



The State of Innovation

Operating model frameworks, findings and resources for multinationals innovating in Israel

April 2019



START-UP
NATION
CENTRAL

Foreword

PwC Israel: Helping global corporations tap into the Israeli Innovation Fountain

In today's fast changing environment, no business has a long-term future without re-inventing itself over and over. Companies that take a proactive innovation approach, sometimes at high cost in the short term, will be here for the longer term.

The meaning and impact of innovation for multinational corporations is changing fast and growing exponentially. Years ago, the definition ended with research and development, but the commercial and cultural value available from embracing agile partnerships with external players is now beyond doubt. Global businesses and entire industries are constantly threatened and disrupted by external innovation. Those that embrace such innovation will end up winning.

PwC Israel is delighted to continue our collaboration with Start-Up Nation Central on this landmark study of Israel's Innovation Economy. Our teams have been supporting global corporations enter and flourish in the Israeli market for decades, and we are delighted to now have the opportunity to publish this research and bring many of our network's leading insights to the global community of innovation executives.

Corporations and start-ups, however, have very different innovation DNA. The purpose of this research is to help global innovation executives understand the local ecosystem, overcome common barriers to success and clarify innovation objectives as they take their first steps in a truly unique innovation community.

We want to extend thanks to more than 70 innovation executives who participated in this study and shared their stories and insights. We wish continued success to both the global corporate community innovating in Israel, and the numerous creative technologists and stakeholders with whom they collaborate to bring new value to consumers in every country and every industry. We are excited to continue our work together with you to reach that goal.

Rubi Suliman
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Start-Up Nation Central: Building the bridge to Israeli innovation

Positioned at the forefront of global innovation, Israel is widely regarded as a leader in creating cutting-edge technological solutions for issues across the world. The abundance of multinational corporations (MNCs) present in the Israeli market demonstrates the importance of Israeli innovation across the globe. With more than 6,000 tech companies and start-ups, these MNCs use different operating models to engage with the local community. This report has been designed to present potential opportunities and operating models for MNCs who wish to engage with the Israeli innovation ecosystem, across all sectors.

Start-Up Nation Central has a unique perspective regarding the potential opportunities available for multinational corporations within the ecosystem. Our in-depth knowledge of Israel's innovation sector allows us the perspective to be able to fully comprehend how innovation can fit with a corporation's strategy, and how it can enhance and augment their outlook, and our non-profit status allows us the objectivity to do this in the most effective manner possible.

Over the past six years, Start-Up Nation Central has worked together with hundreds of MNCs, helping them to navigate around the Israeli innovation ecosystem. We have partnered with them, and individually addressed each of their unique perspectives, cultures, strategies, and needs, with the aim of identifying the best and most suitable solutions to their most pressing challenges.

We are delighted to bring you "The State of Innovation", a report compiled by PwC on behalf of Start-Up Nation Central, which illustrates practical tips and messages for MNCs wishing to engage with the innovative Israeli ecosystem. Based upon the experiences of MNCs with a presence in Israel, this report describes benefits, challenges, time-frames, key operational practices and more, for new commercial entities trying to access Israeli innovation. Please see this as an opportunity to reach out to us, so that we can be your launching-pad in Israel, and can help facilitate your journey in the country of innovation.

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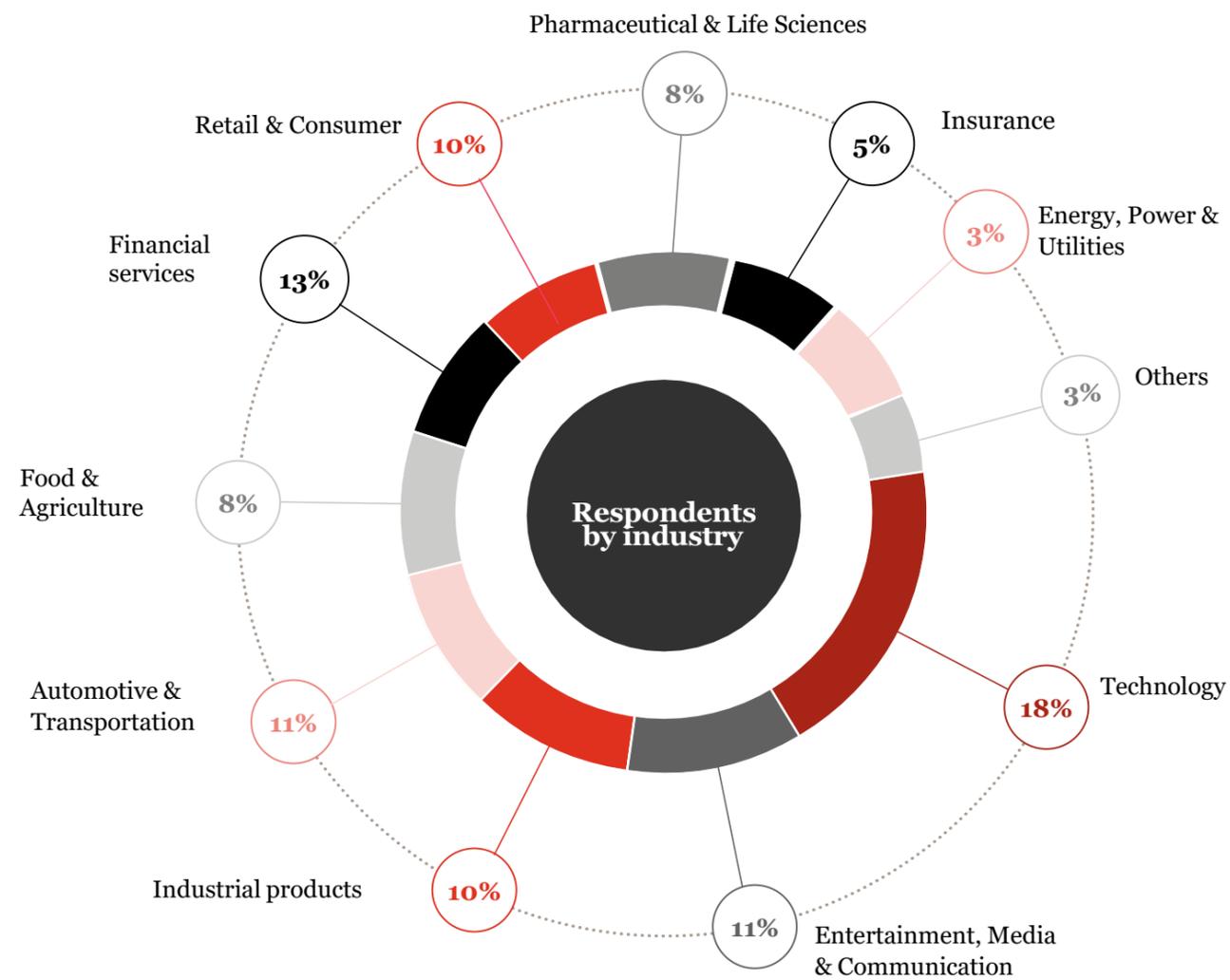
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About this research

