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**A review of recent merger and acquisitions
in mobile telecommunications service industry:
Substantial issues and implications for policy makers**

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Abstract

Mobile telecommunications service industry has oligopolistic market structure. Four or three mobile network operators (MNOs) seem to be a magic number for telecom regulators as their competition safeguard. The merger and acquisition (M&A) process of MNOs has been a debate for several decades, both within industry and in academia. There are two forms of mergers which include mergers giving rise to market dominance (anti-merger) and mergers that provide for integration bringing efficiency and innovation (pro-merger). Therefore, this paper aims to explore the patterns, impacts, and specific measures regulatory agencies apply to mobile network providers who are doing through a merger process. From an extensive review of the articles published from 2012 - 2022, this paper reveals that most MNOs choose to use their stock as the primary acquisition tool. Also, most mergers resulted in a drop in the number of service providers from four to three, with all regulatory bodies ruling in favor of the merger except one (which was soon overturned by the court). Merger approval criteria by regulators have been wide-ranging. However, there has been much focus on the promotion of MVNOs (mobile virtual network operators) and assuring they have bandwidth access to the larger and well-established MNOs. Moreover, infrastructure sharing (such as towers) is another common merger condition as well as roaming agreements and spectrum returns to the government. As in the case of the United States mega-merger of Sprint and T-Mobile, assuring rural access to advanced, expensive, and high-speed technology like 5G becomes the operator's approval bargaining chip. This paper contributes to the international and regulatory discussions concerning the highly charged and complex subject of telecommunications M&A activity.

Keywords: Business integration, Case studies, Merger and acquisitions, Mobile phones, wireless communications carriers

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1. Introduction

Mergers and acquisitions (M&A) are a form of business expansion often used within the mobile telecommunications services sector. The mobile telecommunications sector has also been referred to as having an oligopolistic market structure, which acts as a popular method for imperfect competition (Valaskova et al., 2019). It is this 'imperfect competition' that has led to many controversies and studies, both within the industry and within academia (Majumdar et al., 2006; Middleton, 2014).

One frequent view taken is telecommunications firm mergers (anti-mergers) can lead to market domination or even a monopoly. Some academics have even gone to extremes and suggested that these same monopolies when they are large enough and cross all sectors of a nation's economy, can lead to fascism (Wu, 2018).

However, many others see many advantages to telecommunications firm mergers. These include business synergy (Kang & Johansson, 2000), innovation development (Chiu et al., 2020), cost savings (European Commission, 2012), greater efficiency (Andini & Cabral, 2011; Baburajan, 2016), and bandwidth sharing. These 'pro-mergers' can thus reduce redundant investments in expensive technologies such as 5G which then leads to better financial performance for the new, merged enterprise.

However, historically the telecommunications sector has been regulated heavily, with any regulated changes usually leading to an increase in M&A activity (Majumdar et al., 2006). Specifically, in the period 1973-1998, Andrade et al. (2001) reported that deregulation was the impetus for nearly 50% of all M&A activity. Grande (2019) has also written that the academic and political 'deregulation' rhetoric often suggests that the privatization and liberalization of public activities will put an end to the regulatory problem nightmare.

Since its inception, the telecommunications industry merger activity has been due to industry-level shocks, usually occurring due to technological innovations (excess capacity creation), supply shocks (price changes), and deregulation (Majumdar et al., 2006). On a global level, multiple mergers occur yearly, with high 5G implementation costs being a reason frequently cited in recent mergers. The costs include spectrum acquisition, construction, and network upgrades to support 5G service technology. These factors have led some national regulatory agencies such as the US and Malaysia to adopt a pro-merger approach while maintaining strict supervision over their operators.

Therefore, this paper will focus on discussing the patterns and impacts of various national wireless carrier mergers from 2012 – 2022, as well as specific measures taken by each nation's regulatory agency. This paper will shed light on the patterns and impacts of M&A activity occurring in the international mobile service industry. Finally, it is hoped the research will be useful to firms considering merger activity as well as their national regulatory bodies in their efforts to instill fair and competitive services for their consumers. The structure of the paper is as follows. Section 2 provides recent literature on impacts of M&A in economic perspective both theory and empirical studies. Section 3 reviews mobile service provider merger case studies in previous decade.

2. Prior literature

There are two folds of economic literature on the impacts of mergers in mobile telecommunications services industry. On one hand, merger activities will lead to retail prices increase, compared to the prices observed in the absence of a merger (BEREC, 2018) On another hand, mergers could provide efficiency gains that enhancing innovation and quality improvement (Genakos et al, 2018).

2.1 Mergers and mobile retail prices increased

A series of studies on the impacts of mergers in mobile telecommunications provide empirical evidence in different markets. A study by Grzybowski & Pereira (2007) focuses on the impacts of merger on prices in the Portuguese mobile telephony market. The results reveal that the merger between TMN and Optimus in Portugal in 2006 may cause substantial retail conducts a similar study on the impacts of merger the Portugal merger case in 2006. They found that merger activity not only resulted in price increase, but also marginal cost reduction. BEREC (2018) conducts a study on post-merger market development to find impacts on prices and quality of mobile mergers in Austria, Ireland, and Germany in 2018. Their results confirm that merger activities could lead to significant retail prices increased in investigated countries. Aimene et al. (2019) evaluates the impact of mobile operators' merger on unitary price of data and voice in twenty European countries. They find that mergers from 4-to-3 mobile operators (Austria, Germany, Norway, and Ireland) tend to decrease data unitary price and increase voice unitary price.

2.2 Mergers and efficiency in mobile telecommunications markets

Mergers could also contribute a positive impact through network quality improvement and innovation experienced by the consumer. A study by Pedros et al. (2017) is considered the first study on the impact of mobile telecommunications merger on network quality. Their study investigates the impact of the 2012 merger between two mobile operators in Austria, Hutchison 3G Austria and Orange, on 4G network coverage, download speeds and upload speeds. Their results reveal that the merger could stimulate 4G network coverage and improve 4G download and upload speed of the smaller 4G network operator after two years of the merger. In addition, the merger could improve the quality of mobile networks, download and upload, in the Austrian market.

Genakos et al. (2018) reviews the impact of market concentration on both prices and investment in mobile telecommunications. Their findings show that an increase in market concentration leads to higher prices as well as per-operator investment. This suggests that a merger will have static price effects to the detriment of consumers, but also dynamic benefits for consumers to the extent that investments enhance their demand for services. It is also confirmed an existence of the trade-off between market power and efficiency gains from increased concentration.

