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Research article

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# Transformation Toward Technology Company (Techco), a Framework for Mobile Network Operators in Iran

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## Abstract

*Sharing, outsourcing, and partnership are shown as solutions to increase efficiency. Mobile Network Operators (MNO), used to outsource some functions and make partnerships, but the sharing perspective is still not clear. This paper aims to provide a framework in which MNOs share and utilize their resources more efficiently. Qualitative research was done through the analysis of website reports, documents, and interviews to find MNOs' current and future strategic focus as well as the dimensions of a united network. The MNOs' two main strategies are enhancing core business and developing digital services. The article found an overall paradigm of the sharing resources (network and frequency) as well as some signals for business model evolution. It introduces a two-component framework in which a United Network is created to enhance core business and a new business model to develop digital services. It bolds the importance of network efficiency and the barriers, needs, and motivations of the United Network. To increase efficiency, the industry needs a coopetition framework in which a trust company that is a subsidiary of MNOs, maintains and develops a united network, and the Techcos compete to develop digital services.*

**Keywords:** Telecommunication Industry, Operational Efficiency, Business Model Innovation, Technology Company, Resource Sharing, Iran

## 1. Introduction

The telecommunication industry is undergoing significant changes due to shifts in business dynamics, increased competition, technological advancements, and the need for new business models [1]. These changes have led Mobile Network Operators (MNOs) to seek solutions that not only enhance cost efficiency but also enable them to actively participate in the digital era. The readiness of companies to adapt their operations to these changes is becoming increasingly crucial [2]. This has led to the implementation of cost-efficiency strategies, particularly in networking, where MNOs are compelled to utilize resources from competitors [3]. In addition to cost efficiency, the telecommunications market is experiencing a paradigm shift where voice, data, and communication are being offered as new forms of service [4]. This (service) shift indicates that current business models may no longer be viable and there is a need for innovative new business models. Consequently, telecom operators must continuously review their business model innovation [5].

Despite some forms of resource sharing being implemented worldwide, the creation of a centrally managed united network where MNOs' resources are shared remains largely unexplored. This research aims to address this gap by proposing a novel solution for the telecommunication industry in Iran that optimizes resource use and enables an active presence in the service era. This solution involves a partnership-based framework where MNOs share all their Radio Access Network (RAN) resources and aggregate frequencies. This framework can be applied not only in Iran but also in similar countries or even geographically less extensive neighboring countries. The proposed framework divides the MNOs' current business into two components: one aimed at achieving cost efficiency through the establishment of a trust company that manages a united network, and the other aimed at meeting the evolutionary business model requirements for entering the service era through competition in the development of new services. This would transform MNOs into Technology Companies (Techcos). More details provided in section 5.3.

### ● This Research Seeks to Answer Two Main Questions

How can Iranian MNOs make their resources more efficient?

What evolutionary business model would be compatible with today's industry?

The rest of the article is organized as follows. In section 2, the related literature is precisely reviewed to provide readers with needed insight into how MNOs boost efficiency, the importance of it, and a business model history in the industry. In section 3, the

research methodology is presented. In section 4, we focused on MNOs, and the results extracted from reviews, documents, reports, websites, and interviews are presented. In section 5, the major findings and the needs for the evolutionary business model will be discussed, and the framework is presented. Finally, in section 6 and 7, the conclusion and acknowledgements will be presented.

## 2. Literature Review

The telecommunication industry has been undergoing significant changes and the need for new business models. These changes have led Mobile Network Operators (MNOs) to seek solutions that not only enhance cost efficiency but also enable them to actively participate in the service era.

### 2.1 Efficiency Boosting Strategies in Telecom

The telecommunication industry has always been focused on enhancing efficiency, particularly in network and operation management, which constitute the most significant part of a Mobile Network Operator's (MNO) cost structure (see Figure 3). Given the crucial importance of Radio Access Network (RAN) and frequency resources in providing network capacity, three strategies have been implemented to optimize their utilization. These strategies include outsourcing, strategic partnerships, and resource sharing. Outsourcing, primarily driven by the need to control operational expenses, has been a prevalent strategy among telecom operators [1]. With the advent of technological changes such as 5G, the need for efficiency has doubled, prompting a shift towards functional split of network domains for flexible and cost-efficient network operation [6]. This approach allows operators to focus on their core competencies while outsourcing other functions or services. A prime example of successful outsourcing is Indus Towers Limited in India, one of the world's largest integrated telecommunication networks [7]. Formed by the merger of Bharti Infratel Limited and Indus Towers, it boasts over 189,392 towers and 339,435 co-locations. This large-scale outsourcing of network infrastructure management has significantly boosted efficiency in the telecom sector [1].