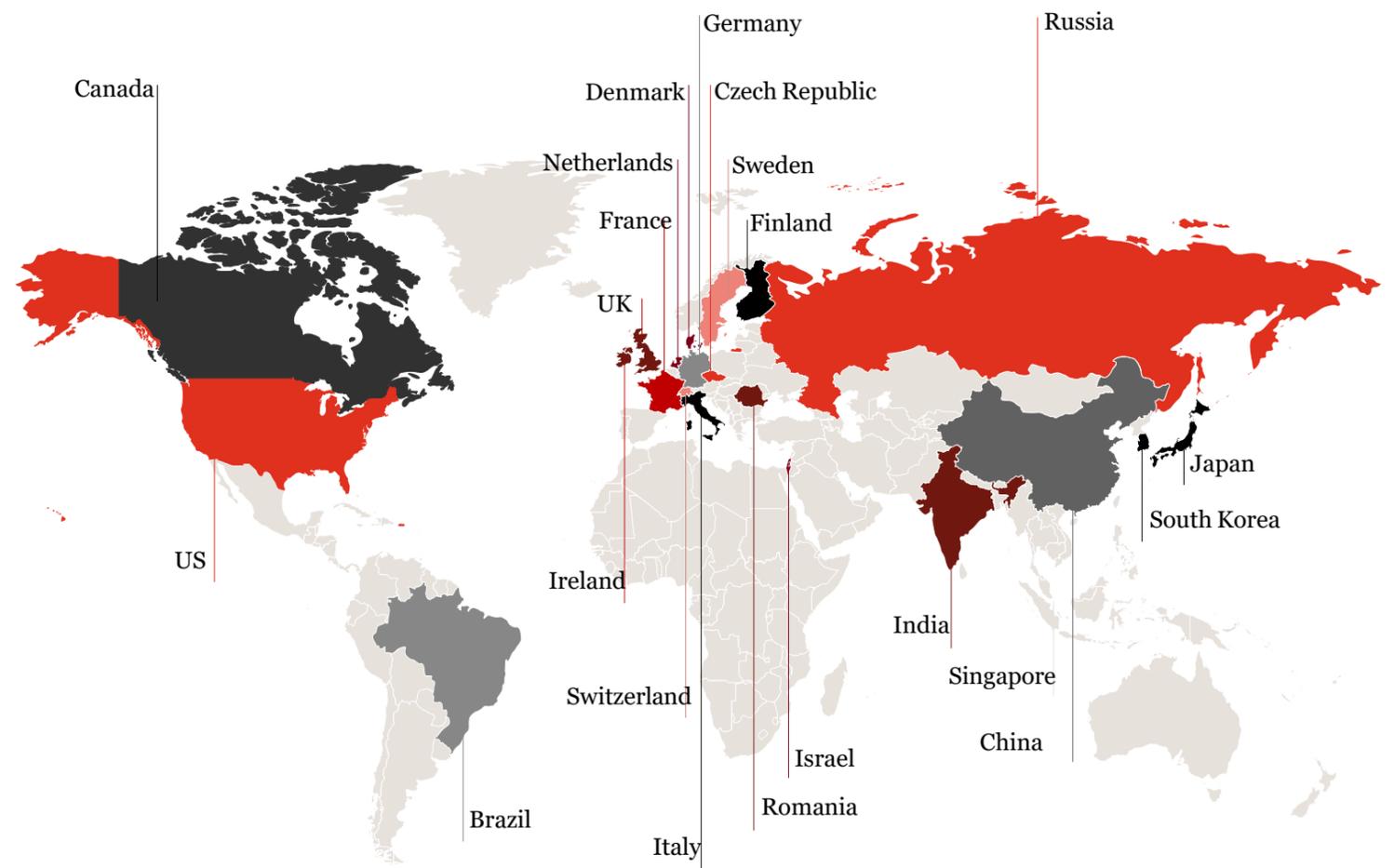
This research was conducted through in-depth interviews with MNC executives, PwC innovation experts and innovation leaders in Israel and globally between September and December 2018. These interviews constitute the PwC & Start-Up Nation Central State of Innovation survey 2019.

For the survey, qualitative and quantitative data points were collected from analysis of more than 90 MNCs in total. 73 executive interviews were conducted as part of the survey, with local and global innovation leaders from 22 countries, across every industry vertical. The industry and geographical profile of the MNC participants is represented below.

MNC respondents – by industry



MNC respondents – by geography



The State of Innovation – Executive Summary

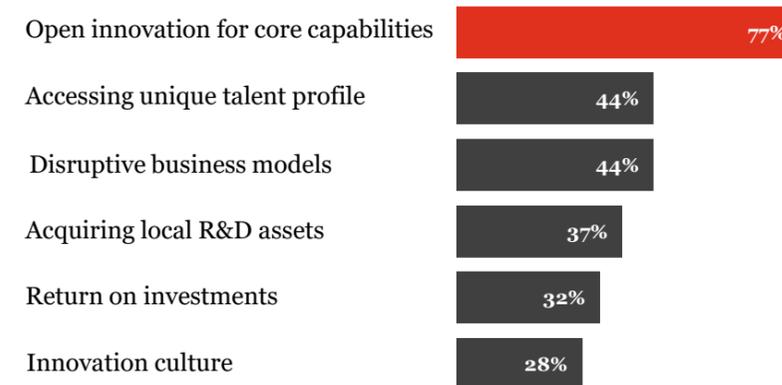
Operating model frameworks, findings and resources for MNCs innovating in Israel

Israel is a global innovation powerhouse



Sources: 2018 World Economic Forum Global Competitiveness Report, PwC & Start-Up Nation Central analysis

Different drivers, various models



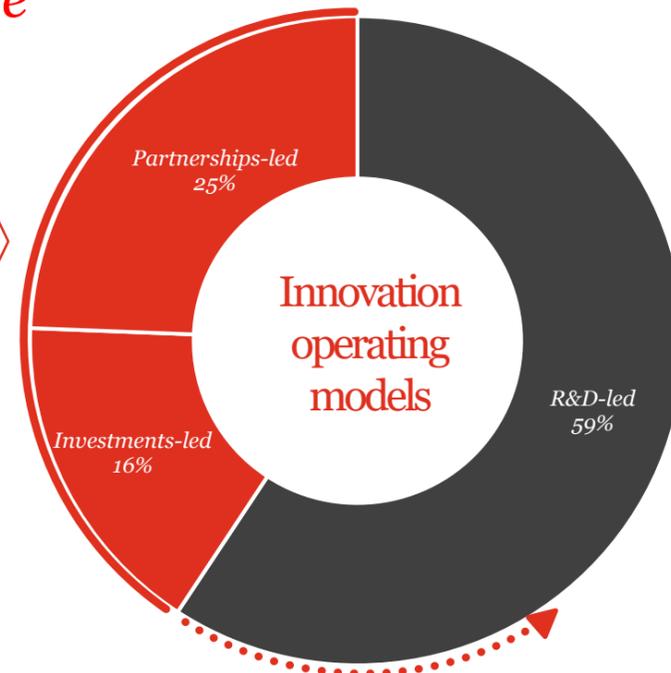
MNCs in Israel operate a diverse range of innovation models, driven by different motivations

Q: What were the key drivers for establishing your innovation activities in Israel?
Source: PwC & Start-Up Nation Central survey, 2019

Open innovation models are growing fastest

The MNC innovation community in Israel is vibrant, successful and growing rapidly - particularly partnership-led models based on open innovation

536
MNCs with innovation activities in Israel



Source: PwC & Start-Up Nation Central MNC ecosystem mapping, 2019

MNCs realize the benefits they come to Israel for, and more

89%

of MNCs looking for enhanced core capabilities though open innovation realize that benefit...

...and other unexpected benefits too



Ecosystem openness



Challenge mindset

The State of Innovation – Executive Summary

Operating model frameworks, findings and resources for MNCs innovating in Israel

Starting points in Israel's ecosystem are variable, and journeys tend to evolve



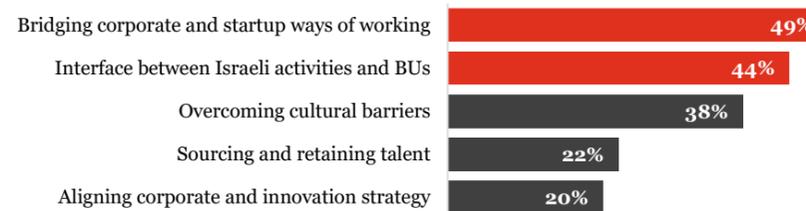
4.5 years

Average age of MNCs' open innovation programs in Israel

Q: How did your company take its first steps in Israel's innovation ecosystem?
Source: PwC & Start-Up Nation Central survey, 2019

Key challenges are not about the ecosystem

The most recognized barriers to innovation success are internal factors, to do with traction across the group