Grajeck et al. (2019) examines the impact of five mergers in the European mobile telecommunications, Austria, Denmark, Netherlands¹, and Greece, during 2005 – 2007 on prices and capital expenditures of merging mobile

operators and their rivals. Prices could represent a measure of static efficiency, while capital expenditure could be a measure of dynamic efficiency through the firms' investment incentives. The results reveal that there is a positive correlation between the price and the investment after the mergers.

All the findings from empirical studies above support a seminal paper by Williamson (1968) stating that merger could raise prices, however, it enhanced productive efficiencies. These efficiencies would outweigh the negative effects of market power and a merger would enhance welfare (Majumdar, et al, 2012). Therefore, the regulator as well as competition authority should be careful in prohibiting mergers.

2.3 Mergers and recommendations for telecom regulators and competition authorities

Telecom regulators as well as competition authorities seem to consider the short-term impact, i.e. retail prices increase, rather than mid- and long-term effects, efficiency gains. Several recent studies have suggested that competition and regulatory authorities should take the potential trade-off between market power effects and efficiency gains when considering mergers in mobile telecommunications (Andini & Carbral, 2007; Pedros et al, 2017; Genekos et al., 2018). Additionally, the competition agencies should consider other relevant effects e.g., network coverage and download and upload speed (Pedro et al, 2017) beyond the short-term.

The evidence of the trade-off between static (cost reduction) and dynamic (investment) efficiencies in mergers in a large sunk cost industries, Austria and Greece, resulted from allowing a merger or imposing appropriate remedies in a merger process (Grajek, et al., 2019). This also suggests that the policy makers should conduct an appropriate analysis before making a decision on merger. Other factors, i.e. investment, quality of service, network coverage, should be in the list of consideration.

¹ The Netherlands had two events of merger, KPN Mobile and Telfort in q3 2005 and Ben (T-mobile) and Dutchtone (Orange) in q3 2007.

3. Mobile service provider merger case studies

In this section, this paper gives a comprehensive overview of nine international mergers within the wireless/mobile phone industry.

3.1 The Philippines – 2011 – acquisition - Smart Communications and Sun Cellular Merger - 3 to 2

On October 26, 2011, the National Telecommunications Commission of the Philippines (NTC) approved a merger between the Philippine Long Distance Company's (PLDT) *Smart Communications* division and Digitel Mobile Philippines' *Sun Cellular* division ("PLDT completes acquisition," 2011). At the time of the merger's approval, *Smart Communications* was the largest wireless provider while *Sun Cellular* was the second largest. Note that the conditional approval by the NTC due to the absence of a competition law² in the country (Landingin, 2011). The approval could be revoked if the merging parties violated the conditions.

The NTC afterward required that PLDT's SMART Communications unit divest itself of its CURE Division (Connectivity Unlimited Resource Enterprises), which owned 10 MHz of 2100MHz spectrum (3G) and other licenses and return them to the government. The merger also allowed the continuation of the *Sun Cellular* brand and the continuation of unlimited call and text services. The NTC ruling also called for the merger participants to maintain good customer service quality. Please see Table 6 for further details.

3.2 Austria – 2012 – acquisition - Hutchison 3G Austria (brand name 'Three' or H3G) Austria and Orange Austria – 4 to 3

On May 7, 2012, the Austrian Regulatory Authority for Broadcasting and Telecommunications (RTR) received a business merger notice under Article 4 of the European Union Council Regulation: EC No. 139/2004 where *Three* (4th largest Austrian mobile operator) proposed a merger with Orange Austria (previously known as *One* and Austria's 3rd largest mobile operator). Primary arguments for the merger submitted to the RTR were *Three* stated they were focused on data services while Orange Austria was focused on voice services. Therefore, the merger would be cost-effective with the savings passed on to the Austrian consumers.

Also, *Three* stated they lacked their own 2G network which was a disadvantage in providing consumers with inexpensive voice service in all service areas. Therefore, a merger would allow it to expand its network coverage and develop 4G networks more quickly, which would then attract more new users which is necessary to stimulate a growing economy.

The proposed merger would also include the conditions that *Three* would acquire all of Orange Austria's shares and that *Three's* subsidiary, *YESSS! Telekommunikation GmbH* (a MVNO) would be sold to the *Telekom Austria (TA) Group* (European Commission, 2012). This sale was approved by the Austrian Cartel Court on November 27, 2012, with no conditions attached, with *Three's* final acquisition of Orange Austria on December 14, 2012. ("Telekom Austria Group," 2013). See Table 1 for the pre-merger and post-merger carrier market shares.

² The Philippines Competition Act was passed in 2015 after four years of mobile merger. It was debating in the congress for 24 years.

Table 1 Austrian mobile phone carrier market share before and after the 2012 merger

Service provider	Before merger	After merger
A1 Telecom Austria (after the merger, Yesss! from Three)	40 - 50%	40 - 50%
T-Mobile	30 - 40%	30 - 40%
Three	10 - 20%	20 - 30%
Orange (Not including Yesss!)	10 - 20%	-
Yesss!	5 - 10%	-
Vectone	0 - 5%	0 - 5%

Source: Compiled by authors

3.2.1 Actions and responses to regulatory actions

The RTR considered *Three* to be a driving force for competition in the Austrian mobile phone market even though the merger would eliminate two smaller companies from the market but the result will be the creation of a highly competitive major service provider to A1 Telecom Austria and T-Mobile.

However, some speculated that this may result in the three major operators who lacked competitive incentives, because of their large market shares. As a result, there is no incentive to lower prices to attract new customers. This could also lead to choices and higher consumer prices.

Therefore, the Austrian RTR on December 12, 2013, permitted the merger under European Union Regulation (EC) No. 139/2004, allowing *Three* to take control of *Orange Austria*. Please see Table 6 for further details.

3.2.2 New service providers

H3G Austria must encourage more new service providers to enter the market by allowing them access to 30% of *Three's* networks, and a maximum of 16 MVNOs (mobile virtual network operators) to the network for 10 years after the integration (Nasralla & Gruber, 2014). *Three* was also required to reach an agreement and provide roaming services to other MVNO operators (approved by the RTR) before it can merge its business with *Orange Austria* (Upfront MVNO).

3.2.3 Spectrum requirement

A requirement was made by the European Commission (EC) for the merger that *Three's* 2.6 GHz frequency band of 2x10 MHz must be separated for use by other MNO or MVNO service providers (European Commission, 2012 a,b). See Table 6 for further details.

