5
<i>Return of Vivo SH's (%)</i>	96.0%	78.3%	62.8%	49.3%	37.4%	26.8%	17.4%	8.9%	1.2%	-5.7%	-12.0%
<i>Return of TIM SH's (%)</i>	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
<i>Return of Telecom Italia SH's (%)</i>	123.9%	109.9%	97.8%	87.2%	77.8%	69.5%	62.1%	55.5%	49.5%	44.0%	39.1%
<i>Debt to EBITDA</i>	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
<i>Debt to Revenues</i>	49.6%	49.6%	49.6%	49.6%	49.6%	49.6%	49.6%	49.6%	49.6%	49.6%	49.6%

7.2.7. Regulatory constraints

In May 2012, the Brazilian congress approved the new anti-trust law and policy in order to modernize and better regulate the economic and business environment. It included, among several amendments, the adoption of a pre-merger review system, which is regulated through a Brazilian agency called CADE (“Conselho Administrativo de Defesa Económica”). The new anti-trust law, enforces that, before any operational alignment between two parties, the merger must be approved by CADE and, according to Article 90 of Law No.12.529/2011, the new Brazilian competitive act, the new merged company cannot practice economic activities that may lead to cartel scenarios or anticompetitive behaviour.

Given the above, the table below presents the revenue share per Brazilian state and, under the scenario of a possible merger between Vivo and TIM, the seventh column represents the combined revenue share of Vivo and TIM (without synergies). As we can see, several states present market shares above 50% and, in some of them, even above 70% and 80%. Therefore, CADE and ANATEL could block the merger since in some states there is clearly an anti-competitive environment that the new anti-trust law does not allow.

In addition, the table below pretends to illustrate a possible asset by asset TIM sale, where in each state, the best operator for acquisition would be the one that had the lowest revenue share.

Table 24 - Revenue share per Brazilian state

Estado	Vivo	TIM	Claro	Oi	Others	TIM + Vivo	TIM + Claro	TIM + Oi
Acre	70%	7%	17%	7%	0%	77%	24%	14%
Alagoas	17%	35%	27%	21%	0%	52%	62%	56%
Amazonas	71%	18%	4%	7%	0%	89%	22%	25%
Amapá	68%	19%	4%	9%	0%	87%	23%	28%
Bahia	32%	24%	24%	20%	0%	56%	48%	44%
Ceará	6%	39%	23%	32%	0%	45%	62%	71%
Distrito federal	28%	23%	25%	21%	3%	51%	48%	44%
Espirito Santo	78%	8%	6%	8%	0%	86%	14%	16%
Goiás	31%	20%	33%	15%	1%	51%	53%	35%
Maranhão	27%	33%	11%	29%	0%	60%	44%	62%
Minas Gerais	40%	28%	11%	20%	1%	68%	39%	48%
Mato Grosso do Sul	54%	14%	27%	5%	0%	68%	41%	19%
Mato Grosso	62%	12%	18%	8%	0%	74%	30%	20%
Pará	43%	36%	7%	14%	0%	79%	43%	50%
Paraíba	13%	35%	22%	30%	0%	48%	57%	65%
Pernambuco	11%	35%	25%	28%	1%	46%	60%	63%
Piauí	18%	34%	33%	14%	1%	52%	67%	48%
Paraná	22%	53%	14%	9%	2%	75%	67%	62%
Rio de Janeiro	30%	15%	20%	11%	24%	45%	35%	26%
Rio Grande do Norte	9%	39%	26%	27%	0%	48%	65%	66%
Rondônia	32%	14%	35%	18%	1%	46%	49%	32%
Roraima	72%	17%	4%	7%	0%	89%	21%	24%
Rio Grande do Sul	51%	14%	22%	13%	0%	65%	36%	27%
Santa Catarina	29%	42%	15%	12%	2%	71%	57%	54%
Sergipe	65%	12%	10%	12%	1%	77%	22%	24%
São Paulo	35%	24%	16%	10%	15%	59%	40%	34%
Tocantins	27%	16%	29%	28%	0%	43%	45%	44%

Source: JP Morgan

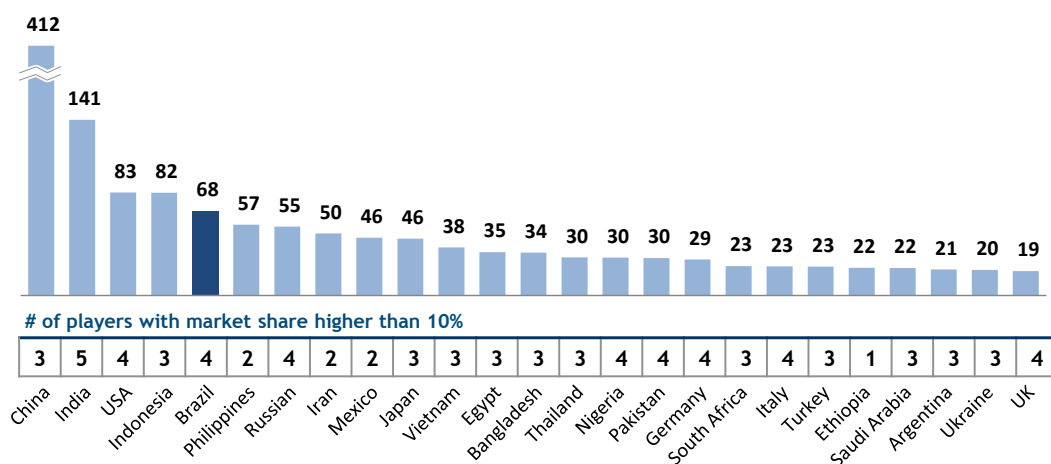
Furthermore, some industry analysts and investment bankers such as JP Morgan made it clear that in order to M&A in the Brazilian telecommunications industry to occur, TIM would have to be

divided into parts in order to reduce some concentration in some states. For instance, the communications regulator in Brazil could enforce a sale of TIM Participações state by state, in order to ensure a revenue share lower than 50%.