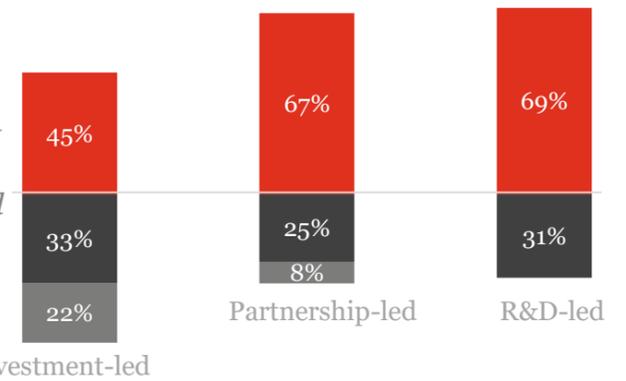


Q: What are the key challenges of innovating in Israel?
Source: PwC & Start-Up Nation Central survey, 2019

High confidence in innovation capability vs competitors

62%

Of MNCs believe that their local innovation performance is ahead of competitors

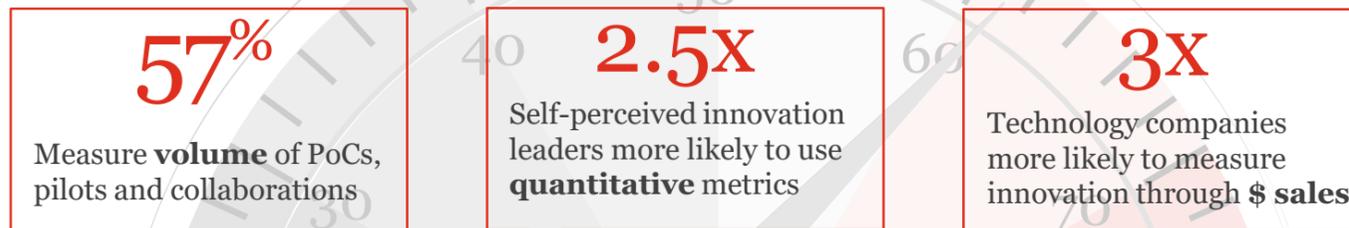


Q: How would you rate your Israel innovation performance compared to competition?
Source: PwC & Start-Up Nation Central survey, 2019

■ Ahead of competition
■ On par with competition
■ Behind competition

Clear KPI maturity curve

There is consensus on how MNCs measure innovation performance in Israel, and how those measurements change over time



Q: Which metrics do you use to measure your Israel innovation activities' performance?
Source: PwC & Start-Up Nation Central survey, 2019

Vast global footprint realizing value

Overall, MNCs innovating in Israel are generating enormous value through creative portfolios of innovation activities

35 countries

Represented by MNCs innovating in Israel



■ Countries of MNCs with Israeli innovation activities

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01

Frameworks

1.1 Ecosystem

Why MNCs are so active in Israel?

1.2 Definition

The meaning of innovation for MNC executives

1.3 Identities

How the MNC innovation community segments

1.4 Differentiators

The range of options available

1.5 Activities

What exactly MNCs are doing in Israel

1.1 Ecosystem

Why are MNCs so active in Israel

“Several years ago, we produced in Israel a version of Cortana (Microsoft’s virtual assistant), which was designed for Android. In the company back then, it was absolutely forbidden to talk about such a thing, but we did it anyway, because we’re Israelis, and we don’t care if they shout at us sometimes, and let it be clear - they did shout at us. Six months later, Satya (Microsoft’s CEO) stood at the podium at Microsoft’s biggest conference, and the first thing he presented was Cortana for Android. That’s Satya: the realization that what went before is not what is needed now.”

Multinational companies (MNCs) have long gravitated to Israel – but what is so distinctive about Israel’s innovation ecosystem? And why is Israel the market where many MNCs come to find ‘what is needed now’? Yoram Yaacovi, Head of Microsoft Israel’s R&D center until 2018, believes it is the combination of Israel’s uncommon population diversity, a bias towards actualizing ideas, and a global mindset focused on designing for export.

Looking at the data, three other reasons stand out: the concentration of start-ups, the relevance of the technology and the maturity of the innovation ecosystem.

The start-ups

More than 6,600 in Israel’s small, connected economy – 14 times the concentration of start-ups per capita in Europe. This community of entrepreneurs, from an economy representing tenth of 1% of the world’s population, draws 19% of global investment in cybersecurity, ranks number one globally in R&D expenditures per GDP, and attracts the highest rate of venture capital funding per capita in the world (\$674/per capita in 2018).

The relevance of the technology

According to PwC’s 2018 Annual Global CEO Survey, CEOs’ three greatest concerns were cyber threats, the speed of technological change and the availability of skills. As this whitepaper will show, the Israel market offers mitigation for each area of concern. Israeli cybersecurity technology in particular already defends critical national infrastructure worldwide and is diversifying industrial applications fast.

The maturing ecosystem

In 2018, the number of start-ups raising between \$10m and \$20m had more than doubled compared to three years prior, which is an index of both venture capital activity and the market size of scale-up technology businesses. PwC Israel partner Yaron Weizenbluth describes the maturity of the high-tech industry and the development of the secondary market in the sector. *“There are fewer exits and at lower prices, while more and more companies are developing high values out of sight and waiting for a big exit. In the future, we’ll see more exits at high values, but fewer exits in general.”* Greater government incentives, and an MNC community of more than 500 according to PwC’s analysis, complete the picture of a fast-maturing ecosystem.

Feature 1: Israel’s Innovation Economy at a glance

With a population of 8.9 million, 0.11% of the global population, Israel has a disproportionate innovation footprint, both in terms of attracting investment and independent global rankings.

6,600+ start-ups

1 per 1,350 people (1 per 20,000 in Europe)

	Population	2018 VC investment	VC investment / capita
ISRAEL	8.9m	\$6bn	\$674
USA	327m	\$131bn	\$401
CANADA	37m	\$2.9bn	\$78
CHINA	1,415m	\$70bn	\$49
INDIA	1,354m	\$7.9b	\$6

In numbers...

#5

In Bloomberg’s 2019 global innovation index

#2

Globally for # cybersecurity companies

#3

Global ranking of NASDAQ listed companies

#1

% of GDP spent on R&D globally (4.3%)

#2

Ease of finding skilled employees, according to WEF

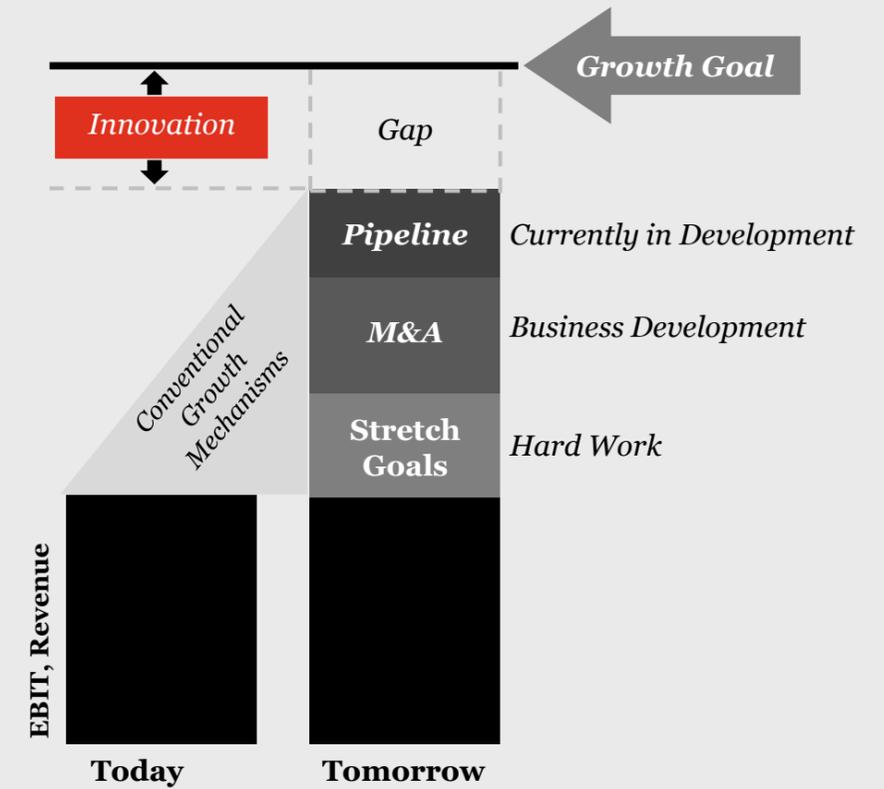


Sources: 2018 World Economic Forum Global Competitiveness Report, Israel Central Bureau of Statistics, PwC & Start-Up Nation Central analysis, Jefferies



Feature 2: Innovation is a bridge to reaching growth goals

Innovation represents the gap between conventional growth mechanisms and strategic goals.