2.3 Ireland – 2013 – acquisition - Telefónica Ireland's O2 and Hutchison 3G (H3G) UK Holdings Limited (*Three* brand name)– 4 to 3

On October 1, 2013, the European Commission (EC) was notified of a merger between Telefónica Ireland's *O2* and Hutchison 3G UK Holdings Limited *Three*. This was due to the terms of the sale and purchase agreement dated 22 June 2013 between the parent company of

O2 (Ireland's 2nd largest wireless provider) and Hutchison 3G UK Holdings Limited. Under the agreement, Hutchison 3G UK Holdings Limited acquired all of O2's shares and upon completion of the merger, Hutchison would operate under the merged company under the *Three* brand (Ireland's 4th largest wireless provider). Telefónica Ireland is Ireland's second largest MNO (Table 2) which offers its services under the brand name *O2* and the sub-brand *48*. It also owns 50% of *Tesco Mobile Ireland* (European Commission, 2014).

The pre-merger mobile phone market in Ireland had approximately 5.5 million subscribers (European Commission, 2014) and four main operators. These included *Vodafone*, *O2*, *Eircom*, and *Three*, with market shares of 39.2%, 23.3%, 20.2%, and 8.9% respectively. In addition, other small operators are MVNOs such as *48*, *Postphone*, *Lycamobile*, *Tesco Mobile*, and *Virgin Mobile* (Ireland's Mobile," 2014), which have a combined market share of 8.4%.

Tragically, according to research from Palcic and Reeves (2013) concerning Irish telecommunications firms' highly leveraged buyouts (LBOs), Eircom became a victim to the trend and went bankrupt in 2012, but has since risen from the ashes. Quite interestingly, the authors paint a troubling trend during this period in which private equity groups assumed ownership of this and similar enterprise from which they extracted the cash and underinvested in their infrastructure contributing to the demise of the enterprise and having wider economic and social effects. The Eircom case demonstrated ownership risks of critical network infrastructure by private equity groups and the need for regulatory safeguards to protect the public interest.

Table 2 Ireland's mobile phone carrier market share before and after the 2013 merger.

Service provider	Before merger	After merger
Vodafone	39.2%	39.2%
Telefónica Ireland O2	23.3%	-
Eir or Eircom (an MVNO which grew to become an MVO) used the Meteor Mobile Communications network in the beginning. In 2019 they were reported to have 17% of the subscriber base (Lancaster, 2019).	20.2%	20.2%
Hutchison 3G (H3G) Three	8.9%	32.2%
Others	8.4%	8.4%

Source: Compiled by authors

2.3.1 Actions and responses to regulatory actions

The EC considered *Three's* merger with O2 as potentially affecting consumers because there was a chance that service quality could deteriorate, the service price would be more expensive, and fewer consumer choices (European Commission, 2014). It was believed that within 2-3 years after the merger there would be no new service providers as MNOs.

On May 28, 2014, the EC passed a resolution that stipulated that in the event of a merger under Council Regulation (EC) No. 139/2004, the company must sell bandwidth that supports voice and data usage up to 30% of the network capacity acquired by the acquisition to other

smaller operators before the acquisition is complete. As a result of these measures, on August 20, 2015, Dixons Carphone's *iD Mobile* was created as the first MVNO to enter the Irish mobile retail market on the *Three* network (O'Brien, 2015). It was the first of two MVNOs that was set up as a result of the conditions for the merger of *Three Ireland* and *O2*. Their goal was to gather a 6% market share within five years. However, as of the 3rd quarter of 2017, *iD Mobile* had only 0.7% of the subscriber's market share and decided on April 6, 2018, to stop providing services and left the market (Godlovitch et al., 2021).

Virgin Mobile, the second MVNO, launched its service on October 5, 2015, and grew from a 0.2% revenue share and subscriber share in Q2 2016 to a 0.9% revenue and subscriber share in Q3 2017. When before and after merger service rates were reviewed, the average mobile service income ARPU (average revenue per user) was stable at around €23-25 per month. Figure 1 details each company's spectrum acquisition in 2012 shortly before *Three's* acquisition of *O2*.

Figure 1. Ireland's 2012 Spectrum Auction.

Frequency Band	Licence Period	Hutchison 3G Ireland Ltd.	Meteor Mobile Communications Ltd	Telefonica Ireland Ltd	Vodafone Ireland Ltd
800 MHz	2013-2015	-	2 × 10 MHz	2 × 10 MHz	2 × 10 MHz
	2015-2030	-	2 × 10 MHz	2 × 10 MHz	2 × 10 MHz
900 MHz	2013-2015	2 × 5 MHz	2 × 5 MHz	2 × 10 MHz	2 × 10 MHz
	2015-2030	2 × 5 MHz	2 × 10 MHz	2 × 10 MHz	2 × 10 MHz
1800 MHz	2013-2015	2 × 10 MHz	2 × 10 MHz	-	2 × 15 MHz
	2015-2030	2 × 20 MHz	2 × 15 MHz	2 × 15 MHz	2 × 25 MHz
Final Upfront Fees** (€ millions)		€51.14 m	€144.78 m	€124.93 m	€160.85 m
Total Spectrum Usage Fees*** (€ millions)		€53.87 m	€99.64 m	€99.64 m	€119.79 m
TOTAL		€ 854.64 million			

Source: Kennedy (2012).

2.4 Norway – 2013 – acquisition - *TeliaSonera* and Sweden's *Tele2* - 3 to 2

On December 10, 2013, Norway held a 4G spectrum auction that collected €212 million. Four telecom operators were participating in the auction in the 800MHz, 900MHz, and 1800MHz spectrums (Øyvann, S. (2013). These included *TeliaSonera*, *Telenor (NetCom)*, *Telco Data*, and an unknown operator at the time who all won blocks in all three frequency bands (Morris, 2015). With great surprise to many, the newcomer *Telco Data* won the largest allocation, an operator known to but a few at the time of the auction, which had only been incorporated in Norway on October 30th. Later research determined that *Telco Data* was owned by AI Media Holdings, a subsidiary of Access Industries, which was a group controlled by Leonard Blavatnik (a Ukrainian billionaire).

However, the fourth bidder, Sweden's *Tele2* (3rd largest operator at the time of the auction) failed to get any spectrum which then led to their decision to drop out of the Norwegian market due to their inability to compete, even though they were the third largest operator at the time with 1.2 million customers. *Tele2* then sold its Norwegian mobile interests for \$746 million (€500 million) to *TeliaSonera* (Middleton, 2014; Nordenstam & Abboud, 2014).

Later, in 2015 another auction was held from which the winning bidders for the 4G 1800 MHz spectrum were Norway's last two established operators, *Telenor* and *TeliaSonera* which raised nearly \$103 million for the Norwegian government (Morris, 2015; Nordenstam & Abboud, 2014). Although billionaire Len Blavatnik's Access Industries' *Ice Communication Norge* (known before as *Telco Data*) also took part (Fildes, 2018), it failed to add additional frequencies.

