Impact of regulation on future scenarios of Israeli telecommunications

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Ministry of Communications
Israel
Tel Aviv
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Agenda

- Introduction
- Impact of telecommunications on the Israeli economy
- Future scenarios for the Israeli telecommunications industry
- Infrastructure sharing impacting future scenarios
- Conclusions
The objective of this meeting is to share with you our perspectives of future evolution of the Israel telecommunications sector

- Estimates of potential economic impact of initiatives in the Israeli telecommunications sector
- Potential industry competitive scenarios and their impact on consumers and the economy
- Regulatory initiatives that will stimulate the development of competition while ensuring sustainability of the industry
- Discuss potential opportunities to collaborate
Agenda

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The Israeli telecommunications industry represents a substantial contribution to the country’s economy.

**ECONOMIC CONTRIBUTION OF THE ISRAELI TELECOMMUNICATIONS INDUSTRY**

- **Direct contribution**
  - **Operators**
    - 6 wireline carriers
    - 4 wireless carriers
    - 1 cable MSO
    - 50+ ISPs
  - **Suppliers**
    - 158 electronics and hardware firms
    - 87 software houses

- **Indirect contribution**
  - **GDP**
    - $ 7.27 B (4% of GDP)
  - **Direct Employment**
    - 36,200 jobs
  - **Taxes**
  - **Indirect employment**
    - 148,000 jobs
  - **Competitiveness of Economy**
    - Economic growth
    - Innovation

**Sources:** Minister of Communications; Ministry of Foreign Affairs
There is substantial evidence that telecommunications contribute to economic growth

<table>
<thead>
<tr>
<th>IMPACT</th>
<th>EXAMPLES OF BENEFIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Productivity</td>
<td>● Labor productivity in ICT-intensive and ICT-non intensive sectors&lt;br&gt;● Productivity improvement in distribution processes and supply chain management</td>
</tr>
<tr>
<td>Value chain reconfiguration and location of firms</td>
<td>● Relocation of firms to optimize production processes as a function of availability of high capacity telecommunications services and quality of services (influenced by telecommunications such as hospitals, schools, and public services)</td>
</tr>
<tr>
<td>Employment</td>
<td>● Creation of jobs as a result of firm relocation in search of labor cost arbitrage&lt;br&gt;● Self employment driven by residential telecommunications services&lt;br&gt;● Employment generated by manufacturing and deployment of telecommunications equipment&lt;br&gt;● Employment generation driven by tele-commuting</td>
</tr>
<tr>
<td>Economic growth</td>
<td>● Strengthening of economic activity of industries with high transaction costs (commerce, financial services, etc.)&lt;br&gt;● Consumer surplus generated by new telecommunications services, lower prices and a reduction in travel time</td>
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</tbody>
</table>
In particular, broadband deployment has a significant potential for creating jobs.

### EMPLOYMENT CREATION OF BROADBAND STIMULUS PROGRAMS

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>STIMULUS INVESTMENT (USD billion)</th>
<th>CONSTRUCTION</th>
<th>EXTERNALITIES</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNITED STATES</td>
<td>$ 6,390</td>
<td>128,000</td>
<td>136,000</td>
<td>264,000</td>
</tr>
<tr>
<td>SWITZERLAND</td>
<td>~$ 10,000</td>
<td>~110,000</td>
<td></td>
<td>110,000+</td>
</tr>
<tr>
<td>GERMANY</td>
<td>$ 47,660</td>
<td>541,000</td>
<td>427,000</td>
<td>968,000</td>
</tr>
<tr>
<td>UNITED KINGDOM</td>
<td>$ 7,463</td>
<td>211,000</td>
<td>69,500</td>
<td>280,500</td>
</tr>
<tr>
<td>AUSTRALIA</td>
<td>$ 31,340</td>
<td></td>
<td></td>
<td>~200,000</td>
</tr>
</tbody>
</table>

Broadband is being considered by numerous countries as key platform to affect economic growth