Source: PwC analysis

“

To stay on top of the market you have to be versatile, and the Israel Advanced Technical Center helps the company to do that.

Gil Golan, Director of the Advanced Technical Center, General Motors

1.2 Definition

The meaning of innovation for executives

Innovation is the creation and delivery of new value for consumers and companies. Ecosystems are the distinctive networks of invested stakeholders who collaborate around innovation from idea generation through to commercial launch.

Getting past the buzzwords, this whitepaper explores what MNCs can expect from Israel's innovation ecosystem - the benefits, the milestones, the challenges - through the experience of MNCs already in Israel. But what does innovation mean for that community of corporate innovators?

Open and closed

MNCs innovate successfully in Israel, through both 'open' and 'closed' approaches. The concept of open innovation gained traction after 2003 when Henry Chesbrough of the University of Berkeley described how companies gain by leveraging development ideas and assets, both internal and external to the company. For MNCs innovating in Israel today, open innovation includes any activity involving collaboration with idea-rich, technology-enabling third parties – often, but not necessarily, start-ups. It is a way of making the costs of innovation more variable and on-demand.

In contrast, closed innovation refers to those activities which do not involve third parties – in-house research and development teams most obviously. Now a fast-growing sector, the MNC community in Israel since 2014 has been exploring investment-led and partnership-led open innovation operating models at increasing rates (see feature 4, 'The growth of open innovation in Israel').

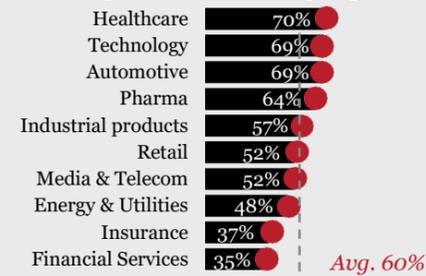
“Cooperation is therefore more significant than establishing an R&D center - it means investing in Israeli businesses, being present in Israeli industry, and connecting Israeli entrepreneurs and innovation with our businesses.

Emmanuel Lagarrigue, Chief Strategy Officer, Schneider Electric

Feature 3: Global innovation practices vary by industry

PwC's global innovation benchmark reveals how innovation practices vary by industry. The left column reveals which innovation operating models are employed by MNCs in different verticals. The right column offers benchmarks for innovation behaviors.

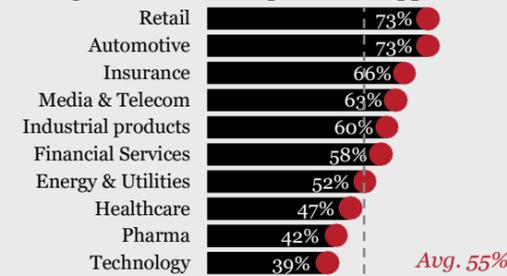
Decentralizing innovation through open innovation¹



Re-invest more than 2% of revenues in innovation²



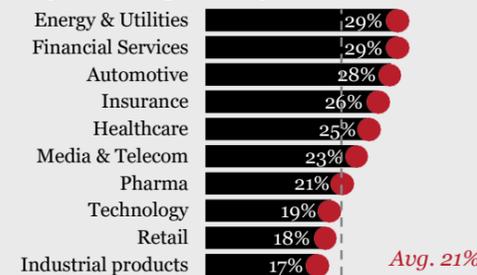
Co-creating with customers, partners, suppliers¹



Focus on breakthrough innovation³



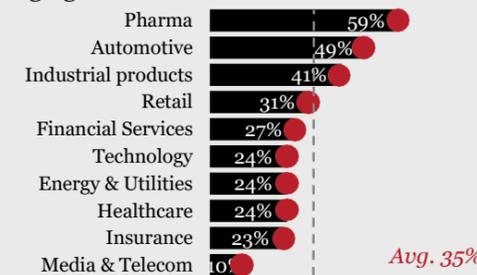
Investing in start-ups through CVCs¹



Innovation has a strong impact on costs⁴



Leveraging traditional R&D¹



Innovation has a strong impact on revenues⁵



Source: 2017 PwC Global Innovation Benchmark

1 Question – What operating models does your organization currently use to drive innovation?

2 Question – What percentage of revenues do you re-invest in innovation?

3 Question – Is your organization more focused on 'incremental change' or 'breakthrough innovation'? (% denotes 'breakthrough innovation')

4 Question – What impact does innovation have on your company's revenues? (% denotes companies responding 'great impact')

5 Question – What impact does innovation have on your company's costs? (% denotes companies responding 'great impact')

Incremental and disruptive

Some innovating MNCs primarily seek to add capabilities to existing products or services, while others search for technologies that will enable a more dramatic step-change in their market position. This research shows how MNCs thrive in the Israel ecosystem with either objective, or more commonly, a calculated blend of the two.

There are MNCs who prioritize breakthrough innovation (sometimes known as ‘horizon 3’), either out of urgency (because their market is facing extreme disruption), or from an assessment of risk (worth the investment to stay ahead of competitors). Tim Hatch, Chief Technology Officer at Stanley Engineered Fastening recounts that, “our CEO mentions breakthrough innovation whenever I hear him speak in a group... he is always asking how we are commercializing the ideas that have been generated by the teams.”

For others, innovation moves in smaller steps. PwC Strategy&’s 2018 Global Innovation 1000 analysis found that 58% of R&D spending is directed at incremental or renewal innovation. “It can’t only be about blockbusters because it’s very risky to bet only on blockbusters,” according to Sanjay Khosla, formerly an executive at Unilever and Kraft.

Technology and business

Innovation is not just about new IP – rather, it lies at the intersection of technological developments and new business models. Nick Donofrio, former leading executive at IBM explains. “We define innovation as our ability to create new value at the intersection of business and technology. We have to have new insights. We have to do things differently. We cannot rely just on invention or technology for success.”