In any case, as we have seen previously, Telecom Italia has a high leverage and has been selling key assets to pay debt. Brazil is also one of the few countries with four main mobile operators and so, we truly believe that some concentration in Brazil will occur in the next three to five years.

On a different point of view, on the figure below, we have made a benchmark, where we select, per country, all operators with more than 10% market share and we have calculated the average number of subscriber per operator. As we can see, Brazil has already one of the highest number of subscribers per operator, and, thus, reducing the number of players to three could put Brazil on the third place, right before China and India in terms of subscribers per operator. As a result, the regulator could, once again, block a possible merger in the country.

Figure 82 - Number of subscribers per operator per country
 (# Millions; excluding operators with market share smaller than 10%)

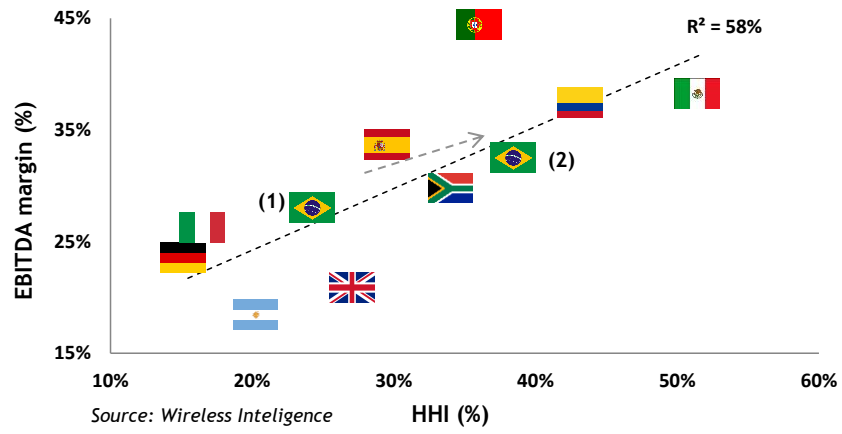


We have made a small study that compares the HHI concentration index with the practiced EBITDA margin of each country and we see that EBITDA margins are higher, the more concentrated the industry is, with an R-squared of 58%.

The current HHI index in Brazil is 25%. If we compute the current TIM and Vivo market share together and we recalculate the new HHI, it increases to nearly 40%. As a result, we believe that both ANATEL and CADE could seriously restrict a full acquisition of TIM by Vivo, and, thus, the acquisition would have to be asset by asset or through a combination of players, as we have concluded in table 24.

Figure 32 present us a selected benchmark of developed and emerging markets HHI's and weighted average EBITDA margins per country. We can conclude that, the higher the concentration, the higher the EBITDA margin. The same would happen in Brazil, where we forecast that the new telecom industry would have a HHI of nearly 40% and an average country EBITDA margin of 32.7%, from previous 27.2%.

Figure 83 - HHI concentration and EBITDA margin per country



8. Conclusions

A merger in the Brazilian telecommunications industry would completely re-shape the industry and the footprint of Telefónica in Latin America. The merger would create a telecom operator with 180 million mobile subscribers and with almost BRL 70 Billion in revenues by 2017. As we have seen previously, although the consolidation is likely to occur, ANATEL and CADE could enforce certain restrictions due to anti-competitive and monopolistic environment in certain Brazilian states.

Nevertheless, we forecast that an acquisition of TIM Participações from Vivo would certainly have a huge impact on the Brazilian domestic industry, with one clear market leader and with estimated synergies above the current market value of TIM. The combined firm would be able to develop a stronger, bigger and with higher quality mobile and fixed infrastructure that would enable even more Brazilians to have access to communications (e.g.: remote areas). Moreover, in terms of synergies, since we are dealing with an *in-country* merger, it would have an enormous impact, in terms of costs, revenues, CAPEX, but also on the discount factor and interest tax shields from the acquisition.

We estimate an enterprise value for Vivo and TIM of BRL 56.2 Billion and BRL 26.5 Billion, respectively and a combined value of BRL 113.8 Billion, corresponding to a synergies value of BRL 31.2 Billion. This huge difference is due to a significant increase in terms of FCFF (through higher EBIT), but also a lower cost of capital and additional interest tax shields totalling BRL 6.1 Billion.

In terms of shareholder's returns, we forecast that Vivo shareholders will have an expected return of 27% (even after accounting for the shares dilution of more than 25% of existing shares), while Telecom Italia will have returns of almost 70% (due to the Vivo stock payment) and TIM free float returns of 40%, corresponding to the premium paid.

Concluding, this deal would represent a complete shift in the telecommunications industry in Brazil, where we would have a clear first player in the market with healthier EBITDA margins and higher debt levels, closer to mature market ratios.

Appendix

Table 25 -Moody's probability of Default in 10 years

Rating	Default rate	Rating	Default rate
Aaa	0.000%	Ba1	3.682%
Aa1	0.000%	Ba2	10.164%
Aa2	0.000%	Ba3	17.791%
Aa3	0.173%	B1	28.372%
A1	0.055%	B2	32.415%
A2	0.515%	B3	51.105%
A3	0.535%	Caa1	50.512%
Baa1	1.664%	Caa2	46.832%
Baa2	2.575%	Caa3	54.381%
Baa3	4.487%	Ca-C	66.259%

Table 26 - Loss Given default by industry

Industry	% loss
Utilities	26%
Insurance and Real Estate	63%
Telecommunications	47%
Transports	61%
Financial institutions	41%
Healthcare and Chemicals	44%
High technology	53%
Aerospace and Auto	48%
Forest and Building products	46%
Consumer and Service	53%
Media and Leisure time	48%
Energy and Natural resources	40%