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NATIONAL BROADBAND PLAN</th>
<th>KEYNESIAN STIMULUS PLAN</th>
<th>GOVERNMENT INTERVENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td></td>
<td>• Grants of $7.2 B to deploy broadband in unserved and underserved areas</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>• Nationwide service of at least 12 Mbps</td>
<td></td>
<td>• Government commits S$14.16B to deploy and operate nationwide broadband network</td>
</tr>
<tr>
<td>Singapore</td>
<td>• Stimulate technological innovation and enhance national resilience by providing 1 Gbps access</td>
<td>• Spur economic growth</td>
<td>• Government invests up to S$1B to improve project’s business case and fulfill policy objectives</td>
</tr>
<tr>
<td>Germany</td>
<td>• Have universal broadband access (1 Mbps) no later than by the end of 2010 and provide to 75 % of households access to at least 50Mbps by 2014</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td>• By 2020 provide 100 Mbps to 90% of households and businesses</td>
<td></td>
<td>• State-owned fiber backbone combined with municipal networks</td>
</tr>
<tr>
<td>Brazil</td>
<td>• Extend broadband service to unserved areas and increase penetration in urban areas</td>
<td></td>
<td>• State-owned fiber backbone operating also as retailer of last resort</td>
</tr>
<tr>
<td>Portugal</td>
<td></td>
<td>• Government announced an E 800 m credit line for the roll-out of NGAN as part of a 2.18-billion-euro plan to boost the country’s economy</td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td></td>
<td>• The government will invest 322 million in a National Broadband Scheme aimed at completing country coverage</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>• Four programs to promote broadband development resulting in an overall investment of C$ 300 million</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td></td>
<td>• Fund 1/3 of NGN roll-out</td>
<td></td>
</tr>
<tr>
<td>New Zealand</td>
<td></td>
<td>• Government investment to boost fiber deployment</td>
<td></td>
</tr>
</tbody>
</table>
The international broadband experience is applicable to the Israel environment along four dimensions

- At 99% household coverage of competing broadband technologies, Israel does not have a supply gap
- However, a demand gap still exists; 17% of households could have broadband but do not (issue of digital inclusion)
- Furthermore, the average download speeds could potentially become an obstacle in stimulating usage leading to economic impact (innovation, productivity, eco-system impact)
- Finally, as a corollary, there appears to be the potential for an NGN national program that could act as an economic stimulus
From a supply standpoint, there is a little room to improve the Israeli broadband penetration, which stands at the top of world performance.
However, emphasis on broadband demand could help reduce the demand gap.

### ISRAELI HOUSEHOLDS PASSED/CONNECTED BY BROADBAND

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>COVERAGE (thousands)</th>
<th>SUBSCRIBERS (thousands)</th>
<th>CONNECTED/PASSED IN %</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSL</td>
<td>2,031</td>
<td>1,005</td>
<td>48.3</td>
</tr>
<tr>
<td>Cable Modem</td>
<td>2,031</td>
<td>683</td>
<td>33.5</td>
</tr>
<tr>
<td>Total (assuming overbuilds)</td>
<td>2,031</td>
<td>1,688</td>
<td>83%</td>
</tr>
</tbody>
</table>

Sources: MoC; Government statistics

### PROGRAMS FOR ADDRESSING THE BROADBAND DEMAND GAP

- Leverage public computer centers (e.g. libraries, schools) to foster consumer adoption (computer literacy training, technical support)
- Subsidize purchasing of computers for low income households
- Aggregate pockets of demand at the community level (chambers of commerce, civil organizations, affinity groups) to generate appropriate service offers negotiated with ISPs
- Develop social networks to share approaches and best practices
- Provide subsidized consulting services to SME managers to help them leverage broadband for new process innovation (supply chain, distribution)

### ISRAEL DEMAND GAP: 17%

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>HOUSEHOLDS SERVED</th>
<th>HOUSEHOLDS CONNECTED</th>
<th>DEMAND GAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>89 %</td>
<td>69 %</td>
<td>20 %</td>
</tr>
<tr>
<td>Denmark</td>
<td>96 %</td>
<td>76 %</td>
<td>20 %</td>
</tr>
<tr>
<td>Germany</td>
<td>98 %</td>
<td>58 %</td>
<td>40 %</td>
</tr>
<tr>
<td>Korea</td>
<td>100%</td>
<td>93 %</td>
<td>7 %</td>
</tr>
<tr>
<td>Sweden</td>
<td>100 %</td>
<td>89 %</td>
<td>11 %</td>
</tr>
<tr>
<td>US</td>
<td>92 %</td>
<td>61 %</td>
<td>31 %</td>
</tr>
</tbody>
</table>

Sources: EU; FCC; BMWi; OECD; PTS; analysis by the author
In addition, we believe that faster broadband download speeds and improved QOS could enhance economic output.