Strategic partnerships have transformed client-vendor relationships into mutually beneficial collaborations [1]. The partnership, which is considered one of the six core capabilities needed to create value, are critical for success in an ecosystem [8]. Spectrum scarcity has been a primary driver for such collaboration among operators [9]. With the advent of 5G, business models are expected to center around creating and capturing value through multi-partnerships within collaborative value ecosystems [10]. These collaborations have enabled MNOs to develop new ecosystems, services, business models, and sources of cost savings. While outsourcing and partnerships are common in the industry, resource sharing is a relatively unexplored strategy that involves sharing MNOs' sensitive resources. The sharing economy is about creating and accessing underutilized resources for more efficient use [11]. It involves collaborative consumption, acquisition and allocation of resources, and sharing idle resources (see figure 1) [12-14].

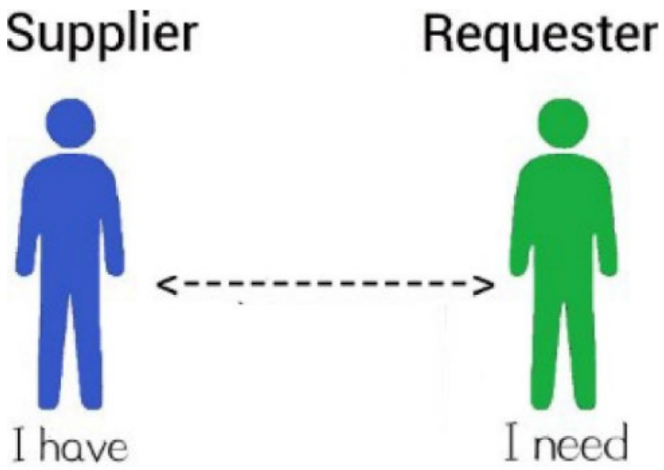



**Figure 1: The Simple Concept of the Sharing Economy [14]**

Historically, resource sharing has been implemented to reduce costs. For instance, Telefonica, France Telecom/Orange, and Telia formed two infrastructure-sharing companies in the early 2000s to reduce the costs of their 3G licenses nationwide [15]. Recently, Spectrum sharing has become a key asset to meet 5G needs due to insufficient spectrum to support all 5G use cases, the speed needed to suit 5G demands, and better use of underused spectrum resources for promoting efficient bandwidth utilization [16]. The GSMA (Global System for Mobile Communications Association) reported five types of sharing (see table 1) approved in 16 countries and even mandatory in seven countries [17]. Among these types of sharing, full RAN sharing (figure 2) is the most efficient type and could save up to 50% of the costs [18]. Taiwan Mobile is also actively involved in implementing the sustainable development principles of 5G frequency sharing, network sharing, and co-construction [19]. However, despite these advancements in resource sharing, centrally managed united networks are still largely unexplored.

| | Sharing Type | What shared | Remarks |
|---|---|---|---|
| Passive | Site | Co-location of sites; Operators share the same physical compound but install separate site masts, antennas, cabinets, and backhaul. | The easiest and most commonly |
| | Mast (Tower) | Sharing the same mast, antenna frame, or rooftop | Each operator will install their antennas onto a shared physical mast or other structure |
| Active | RAN | All access network equipment, including the antenna, mast, and backhaul equipment | MNOs continue to keep separate logical networks and spectrum |
| | Core Network | Transmission ring, Switching center, Billing platform, Value Added Systems | To reduce costs in operations and maintenance |
| | Network (Roaming) | Just an agreement to carry traffic from one operator's subscriber onto another operator's network | May not classify as a form of sharing since nothing is shared |

**Table 1: Types of Sharing. Source [17]**

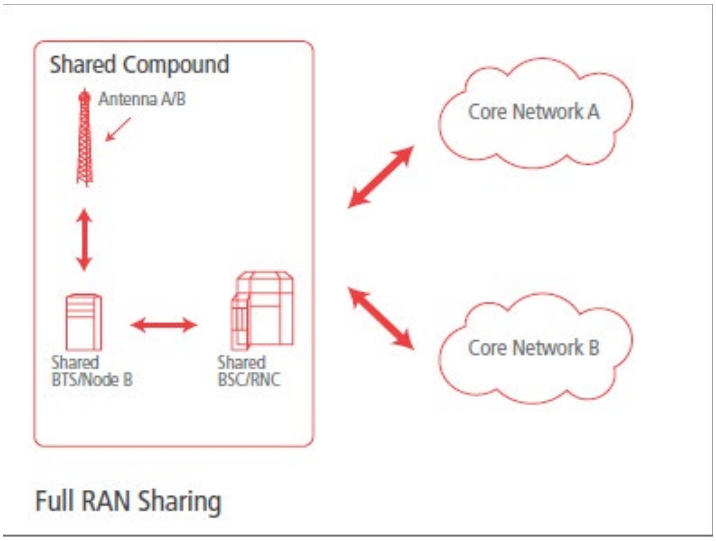



**Figure 2: Full RAN Sharing. Source [17]**

[20] has also reported different experiences of sharing. In Spain and the United Kingdom, an agreement between Orange and Vodafone to share infrastructure reportedly reduced capital and operating costs by up to 30 percent and the number of sites by around 40 percent. In Brazil, all operators in an area are allowed to use each other's networks to provide services due to regulatory intent for nationwide access to wireless broadband services. Similarly, in Jordan, all mobile telephony licensees are required to provide infrastructure sharing and collocation to other licensees, subject to availability [20].