Figure 84 - TIM long-term infrastructure strategy from 2014 to 2016

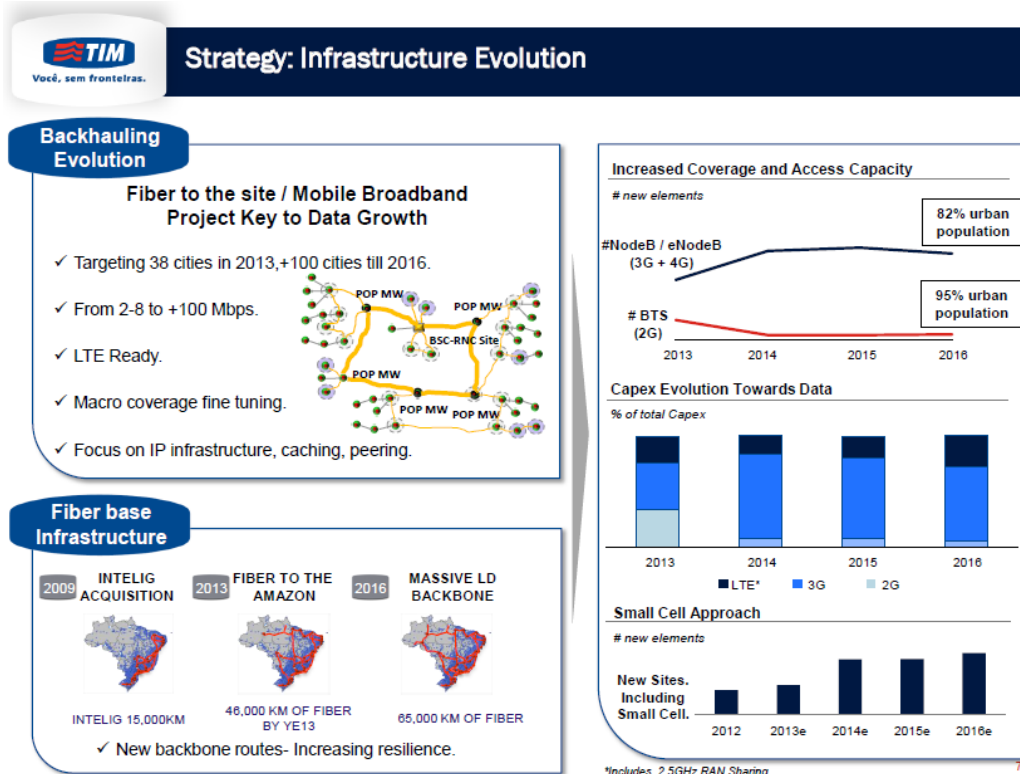


Table 27 - Vivo Profit and Losses map

BRL Millions	2012	2013	2014F	2015F	2016F	2017F	2018F	2019F	2020F	2021F	2022F	2023F
Total revenues	33,920	34,722	36,717	38,750	40,695	42,700	44,765	46,757	48,647	50,420	52,093	53,686
growth %	2.3%	2.4%	5.7%	5.5%	5.0%	4.9%	4.8%	4.5%	4.0%	3.6%	3.3%	3.1%
Net operating mobile revenue	21,398	23,002	24,165	25,460	26,719	28,016	29,332	30,608	31,819	32,952	34,018	35,035
growth %	9.2%	7.5%	5.1%	5.4%	4.9%	4.9%	4.7%	4.4%	4.0%	3.6%	3.2%	3.0%
Net service mobile revenues	20,437	21,691	22,766	23,970	25,139	26,348	27,570	28,755	29,876	30,921	31,901	32,833
growth %	9.7%	6.1%	5.0%	5.3%	4.9%	4.8%	4.6%	4.3%	3.9%	3.5%	3.2%	2.9%
Access and usage	10,876	11,266	11,825	12,377	12,910	13,429	13,970	14,485	14,967	15,419	15,843	16,241
growth %	11.8%	3.6%	5.0%	4.7%	4.3%	4.0%	4.0%	3.7%	3.3%	3.0%	2.7%	2.5%
Network usage	3,830	3,270	3,338	3,403	3,462	3,516	3,570	3,617	3,659	3,696	3,728	3,755
growth %	-7.8%	-14.6%	2.1%	1.9%	1.7%	1.6%	1.5%	1.3%	1.2%	1.0%	0.9%	0.8%
Data and VAS	5,648	6,877	7,436	8,031	8,595	9,209	9,856	10,477	11,071	11,626	12,154	12,659
growth %	21.7%	21.8%	8.1%	8.0%	7.0%	7.1%	7.0%	6.3%	5.7%	5.0%	4.5%	4.2%
Messaging P2P	1,921	1,973	2,097	2,166	2,237	2,332	2,416	2,506	2,603	2,700	2,802	2,909
growth %	23.0%	2.7%	6.3%	3.3%	3.3%	4.3%	3.6%	3.7%	3.9%	3.7%	3.8%	3.8%
Internet	2,826	3,740	4,011	4,407	4,777	5,167	5,590	5,989	6,362	6,707	7,027	7,326
growth %	19.4%	32.4%	7.2%	9.9%	8.4%	8.2%	8.2%	7.1%	6.2%	5.4%	4.8%	4.3%
VAS	901	1,164	1,327	1,458	1,581	1,710	1,850	1,982	2,105	2,219	2,325	2,424
growth %	26.4%	29.2%	14.0%	9.9%	8.4%	8.2%	8.2%	7.1%	6.2%	5.4%	4.8%	4.3%
Other services	83	278	166	160	172	194	173	175	178	180	177	178
growth %	-26.4%	236.6%	-40.2%	-3.9%	7.4%	13.0%	-10.8%	1.0%	2.1%	0.9%	-1.9%	0.5%
Net handset revenues	961	1,311	1,400	1,490	1,580	1,669	1,762	1,854	1,943	2,031	2,117	2,202
growth %	0.7%	36.4%	6.8%	6.4%	6.0%	5.7%	5.6%	5.2%	4.8%	4.5%	4.2%	4.0%
Net operating fixed revenue	12,522	11,720	12,552	13,289	13,976	14,683	15,433	16,149	16,828	17,468	18,075	18,652
growth %	-7.8%	-6.4%	7.1%	5.9%	5.2%	5.1%	5.1%	4.6%	4.2%	3.8%	3.5%	3.2%
Voice and accesses	6,929	6,160	6,284	6,410	6,539	6,671	6,805	6,942	7,081	7,223	7,369	7,517
growth %	-14.5%	-11.1%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Interconnection	475	460	455	455	448	444	441	437	433	429	425	421
growth %	4.1%	-3.1%	-1.1%	0.0%	-1.4%	-0.9%	-0.8%	-1.0%	-0.9%	-0.9%	-0.9%	-0.9%
Data transmission	3,563	3,651	4,162	4,573	4,957	5,361	5,801	6,215	6,602	6,959	7,291	7,602
growth %	3.3%	2.5%	14.0%	9.9%	8.4%	8.2%	8.2%	7.1%	6.2%	5.4%	4.8%	4.3%
PaycTV	594	491	635	770	897	1,022	1,142	1,255	1,359	1,455	1,541	1,619
growth %	-8.3%	-17.3%	29.3%	21.2%	16.5%	13.9%	11.7%	9.9%	8.3%	7.0%	5.9%	5.0%
Other services	961.8	957.5	1,015.67	1,081.23	1,134.32	1,185.08	1,244.38	1,301.35	1,353.10	1,401.65	1,448.75	1,493.25
growth %	3%	-0.4%	6.1%	6.5%	4.9%	4.5%	5.0%	4.6%	4.0%	3.6%	3.4%	3.1%
Operational costs	- 21,217	- 24,146	- 24,881	- 26,094	- 27,246	- 28,431	- 29,414	- 30,426	- 31,336	- 32,146	- 32,854	- 33,483
growth %	0.4%	13.8%	3.0%	4.9%	4.4%	4.3%	3.5%	3.4%	3.0%	2.6%	2.2%	1.9%
Personnel	- 2,403	- 2,532	- 2,665	- 2,798	- 2,925	- 3,047	- 3,174	- 3,292	- 3,403	- 3,507	- 3,605	- 3,699
growth %	5.8%	5.4%	5.3%	5.0%	4.5%	4.2%	4.1%	3.7%	3.4%	3.1%	2.8%	1.5%