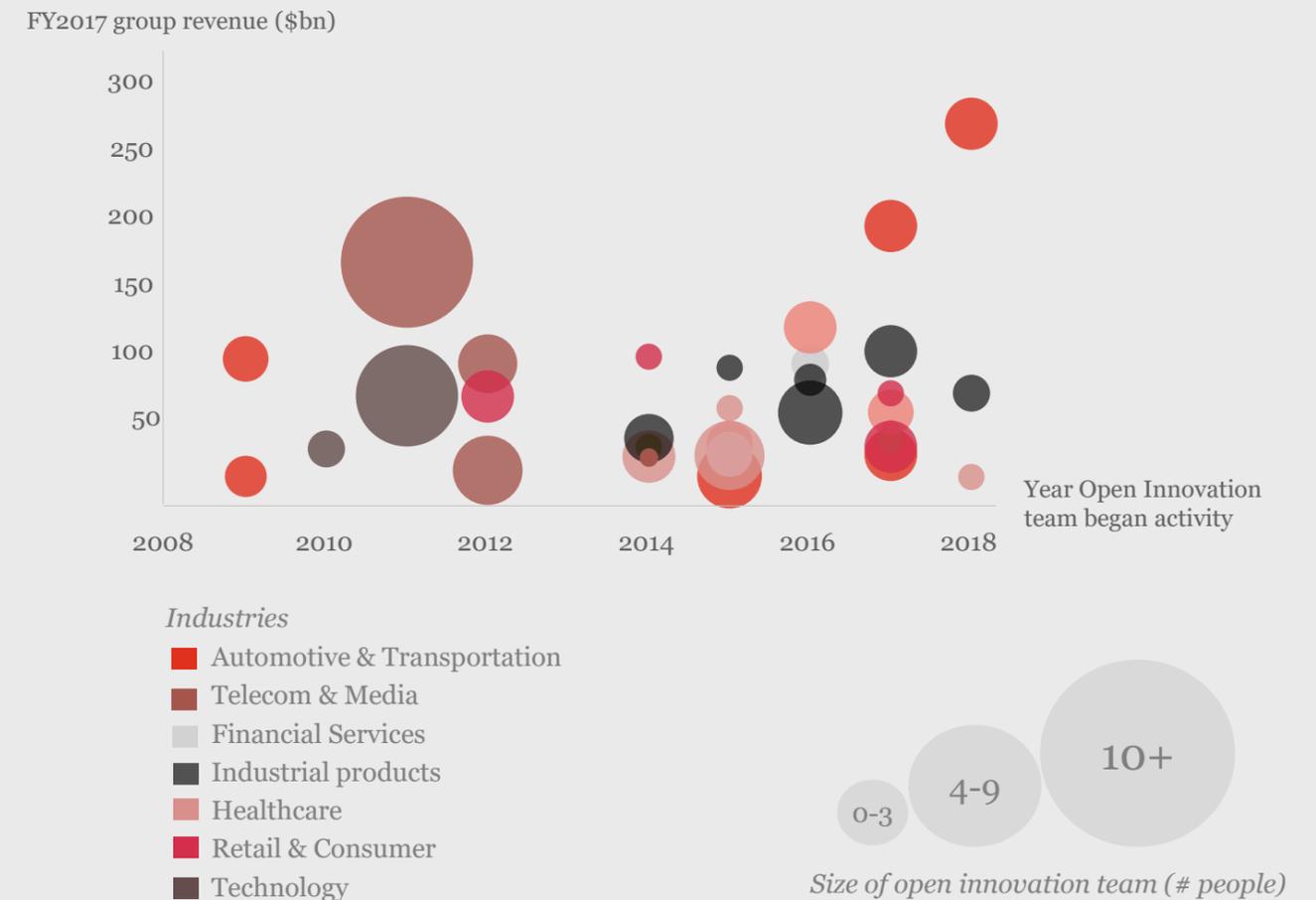
The first movers in Israel’s MNC community were looking for engineering talent and IP assets. But as the ecosystem of innovation stakeholders matured, Israeli partners became key to the commercialization as well as the generation of use cases around emerging technologies. Many MNC innovation programs and suppliers define themselves as commercialization programs. Examples include The Bridge, a leading commercialization program based in Israel that facilitates service agreements for Coca Cola, Mercedes Benz, Turner and Walmart, or Siemens’ Dynamo, a commercialization program enabling start-ups to partner with Siemens’ lines of business.

“We define ‘innovation’ as our ability to create new value at the intersection of business and technology. We cannot rely just on invention or technology for success.”

Nick Donofrio, Former Executive Vice President of Innovation and Technology, IBM

Feature 4: The growth of open innovation in Israel

The following visual represents the growing popularity of MNC open innovation teams in Israel over time, based on the indicative data collected in executive interviews with innovation leaders.



- **Growth** – Since 2014, there has been a notable increase in the number of open innovation teams being activated by MNCs in Israel
- **Industries** – The blend of industries has also increased since 2014, with retail, healthcare and financial services companies starting to explore collaborative programs with third parties
- **Teams** – Open innovation teams are typically 3 – 5 people including a general manager, a scout focusing on generating deal-flow, a technical expert, and, if relevant, an investment associate appraising opportunities

Source: PwC analysis, company information.

Ideation through commercialization

When asked which stage of the innovation process — ideation, project selection, product development, commercialization — was most important, 35% of respondents to PwC's Strategy& 2018 survey of innovation leaders chose project selection, followed by 31% for ideation. But execution is equally essential. *"Innovation is ideas, and everyone has ideas... What we need is people to take these ideas and say, 'I have the audacity and daring to do something, and I know how to sell it.' This combination exists [in Israel] in a higher concentration than anywhere else in the world,"* explains Yoram Yaacovi, former head of R&D at Microsoft Israel.

Innovation executives participating in this research describe value realized at each stage in Israel. At the front-end, they cite the connectedness and accessibility of innovation stakeholders in Israel, meaning that generating deal flow is quicker than in larger markets. Participants also cite the distinctive execution pace of Israeli start-ups and the rising popularity of commercialization programs.



1.3 Identities

How the MNC innovation community segments

What are the range of innovation operating models observed in Israel amongst the MNC innovation community? Looking only at what MNCs do does not factor in why they do it – each MNC has a unique set of drivers that explain why they string together several activities in a coherent innovation strategy.

To understand the range of innovation operating models available, this research follows three steps:

1. Defining three possible *innovation identities* that capture what is most essential about MNCs' innovation profile in Israel
2. Clarifying the operating model *differentiators* which reveal the nuances that make any MNC's innovation profile unique
3. Classifying the specific innovation *activities* which MNC's initiate to achieve their objectives

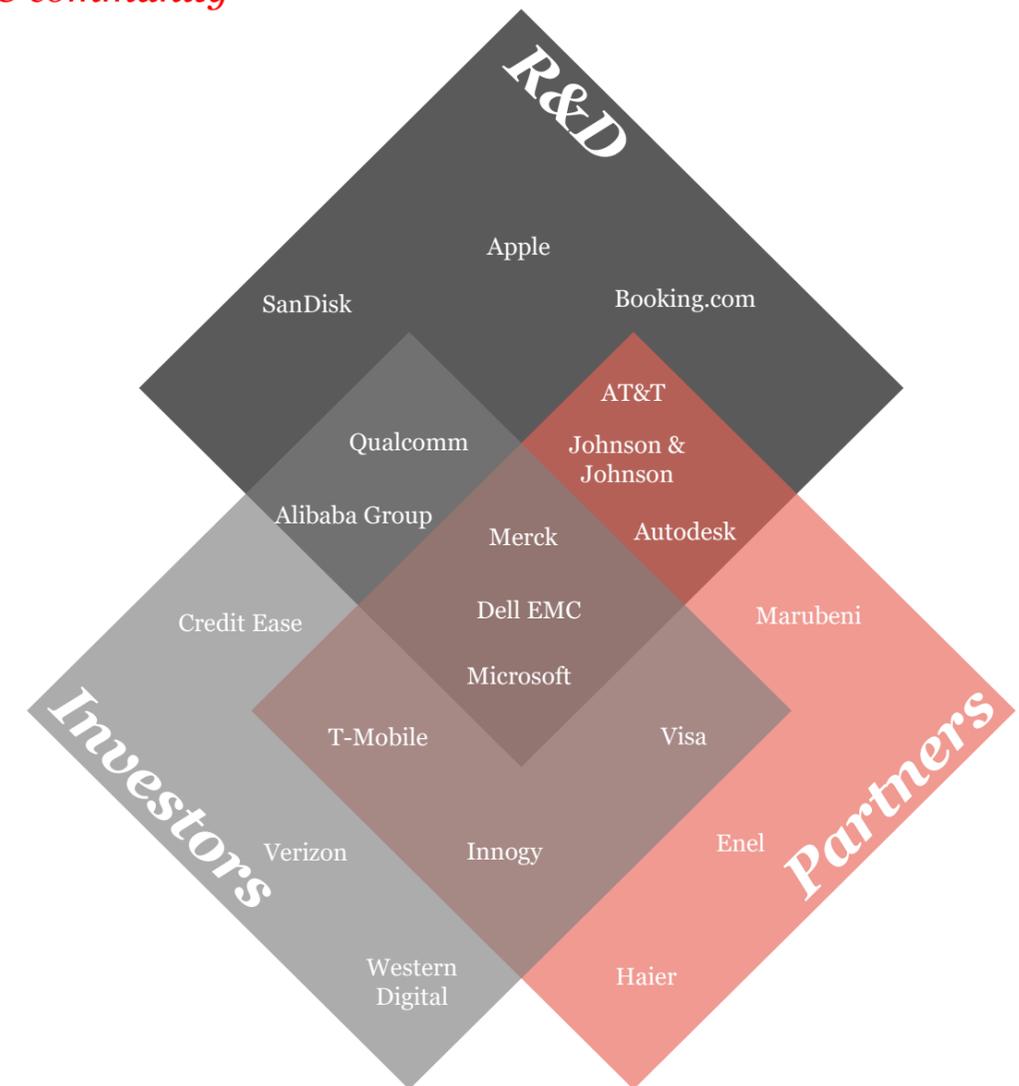
Three identities

Three innovation identities can be observed, but any given MNC often has attributes common to more than one identity in parallel.