Regulators play a crucial role in enabling resource sharing in the telecom industry. Research organizations and regulators worldwide, such as the CSIR, FCC of the USA, Ofcom of the UK, and ICASA of South Africa, are promoting innovative spectrum-sharing technologies to enhance the effective utilization of national spectrum resources [21]. While outsourcing and strategic partnerships are common strategies for boosting efficiency in the telecom industry, resource sharing is a relatively promising strategy.

## 2.2. Evolution of Telecom Business Models

Most global companies are now actively considering ecosystem business models due to their potential for value generation: growing the core business and generating revenues from new products and services [22]. In the telecom industry, operators must not only provide connectivity but also introduce other application services [19]. The disruption in the industry over recent years has shown that MNOs need to explore new paths to grow and play a more valuable role in consumers' everyday lives [23].

Technological change has been a primary driver of business model innovation in the telecom industry [24]. The introduction of new network technologies has often corresponded with significant evolutions in business models [25]. In 2011, [26] envisioned a separation of the industry into service providers (ServCo) and network providers (NetCo) to release hidden value. A few years later, [27] reviewed the history of business model evolutions and highlighted the changes and limitations that are summarized in table 2. With the advent of 5G, this business model change is becoming a reality [24]. 5G provides a highly flexible and scalable platform that supports new business models and revenue streams while reducing operational costs [28].

| No | Business Model | Reason/limitation |
|---|---|---|
| 1 | Provision of voice services | |
| 2 | Broadband Business Model | Provision of services with large capacity and high speed |
| 3 | Target Expansion Model | • Utilizing available capacity<br>• Focus on certain customers |
| 4 | Outsourcing Managed Services Model | • Increase user penetration<br>(Basically, collaboration with third parties for building and operating infrastructure to strengthen the sales and marketing of service) |
| 5 | Mobile Virtual Network Operator (MVNO) Model | • Very high costs to build networks<br>• To be able to expand the added value services<br>• Using the network effectively and efficiently<br>(Conducted between operators with certain business entities) |

**Table 2: The History of MNOs' Business Model Evolution [27]**

## 3. Methodology

In order to find the data needed to answer the research questions, a qualitative research approach was conducted and data, both primary and secondary, was gathered from multiple sources. The use of different sources of qualitative data was applied to increase confidence in the findings [29].

### 3.1. Secondary Data Collection

To answer the research questions, relevant literatures, including Iranian sources were reviewed. To enhance secondary data, the MNOs' and the regulator's reports, documents, and websites were investigated too. The reports and documents were reviewed to find the MNOs' current market share and any considerable changes in recent years, their collaboration background, any evidence about resource scarcity and needs for frequency and network coverage. Organizational and institutional documents have been a staple in qualitative research for many years [30]. The aim was also to figure out their past and current strategies. In an attempt to analyze the cost structure of MNOs, the publicly published financial statements were scrutinized too. Of the three operators, we reviewed the internal reports of only one MNO because it is the initiator of sharing and the status of the industry, in terms of sharing, can be fully tracked in its reports.

Then, besides the regulator and MNOs' websites, some online news and research websites and international online reports were also sought. Documents obtained from official webpages, blogs, and reports were considered principal sources of relevant information, as were online newspapers and magazines that presented quotes and/or interviews [31]. There was much news about their core and new services and also many interviews done by the MNOs' managers that show their current strategic focus.

Other visited websites are as follows: the ITU (International Telecommunication Union) (www.itu.int), GSMA (www.gsma.com), (www.mckinsey.com), (www.accenture.com) whose reports and insights, were addressed in section 2 previously. The MTN Group website (www.mtn.com) was checked to figure out the financial statement of its subsidiary in Iran which will be addressed in the reports and document's part. The database of the Securities and Exchange Organization of Iran (www.codal.ir) is also examined which aims to collect the companies' financial reports. (www.donya-e-eqtesad.com), (www.irna.ir), (www.ilna.ir) which are news agencies' websites to reflect MD's interviews, and (www.rasta360.ir) which provides Iran startup ecosystem reports were investigated websites too. To benchmark one of the world's largest telecom integrated networks, (www.industowers.com) is also visited.

### 3.2. Primary Data Collection

Ten semi-structured interviews were conducted to reassure MNOs' past and current strategies, extract future/possible strategies, and characterize different dimensions of the united network in terms of barriers and concerns and to see whether or not there is a perspective to extend collaboration. Semi-structured interviews are a qualitative approach to collect data [32]. The interview was prepared based on [31] protocols and included open-ended questions. Often, documentary evidence is combined with data from interviews and observation to minimize bias and establish credibility [30]. The interviews were digitally recorded and repeated until the data were saturated. The concept of data saturation is defined as information redundancy or the point at which no new themes or codes emerge from data [33].