Cost of services rendered	- 10,164	- 10,637	- 11,408	- 12,123	- 12,723	- 13,279	- 13,879	- 14,394	- 14,833	- 15,212	- 15,536	- 15,817
growth %	-3.3%	4.7%	7.2%	6.3%	5.0%	4.4%	4.5%	3.7%	3.1%	2.5%	2.1%	1.8%
Interconnection	(4,012)	(3,842)	(4,121)	(4,379)	(4,596)	(4,797)	(5,013)	(5,199)	(5,358)	(5,495)	(5,612)	(5,713)
growth %	-11.4%	-4.2%	7.2%	6.3%	5.0%	4.4%	4.5%	3.7%	3.1%	2.5%	2.1%	1.8%
Taxes and contributions	(1,810)	(1,721)	(1,846)	(1,962)	(2,059)	(2,149)	(2,246)	(2,329)	(2,401)	(2,462)	(2,514)	(2,560)
growth %	2.9%	-4.9%	7.2%	6.3%	5.0%	4.4%	4.5%	3.7%	3.1%	2.5%	2.1%	1.8%
Third-Party Services	(3,287)	(3,582)	(3,841)	(4,082)	(4,284)	(4,471)	(4,673)	(4,847)	(4,995)	(5,122)	(5,231)	(5,326)
growth %	7.7%	9.0%	7.2%	6.3%	5.0%	4.4%	4.5%	3.7%	3.1%	2.5%	2.1%	1.8%
Others	(1,056)	(1,492)	(1,600)	(1,700)	(1,784)	(1,862)	(1,946)	(2,018)	(2,080)	(2,133)	(2,179)	(2,218)
growth %	-10.5%	41.3%	7.2%	6.3%	5.0%	4.4%	4.5%	3.7%	3.1%	2.5%	2.1%	1.8%
Cost of Goods sold	(1,802)	(2,118)	(2,261)	(2,407)	(2,552)	(2,696)	(2,847)	(2,995)	(3,139)	(3,281)	(3,420)	(3,557)
growth %	4.3%	17.5%	6.8%	6.4%	6.0%	5.7%	5.6%	5.2%	4.8%	4.5%	4.2%	4.0%
Selling expenses	(6,444)	(7,427)	(7,644)	(7,795)	(7,985)	(8,151)	(8,311)	(8,467)	(8,605)	(8,728)	(8,841)	(8,943)
growth %	8.0%	15.2%	2.9%	2.0%	2.4%	2.1%	2.0%	1.9%	1.6%	1.4%	1.3%	1.2%
Provision for Bad Debt	(654)	(741)	(706)	(773)	(821)	(845)	(894)	(934)	(969)	(1,006)	(1,039)	(1,070)
growth %	15.8%	13.3%	-4.8%	9.5%	6.2%	2.9%	5.8%	4.5%	3.7%	3.0%	3.3%	3.0%
Third-Party Services	(5,493)	(6,397)	(6,531)	(6,658)	(6,773)	(6,879)	(6,984)	(7,077)	(7,159)	(7,230)	(7,293)	(7,347)
growth %	12.9%	16.5%	2.1%	1.9%	1.7%	1.6%	1.5%	1.3%	1.2%	1.0%	0.9%	0.8%
Others	(297)	(288)	(407)	(364)	(390)	(428)	(433)	(456)	(477)	(491)	(509)	(525)
growth %	-44.8%	-3.0%	41.3%	-10.7%	7.4%	9.6%	1.1%	5.5%	4.6%	2.9%	3.6%	3.1%
G&A Expenses	(1,091)	(1,050)	(1,154)	(1,212)	(1,260)	(1,333)	(1,395)	(1,455)	(1,516)	(1,570)	(1,622)	(1,672)
growth %	3.3%	-3.8%	9.9%	5.0%	4.0%	5.8%	4.6%	4.3%	4.2%	3.6%	3.3%	3.1%
Third-Party Services	(832)	(805)	(879)	(925)	(963)	(1,017)	(1,065)	(1,111)	(1,157)	(1,199)	(1,239)	(1,277)
growth %	3.9%	-3.3%	9.3%	5.3%	4.1%	5.7%	4.7%	4.3%	4.2%	3.6%	3.3%	3.1%
Others	(260)	(245)	(275)	(287)	(297)	(316)	(330)	(344)	(359)	(371)	(384)	(396)
growth %	1.3%	-5.6%	12.1%	4.4%	3.8%	6.1%	4.4%	4.3%	4.3%	3.5%	3.3%	3.1%
Other Operating Loss	688	(383)	251	240	199	76	191	176	161	151	170	165
growth %	70.6%	-155.8%	-165.4%	-4.4%	-17.1%	-61.6%	150.6%	-7.8%	-8.9%	-5.9%	12.4%	-3.1%
EBITDA	12,703	10,576	11,836	12,656	13,448	14,269	15,351	16,331	17,312	18,274	19,239	20,203
growth %	5.6%	-16.7%	11.9%	6.9%	6.3%	6.1%	7.6%	6.4%	6.0%	5.6%	5.3%	5.0%
EBITDA margin	37.4%	30.5%	32.2%	32.7%	33.0%	33.4%	34.3%	34.9%	35.6%	36.2%	36.9%	37.6%
Depreciation and Amortization	(5,492)	(5,643)	(5,972)	(6,575)	(7,038)	(7,473)	(7,800)	(8,133)	(8,446)	(8,720)	(8,965)	(9,098)
growth %	7.0%	2.8%	5.8%	10.1%	7.0%	6.2%	4.4%	4.3%	3.8%	3.3%	2.8%	1.5%
Depreciation	(3,675)	(3,815)	(3,620)	(3,583)	(3,837)	(4,079)	(4,253)	(4,436)	(4,607)	(4,756)	(4,890)	(4,962)
growth %	2.4%	3.8%	-5.1%	-1.0%	7.1%	6.3%	4.3%	4.3%	3.9%	3.2%	2.8%	1.5%
Amortization of intangibles	(797)	(797)	(2,352)	(2,993)	(3,201)	(3,394)	(3,547)	(3,697)	(3,838)	(3,964)	(4,075)	(4,135)
growth %	33.3%	0.0%	195.2%	27.3%	7.0%	6.0%	4.5%	4.2%	3.8%	3.3%	2.8%	1.5%
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Table 28 - TIM Profit and Losses map