R&D-led MNCs have the longest-standing footprint in Israel - as of January 2017, foreign companies operating Israeli R&D centers employed 71,000 workers in R&D centers and manufacturing facilities, about 24% of all employees in Israel's high-tech industry.

However, this pattern is changing. Growing traction globally around open innovation, supply constraints around local engineering talent, and the growing popularity of Corporate Venture Capital have closed the gap.

Feature 5: Three innovation identities are observable in Israel's MNC community



R&D-led – companies with significant Israel-based research and development operations, often grown through acquisitions of local companies, who benefit from the local talent pool of software engineers and data scientists to lead new product ideation and development

Investment-led – global corporates primarily focused on investing in local start-ups for strategic purposes (such as IP synergy or talent acquisition), or financial returns (through IPOs or later-stage acquisitions), or both. Investments are used by MNCs in this way as one way to hedge against disruption

Partnership-led – MNCs that develop one or more activities to interface with innovation stakeholders outside the company (start-ups, customers, academic institutions, public authorities etc) through commercial agreements, product co-development, event sponsorships and other means

Source: PwC analysis, company information

Feature 6 – Case study: The global automotive industry in Israel

Without a domestic car manufacturing industry, Israel has become an innovation powerhouse as global car manufacturers and OEMs increasingly switch their competitive focus from hardware to software. Israeli start-ups have contributed emerging technologies in computer vision, advanced analytics, advanced sensors and cybersecurity.

Volkswagen Group, Intel's Mobileye and Champion Motors recently announced plans to commercialize Mobility-as-a-Service with self-driving vehicles in Israel by deploying the first autonomous EV ride-hailing service. Numerous other global automotive companies have established innovation activities in Israel. Selected illustrative examples follow.

General Motors: R&D activities combined with open innovation and a global CVC arm

Operating in Israel since 1995, GM has significantly ramped up its local R&D activities in recent years, counting over 300 employees in what is today the largest center in Israel for smart transportation. The company also operates local open innovation activities as well as a Corporate Venture Capital Fund, GM Ventures, which has already invested in two Israeli start-ups: Powermat, a developer of wireless charging technologies; and Sital Technology, developing solutions for locating damaged or torn cables inside a vehicle.

Daimler: fast-growing R&D coupled with open innovation

Launched in November 2017, Daimler's Israel operations combine an R&D center focusing on cybersecurity and an open innovation team looking to connect Israeli smart mobility start-ups with relevant business units. This combination followed a decision made early on by Daimler Chairman Dieter Zetsche: *"There are some 6,000 start-ups here and it would be very dumb if we go blindfolded though this environment."* Daimler has also invested directly in several Israeli companies, including Via, StoreDot and Anagog.

Volkswagen Konnect: a local innovation hub for the group's brands

Launched in May 2018 in Israel, Konnect is a unique model for the Volkswagen Group. It acts as a full-suite innovation 'service provider' for the Group brands in Israel to scout and collaborate with Israeli start-ups, focusing on cross sector topics, such as sensors, connectivity, smart navigation, cybersecurity and big-data. It operates a model in which solutions to clearly defined group challenges are sought from the market. According to Managing Director Stephanie Vox, Konnect is *"supporting the real needs and challenges of VW Group brands and connects them to technological solutions in Israel for the purpose of creating PoCs, projects and series integration."*

DRIVE: an innovation center connecting smart mobility start-ups to global automotive companies

Announced in February 2017 by Mayer Cars and Trucks, DRIVE serves as a bridge between global automotive players including Honda, Volvo, Delphi and Hertz, and Israeli smart mobility start-ups. These MNC partners build on existing relationships with the Mayer Group, the Israeli importer of Honda and Volvo Cars which has also worked with Hertz for over 40 years in Israel. Moreover, Honda, as a Drive partner, connects emerging start-ups to its already existing Honda Xcelerator open innovation program.

DRIVE runs two distinct activities: a co-working space for early-stage start-ups to help define their value proposition for DRIVE's corporate partners, and an accelerator program called *Fastlane*, where mature start-ups are selected to collaborate with corporate partners to address challenges and co-develop PoCs. To date, 24 Israeli start-ups have participated in *Fastlane* in three different batches.

Škoda: collaborating with a leading local importer to leverage Israeli innovation

ŠKODA AUTO DigiLab Israel Ltd is a subsidiary of ŠKODA AUTO, located in Tel Aviv and looking for mature start-ups, innovative corporations and universities to collaborate on future business ideas and technological solutions relevant for the automotive industry. At the end of 2017, ŠKODA AUTO started establishing the joint venture company together with the Israeli importer Champion Motors, who had invested in several auto-tech start-ups. The ŠKODA DigiLab is currently collaborating with more than ten mature start-ups including ANAGOG, into which ŠKODA AUTO also made a strategic investment. In December 2018, ŠKODA AUTO became the first global automaker to debut a car in Israel – the ŠKODA SCALA. The shared portfolio offers synergies both for ŠKODA AUTO and Champion Motors.

Ford: acquire around computer vision capabilities

In 2016, Ford acquired SAIPS, a computer vision and machine learning Israeli start-up, which de facto became its Israeli R&D center. In November 2018, Ford announced a local \$12m research investment for developing a decision-making system for autonomous cars, combining SAIPS employees and a research team led by Prof. Shie Mannor, a leading Technion researcher in reinforcement learning. The project is expected to contribute to Ford's "aggressive targets [we] set for ourselves on the journey to building a smart vehicle" according to Ford CTO and VP research and advanced engineering Dr. Ken Washington.

Takeaway

Corporations within the same industry – in this case the fast-changing automotive industry – can succeed with different innovation operating models. Israel's concentrated innovation ecosystem enables diverse, creative combinations of stakeholders to collaborate on synergetic ventures that in other markets would be considered implausible.



1.4 Differentiators

The range of options available

There are many viable routes for MNCs to innovate successfully in Israel, and the second stage in presenting the range of innovation operating models available to MNCs in Israel is to characterize the key differentiators associated with each identity.

Differentiators are a series of scales, and there are numerous examples of MNCs in Israel innovating at different positions along each scale. These differentiators also represent a series of choices facing MNCs in the process of establishing their innovation operating models.

In practice, most MNCs sit somewhere along the spectra described, for example neither being solely dedicated to breakthrough innovation, nor only innovating incrementally, but perhaps doing both in parallel through a ratio represented by a specific combination of activities.

“

Everyone has ideas. What we need is people to take these ideas and say, 'I'm going to do something with this'. This combination exists here in a higher concentration than anywhere else in the world.

Yoram Yaacovi, Former Head of R&D center, Microsoft Israel

Differentiators of R&D-led models

1. Ecosystem transparency

How open is the MNC to working with third parties as innovation partners?

Open | Closed

While a small number of R&D-led MNCs innovate without extensive, public third party collaborations in Israel – Apple and Amazon may be good examples – others are very open to co-developing with a range of external stakeholders on their R&D portfolio, in the belief that multiparty collaborations help generate additional value for their companies.