Faster speeds improve productivity of knowledge workers

<table>
<thead>
<tr>
<th>Application</th>
<th>Download speeds</th>
<th>500 Kbps</th>
<th>5 Mbps</th>
<th>50 Mbps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google home page</td>
<td></td>
<td>0.3 sec</td>
<td>0.03 sec</td>
<td>0.003 sec</td>
</tr>
<tr>
<td>10 Mbs worksheet</td>
<td></td>
<td>150 sec</td>
<td>16 sec</td>
<td>1.6 sec</td>
</tr>
<tr>
<td>High quality videostreaming</td>
<td>Very low resolution</td>
<td>Medium resolution</td>
<td>High resolution</td>
<td></td>
</tr>
</tbody>
</table>

Big impact is achieved when transitioning from dial-up to broadband...

...But faster speeds could have an impact on innovation
A radical NGN program could have a potential for generating jobs and increasing positive externalities of broadband

**ISRAEL: APPROXIMATE ESTIMATE OF EMPLOYMENT IMPACT OF NGN PLAN**

**Goal:** Mass deployment of NGN
- Comprises FTTH and DOCSIS 3.0

**Investment in NGN infrastructure**
- 500,000 FTTH lines ($1,725/line)
- 350,000 DOCSIS 3.0 ($600/line)
- 100,000 VDSL ($450/line)

**Estimated Investment:** $1,118 million
- FTTH: $862.5 mm
- DOCSIS 3.0: 210 mm
- VDSL: 45 mm

**Raise download speeds**

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>2 MBs</td>
<td></td>
</tr>
<tr>
<td>1.5 MBs</td>
<td>60 %</td>
<td>10 %</td>
</tr>
<tr>
<td>2-3 MBs</td>
<td>30 %</td>
<td></td>
</tr>
<tr>
<td>4-10 MBs</td>
<td></td>
<td>20 %</td>
</tr>
<tr>
<td>10-25 MBs</td>
<td>10 %</td>
<td>20 %</td>
</tr>
<tr>
<td>&gt;25 MBs</td>
<td></td>
<td>50 %</td>
</tr>
</tbody>
</table>

**Employment impact**
- Network deployment ($50,000 per annual job): **22,000 over 3 years**
- Externalities (innovation and productivity effects driven primarily by faster broadband): if penetration increases to 82%, employment growth would be accelerated by 2.5%
However, in order to maximize economic impact it is critical to define an optimal industry structure

- How do we define policies that provide incentive for capital investment?
- What is the sustainable industry structure that provides the long-term capability for creating jobs, promoting innovation and reducing prices?
- What is the ideal number of industry players to maximize welfare benefits?
- How much “creative destruction”?
- What are the risks of increasing frictional costs of bankruptcies?
- How much asymmetric regulation?
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The Israeli market grew in 2008 despite the recession, although it is expected to slow down significantly in the future.

ISRAEL TELECOMMUNICATIONS MARKET

Sources: MoC; Merrill Lynch; The Economist; analysis by the author
Several uncertainties, beyond the macroeconomic environment, remain regarding the future evolution of demand

- Voice revenue will continue to decline as price elasticity falls further
- Data adoption will replace some of the falling voice ARPU
- Shifts in usage will continue to emerge (wireless vs. wireline, voice vs. data, local vs. LD, type of data)
- Further growth is dependent on more robust wireless substitution (FMC) and content consumption (quad-play, mobile TV, etc.)
- However, the adoption of both FMC and quad-play remains uncertain
- Changes in purchasing decision making (handset vs. plan, bundles)
- Changes in distribution channel preference (retail, On-line, Store in store)
For example, while data is expected to reach 19% of ARPU by 2011, it will not have grown enough to compensate for voice ARPU decline.

LOWER YIELDS WILL NOT BE OFFSET BY INCREASED MOU, RESULTING IN ARPU DECLINE

INCREASING DATA ARPU WILL BE INSUFFICIENT TO OFFSET DECLINING VOICE ARPU

Source: Merrill Lynch

Source: Merrill Lynch
These uncertainties, combined with other non-market factors, are prompting a supplier “shake up”

COMPETITIVE MOVES IN ISRAELI TELECOMMUNICATIONS

Legend:
- Ownership or alliance
- Acquisition or entry intention
- Divestiture
- Acquisition
- Tacit or explicit government restriction
- Telco player
- Foreign player
- Non telco player
In the near future, the industry structure is somewhat fragmented, but starting to show some embryonic cross-sector consolidation.
The turbulence on the supply side could be exacerbated by the entry of other non-traditional players.