In order to extract comprehensible knowledge from interview data, grounded theory was used as it lays the foundation for one of the most prominent and influential qualitative research methodologies in the social sciences and beyond [34].

#### 3.2.1. Participant and Context

The ten interviewees were selected based on their experience in the industry (from 4 to 15 years) and their closeness to the subject. Eight interviewees were working in the Iranian MNOs, one in the Communication Regulatory Authority (CRA) and the other was the former CTO in an MVNO. These experts were selected based on the authors' familiarity and also the snowball technique. Snowball sampling is one of the most popular methods of sampling in qualitative research, central to which are the characteristics of networking and referral [35].

The questions were ordered to find out the current and future strategies of MNOs as well as the impact of sharing resources on efficiency and barriers to implementing it. The questions were all at the industry level and no MNO name or brand was included in order to minimize the impact of potential biases. In order to let them be easy to answer, the interviewees weren't interrupted until they were done. Only some follow-up questions were asked if the interview direction was diverted or if the comments needed more elaboration. Researchers need to ask pertinent follow-up questions that elaborate on more general knowledge [32]. On average, each interview took about 45 minutes.

### 3.2.2. Tool and Validation

The interviews were recorded, typed, read, and interpreted. Then the scripts were entered into the MAXQDA software and categorized in order to extract the themes. MAXQDA has several capabilities for analysis visualization [36]. The results reviewed with two interviewees and two more experts in the fields. Member checking and peer debriefing are two methods to assure the research validity. Member checking is the process where the researcher checks the validity of the findings by getting them reviewed by the participants and Peer debriefing in the form of peer reviews is also another method of establishing the credibility of the study [37].

## 4. Results

### 4.1. Result from Secondary Data

### 4.1.1. Sharing Economy in the Initial Stage

The experiences of sharing in different countries and MNOs emerged from the data. The largest was in India where up to six operators share a single site [17] and the most active MNO is Taiwan Mobile which made a partnership with other players, implementing the sustainable development spirit of 5G frequency sharing, network sharing, and co-construction [19]. The data showed that full RAN sharing is the most efficient type and could save up to 50% of the costs [18].

In Iran, Mobile Network Operators (MNOs) initiated site/RAN sharing a few years ago. As of now, nearly half of the subscribers from one MNO are accommodated within the networks of other MNOs. However, a significant amount of resources remain unshared. The total number of shared sites does not even constitute 1% of the total, and frequency allocation is still a subject of negotiation among MNOs and between MNOs and the CRA.

### 4.1.2. 5G, a Trigger for Efficiency, Sharing and Business Model Change

Network efficiency, especially in the 5G era, is the main reason to increase collaborations among MNOs. Insufficient spectrum to support all 5G use, the speed needed to suit 5G demands, and better use of underused spectrum resources for promoting efficient bandwidth utilization were highlighted as key drivers for collaboration. Network expenses are found to be the most important parts of an MNO cost. A glance at the financial reports indicates that network-related costs contribute a considerable part of MNO total costs (figure 3). These changes in the business environment such as the new paradigm of basic services and technological change are the main drivers of business model innovation in the telecommunications industry. MNOs are transforming to Techco.

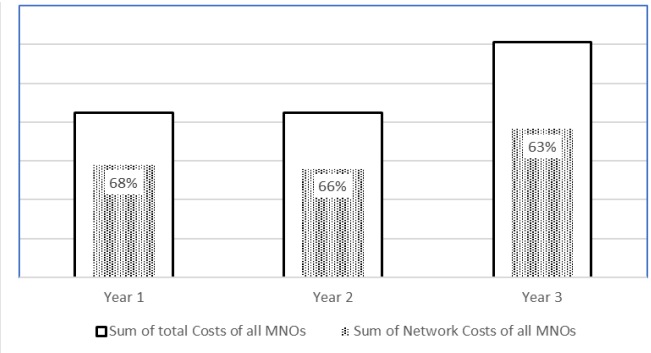



**Figure 3: Sum of all MNOs' Costs vs. the Sum of their Network Costs. Sources: [38]and[39]**

### 4.2 MNOs' Strategies

The analysis showed that MNOs are concentrating on two strategies: New/Digital Services and Enhancing Core Business. The objective of Iranian MNOs is to develop new services that align with the digital lifestyle of subscribers and to establish a significant presence in the country's digital market [40]. An examination of Iran's startup ecosystem map and its key players, could provide valuable insights into MNOs' strategies in digital services [41]. Beyond their basic services, they (only two of them) focus on developing a robust portfolio of digital services. These include messenger, digital entertainment and content, online TV, online psychology, dress shop platform, online shop, online taxi, online hoteling\Tourism, online shop, online food delivery, online courier, application shop, FinTech, accelerator, home maintenance platform, social media, cargo transportation, gaming services, artificial intelligence, digital marketing, online automobile sale platform, online shop, online tourism, home rent, online education, e-commerce and rehabilitation & Health.