2.4.1 The acquisition results

After *Tele2* was acquired by *TeliaSonera*, Norway essentially had only two strong operators and a third firm with lots of spectrum, little infrastructure, and few customers (Middleton, 2014), leaving *TeliaSonera*, and *Tele2* shareholders the opportunity with a good return on their investments. But it's a timely reminder for the mobile industry that poor regulatory decisions can create uncertainty that makes a mockery of huge infrastructure investments.

The outcome increased *TeliaSonera*'s market share from 23% to 40% after the merger with *Tele2*, increasing to 2.7 million. Simultaneously, *Telenor* had 3.2 million mobile subscribers. In 2014, *Ice.net* (another winning bidder in 2013) and *Tele2* signed an agreement to lease the 900 MHz spectrum in the 5 MHz band, effective October 1, 2018. 2014 through April 1, 2015. As part of the deal, *Ice* also intended to purchase some of *Tele2*'s mobile network infrastructure.

2.4.2 Actions and responses to regulatory actions

After detailed scrutiny by the Norwegian Competition Authority, *TeliaSonera* was allowed to acquire the proposed *Tele2* operation for \$746 million, free of cash and debt. The terms of operation were based on the commitment package submitted by *TeliaSonera*, which included a roaming agreement with *Ice.net* and the sale of *Tele2*'s mobile network infrastructure and customer base to *Ice.net*. See Table 6 for more details.

2.5 United Kingdom – 2015 to 2016 – acquisition - Telefonica Europe Plc O2 and Hutchison 3G (H3G) UK Investments Limited Three – 4 to 3

On 11 September 2015, the EC was notified of the merger by Hutchison 3G UK Investments Limited, which has its parent company CK Hutchison Holdings Limited, whose merger meets the terms of Article 3(1)(b). According to Council Regulation (EC) No. 139/2004, the acquisition of Telefonica Europe Plc which operated under the O2 brand (2nd largest), with H3G operating under the *Three* brand (4th largest) totaling £10.25 billion.

In 2015, there were four main MNOs in the UK. They included EE, O2, Vodafone, and Three, with market shares of 29%, 27%, 19%, and 11%, respectively (Table 2). However, EE and Three combined their networks and jointly operated them under the name Mobile Broadband Network Limited (MBNL) (European Commission, 2016). Additionally, other smaller operators controlled approximately 15% of the total number of wireless service users. By 2018, the numbers had shifted only slightly, with *BT* including *EE* at 28%, *O2* at 26%, *Vodafone* at 21%, and *Three* at 12% (Statista, 2022).

Table 2 UK mobile phone carrier market share before and after the 2015 merger.

Service provider	Before merger	After merger
EE (British Telecom-BT)	29%	29%
Telefónica's O2	27%	-
Vodafone	19%	19%
Hutchison's Three (3)	11%	38%
other	15%	15%

2.5.1 UK MNVO market

In 2003 Tesco inked a deal with the network provider O2 to establish an MVNO 50/50 joint venture in the UK under the name Tesco Mobile (Gibson, 2003). By 2018, the MVNOs *Tesco Mobile* controlled 6% of the UK wireless market, *Virgin Mobile* controlled 4%, with the smallest MVNOs *Talk Talk*, *iD Mobile*, and *Sky* each having 1% of the UK wireless market

2.5.2 Actions and responses to regulatory actions

In the EC's 2016 ruling concerning the O2 and Three merger, they stated that the merger would reduce UK competition in the retail mobile telecommunications market, thus disallowing the merger. The ruling also stated that the merger would lead to higher prices and reduced choices and quality for consumers (Schillemans et al., 2020). The EC also noted that both companies exerted an important competitive constraint in the market and that Three was an "important competitive force," which is a term the EC uses to refer to companies that have a greater influence on the competitive process than their market shares suggest.

Furthermore, in establishing the merged companies as an "important competitive force," the Diversion Ratio is taken into account. This is a decrease in the rate of sales of Product A because customers use Product B when the price of Product A increases as an indicator of how much/less the two companies wishing to merge have to make a large investment for their services (close competitors). Based on the calculation of the Diversion Ratio, Three and O2 were closely interchangeable in service (close competitors).

Three as the newest player in the market played a key role in driving competition in the mobile operator market, while O2 was strong with a well-recognized brand and good reputation. Also, O2 at the time of the proposed merger was the second-largest provider in terms of revenue. and was ranked number 1 when considering the number of users (including Tesco Mobile users). The merger would then give Three and O2 the lead in market share of more than 40%, thereby reducing the competitive incentives of Vodafone and EE. The commission's analysis also showed that a merger would lead to higher retail prices than without a merger.

Furthermore, the EC felt that *Three* played a disruptive market role due to its aggressive pricing, subscriber gross numbers, and its "gross adds" market share. Gross adds is a metric used by the EC which is the proportion of new customers and customers switching providers won by each firm (European Commission, 2016). Also, the EC felt that reducing the number of available MNOs would lead to a reduction in the number of future MVNOs and the effect of the merger on network-sharing arrangements and the bargaining power of non-MVNOs.

Interestingly, the EC felt because the new company in the past had sharing agreements with both Beacon and MBNL, it would have an unfair advantage as a new company in that it knew its competition's future development plans, especially concerning next-generation 5G technology. Therefore, this was a serious detriment to the UK's operator competitiveness (European Commission, 2016).

However, in 2020, the European Union's Central Court revoked the decision of the EC after an appeal was filed. The reasons for the revocation of the decision are as follows:

- (1) The impact of the merger on price and service quality for customers is not substantiated by the necessary legal standards.
- (2) The EC does not have sufficient grounds to demonstrate that business integration will affect agreements on network sharing and mobile network infrastructure in the UK, which will be a major obstacle to effective competition.
- (3) The impact of adequate consolidation is not significant in the wholesale service market to impede effective competition.

Although the court changed the ruling allowing the two companies to merge, *Three* and *O2* did not implement the merger plans they had previously submitted to the commission, and in 2020 *O2* made a 50:50 joint venture with *Virgin Media*. *O2* would benefit from *Virgin Media's* national fiber optic network, while *Virgin Media* would gain access to *O2's* mobile network, giving it a better competitive edge against *EE*.

2.6 Italy – 2016 – merger - VimpelCom's Wind and CK Hutchison's Tre (Three) – 4 to 3 then back to 4

In 2016, there was a merger between Italy's third-largest wireless carrier *Wind*, and the fourth-largest wireless carrier *Tre*. After the completion of the merger, the new entity became known as *Wind Tre*. However, before the merger France's *Iliad* paid 450 million euros for spectrum from *Wind* and *Three* so that it could enter the Italian market in the merger year (Burkitt-Gray, 2016), thereby maintaining the total of MNOs at four. In 2022, Italy still had four MNOs, while adding five MVNOs since 2016.