**APPLE’S ENVELOPMENT STRATEGY**

- **CONSUMER/LISTENER**
- **HANDSET OEMs**
- **PORTABLE MUSIC PLAYER**
- **MOBILE PHONE**
- **NETWORKED PC**
- **MVNO**
- **MOBILE NETWORK**
- **MOBILE OPERATOR**
- **ONLINE MUSIC STORE**
- **PLATFORM VENDOR/CONTENT AGGREGATOR**
- **CONTENT PRODUCERS**

**CORE TECHNOLOGIES: DRM, CODEC, MEDIA PLAYER**

**EXAMPLE**

Apple  Mobile Operators
Low barriers to entry and lack of vertical integration are leading to a Heightened Competition Scenario

1. MONOPOLY (past)

2. MANAGED COMPETITION (today)

3. HEIGHTENED COMPETITION (2-3 yrs.)

- Non traditional competitors take advantage of this market situation and an increasing number of them begin to offer wireless service (e.g. MVNO)
- The marketplace will be crowded with many players behaving disruptively in order to establish a foothold in the wireless industry, as a result existing carriers will face financial pressure
- Alternate technologies, like WIMAX, enable some players to bypass traditional wireless networks all together in certain areas
- Wireless remains the core business and is sold predominantly as a stand alone product
- Intense competition, among the MNOs, for MVNO clients leads continued declines in prices for voice and data

INDUSTRY STRUCTURE EVOLUTION FRAMEWORK

<table>
<thead>
<tr>
<th>Product/Market Configurations</th>
<th>Pure play (wireless-wireline)</th>
<th>Bundled</th>
<th>Convergence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barriers to Entry</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
</tr>
</tbody>
</table>
The future competitive environment is characterized by two key trends

<table>
<thead>
<tr>
<th>BARRIERS TO ENTRY ARE DECREASING</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Barriers to entry have fallen dramatically as MNOs would have opened their networks to MVNOs on a wholesale basis</td>
</tr>
<tr>
<td>• MVNOs may account for 15% of the market within five years</td>
</tr>
<tr>
<td>• In addition to MVNOs, new technologies allow new entrants to experiment with wireless service at much lower costs than before</td>
</tr>
<tr>
<td>• Capital might be available to fund the development of new technologies</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NEW BUSINESS MODELS ARE EMERGING</th>
</tr>
</thead>
<tbody>
<tr>
<td>• New technologies and business models are rapidly developing and attracting entrants from outside the communications industry (handset OEMs, software players, content providers)</td>
</tr>
<tr>
<td>• Content providers are looking at ways to extract more revenue out of the traditional wireless content value chain</td>
</tr>
<tr>
<td>• Some telcos and cable TV players will be looking at ways to offer integrated communications services</td>
</tr>
<tr>
<td>• Other carriers will be extremely successful with the high usage low cost business model</td>
</tr>
</tbody>
</table>
In the long run, two scenarios are possible for the Israeli telecommunications industry

4. Hyper-competition
- Technology significantly lowers the capital requirements for the industry
- New entrants can offer products that are true substitutes to wireless
- Brand, content, and applications drive wireless decision
- The industry is divided among 6+ players
- Non traditional competitors take advantage of this market situation and an increasing number of them begin to offer wireless service

5. Platform competition
- Capital requirements limits the ability of new entrants
- The advantages of scale and installed base also favor incumbents
- Carriers adapt to block/embrace new business models
- A large acquisition is the only viable scenario for a new entrant
- 90+% of the market remains in the hands of 3 players
The hyper competition scenario is characterized by intense supply fragmentation

- Data and content adoption takes off and customers show a willingness to purchase wireless from content providers
- Facilities-based mobile players rapidly lose share as 25%-50% of customers show an interest in purchasing wireless from specialized players (content, brand, usage, etc.,)
- As a result of slow reactions and rapid technological advances MNOs are unable to reign in competition
- Alternate networks are feasible and device pricing collapses leading to the emergence of new network operators
- A new breed of company called the “NetCo” emerges which offers wholesale access to any player interested in offering wireless service (“ServCo”)
- An MNO spins off its retail arm and becomes a pure wholesale provider
- Existing wireless players are forced to drastically change their operating structure in order to survive with a dramatically lower customer base
Hypercompetitive industry structure

- **BEZEQ**
  - **HOT**
  - **NETVISION**
  - **012 SMILE**
  - **ORANGE**
- **WIRELESS**
  - **PELEPHONE**
    - **MIRS**
      - **WIMAX**
      - **MVNO**
    - **CELLCOM**
      - **MVNO**
      - **WIMAX**
    - **ORANGE**
      - **MVNOs**
- **CONTENT**
  - **YES**
  - **HOT**
By embracing new business models and blocking new entrants, the large players dominate the market in the platform competition scenario.