## 5. Results from Primary Data

The analysis of primary data from interviews revealed two main themes

- The dimensions of a sharing resource (the united network)
- Current strategic focuses and probable ones in the future

The dimensions of sharing resources (see Figure 4) are classified into needs, barriers, and motivations. Sharing resources to create a united network in the country needs the active role of the regulator (14) to support a robust contract and mechanism (8) as well as

new equipment and a strong advisor (4). Some difficulties may hinder the sharing happened, such as technical complexity (19) in network planning, jeopardizing MNO identity and independency (18), especially in their resource control, some risks (12) for the core business, security, network stability, and finally, the subsidiary commitment (6) to supply the best quality neutrally. Despite these barriers, there are strong motivations that preponderate and lead them to share their resources such as an increase in the rate of efficiency (101), mostly due to cost reduction, network quality (18), and positive consequences for the country's macro-economy (15).

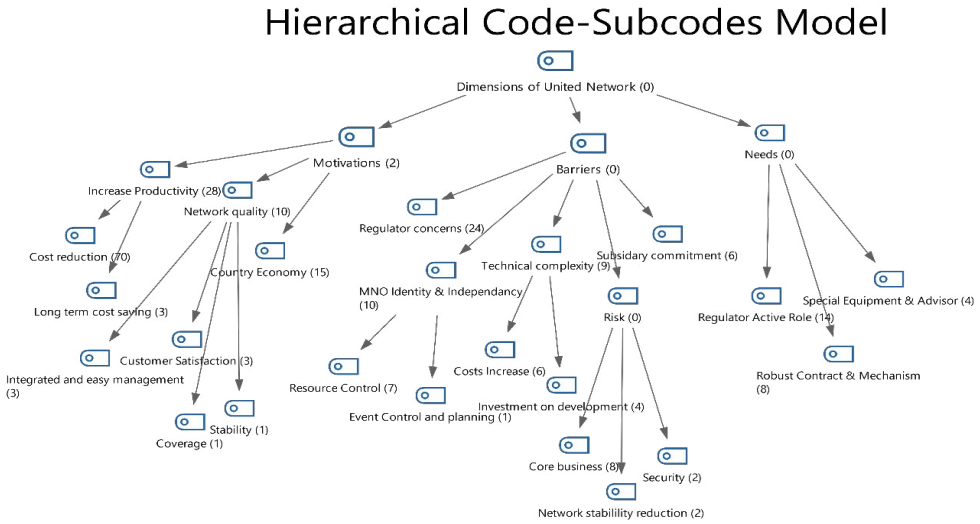



**Figure 4: The Dimensions of a United Network (Source: Research Findings)**

Due to external forces and resource needs, the interviewees believed that the MNOs already started to collaborate (10) but meanwhile, they previously focused on their core business (10) i.e., market penetration and network operation. But while enhancing these core businesses (20), they are currently trying to develop new services (19) and implementing conservation (7) and coopetition (5) strategies. They strongly believe that the collaboration perspective is hopeful. They mentioned some possible strategies (54) in which some believed that the MNOs will continue (29) to work together in the future if they could find a suitable solution for their concerns especially profitability, the level of sharing (site, RAN or network core), and the risks in the core business (customer database, charging systems). The interviewees strongly recommended the sharing in frequency and RAN levels. They were concerned if the network core was shared, the independency and identity of an MNO would be under question and that, the MNOs do not have any control over their business and customer database. More details are shown in Figure 5.