BRL Millions	2012	2013	2014F	2015F	2016F	2017F	2018F	2019F	2020F	2021F	2022F	2023F
Gross Revenues	27,756	29,706	31,546	33,350	35,022	36,563	38,148	39,606	40,960	42,236	43,442	44,584
growth %	12.1%	7.0%	6.2%	5.7%	5.0%	4.4%	4.3%	3.8%	3.4%	3.1%	2.9%	2.6%
Mobile	22,880	24,037	25,590	27,169	28,629	29,973	31,381	32,679	33,889	35,038	36,129	37,167
growth %	10.6%	5.1%	6.5%	6.2%	5.4%	4.7%	4.7%	4.1%	3.7%	3.4%	3.1%	2.9%
Usage and Monthly fee	11,087	11,310	12,229	13,024	13,779	14,481	15,112	15,669	16,191	16,679	17,137	17,568
growth %	8.0%	2.0%	8.1%	6.5%	5.8%	5.1%	4.4%	3.7%	3.3%	3.0%	2.7%	2.5%
Value added services - VAS	4,405	5,354	6,008	6,637	7,221	7,795	8,450	9,062	9,629	10,158	10,649	11,109
growth %	39.1%	21.5%	12.2%	10.5%	8.8%	7.9%	8.4%	7.2%	6.3%	5.5%	4.8%	4.3%
Long distance	3,218	3,333	3,423	3,571	3,717	3,854	4,010	4,168	4,330	4,502	4,679	4,862
growth %	1.2%	3.6%	2.7%	4.3%	4.1%	3.7%	4.0%	3.9%	3.9%	4.0%	3.9%	3.9%
Interconnection	3,969	3,761	3,707	3,717	3,686	3,620	3,585	3,556	3,516	3,475	3,440	3,405
growth %	3.1%	-5.3%	-1.4%	0.3%	-0.8%	-1.8%	-0.9%	-0.8%	-1.1%	-1.2%	-1.0%	-1.0%
Others	201	280	222	220	226	223	223	224	223	223	224	223
growth %	-12.4%	39.2%	-20.6%	-1.1%	2.8%	-1.5%	0.1%	0.5%	-0.3%	0.1%	0.1%	-0.1%
Fixed	1,470	1,072	1,093	1,115	1,138	1,161	1,184	1,208	1,232	1,257	1,282	1,308
growth %	-3.6%	-27.1%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Gross Revenues Handset sales	3,406	4,597	4,862	5,065	5,255	5,429	5,584	5,720	5,838	5,942	6,031	6,108
growth %	34.1%	35.0%	5.8%	4.2%	3.7%	3.3%	2.8%	2.4%	2.1%	1.8%	1.5%	1.3%
Discounts on Gross Revenues	(8,992)	(9,740)	(10,295)	(10,872)	(11,447)	(11,937)	(12,456)	(12,939)	(13,380)	(13,799)	(14,196)	(14,570)
growth %	17.2%	8.3%	5.7%	5.6%	5.3%	4.3%	4.4%	3.9%	3.4%	3.1%	2.9%	2.6%
Net Revenues	18,764	19,965	21,251	22,478	23,575	24,626	25,692	26,667	27,580	28,437	29,246	30,014
growth %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Operating Expenses	(13,753)	(14,715)	(15,606)	(16,342)	(16,976)	(17,574)	(18,167)	(18,685)	(19,142)	(19,544)	(19,896)	(20,209)
growth %	10.7%	7.0%	6.1%	4.7%	3.9%	3.5%	3.4%	2.9%	2.4%	2.1%	1.8%	1.6%
Personnel expenses	(729)	(832)	(891)	(940)	(988)	(1,034)	(1,077)	(1,117)	(1,155)	(1,191)	(1,224)	(1,256)
growth %	15.2%	14.1%	7.1%	5.5%	5.1%	4.6%	4.2%	3.7%	3.4%	3.1%	2.8%	2.6%
Selling & marketing expenses	(3,843)	(3,938)	(4,056)	(4,146)	(4,228)	(4,303)	(4,369)	(4,427)	(4,478)	(4,523)	(4,562)	(4,596)
growth %	-2.3%	2.5%	3.0%	2.2%	2.0%	1.8%	1.5%	1.3%	1.2%	1.0%	0.9%	0.8%
Network & interconnection	(5,353)	(5,312)	(5,774)	(6,136)	(6,440)	(6,722)	(7,025)	(7,285)	(7,508)	(7,700)	(7,864)	(8,006)
growth %	13.4%	-0.8%	8.7%	6.3%	5.0%	4.4%	4.5%	3.7%	3.1%	2.5%	2.1%	1.8%
General & administrative	(551)	(625)	(638)	(675)	(708)	(740)	(772)	(801)	(828)	(854)	(878)	(901)
growth %	9.7%	13.3%	2.2%	5.8%	4.9%	4.5%	4.3%	3.8%	3.4%	3.1%	2.8%	2.6%
Cost Of Goods Sold	(2,605)	(3,351)	(3,544)	(3,693)	(3,831)	(3,958)	(4,070)	(4,170)	(4,256)	(4,332)	(4,397)	(4,453)
growth %	26.3%	28.6%	5.8%	4.2%	3.7%	3.3%	2.8%	2.4%	2.1%	1.8%	1.5%	1.3%
Bad Debt	(251)	(240)	(256)	(270)	(283)	(296)	(309)	(321)	(332)	(342)	(352)	(361)
growth %	8.4%	-4.4%	6.4%	5.8%	4.9%	4.5%	4.3%	3.8%	3.4%	3.1%	2.8%	2.6%
Other operational expenses	(420)	(417)	(446)	(482)	(497)	(521)	(546)	(564)	(584)	(603)	(620)	(636)
growth %	24.8%	-0.8%	7.0%	7.9%	3.3%	4.8%	4.6%	3.5%	3.5%	3.1%	2.8%	2.7%
EBITDA	5,011	5,251	5,644	6,137	6,599	7,053	7,525	7,981	8,438	8,894	9,350	9,804
EBITDA Margin	26.7%	26.3%	26.6%	27.3%	28.0%	28.6%	29.3%	29.9%	30.6%	31.3%	32.0%	32.7%
growth %	7.4%	4.8%	7.5%	8.7%	7.5%	6.9%	6.7%	6.1%	5.7%	5.4%	5.1%	4.9%
Depreciation & amortization	(2,689)	(2,768)	(2,926)	(3,271)	(3,680)	(4,025)	(4,090)	(4,170)	(4,250)	(4,260)	(4,269)	(4,328)
Depreciation	(1,459)	(1,502)	(1,608)	(1,798)	(2,023)	(2,212)	(2,248)	(2,292)	(2,336)	(2,341)	(2,347)	(2,379)
growth %	4.3%	3.0%	7.0%	11.8%	12.5%	9.4%	1.6%	2.0%	1.9%	0.2%	0.2%	1.4%
Amortization	(1,230)	(1,265)	(1,318)	(1,473)	(1,657)	(1,812)	(1,842)	(1,878)	(1,914)	(1,918)	(1,923)	(1,949)
growth %	2.7%	2.9%	4.1%	11.8%	12.5%	9.4%	1.6%	2.0%	1.9%	0.2%	0.2%	1.4%
EBIT	2,322	2,483	2,718	2,866	2,919	3,028	3,434	3,811	4,188	4,634	5,081	5,477
EBIT Margin	12.4%	12.4%	12.8%	12.7%	12.4%	12.3%	13.4%	14.3%	15.2%	16.3%	17.4%	18.2%
growth %	12.3%	6.9%	9.5%	5.4%	1.9%	3.7%	13.4%	11.0%	9.9%	10.6%	9.6%	7.8%