2.6.1 Actions and responses to regulatory actions

The EC voiced some merger concerns with the *Wind Tre* alliance. These included that consumers would only be left with three wireless operators after the merger, which was voiced before *Iliad's* entry. Also, reduced competition between domestic telecommunications companies may be a burden on users. Other details can be found in Table 6.

Regulatory documents from 2015 indicated that when *Wind* and *Three* proposed their merger, *Telecom Italia* had 35% of the Italian mobile market and *Vodafone* 29%. However, after the merger, *Wind/Three* would have 16%, *Swisscom's Fastweb* would have 15% and *Vodafone* would have 13%. Trailing far behind would be *Tiscali* with 6% (Burkitt-Gray, 2016).

Although *Iliad* only started offering retail wireless services in the year of the merger, *Iliad* already had significant experience and a 20-year track record at providing fixed telephone and fixed broadband Internet.

2.7 United States – 2018 – acquisition - T-Mobile and Sprint – 4 to 3

On June 18, 2018, T-Mobile (2nd largest) and Sprint (4th largest) filed a merger application with the US Federal Communications Commission (FCC). Regarding the merger, T-Mobile

and Sprint also submitted documents under Sections 214 and 610(d) of the Communications Act 1934 to the FCC seeking permission to transfer spectrum-related licenses. The merger was an all-share swap, with Sprint shareholders receiving T-Mobile shares.

At the time of the proposed merger, there were four major carriers in the US mobile phone market. These included Verizon, AT&T, T-Mobile, and Sprint, with Sprint owning Boost Mobile as an MVNO using Sprint's network. Sprint argued at the time that the merger would allow for better service, reduce service costs, and make service prices lower, allowing Sprint to better compete with the other two major carriers. In regard to 5G, both companies claimed that they could not provide 5G services with one company. Therefore, to provide better and more efficient services to consumers, the firms needed to be merged.

Table 4

US mobile phone carrier market share before and after the 2018 merger.

Service provider	Before merger	After merger
Verizon	35.82%	35.82%
AT&T	34.01%	34.01%
T-Mobile	17.50%	30.17%
Sprint	12.67%	-

2.7.1 Actions and responses to regulatory actions

The FCC was concerned that the proposed merger would lessen business competition, give more power to the remaining operators, allowing them to increase consumer pricing and make themselves more profitable. However, the FCC supported the merger.

One of the key factors for the T-Mobile and Sprint merger was the two companies plan to use their combined spectrum to deliver 5G networks to 97% of the US within five years across the entire US (Romm, 2019). The FCC saw the merit in this due to the massive size of the US and felt no single company had the resources to bring 5G coverage to such a large area. However, merging these operators might give them the ability to do so. Therefore, on November 5, 2019, the FCC officially approved the merger under specific conditions concerning 5G network expansion and service rates. Please see Table 6.

Before the FCC's approval, on July 26, 2019, the US Department of Justice approved T-Mobile's (3rd largest carrier) \$26 billion merger with Sprint (fourth largest carrier) (Romm, 2019) after the two carriers reached an agreement to sell their prepaid phone card businesses Boost Mobile and Virgin Mobile (a subsidiary of Sprint) for \$5 billion to Dish Network, the main provider of television and satellite services. Additionally, they sold their 800MHz spectrum to Dish for \$3.6 billion. The merger company is expected to have over 100 million subscribers.

The spectrum sale would be completed three years after the merger to allow time for Sprint's existing network customers to switch to T-Mobile and Dish Network, later acquired by Boost Mobile and Virgin Mobile, MVNO companies offering prepaid cell phones. On July 1, 2020, Dish started offering prepaid cell phones and plans to offer postpaid service in the future. It also plans to provide 5G services across 70% of the US by 2023 (Romm, 2019).

As of Q2 2021, the United States had four major carriers including Verizon, T-Mobile, AT&T, and DISH, with Verizon having 121.3 million subscribers, T-Mobile with 104.8 million subscribers, AT&T with 97.8 million subscribers, and DISH with 8.9 million subscribers. The merger moved T-Mobile into second place in the market, replacing AT&T.

2.8 Netherlands – 2017 to 2019 - acquisition - T-Mobile and Tele2 – 4 to 3

On January 2, 2019, in the Netherlands, Germany's Deutsche Telekom T-Mobile (3rd largest) acquired and merged Sweden's *Tele2* (4th largest) into T-Mobile's network (Tele2, 2019) for €190 million. During the merger, there were four MNO operators in the Netherlands. As a result, after the merger, T-Mobile rose to number 3 in market share, with KPN (40% market share) and VodafoneZiggo (30% market share) being larger. The merger was the first EC-approved merger without remedies (Coates, 2018), mostly due to Tele2 having only a 10% market share and no significant competitiveness. After the merger, the T-Mobile Group had a 30% market share, which was similar to Vodafone. See Table 6 for more detail.

2.9 Malaysia – 2021 to 2022 – merger – Digi and Celcom – 4 to 3

In July 2021, Axiata Group Berhad (Axiata) (Malaysian telecom operator Celcom-3rd largest) announced that it had negotiated a merger agreement with Telenor ASIA (Malaysian telecom operator Digi-2nd largest). Subsequently, a merger application with the Malaysian Communications and Multimedia Commission (MCMC) was filed in November 2021.

Telenor Group, Digi's largest shareholder, announced a \$15 billion merger of its Malaysian mobile services business with Axiata Group Bhd., a mobile service company under the brand name Celcom. The filing indicated that the new legal entity would be called Celcom Digi Berhad.

Each party was stated to have an equal share of 33.1% after the merger, with the remaining shares to be held by Malaysian funds and institutional investors. The stated reason for this merger was the upgrade costs for 4G and 5G technologies, especially for infrastructure items such as towers, systems related to fiber optic cables, and other local problems. In addition to cost savings, the merger participants indicated that the merger would allow for more efficient resource sharing and innovation creation.

In June 2022 the MCMC issued a 'Notice of No Objection' for the merger ("MCMC approves merger," 2022). In return, Celcom and Digi detailed what they agreed to secure regulatory approval for their merger. Please see Table 6 for details.

The merger will make the new brand name *Celcom Digi Berhad* the largest mobile operator in Malaysia. It is projected to have a customer base of approximately 19 million subscribers and estimated annual revenue of approximately \$3 billion ("Axiata, Telenor win approval," 2022).