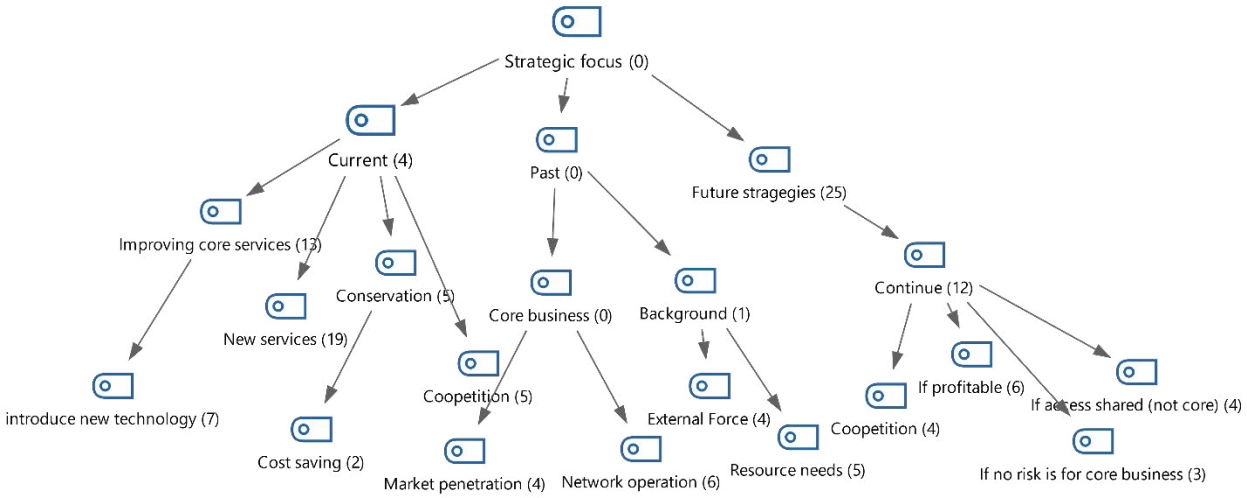



**Figure 5: The Past, Current, and Future Strategic Focus of MNOs (Source: Research Findings)**

## 6. Discussion

### 6.1 Context

Iran's mature telecommunication market, with three Mobile Network Operators (MNOs) and over 145 million subscribers, is transitioning into the 5G era [42]. The market structure, characterized by hyper-competition and oligopoly, allows for one of the lowest service tariffs. Due to certain political and economic factors in the macro-environment, currency outflow is heavily restricted, limiting access to equipment, hardware, and international know-how. The Communications Regulatory Authority (CRA), is tasked with executing governmental powers as well as supervisory and executive powers to facilitate a competitive telecommunication market and ensure service quality. The CRA oversees policy enforcement and rule implementation, issuing all relevant permissions and licenses. As stated on the CRA reports, the market shares of MNOs have remained relatively stable in recent years (see Figure 6).

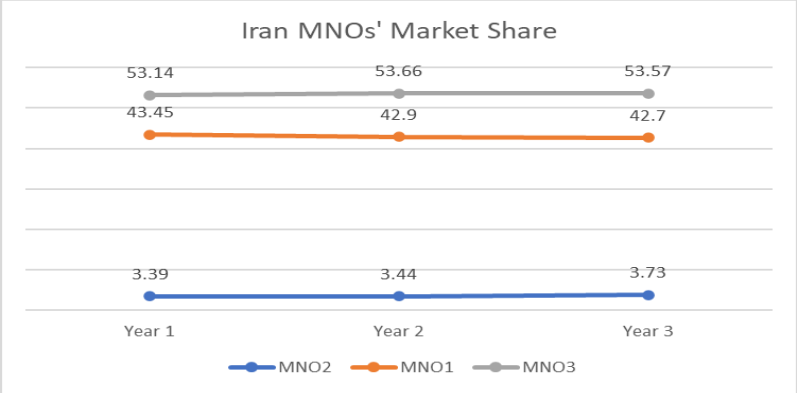



**Figure 6: The Iranian MNO Market Share: [42]**

In this low-growth market with a penetration rate of 168%, MNOs have recently introduced initiatives that deviate somewhat from their core business operations such as voice, SMS, and data services [42]. The scarcity of resources (network and frequency) has become more pronounced recently, with network costs accounting for the largest portion of financial statements (ranging from 63% to 68% of total costs in the last three years) (see Figure 3). To better manage resources, MCI, the market leader, has outsourced its network management to NAK (an ICT managed service company). A few years ago, the first phase of the national roaming policy was implemented by the regulator. This marked their initial experience with cooperation and resource sharing. Since then, due to the need for improved service quality, there has been a growing trend towards sharing more resources. However, progress in this area has been slow. Even with this level of sharing, several benefits have been observed

• Partial and temporary resolution of MNOs' coverage and frequency issues

• 65% of traffic generated on an MNO's network comes from 50% of subscribers due to a site redeployment strategy that allows MNOs to relocate underutilized sites to denser areas

• Inferred reduction in transaction costs (power, location rent, permissions)

• Improved service quality due to efficient frequency allocation

Given these points and the context of Iran's telecom industry, it is believed that a restructuring of Iran's telecommunication industry is necessary. Iranian MNOs are grappling with either network quality or coverage issues. In other words, there are underutilized resources that could be more efficiently utilized through sharing. Specifically, in Iran's case, there is an urgent need for Radio Access Network (RAN) coverage on one side due to underutilized frequency resources. On the other side, there is a strong need for frequency while RAN is not fully utilized. Therefore, the "I have, I need" concept introduced by can be customized for Iranian MNOs as shown in Figure 7 [14].