Table 29 - Multiple analysis for Vivo - Individual data (as a % of Vivo values)

Country	Name	P/E	EV/EBITDA	EV/EBIT	Mkt Cap (BRL)	Price/Sales	Sales	EBITDA	EBIT	Capex
Sweden	TELIASONERA	1.03x	1.63x	1.38x	1.33x	1.45x	.97x	1.06x	1.24x	.93x
U.K.	BT GROUP	1.11x	1.47x	1.32x	2.13x	1.17x	1.67x	1.79x	2.00x	1.35x
Norway	TELENOR	1.20x	1.46x	1.12x	1.47x	1.45x	1.10x	1.23x	1.60x	.98x
Canada	MOBILE TELESYSTEMS	.53x	.79x	.63x	.66x	.98x	.78x	1.12x	1.40x	.78x
Netherlands	KPN	2.79x	1.58x	2.07x	.65x	.54x	.70x	.78x	.60x	.65x
Brazil	TIM PARTICIPACOES SA	1.43x	1.03x	1.03x	.54x	1.02x	.57x	.49x	.49x	.61x
Russia	TELUS CORP	1.44x	1.59x	1.35x	.98x	1.65x	.69x	.80x	.94x	.73x
Netherlands	VIMPELCOM	.71x	.85x	.80x	.66x	.49x	1.40x	1.96x	2.09x	1.46x

Table 30 - Multiple analysis for TIM - Individual data (as a % of TIM values)