2. Growth source

What is the preferred route to scale up local R&D operations?

Organic | Inorganic

‘Acquihires’ – purchasing companies for their skills more than their products – are a common starting point for MNCs in Israel (see section 2.1) and represent an inorganic route to building a critical mass of engineering talent. Alibaba’s acquisition of Visualead in December 2017 and the subsequent creation of their local R&D center is an example. Other MNCs develop R&D operations more organically through in-market talent sourcing, like J.P. Morgan who are planning 200 engineers by 2020, up from 90 today.

3. Group impact

Does the R&D operation support all lines of business?

BU-specific | Group-wide

Israel-based R&D centers may support the MNC with a single or many lines of business. Following the acquisition of SafeNet in 2015, Gemalto’s Israel operation has served its global Software Monetization division - SafeNet’s products are now sold under Gemalto’s Sentinel brand. Other MNCs build wide-ranging R&D centers which support innovation across all divisions – AT&T’s 600 R&D engineers focus on a variety of strategic topics for the company, such as Voice-over-IP, Software-Defined Networking, Cybersecurity and the Internet of Things in telecommunications.

4. Public sector integration

To what extent are government partnerships relevant?

Collaborative | Private

Many MNCs co-finance university research with government, participate in Israel Innovation Authority subsidy programs (see feature 11) and benefit from public tax incentives. Others opt to forgo the financial benefits available to limit potential future liabilities or disclosure requirements.

5. Technology scope

Which sectors of emerging technologies are focused on?

General | Specialized

The Alibaba-Visualead acquisition built on previous investments by the Chinese technology giant, which developed a specific kind of ‘dot-less’ QR code that Alibaba had used for its Chinese activities. Microsoft’s Israel R&D center is made up of 18 product development teams in various high impact domains such as Cyber Security, Business Analytics, and Artificial Intelligence.

Differentiators for R&D-led MNCs

R&D	01	Ecosystem transparency	<i>Open</i>	←.....→	<i>Closed</i>
	02	Growth source	<i>Organic</i>	←.....→	<i>Inorganic</i>
	03	Group impact	<i>BU-specific</i>	←.....→	<i>Group-wide</i>
	04	Public sector integration	<i>Collaborative</i>	←.....→	<i>Private</i>
	05	Technology scope	<i>Core</i>	←.....→	<i>Specialized</i>

“

For almost every area that AT&T is participating in, leading and having business in, there’s a good depth of technologies and variety of companies here in Israel. That is what is so unique here.

Igal Elbaz, Vice President for ecosystem and innovation, AT&T Services

Differentiators of investment-led models

6. Investment objective

Are the investments aimed primarily at strategic or financial value?

Strategic | Financial

Alphabet's Capital is a global example of corporate venturing for purely financial returns. However, strategic investments are perhaps more common in Israel, with MNCs motivated by exclusivity arrangements and first-sale-options for scaling companies with significant potential for their group product and service portfolio. This side of the scale is particularly common amongst automotive MNCs (see feature 6).

7. Independence level

Does the MNC invest in partnerships with other stakeholders?

Sole-investor | Co-investing

Deutsche Telekom Capital Partners (DTCP) is the company's investment management group with \$1.6bn in assets under management and a portfolio of over 60 companies, with dedicated funds for Israeli investments. But there are many investment vehicles that involve risk/reward sharing with other stakeholders, often other MNCs: investing as limited parties in external venture capital funds, creating investment operations through joint ventures, and investing in third-party associations in a given industry (like Team8 in the cybersecurity space).

8. Portfolio range

Which maturity stage is preferred for start-up investments?

Early-stage | Mature companies

Many MNCs simultaneously mobilize innovation activities in Israel to explore investment potential in both early and late stage companies. Samsung invests in Israeli start-ups through three platforms. Samsung Ventures supports start-up companies with direct engagement with Samsung's business units. Samsung NEXT invests in early stage software companies to drive innovation in software and services. Samsung Catalyst Fund is a multi-stage fund that invests in the new data economy and strategic ideas for Samsung mobile, device solutions and consumer electronics groups. Altogether Samsung has a portfolio of over 30 investments in Israel.

9. Execution

Will the end-to-end investment process be managed by the MNC, or a third party?

Self-managed | Outsourced

Verizon Ventures have an internal team managing target identification, start-up appraisals and fund management. Innogy's Israeli team is made up of a Managing Director, an Investment Director, a Business Development Director, a CTO and an office manager. On the other hand, Schneider Electric and Alstom invest through Aster Capital, and i3 Equity Partners operates as a investor with MNC limited partners including GE, HNA, Microsoft, Qualcomm and Tata.

10. Capital Source

How are the MNC's investment funds structured?

Dedicated fund | Balance sheet

Corporate Venture Capital funds are common in Israel - there are currently over 30 operating locally, many having opened since 2015. Other MNCs choose to invest more opportunistically 'from the balance sheet', essentially acquiring individual assets, whether they be full company acquisitions or equity stakes in high-potential start-ups. Many combine both approaches.

Differentiators for investment-led MNCs

INVESTMENT	06	Primary objective	Strategic	↔	Financial
	07	Independence level	Sole-investor	↔	Co-investing
	08	Portfolio range	Early-stage	↔	Mature companies
	09	Execution	Self-managed	↔	Outsourced
	10	Capital source	Dedicated fund	↔	Balance sheet

“

In Israel, innovation is everywhere, like water and food, it's so natural.

Jack Ma, Co-founder and Executive Chairman, Alibaba Group

Differentiators of partnership-led models

11. Start-up interactions

Does the MNC partner opportunistically or through structured programs?

Structured | Opportunistic

Recruiting periodic cohorts of start-ups to participate in structured programs with defined prerequisites and program benefits are common – Haier’s innovation center and Barclay’s RISE are examples. Other MNCs assess and create partnerships on a case-by-case basis, structured in line with the specific opportunity identified.

12. Solutions driver

Which comes first for the MNC: solving problems or identifying solutions?

Group requirements | Market capabilities

Many MNCs look to Israel’s innovation ecosystem as a place where solutions can be found to well-defined group challenges or requirement areas. The companies ‘pull’ emerging technologies in to the group by creating solution-orientated partnerships. Others give a mandate to their Israel innovation teams to identify and then ‘push’ high-potential, low-awareness technologies towards business units, helping to imagine the use case and its commercial application.

13. Partnership model

What is the preferred commercial model in MNC-start-up collaborations?

Licensing | Co-development

A significant proportion of MNCs aim to sign partnership agreements with start-ups after successful pilots. They then become licensed resellers of often white-labelled product components to the MNC’s customers, dividing commissions or royalties from the subsequent revenue generated. Other MNCs build partnerships at the development stage, co-creating solutions with a network of invested stakeholders using the MNC’s resources, data and relationships, and the start-ups’ technical capability and IP. Many do both, creating different programs for early-stage innovators and more mature start-ups.

14. Ecosystem integration

Does the MNCs partner with start-ups independently or build ‘consortia’?

Independent | Co-opetition

Through its Israeli campus *Konnect*, the Volkswagen Group helps its portfolio of brands engage with the Israeli innovation ecosystem. Other MNCs set the objective of working with other complementary corporates, including competitors in the case of El-Al’s Cockpit’s collaboration with the likes of Lufthansa or Boeing. This creates an ecosystem which in time generates its own innovation inertia through becoming the market’s center of gravity in a defined industry (see feature 22).

15. Partner profile

Which stakeholder groups is the MNC interested in partnering with?

Start-ups | Broad stakeholders

Start-ups are usually involved, but MNCs differ on the role of other potential stakeholders. Deutsche Telekom and IBM’s research units involve academia extensively. Enel and AT&T partner with Israeli corporates (Shikun & Binui and Amdocs, respectively), and numerous other stakeholder combinations are observable in the Israeli market (see feature 13).