- Telecom operators (Bezeq and HOT) rethink the wholesale model and vertical integration takes place as they acquire the few successful MVNOs.
- Customers (25%-50%) demand integrated communications packages and a wide variety of content and product choices.
- Telecom operators embrace new technology (within NGN/hybrid networks) and business models and quickly block new entrants from establishing any major presence.
- Ownership issues get resolved as mobile, fixed, broadband and content distribution players tightly integrate.
- No “killer app” but rather an assortment of new products (LBS, content, data, gaming, etc.) all prevail in the market.
- The required assortment of products and applications places smaller players at a financial disadvantage since they cannot afford the upfront investments and they rapidly lose market share.
2.5 Player Industry Structure

- **Wireline**
  - Bezeq
  - Hot
  - Netvision

- **Broadband**
  - Broadband
  - Hot
  - Netvision
  - Fixed BB

- **Wireless**
  - Pelephone
  - Mirs
  - Wimax
  - Mvno
  - Cellcom

- **Content**
  - Yes
  - Hot
The implications of either scenario differ for consumers, carriers and the economy at large

<table>
<thead>
<tr>
<th>2-3 Years Scenario</th>
<th>Higher Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Many new entrants enter the landscape fueled by technology and business model innovations</td>
<td></td>
</tr>
<tr>
<td>• Majority of the existing carriers see a deterioration in financial performance</td>
<td></td>
</tr>
<tr>
<td>• Heavy investment in technology (existing carriers and new entrants)</td>
<td></td>
</tr>
<tr>
<td>• Discussion around the potential emergence of NetCos</td>
<td></td>
</tr>
<tr>
<td>• Heavy investment in technology (existing carriers and new entrants)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6 Years Scenario</th>
<th>Platform Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Transformation of MNO model to a complete communications provider (across products and platforms)</td>
<td></td>
</tr>
<tr>
<td>• Competition between telco (Bezeq) and cable (HOT) signals the advent of the intermodal era</td>
<td></td>
</tr>
<tr>
<td>• Advanced hybrid networks patch together cellular, WiFi, and WiMax technologies</td>
<td></td>
</tr>
<tr>
<td>• Content drives data adoption and wireless becomes just another distribution platform for content</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4 Years Scenario</th>
<th>Hyper Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Low barriers to entry enable multiple players to become service providers and own customer relationship</td>
<td></td>
</tr>
<tr>
<td>• The emergence of the “NetCo” model serves to fragment the industry and more than 10 players have an equal share of the market</td>
<td></td>
</tr>
<tr>
<td>• Existing carriers are forced to transform and some become wholesale providers only</td>
<td></td>
</tr>
<tr>
<td>• Wireless service becomes subsidized by content and advertising players, who capture most of the value</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>TELECOM SECTOR</th>
<th>CONSUMERS</th>
<th>ECONOMY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-3 Years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Market share fragmentation</td>
<td>• Lower prices</td>
<td>• Externalities driven by network investments and business model innovation</td>
</tr>
<tr>
<td></td>
<td>• Need to invest in new technology and products</td>
<td>• New entrant Innovation benefits consumers</td>
<td>• Margin erosion limit sector indirect impact</td>
</tr>
<tr>
<td></td>
<td>• Margin erosion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Market share improves as a result of M&amp;A</td>
<td>• Price stabilization</td>
<td>• Impact of new network technology on the economy (jobs, innovation)</td>
</tr>
<tr>
<td></td>
<td>• Investments in integrated services pay off</td>
<td>• Further advances in network technology and platforms</td>
<td></td>
</tr>
<tr>
<td>4 Years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Services increasingly commoditized</td>
<td>• Benefits in terms of price competition</td>
<td>• Frictional costs (bankruptcies/job losses) affect contribution</td>
</tr>
<tr>
<td></td>
<td>• Carriers must shed cost to support reduced market share</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The long-term scenario depends as much on the external environment as it does on the internal carrier response.