Country	Name	P/E	EV/EBITDA	EV/EBIT	Mkt Cap (BRL)	Price/Sales	Sales	EBITDA	EBIT	Capex
Turkey	TURKCELL	.64x	1.20x	1.03x	1.05x	1.75x	.65x	.75x	.91x	.43x
Turkey	ROSTELECOM	.93x	1.61x	1.24x	.86x	1.23x	.75x	1.04x	1.40x	.73x
Belgium	BELGACOM	.63x	.79x	.67x	.86x	.85x	.90x	.94x	1.09x	.69x
Russia	TURK TELEKOM	.49x	2.17x	2.30x	.50x	.47x	1.11x	1.48x	1.25x	1.30x
Canada	MOBILE TELESYSTEMS	1.00x	.76x	.62x	1.81x	1.61x	1.20x	1.62x	1.90x	1.20x
Netherlands	KPN	1.94x	1.81x	1.44x	1.19x	.53x	1.22x	1.59x	1.21x	1.06x
Russia	TELUS CORP	.37x	1.54x	1.31x	1.22x	.95x	1.35x	2.28x	2.82x	1.28x
Sweden	TELIASONERA	.72x	1.41x	1.09x	2.43x	1.41x	1.69x	2.15x	2.52x	1.52x
Norway	TELENOR	.84x	2.71x	2.15x	2.71x	1.42x	1.92x	2.49x	3.23x	1.61x
Canada	BCE	.90x	.68x	1.13x	2.79x	1.36x	2.14x	3.19x	3.92x	2.10x

Table 31 - Merged firm Profit and Losses map with synergies

BRL Millions	2012	2013	2014F	2015F	2016F	2017F	2018F	2019F	2020F	2021F	2022F	2023F
Total Revenues	52,684	54,687	58,253	61,962	65,185	68,316	71,497	74,490	77,315	79,962	82,457	84,829
growth %	4.8%	3.8%	6.5%	6.4%	5.2%	4.8%	4.7%	4.2%	3.8%	3.4%	3.1%	2.9%
Mobile revenues	35,855	37,645	39,972	42,565	44,779	46,992	49,224	51,336	53,332	55,204	56,971	58,656
growth %	8.8%	5.0%	6.2%	6.5%	5.2%	4.9%	4.7%	4.3%	3.9%	3.5%	3.2%	3.0%
Usage	18,317	18,626	19,980	21,309	22,380	23,418	24,394	25,283	26,120	26,902	27,634	28,322
growth %	8.5%	1.7%	7.3%	6.6%	5.0%	4.6%	4.2%	3.6%	3.3%	3.0%	2.7%	2.5%
VAS and data	8,723	10,790	11,980	13,191	14,300	15,468	16,712	17,891	19,003	20,041	21,016	21,938
growth %	30.7%	23.7%	11.0%	10.1%	8.4%	8.2%	8.0%	7.1%	6.2%	5.5%	4.9%	4.4%
Interconnection	6,461	5,581	5,513	5,502	5,445	5,359	5,302	5,247	5,184	5,117	5,055	4,992
growth %	-5.9%	-13.6%	-1.2%	-0.2%	-1.0%	-1.6%	-1.1%	-1.0%	-1.2%	-1.3%	-1.2%	-1.2%
Others	2,354	2,648	2,498	2,563	2,654	2,748	2,816	2,915	3,024	3,144	3,267	3,403
growth %	-7.5%	12.5%	-5.7%	2.6%	3.5%	3.5%	2.5%	3.5%	3.7%	4.0%	3.9%	4.2%
Fixed revenues	13,524	12,283	13,177	13,942	14,659	15,385	16,152	16,870	17,555	18,201	18,816	19,403
growth %	-8.1%	-9.2%	7.3%	5.8%	5.1%	5.0%	5.0%	4.4%	4.1%	3.7%	3.4%	3.1%
Usage	7,930	6,724	6,909	7,063	7,222	7,372	7,524	7,663	7,807	7,956	8,110	8,268
growth %	-14.1%	-15.2%	2.7%	2.2%	2.3%	2.1%	2.1%	1.8%	1.9%	1.9%	1.9%	2.0%
Data transmission	3,563	3,651	4,162	4,573	4,957	5,361	5,801	6,215	6,602	6,959	7,291	7,602
growth %	3.3%	2.5%	14.0%	9.9%	8.4%	8.2%	8.2%	7.1%	6.2%	5.4%	4.8%	4.3%
Others	2,030	1,909	2,106	2,306	2,479	2,651	2,827	2,993	3,145	3,286	3,415	3,533
growth %	-0.1%	-6.0%	10.3%	9.5%	7.5%	6.9%	6.6%	5.9%	5.1%	4.5%	3.9%	3.4%
Handsets revenues	3,305	4,758	5,105	5,455	5,747	5,939	6,121	6,284	6,428	6,557	6,670	6,770
growth %	27.7%	43.9%	7.3%	6.9%	5.4%	3.3%	3.1%	2.7%	2.3%	2.0%	1.7%	1.5%
Total Costs	34,970	38,861	42,379	42,654	42,452	43,724	45,083	46,501	47,755	48,861	49,817	50,698
growth %	4.2%	11.1%	9.1%	0.6%	-0.5%	3.0%	3.1%	3.1%	2.7%	2.3%	2.0%	1.8%
Personnel expenses	3,132	3,364	3,474	3,577	3,624	3,752	3,877	3,989	4,090	4,180	4,260	4,334
growth %	7.8%	7.4%	3.3%	3.0%	1.3%	3.5%	3.3%	2.9%	2.5%	2.2%	1.9%	1.7%
Selling & marketing expenses	10,287	11,364	11,430	11,387	11,367	11,594	11,806	12,009	12,187	12,346	12,491	12,620
growth %	3.9%	10.5%	0.6%	-0.4%	-0.2%	2.0%	1.8%	1.7%	1.5%	1.3%	1.2%	1.0%
Network & interconnection	15,518	15,949	16,959	17,783	18,415	19,220	20,088	20,833	21,470	22,017	22,487	22,894
growth %	1.8%	2.8%	6.3%	4.9%	3.6%	4.4%	4.5%	3.7%	3.1%	2.5%	2.1%	1.8%
General & administrative	1,643	1,674	1,712	1,745	1,767	1,851	1,938	2,019	2,096	2,169	2,237	2,302
growth %	5.3%	1.9%	2.3%	1.9%	1.3%	4.8%	4.7%	4.2%	3.8%	3.4%	3.1%	2.9%
Cost Of Goods Sold	4,407	5,469	5,548	5,897	6,211	6,462	6,711	6,942	7,156	7,356	7,542	7,716
growth %	16.3%	24.1%	1.4%	6.3%	5.3%	4.0%	3.9%	3.4%	3.1%	2.8%	2.5%	2.3%
Others	-	16	1,040	3,257	2,264	1,068	844	663	709	755	794	801
growth %	-110.0%	-6427%	213.0%	-30.5%	-52.9%	-21.0%	-21.4%	6.9%	6.6%	5.0%	1.0%	3.9%
EBITDA	17,714	15,826	15,874	19,308	22,733	24,592	26,414	27,989	29,560	31,101	32,640	34,131
growth %	6.1%	-10.7%	0.3%	21.6%	17.7%	8.2%	7.4%	6.0%	5.6%	5.2%	4.9%	4.6%
EBITDA Margin	33.6%	28.9%	27.2%	31.2%	34.9%	36.0%	36.9%	37.6%	38.2%	38.9%	39.6%	40.2%
D&A	-	8,180	-	8,411	-	8,807	-	9,610	-	10,299	-	10,949
growth %	5.9%	2.8%	4.7%	9.1%	7.2%	6.3%	6.9%	7.2%	0.1%	-0.2%	-0.2%	-0.2%
EBIT	9,533	7,415	7,067	9,698	12,434	13,644	14,714	15,445	17,006	18,566	20,132	21,648
growth %	6.3%	-22.2%	-4.7%	37.2%	28.2%	9.7%	7.8%	5.0%	10.1%	9.2%	8.4%	7.5%
EBIT Margin	18.1%	13.6%	12.1%	15.7%	19.1%	20.0%	20.6%	20.7%	22.0%	23.2%	24.4%	25.5%