Moreover, merger plans detail how the new company will raise funds through an IPO on the Malaysian stock exchange and in the international market. Further synergy will be obtained by the ownership merging of approximately 60,000 towers from the original two companies, and the potential formation of a telecommunications tower company called Edotco, which would become the world's fifth largest telecommunications tower company. There is also a plan to develop the country into a regional innovation hub and establish *The Innovation Center* to upgrade skills. and potential of employees.

Malaysia has a total population of about 32 million people and 40 million mobile phone numbers, with four main operators including Maxis with a 28% market share, Digi with a 26% market share, Celcom with a 22% market share, and U Mobile with a 19% market share (Table 5). In addition, the remaining market share of 5% belongs to eight MVNO operators.

Table 5

Malaysian mobile phone carrier market share before and after the 2022 merger.

Service provider	Before merger	After merger
Celcom Digi Berhad	-	48%
Maxi	28%	28%
Digi	26%	-
Celcom	22%	-
U Mobile	19%	19%
Others	5%	5%

3. Rationales for the business mergers and the specific measures required by the regulatory body for implementation

Table 6 summarizes the details of the wireless operator case studies and the reasons specified by the companies for the merger and the specific measures required by the regulators in each case for merger approval.

Table 6 summarizes the reasons for the business combination and specific measures.

Case Studies	Merger Justifications	Specific Merger Measures
<p>1. The Philippines (2011)</p> <p>Three to two: Smart (1st largest) and Sun (3rd largest)</p> <p>Outcomes/Comments:</p> <p>PLDT during this merger was partly owned by Hong Kong's First Pacific Co Ltd., Japan's NTT Communications, and NTT DoCoMo ("Manila's PLDT in talks," 2011).</p>	<p>Smart argues that the merger cost savings will be passed on to the consumer, while also allowing better consumer service quality and more comprehensive services.</p>	<p>The Philippine National Telecommunications Commission (NTC) requires that mergers maintain competitiveness and market share as follows:</p> <ol style="list-style-type: none"> 1. The Philippine Long Distance Telephone Co (PLDT) must sell its Connectivity Unlimited Resource Enterprises (CURE) (a subsidiary of (PLDT unit) Smart Communications Inc.), which owns 10 MHz of 2100MHz spectrum and other licenses, or else in 2018 it must return the spectrum to the Philippine government. 2. Maintain the Sun Cellular brand and provide unlimited call and text services. 3. Maintain good customer care and service quality.
<p>2. Austria (2012-2013)</p>	<p>Hutchinson Drei (Three) Austria argued in the merger</p>	<p>1. Hutchinson Drei (Three) Austria must encourage more new service providers to enter the market,</p>

Case Studies	Merger Justifications	Specific Merger Measures
<p>Four to three:</p> <p>Orange (One) (3rd largest) and Drei (Three) Austria (4th largest)</p> <p>Outcomes/Comments:</p> <p>On February 3, 2012, Hutchison Drei Austria acquired communications company Orange Austria Telecommunication in their first acquisition in the telecommunications sector from Mid Europa Partners and France Telecom-Orange for \$1.7 billion. “Hutchison closes deal,” 2013). Simultaneously, market leader Telekom Austria finalized its acquisition of Yesss from Orange Austria.</p>	<p>that they were more focused on offering more aggressive data services compared to other carriers, but Three's lack of a 2G network was a disadvantage in its voice service. Therefore, Three could not offer proactive pricing in all service aspects. Thus, a merger would allow Three to have its own 2G network, enabling lower average costs and lower-priced services. This enabled Three to expand their network coverage and develop their 4G networks more quickly, which would attract more new users. This then would stimulate economic growth.</p>	<p>which will allow new operators to access up to 30% of Three's network. Potentially, up to a maximum of 16 MVNOs will be required to have access to the network for 10 years after the integration. Finally, Three will be allowed to arrange to roam with other service providers, as well as allow the trading of Three's assets.</p> <p>2. Three must reserve the 2.6 GHz band of 2x10 MHz for new operators to enter the market, either MNO or MVNO and that spectrum will be combined with the 800MHz band that RTR can use. In 2013 an auction took the largest that stipulated the conditions that only new service providers had the right to bid. However, if there are no new operators to bid on the spectrum, the measure requiring the separation of the spectrum would be repealed. The 2.6 GHz spectrum was reserved for the next spectrum auction, which could only be sold to new service providers.</p>
<p>3. Ireland (2013-2015)</p> <p>Four to three:</p> <p>Telefónica (O2) (2nd largest) and Hutchinson Three Ireland (4th largest)</p> <p>Outcomes/Comments:</p> <p>Hutchison Whampoa announced in June 2013 its acquisition of the Irish arm of Telefónica O2 for €780 million. Telefónica O2 was then merged into Hutchison Whampoa's subsidiary Three Ireland in March 2015. Subsequently, in 2014 acquired Telefonica's Irish mobile for €1 billion (Chee, 2014). Hutchison is controlled by one of the wealthiest men in Asia, Li Ka-Shing, which operates in six countries.</p>	<p>Merger justification included the argument that Ireland's market conditions were dominated by Vodafone. Without the merger, Vodafone would have continued its monopoly and created more gaps between the smaller carriers. Therefore, a merger of two of the smaller carriers would strengthen the financial conditions of the two combined companies and make them more competitive with Vodafone.</p>	<p>1. It was argued that a merger would give each MVNO provider access to the network at a fixed rate fee. However, the EC established conditions that a merger was conditional on Hutchison Whampoa selling up to 30% of the merged company's network capacity to MVNO operators (Chee, 2014).</p> <p>2. There must be a minimum capacity for MVNO providers to use to attract MVNO providers to compete in the market during the first 5 years.</p> <p>3. A merger must support the use of 2 blocks of 1800MHz spectrum, 2 blocks of 2100MHz spectrum, and 1 block of 900MHz spectrum (five blocks total) for 10 years starting from January 1, 2016.</p>