### EXTERNAL ENVIRONMENT
Will New Technologies Offer a Much Cheaper Way To Build Out Substitute Networks?
- YES
- NO

### INTERNAL CARRIER RESPONSE
Will Carriers Be Able to Raise Barriers to Entry Thereby Preventing New Entrants?
- NO
- YES

### REGULATORY APPROACH
Will regulator continue pushing for LLU, MVNO, MNP, and asymmetric regulation?
- YES
- NO

---

**Barriers to Entry**
- Pure play: High, Medium, Low
- Bundled: 6 Years, Intermodal Competition
- Convergence: 2-3 Years, Heightened Competition
- Product/Market Configurations:
  - Today
  - 2-3 Years
  - 6 Years

**Heightened Competition**
- Pure play: High, Medium, Low
- Bundled: 4 Years, Hyper Competition
- Convergence: 2-3 Years, Heightened Competition
- Product/Market Configurations:
  - Today
  - 2-3 Years
  - 4 Years
Scenario triggers indicate that the industry is definitely moving into heightened competition.

- Industry growth has significantly slowed down.
- Telecom incumbent Bezeq revenues flat and market share dropped to 84.8% in the business sector and 77.3% in the consumer market.
- Partner’s revenue and profits down as a result of “challenging competitive and regulatory environment.”
- Partner, Netvision and HOT have raised their wireline rates reflecting diseconomies of scale for Partner and low bundle profitability for others.
- Withdrawal of international investors Motorola (MIRS) and Hutchinson (Partner) although this could be due to other reasons (e.g. international strategy).

![Industry Structure Evolution Framework](image_url)
It is critical for the regulator to determine the appropriate regulatory model and policies.

Excessive regulation promoting irrestrictive competition could have a negative impact on the telecommunications industry’s innovation and investment.

REGULATION VS. INNOVATION AND INVESTMENT

• Recently completed research on drivers of NGN investment across 30+ countries found that unbundling local loops is negatively related, at a significant level, to the deployment of fiber to the home: consistent with all the literature previously reviewed, platform-based competition acts as an inducement of investment in forward looking technologies.

• Pricing of broadband services is negatively related to fiber deployment: if pricing is an indicator of competitive intensity, the lower retail prices of broadband, the less incentive there is to deploy FTTH because, at lower ARPUs, the NPV of the fiber project diminishes.

Source: Prepared based on Gual, J. et al. (2006)
The regulatory framework can affect the industry’s investment in infrastructure and, consequently, the pace of innovation.

**DEREGULATION AND INVESTMENT CYCLE: THE NEGATIVE CYCLE**

- **ASYMMETRIC REGULATION**
  - Greater regulatory pressure
  - New Product Introduction
  - Price Reduction (Welfare Effects)

- **Price Elasticity**
  - Increase in replicability costs
  - Increase in competitive OPEX (Advertising)
  - Increase in QoS OPEX

- **Revenues**
  - Demand uncertainty
  - Market saturation

- **Free Cashflows**
  - Lower investment
  - Capital Expenditures

- **Callibration Point**
  - CAPEX < 20% of sales
If the cycle turns negative, ICT diffusion could be affected and the positive impact on the economy and society could decrease.

**IMPACT AND INTERRELATIONSHIP OF FACTORS**

- **REGULATORY FRAMEWORK AND PUBLIC POLICIES**
  - Competitive intensity

- **INDUSTRY DEVELOPMENT**
  - Investment incentives

- **DIFFUSION AND ADOPTION OF ICT**
  - Productivity

- **IMPACT ON ECONOMY AND SOCIETY**
  - Erosion of margins resulting from price declines
  - Assignment of more resources to advertising and marketing to face competitive pressure
  - Capex reduction
  - Reduction of amount assigned to the development of new services
  - Replicability rules result on a negative impact on investment for new product development
  - Reduction of impact of ICT on economy and society
    - Less jobs
    - Less impact on productivity

- Adoption and assimilation incentives
Agenda

- Introduction
- Impact of telecommunications on the Israeli economy
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- Conclusions
Infrastructure sharing represents an adequate approach to stimulate competition by allowing small players to benefit from scale.

**NA/EUROPEAN MOBILE OPERATOR ECONOMIES OF SCALE**

- Wireless economies of scale average 80% are driven primarily by the large fixed component of local radio network deployment and infrastructure costs.
- Network sharing and MVNO policies allow new entrants and small players to benefit from economies of scale.