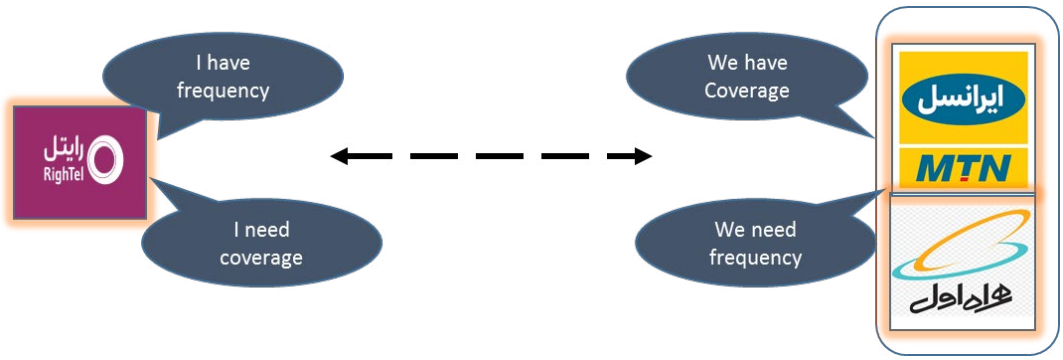



**Figure 7: The Concept of "I have, I need" in Iran Telecom (Source: Research Findings)**

### 6.2 Major Findings

This article presents three significant findings:

• Operators are implementing sharing, outsourcing, and partnership strategies to achieve cost efficiency. While outsourcing and partnership have been in place for some time, resource sharing is still in its early stages. Resource sharing among MNOs could lead to increased connection time for users, efficient processes, intelligent traffic control, an optimized network, simplified and cost-effective distribution, more control over operating expenses (OPEX), and improved capacity and coverage through spectrum provisioning [43]. Despite the proven profitability of sharing, progress has been slow, but the intention towards it, is tangible. This could be due to the fact that unlike outsourcing and partnerships that usually involve non-competitors, sharing agreements need to be made with competitors. The article attempts to elaborate on the dimensions of sharing to help accelerate its progress. It appears that the industry requires a more active role from the regulator and a more constructive atmosphere of collaboration among MNOs to set a perspective for sharing because it is beneficial not only for MNOs' efficiency but also for the industry as a whole. Moreover, the current level of sharing is insufficient for future needs and use cases, especially for establishing a united network.

• The sites and frequency have been the focus of sharing. Network operation costs are so substantial that many researchers focus on improving its efficiency. Network costs and cost efficiency are crucial factors for MNOs to remain profitable and sustainable in the long run. In countries like Iran with large geographic areas or challenging terrain, MNOs need to invest heavily in infrastructure. In addition to capital expenditures, MNOs also need to pay ongoing operating costs such as energy and maintenance costs to keep their networks running. That's why this part of the MNOs' cost has always been one of the recurring subjects of cost-efficiency research. By sharing network infrastructure with other operators, MNOs can reduce their capital and operating costs while still providing good service to their customers.

• 5G technology has the potential to support new business models and revenue streams. In Iran, the evolution of MNOs' business models is very plausible since resource needs are a major reason for sharing, and 5G technology has recently been introduced. The new paradigm that the telecommunication market is experiencing in which voice, data, and communication are being used in a new form of service, along with the need for cost efficiency, digital service development, the tendency towards more sharing, and the introduction of 5G technology in the Iranian telecom industry have the potential to support new business models and revenue streams [4]. This could also lead to greater cooperation and collaboration between MNOs which could benefit the industry as a whole. Therefore, this article adds a new business model to the list mentioned by in section 2.2 (Table 2) called the Techco business model (see Table 3) [27].

| No | Business Model | Reason/limitation | Remarks |
|---|---|---|---|
| 6 | Technology Company (Techco) | Resource scarcity<br>New technology introduction<br>Operation efficiency | MNOs share the frequencies and RAN and create a united network so they can professionally do both network-related affairs and service-related affairs |

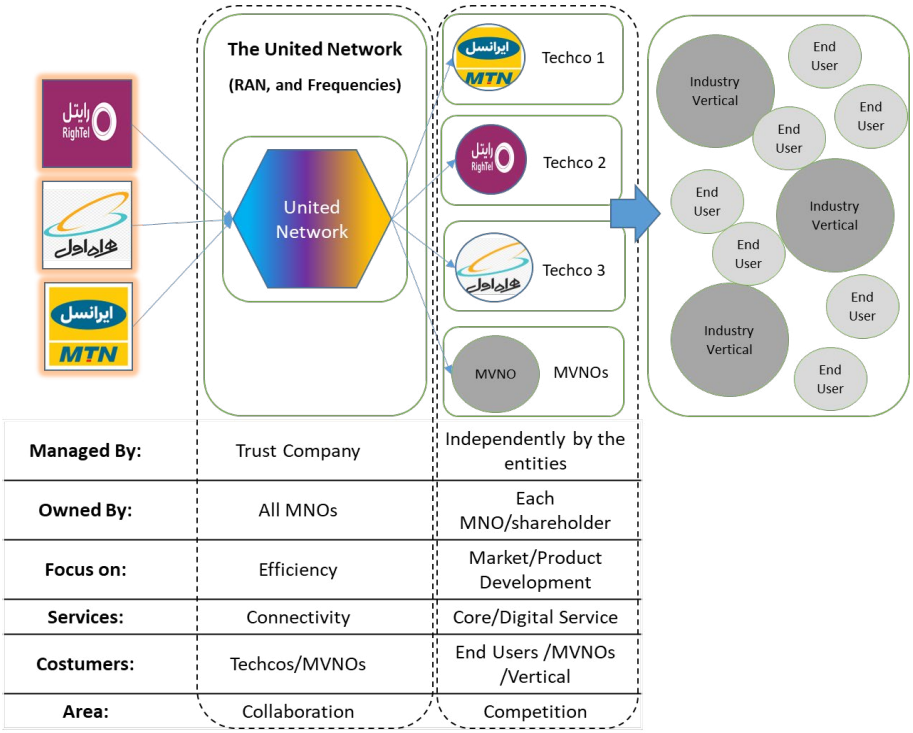
**Table 3: The new Evolutionary Business Models. Source: (Research Findings)**