Table 32 - Operational synergies per category

(Excluding interconnection costs effect)

Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Total synergies	-	1,202,319	1,656,439	3,759,392	4,376,660	4,658,118	4,813,764	4,961,484	5,094,795	5,217,470	5,293,729
<i>growth %</i>	<i>n/a</i>		-237.8%	127.0%	16.4%	6.4%	3.3%	3.1%	2.7%	2.4%	1.5%
Costs	913,462	1,533,044	2,254,908	2,383,419	2,498,448	2,610,166	2,722,899	2,828,815	2,932,814	2,994,528	
<i>growth %</i>		67.8%	47.1%	5.7%	4.8%	4.5%	4.3%	3.9%	3.7%	2.1%	
Personnel expenses	82,274	160,839	289,450	329,155	373,751	420,131	468,169	517,764	568,836	580,085	
Selling & marketing expenses	270,417	552,757	845,611	860,610	873,811	885,428	895,629	904,572	912,400	919,243	
Network & interconnection	223,512	475,025	747,837	780,534	815,768	846,025	871,882	894,113	913,175	929,706	
General & administrative	79,460	141,734	200,967	221,206	228,636	236,564	248,042	255,749	263,720	271,925	
Cost Of Goods Sold	257,799	202,689	171,042	191,914	206,481	222,019	239,177	256,617	274,684	293,569	
CAPEX	404,510	1,141,298	1,074,468	1,106,265	1,119,822	1,137,155	1,151,270	1,161,232	1,166,095	1,170,340	
<i>growth %</i>		182.1%	-5.9%	3.0%	1.2%	1.5%	1.2%	0.9%	0.4%	0.4%	
Revenues	285,144	733,953	915,274	989,512	1,039,848	1,066,443	1,087,315	1,104,748	1,118,561	1,128,861	
<i>growth %</i>		157.4%	24.7%	8.1%	5.1%	2.6%	2.0%	1.6%	1.3%	0.9%	
Mobile	159,008	446,869	509,067	577,019	609,986	640,679	669,615	696,630	721,961	745,873	
<i>Usage</i>	99,404	315,942	331,824	347,210	361,688	374,870	387,284	398,871	409,726	419,927	
<i>VAS and data</i>	59,604	130,927	177,243	229,809	248,298	265,809	282,331	297,758	312,235	325,946	
<i>Interconnection</i>	-	-	-	-	-	-	-	-	-	-	
<i>Others</i>	-	-	-	-	-	-	-	-	-	-	
Fixed	68,404	104,728	142,485	163,460	185,179	188,594	192,148	195,812	199,591	203,486	
<i>Usage</i>	68,404	104,728	142,485	163,460	185,179	188,594	192,148	195,812	199,591	203,486	
<i>Data transmission</i>	-	-	-	-	-	-	-	-	-	-	
<i>Others</i>	-	-	-	-	-	-	-	-	-	-	
Handsets	57,731	182,357	263,723	249,033	244,683	237,170	225,552	212,306	197,009	179,502	
One time sale FCFF	177,650	236,867	177,650	118,433	-	-	-	-	-	-	
One time integration costs	-	2,983,085	-	1,988,723	-	662,908	-	220,969	-	-	
<i>Marketing</i>	1,714,485	1,142,990	380,997	126,999	-	-	-	-	-	-	
<i>IT</i>	1,196,600	797,733	265,911	88,637	-	-	-	-	-	-	
<i>Consulting</i>	72,000	48,000	16,000	5,333	-	-	-	-	-	-	

Table 33 - Operational synergies split per OPEX, CAPEX and Revenues

Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Costs	57%	45%	53%	53%	54%	54%	55%	56%	56%	57%
CAPEX	25%	33%	25%	25%	24%	24%	23%	23%	22%	22%
Revenues	18%	22%	22%	22%	22%	22%	22%	22%	21%	21%

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