**EUROPEAN FIXED LINE OPERATOR ECONOMIES OF SCALE**

- Wireline economies of scale, while less pronounced than in wireless, are driven by equipment costs, advertising, IT, and other cost items.
- Infrastructure sharing allow the development of broadband competition beyond two vertically integrated players.
Network sharing in the wireless sector is estimated to yield up to 48% reduction in access costs.

**Impact of Infrastructure Sharing on Operator’s Cost Structure**

<table>
<thead>
<tr>
<th>Total cost base</th>
<th>Network cost</th>
<th>Access cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>26% Sales</td>
<td>13% Mobile</td>
<td>16% CRM</td>
</tr>
<tr>
<td>45% Network</td>
<td></td>
<td>25% Core</td>
</tr>
<tr>
<td>75% Access</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Assumptions, all Capex and Opex, 5 years average, limited capacity effect.

This justifies the agreement between Vodafone and Telefonica in Europe and similar agreements between carriers in North America.

**Infrastructure Savings**

- NetCo: 42% - 48%
- Roaming Club: 35% - 45%
- Shared RAN: 15% - 22%
- Sprint Built Out: 7% - 14%
- Joint Sites: 4% - 6%

**Degree of Technical Co-operation**

- High

**Extent of Regional Differentiated Rollout**

- Low

- High
Wireless network sharing could be pushed to an industry model of wholesale/retail value chain fragmentation.

**WIRELESS NETWORK SHARING INDUSTRY MODEL**

- **Retail Carrier I**
  - 100%

- **Retail Carrier II**
  - 100%
  - 15%

- **MVNO I**
  - 70%

- **MVNO II**
  - 15%

- **MVNO III**
  - 15%

- **MVNO IV**
  - 15%

- **NETCO I**
  - 15%

- **NETCO II**
  - 15%

**VERTICALLY INTEGRATED CARRIER**

- **Ownership/Control**
- **Product purchase**
Wireline infrastructure sharing can assume a variety of models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CHARACTERISTICS</th>
<th>EXAMPLES</th>
</tr>
</thead>
</table>
| Structural/Functional Separation | ● Local loop is spun off by incumbent into a fully owned (functional) or a standalone company (structural) offering access | ● United Kingdom  
● Sweden  
● New Zealand |
| Layer 1 Separation         | ● Passive infrastructure is spun off by incumbent into an independent company  
● Active layer is owned by another company | ● Singapore |
| Local Loop Unbundling      | ● Incumbent offers access to its own infrastructure at a regulated wholesale price | ● European Union |
| Multi-fiber model          | ● Incumbent constructs a four fiber model and sells IRUs to other entrants (submarine cable model) to share risk | ● Switzerland |
| Risk sharing model         | ● Incumbent deploys fiber and allows entrants to buy access at time of construction with a risk-adjusted price | ● DTAG proposal |
The Singapore model – a separation model - was deployed in order to fulfill the deployment of fiber in the local loop.
The Swiss multi-fiber model represents an option to share fiber deployment risk with the incumbent.

### SWITZERLAND: MULTI-FIBER MODEL COMPARED TO OTHER INFRASTRUCTURE SHARING

<table>
<thead>
<tr>
<th>NetCo’s activities</th>
<th>OpCo’s activities</th>
<th>Service Providers’ activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ducts and physical fiber</td>
<td>Data link and network layer</td>
<td>Application layer (services)</td>
</tr>
</tbody>
</table>

#### Model 1 – «Multi-Fiber Model»
- 2 carriers—Company A and B
- 1 carrier—Company C
- Company D
- Companies E & F
- n > 3 companies

#### Model 2 – «One - Fiber Model»
- 1 carrier
- n > 3 companies

#### Model 3 – «Dark - Fiber Model»
- Company D
- Companies J & K
- Companies E or F
- n > 3 companies

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Another wireline fiber sharing option under consideration is one of wholesale risk-sharing contracts

- Before roll-out, the “access seeker” (unbundler) enters into a binding commitment to buy a sufficiently large amount of bitstream accesses for a sufficiently long period of time.

- This obligation is independent from the actual market development and cannot be renegotiated (“sunk cost” for the unbundler as it is for the incumbent)

- If an “access seeker” does not invest upfront and is willing to wait until the market develops they can buy access through risk free contracts but that would entail a price premium to reflect the “wait and see” option value
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In summary, decisions in the regulatory arena will have a significant impact on the future economic contribution of the telecom sector.