Case Studies	Merger Justifications	Specific Merger Measures
<p>Three Ireland also has stated that in their network design they have no intent to support older GSM handsets. Therefore, their focus on 4G broadband data, requires a more focused and less costly use of spectrum (Kennedy, 2012).</p>		
<p>4. Norway (2013-2014)</p> <p>Three to two:</p> <p>TeliaSonera (2nd largest) Tele2 (3rd largest) – 1.2 million customers in 2014 and 432 employees. Founded in Norway in 1995.</p> <p>Ice.net (new entrant)</p> <p>Outcomes/Comments:</p> <p>There were considerable questions about the auction’s methods and outcome. This was mainly due to the Nordic regulator NPT using a first price sealed bid format for the auction, which effectively makes carriers bid blind, with the highest bidders paying the amount they each bid (Middleton, 2014).</p>	<p>Norway's third-largest mobile operator, Tele2, lost the auction in December 2013, not receiving any spectrum. Therefore, in July 2014, Tele2 divested its Nordic operations after failing in a bid for 4G spectrum in late 2013, with TeliaSonera offering to buy Tele2 for \$746 million. (Middleton, 2014).</p>	<p>The roaming agreement with Ice.net and the sale of Tele2's mobile network infrastructure and customer base to Ice.net were undertaken as follows:</p> <ol style="list-style-type: none"> 1. TeliaSonera would sell its infrastructure to Ice.net. 2. TeliaSonera would make a roaming deal with Ice.net. 3. TeliaSonera would sell the customer base (enterprise) of Network Norway, the spectrum distribution network, to Ice.net. 4. TeliaSonera would commit to providing MVNO access to Norwegian mobile operators. 5. TeliaSonera would offer three Tele2 retail outlets to Ice.net. <p>These conditions were stated to be essential for the development of new telecommunication service providers.</p>
<p>5. United Kingdom (2015 - 2016)</p> <p>Four to three:</p> <p>O2 (2nd largest) and Three (4th largest)</p> <p>Outcomes/Comments:</p> <p>By 2022, Tesco Mobile (a Tesco–Virgin Media O2 JV) had become the UK’s largest MVNO</p>	<p>In 2015 in the UK considerable discussion was given to the mergers of BT (the largest fixed provider) and EE (the largest mobile provider) and of O2 and Three (Mallinson, 2015).</p> <p>Three reasoned in the merger that merging with O2 would allow its operations to become more efficient.</p>	<p>(Examples of specific measures proposed by Three)</p> <ol style="list-style-type: none"> 1. Withdraw 50% of O2's stake in Tesco Mobile (O2 is a 50/50 joint venture with Tesco under the name Tesco mobile, the largest MVNO in the UK) (Agnew, 2022). 2. Give 1 - 2 new players access to a perpetual fractional network interest with 10 - 20% of capacity. 3. Proposals for MVNOs that have contracts with Three and O2 that do not have 4G access to obtain 4G at the same price as 3G access for 5 - 10 years from the date of the merger.

Case Studies	Merger Justifications	Specific Merger Measures
(Agnew, 2022) with 5.14 million consumers.		
<p>6. Italy (2016)</p> <p>Four to three:</p> <p>VimpelCom Wind (3rd largest) and CK Hutchison 3 Italia/Tre.it (4th largest)</p> <p>Outcomes/Comments:</p> <p>In 2016 Wind Tre. was created by combining VimpelCom's (now VEON) subsidiary WIND with those Hutchison's subsidiary H3G. These were the 3rd and 4th largest operators in the Italian retail mobile market (European Commission, 2018; Vimpelcom, 2016). The EC also allowed the entrance of Iliad into the market.</p>	<p>Wind and Tre.it argued that a 50/50 JV merger would provide cost savings of more than 5 billion euros and improve service efficiency (Baburajan, 2016). Additionally, in a VimpelCom Wind presentation to stockholders, the company indicated they would be spending 7 billion euros in upgrading Italy's digital infrastructure (Vimpelcom, 2016).</p>	<p>The EC approved the amalgamation with the following conditions supporting the establishment of a new MNO provider (Iliad) in Italy:</p> <ol style="list-style-type: none"> 1. To facilitate Iliad's entry into the telecommunication network, Wind Tre must allow Iliad to use its spectrum. 2. Wind Tre has to sell some telecommunication infrastructure to Iliad, such as their telecommunication towers. 3. Wind Tre must transfer some of its 900, 1800, 2100, and 2600 MHz frequency bands to Iliad (European Commission, 2018).
<p>7. United States (2018)</p> <p>Four to three: AT&T, Sprint, T-Mobile, and Verizon to AT&T, New T-Mobile, and Verizon. T-Mobile was the 3rd largest and Sprint was the 4th largest at the merger.</p> <p>Outcomes/Comments:</p> <p>The outcome of the merger was the creation of a new provider called 'New T-Mobile.' Criticism of the merger includes loss of customer service, higher prices, and more attention to profitability (Forbes Technology Council, 2018).</p> <p>Advantages will include</p>	<p>T-Mobile and Sprint justified their merger (New T-Mobile) due to them being the two smallest MNO mobile operators in the US market. By combing their resources, they would be able to scale and roll out faster the highly expensive 5G networks (Federal Communications Commission, 2020; Forbes Technology Council, 2018) The disadvantages of the two companies are Sprint's shortage of mid-band spectrum and T-Mobile's short-band spectrum. Additionally, the merger will allow T-Mobile to compete with the previous two major carriers, and at the time of the merger did not result in the loss of market competitiveness.</p>	<ol style="list-style-type: none"> 1. The 'New T-Mobile' promised they would provide 5G coverage to 85% of the rural US population within three years of the merger, and 90% within six years. Also, the FCC required New T-Mobile to provide 66% of the US rural population 100 Mbps or higher within six years (Federal Communications Commission, 2020). Other conditions included deploying 5G services over low-band frequencies to 97% of the population within three years and 99% within six years. 2. The merged companies must comply with the Legacy Rate Plan effective from February 4, 2019, to February 4, 2022, or for three years after the merger completion. 3. T-Mobile may adjust the service rate only if additional costs, taxes, and fees to be paid to other business partners are not related to the merged companies. 4. Any change or termination must be the result of an unrelated company.