### 6.3 The Proposed Framework

This article proposes a framework in which an operator can focus efficiently on connectivity business, and as a Technology Company (Techco) concentrating specifically on digital service development. This allows them to maintain their brands, customer base, and brand identity while sharing resources. The article suggests they retain a supervisory role in the former model and focus on new markets and competition with other players in the latter model. In this framework, a united network, comprising all MNOs' frequencies and RAN, is created and managed centrally by a subsidiary trust company. The proposed framework consists of two interrelated businesses:

• One is the Connectivity Business, that believed could result in efficient processes, an optimized network, cost-effective distribution, more control over OPEX, better capacity and coverage through spectrum provisioning, etc [43]. This business will be managed by a subsidiary trust company that can be a joint venture owned and supervised by all MNOs. It then manages a united network, including all network resources (sites and RAN see Figure 2) available in the industry. This way, resources can be used much more efficiently and could save up to 50% of costs [18]. In this business model, the customers are any clients that demand connectivity including Techcos and MVNOs. This is the collaboration area.

• Two, the Techco business model or the Innovative one focuses most of its energy and capabilities on R&D, sales and marketing of new use cases of the digital service era along with basic services (voice, SMS, data). The Techcos are directly managed to align with their subscribers' digital lifestyle which was the goal of the MDs. They sell their products to end users, MVNOs and any industry verticals that demand digital services. This is the competition area. In short, MNOs form a strategic partnership in which they share all their resources (except core) and outsource it to a subsidiary trust company. In this framework, presented in Figure 8, a more serious coopetition atmosphere will be shaped. Coopetition is where players cooperate and compete at the same time [3].




| | | |
|---|---|---|
| **Managed By:** | Trust Company | Independently by the entities |
| **Owned By:** | All MNOs | Each MNO/shareholder |
| **Focus on:** | Efficiency | Market/Product Development |
| **Services:** | Connectivity | Core/Digital Service |
| **Costumers:** | Techcos/MVNOs | End Users /MVNOs /Vertical |
| **Area:** | Collaboration | Competition |

**Figure 8: The Proposed Sharing Framework. Source: (Research Findings)**

The trust company would play a critical role in ensuring the efficiency and security of all MNOs' core businesses. The trust company would be responsible for managing the united network resources and frequencies, ensuring equal access for all MNOs. This would help ensure that no single MNO has an unfair advantage over others and that all MNOs can participate in the network-sharing arrangement on equal terms. The trust company in our framework has the following rough characteristics:

- It's a subsidiary of the three MNOs and is owned by them
- Its mission is solely to provide professional access layer services to first MNOs and then other clients (not end users)
- Each operator's share is determined in proportion to the value of the shared resources

## 7. Conclusion

To reduce costs, MNOs share resources, outsource some functions, and form strategic partnerships. However, resource sharing is not as mature as the other strategies. Based on the concept of the sharing economy, this article concludes that underutilized resources among MNOs have significant potential for sharing. Resource sharing is a promising strategy to address the growing demand for digital services by optimizing capacity and reducing network deployment and operation costs. The lack of an agreed perspective on sharing and the passive role of the regulator have slowed the progress of sharing. Through literature reviews, reports, document analysis, and interviews, this article investigates the creation of a united network in Iran and identifies needs, barriers, motivations, and plausible future strategies for MNOs in the digital service era. The prominent intentions are core service enhancement and digital service development within a coopetition atmosphere. The article also reviewed the evolutions in the MNOs' business models in the world and found that similar signals such as needs for resources, a tendency toward more sharing and new technology introduction have been recognizable in Iran.

Given the importance of network cost and the need to increase its efficiency, this article presents a novel perspective of collaboration in Iran's telecommunication industry and suggests a framework in which the MNOs business is divided into two components. In the first, they collaborate to create a united network and delegate the network affairs to a proficient trust company and in the second, they compete in the development of new digital services. However, this framework cannot be implemented overnight. For further studies, technical considerations need to be investigated more. Also, the financial structure and valuation of the main resources can be attractive for researchers. The mobile operators were studied in this research but many similar resources in fixed operators could be subjects of further research too.

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