- As shown, ICT in general and broadband in particular, have an important impact in fostering growth and employment.
- However, a national program that opens the way to ultra-broadband platforms requires investment which tends to come from the private sector.
- The competitive environment resulting from selected regulatory policies has an impact on the level of investment.
- Two scenarios are open for development of the industry: each one carries positive and negative implications.
- Regulation will have a significant impact on future industry performance:
  - Tariffs (primarily interconnect rates and broadband wholesale access)
  - Spectrum allocation
  - Rules regarding industry structure in terms of restrictions to vertical integration of incumbent carriers.
- The continuing regulatory pressure, combined with slowing industry growth will have an impact on industry performance:
  - Wireless is reaching a saturation point in the industrialized world and in many emerging economies.
  - Broadband penetration is slowing down in the United States, Japan and Korea and is expected to reach a similar stage in other industrialized economies within the next five years.
A scenario of heightened competition challenges the regulator to benefit consumers while ensuring industry sustainability.

**INDUSTRY TRENDS**
- Economies of scale
- Industry consolidation
- Margin preservation through price discipline

**MARKET EFFECTS**
- Pricing trends
- Innovation
- Capital investment
- Market Failures

**REGULATORY TOOLS**
- Stimulate competition
  - Local Loop unbundling
  - Wholesale tariff regulation
  - MVNO
  - Asymmetric regulation
- Government intervention

**QUESTION:** Does consolidation have a negative impact on consumers?

**QUESTION:** Does regulatory intervention have a positive impact on consumers and the industry?
The deployment of next generation access networks introduces another layer of regulatory conflict between the incumbent and the government.

Regulator requests that the incumbent includes the fiber access network within the legacy regulatory framework.

- **A**: Includes fiber in the current access framework but reduces investment.
  - Possibility of a delay in the deployment of fiber raises the cost—driven by the loss of social benefit—to the regulator.

<table>
<thead>
<tr>
<th>Where:</th>
<th>Incumbent</th>
<th>Regulator</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>• Represents financial performance under conditions of fiber access at regulated prices</td>
<td>• Subjective value of the welfare benefit of having regulated the incumbent minus having slowed down the fiber investment</td>
</tr>
<tr>
<td>B</td>
<td>• Represents financial performance under pricing fiber access through commercial arrangements</td>
<td>• Subjective value of a discrimination of fiber access minus the reputation of the regulator of having stimulated investment</td>
</tr>
<tr>
<td>C</td>
<td>• Financial performance combining prices under fiber and copper</td>
<td>• Subjective value of welfare benefit of new framework</td>
</tr>
</tbody>
</table>

- **Incumbent**
  - **A**: Includes fiber in the current access framework but reduces investment.
  - **B**: No reaction.
  - **C**: Accepts the proposed framework.

- **Regulator**
  - **A**: Proposes that fiber is regulated with prices that recognize the new investment.
  - **B**: Refuses including fiber in the regulatory framework.
  - **C**: Emphasizes the financial difficulty to deploy fiber.
It is critical that the regulator gains an understanding of potential outcomes of current regulatory and industry moves

Several dynamics are at play in Israeli telecommunications

- Will the telco incumbent react negatively to the regulatory and competitive pressure reducing its capacity to innovate and invest?

- What will the frictional costs be of entry/exit of private equity (debt leverage, bankruptcies, job losses, etc.)?

These dynamics are critical in terms of their potential impact of the sector on the Israeli economy

- What happens if the current environment leads to under-investment in network deployment and innovation?
A process aimed at formulating regulatory policies needs to consider an in-depth analysis of expected results.

**REGULATORY POLICY FORMULATION CYCLE**

- **DEFINITION OF OBJECTIVES TO BE MET**
  - Guarantees a conceptual consistency in the definition of regulatory frameworks
  - Allows for the evaluation of options and trade-offs

- **POLICY DEFINITION**

- **SIMULATION OF POLICY IMPACT**
  - As a function of metrics and benchmarks
  - Quantitative analysis that allows the analysis of expected behavior of players
  - Systemic study that allows to identify non-expected results

- **ANALYSIS OF RESULTS**
  - Achievement of objectives
  - Emergence of unintended consequences
We can help the Ministry of Communications at several levels

- Development of a National Broadband Plan that integrates the current initiatives within a comprehensive framework aimed at maximizing the short term and long term impact on the economy
- Conduct a simulation wargame that could formalize future competition scenarios, understand the behavior of industry players and determine potential outcomes
- Provide consulting support of the development of alternative regulatory approaches aimed at limit the negative impact on the industry of pro-competitive policies (e.g. network sharing agreements)