Case Studies	Merger Justifications	Specific Merger Measures
faster 5G rollouts leading to better education and remote work opportunities.		
<p>8. The Netherlands (2017-2019)</p> <p>Four to three:</p> <p>Deutsche Telekom AG's (DTAG) T-Mobile (3rd largest) and Tele2 (4th largest)</p> <p>Outcomes/Comments:</p> <p>According to the European Commission (2017), the Netherlands has the most robust broadband coverage in the EU, with fixed broadband penetration at 94.1% (compared to the Western Europe average of 84%). In 2016, 43.8% of Holland's population subscribed to fast broadband services, the highest figure in the EU.</p>	<p>T-Mobile argued that the merger would increase competition in the market because it would increase the market share of T-Mobile, the No. 3 service provider. The merger would then allow T-Mobile to better compete with the no. 1 and no. 2 mobile carriers, KPN and Vodafone. This would also enable users to benefit from the competition.</p>	<p>Merger justification included Tele2's small 10% market share and no significant competitiveness, when compared to the other Dutch MNO operators KPN (40%), Vodafone (30%), and T-Mobile (20%). Thus, a T-Mobile/Tele2 merger would increase the new group's market share to 30% market share, which was close to Vodafone. The EC approved the merger (European Commission, 2017) without special conditions.</p>
<p>9. Malaysia (2019-2022)</p> <p>Digi (2nd largest) and Celcom (3rd largest)</p> <p>Outcomes/Comments:</p> <p>On June 29th, 2022 the Malaysian Communications and Multimedia Commission (MCMC) sent a ruling to both Telenor Group's Malaysian subsidiary Digi.Com Berhad ("Digi"), and Axiata Group Berhad's 'Celcom' that they could proceed with their merger with no objections into a new company called <i>Celcom Digi Berhad</i>. ("Celcom-Digi receives, 2022).</p>	<p>Celcom and Digi argued for the merger that the shift in 4G and 5G technologies is costing both companies huge investments in networking. Therefore, a merger will help them reduce costs and help with efficient resource sharing. Additionally, a merger will be an opportunity to create innovations for the country's telecommunication industry.</p>	<ol style="list-style-type: none"> 1. Both Malaysian MNO operators Celcom and Digi will return 70 MHz in the 1800MHz, 2100MHz, and 2600MHz bands to MCMC, with the frequencies in the first band to be returned within 24 months after completion of the merger, while spectrum in the latter two bands will be handed back within 36 months ("MCMC approves merger, 2022). 2. Within six months of the merger, a separate independent unit must be established for MVNO operators at terms equal to or better than existing contracts. 3. Dispose of the Yoodo brand owned by Celcom within a period agreed to by the MCMC. 4. Enable non-exclusive dealers in Sabah Sarawak, Kelantan, Pahang, and Terengganu to sell products of service providers other than those of business integrators within 3 years of the merger. 5. After the merger's completion, Malaysian telecoms group Axiata and Norway's Telenor will each hold 33.1% of the new mobile service provider, <i>Celcom Digi Berhad</i>. 6. Position the Celcom and Digi brands as products under a single MergeCo corporate brand by the end

Case Studies	Merger Justifications	Specific Merger Measures
		of the second year after the completion of the merger.

4. Observations from international wireless operator mergers

4.1 Number of service providers after a business combination

From the aforementioned international case studies, it was found that most of the mergers resulted in the market structure is changed from having four major service providers to three primary service providers.

4.2 Reasons for operator mergers

Operator mergers used cost savings and improvement in service efficiency as the main justification for their merger applicants to regulators (Baburajan, 2016; European Commission, 2012). Also, mergers make the market more competitive as the market share spread is reduced. In addition, business integration will lead to faster development of 4G (Austria) and 5G (USA) networks, resulting in more efficient competition, faster rollouts, and greater coverage (Romm, 2019).

4.3 Forms of operator mergers

The most common form of operator consolidation was the use of stock to acquire the merger target (acquisition), such as in the case mega-merger case in the US between Sprint and T-Mobile.

4.4 Specific measures prescribed by regulators

Specific measures that regulators require for merger applicants included the following for the retail and service wholesale markets:

4.4.1 Specific Measures Related to MVNOs

Irish and Austrian regulators required MVNOs to have access to the network. The regulators also required that after the merger, the new companies would allocate bandwidth supporting voice and data services to the MVNO at a maximum of 30% for 5 and 10 years, respectively.

4.4.2 Specific measures related to brands and promotions

In the Philippines, the regulator PNTC required that the merger maintain the Sun Cellular brand even though it was a merger of Smart and Sun. PNTC also required that the new entity maintain unlimited calling and messaging services as a choice for its service users.

In Malaysia, the MCMC required the merger applicants to sell Celcom's Yoodo sub-brand (Lennihan, 2022), and to jointly create a joint brand within two years from the merger completion.

In the US, the FCC required the merger applicants to comply with the legacy rate plan or to maintain service rates for three years after the merger, to prevent higher consumer pricing impact on the service users

4.4.3 Specific measures related to network sales roaming agreements and frequency return

Regulators in multiple countries required merger applicants to sell infrastructure such as telecommunication towers to other service providers (Norway, Malaysia, and Italy) (European Commission, 2018).

In Malaysia, the merger terms required the ownership merging of approximately 60,000 towers from the original two companies, and the potential formation of a telecommunications tower company called Edotco Group, which would become the world's fifth-largest telecommunications tower company (Abadilla, 2022).

Norwegian regulators required merger applicants to enter into roaming agreements with new MNO operators.

Regulators in other countries required merger requesters to return the spectrum to the regulators to redistribute, such as Austria, Italy, and Malaysia.

4.4.4 Specific measures related to sales and/or assignment of business merger applicants to other service providers to use distribution channels

Norwegian regulators required merger applicants to offer three retail outlets to a new service provider.

Malaysia's MCMC required the merger applicants to have another service provider use the merged company's regional distribution channel for up to three years after the merger.

4.4.5 Specific measures related to network coverage expansion

In the US, the FCC set specific measures requiring merger applicants to provide 5G coverage to 85% of the rural US population within three years of the merger, and 90% within six years. It also required that 66% of all rural areas in the US have access to speeds of 100 Mbps or higher within six years of the merger date (Federal Communications Commission, 2020).

4.5 Judgments of merger denial

Within the EU over the past 10 years, there has been only one merger that the EC denied. However, shortly after this merger denial, the EU's central court revoked the ruling. The reason for the withdrawal gave the weight of proof of the impact that would have been on the price and quality of service and the effect on the deal, which would create a significant barrier to effective competition.

5. Conclusion and suggestions

From an extensive review of the articles published from 2012 - 2022, the author discovered that of the nine countries reviewed from 2012 - 2022, most mergers reduced the total number of MNOs from 4 to 3. In only two cases (Philippines and Norway) the number of MNOs reduced to 2.

It was also well established that regulators choose to decide on operator mergers by defining specific measures for the applicants to merge, and in the vast majority of cases, it appears that regulators favor pro-mergers. One reason is that prohibiting mergers may have a greater harmful consequence than the actual outcome of the merger.

Merger approval criteria by regulators have been wide-ranging. However, there has been much focus on the promotion of MVNOs (mobile virtual network operators) and assuring they have bandwidth access to the larger and well-established MNOs (mobile network

operators). Moreover, infrastructure exchange (such as towers) is another common merger condition as well as roaming agreements and spectrum returns to the government. As in the case of the United States mega-merger of Sprint and T-Mobile, assuring rural access to advanced, expensive, and high-speed technology like 5G becomes the operator's approval bargaining chip. International operators and regulatory authorities can use this paper as a decision-making guide in assisting in their M&A decision-making.

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