Differentiators for partnership-led MNCs

PARTNERSHIP	11	Start-up interactions	Structured	←-----→	Opportunistic
	12	Solutions driver	Group requirements	←-----→	Market capabilities
	13	Partnership mode	Licensing	←-----→	Co-development
	14	Ecosystem integration	Independent	←-----→	Co-opetition
	15	Partner profile	Start-ups	←-----→	Broad stakeholders



There are some 6,000 start-ups here and it would be very dumb if we go blindfolded though this environment.

Dieter Zetsche, Chairman, Daimler

1.5 Activities

What exactly are MNCs doing in Israel

MNCs have observable *core identities*. These break down into a unique set of viable decisions that become *differentiators* for any given MNC's innovating in Israel. Finally, an MNC's differentiated identity then takes effect through its specific portfolio of innovation *activities*.

Activity portfolios vary widely in Israel. R&D-led MNCs tend to have the most diversified activity range, with an average of 4.4 different innovation activities in Israel according to this research. Investment-led MNCs average 3.1, and partnership-led MNCs average 2.5.

The options are characterized below, in decreasing order of frequency observed in Israel.

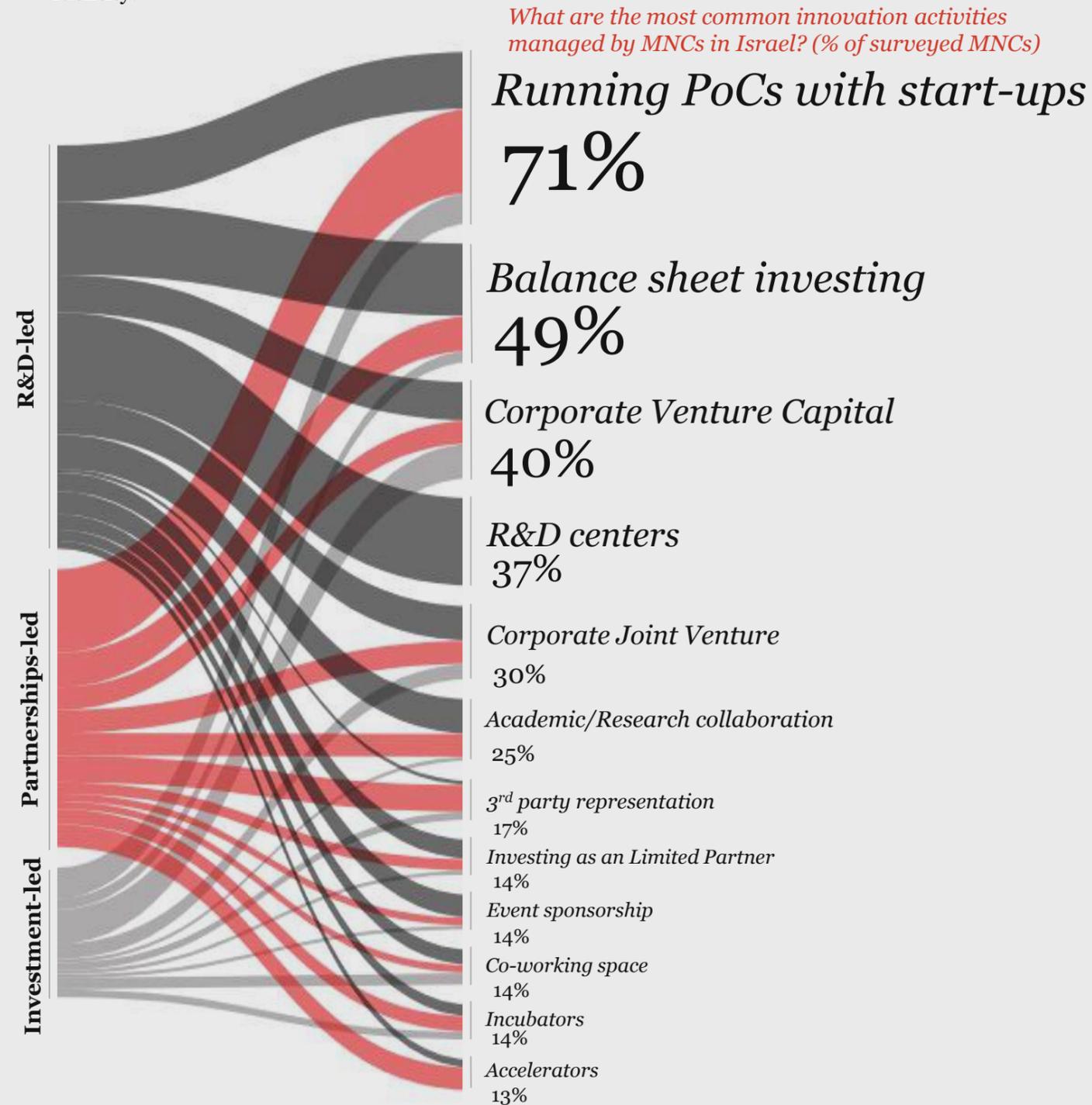
Defining the innovation activities observed

1. *Running PoCs with start-ups*
Working with start-ups that demonstrate relevant capabilities through offering ad hoc incentives for a set-scope collaboration (eg. funding, expertise, data, initial purchase orders). Based on the value demonstrated, this is a route to scaled-up commercialization, partnership agreements, or shared royalties
2. *Balance sheet investing*
Acquiring innovation assets directly, either through funding start-ups on an ad hoc basis in exchange for equity stakes, or through full company acquisitions to incorporate their capabilities or IP into the MNC
3. *Investing through corporate venture capital*
Raising a dedicated investment fund, often 'evergreen', into which returns are reinvested. Usually the fund leads to a global portfolio of start-ups, but in some cases is dedicated to Israel-based targets exclusively
4. *Running R&D centers*
Operating advanced R&D centers, typically created through local acquisitions and/or organic hiring, focusing notably on software, hardware or advanced manufacturing
5. *Agreeing a joint venture*
Working with other MNCs or an Israel-based corporate with mutual incentives to explore commercial applications of new technologies on an exclusive basis. Typically brings together different, complementary strengths between the MNC partners, as well as start-up know-how
6. *Partnering with academia*
Supporting applied research programs and Technology Transfer Offices (TTOs) through MNC resources and funding, or mobilizing joint teams to co-develop and bring to market high-potential research projects. Several government programs support these types of corporate-academic collaborations
7. *Sourcing third party representatives*
Tapping into the Israel innovation ecosystem through local representation – often providing services including scouting, deal-flow generation, target appraisal, execution support and introductions
8. *Investing as a limited partner*
Making financial investments in an independent venture capital fund, likely based in Israel, to accelerate access to IP and talent, and generate financial returns. This activity outsources the deal flow sourcing and appraisals to third party professionals, and spreads risk across a portfolio
9. *Sponsoring events*
Organizing one-off events such as hackathons, pitch competitions or meet-ups to develop an interface with the start-up world, identify collaboration partners and generate brand awareness
10. *Offering co-working spaces*
Subsidizing commercial space, and offering community and mentoring events to start-ups to develop, test and validate ideas. Access provided to MNC personnel and resources (eg. data centers, simulation labs, business mentoring)
11. *Establishing Incubator programs*
Hosting longer-term, phased programs, typically 9-12 months, for early stage start-ups. Usually includes deeper access to MNC resources, and exchanges five-figure funding for a 20 to 50% stake. Many incubators are supported and co-funded by the Israel Innovation Authority (see feature 11)
12. *Running Accelerator programs*
Facilitating short-term programs - often lasting three months - for early-stage start-ups to validate technologies and business models. The goal is a venture-ready business, in which the MNC can become the strategic investor. MNCs either co-sponsor independent accelerators or create their own programs

Feature 8: The most common innovation activities managed by MNCs in Israel

The following visual shows the percentage of MNCs participating in this research that manage each of the innovation activities defined. It also represents the relationships between the three innovation identities and the activities that are most common for each identity.

What is the MNC's core innovation identity?



Source: PwC & Start-Up Nation Central survey 2019, PwC analysis



Feature 9 – Case study: AT&T, from 'acquire' to an innovation 'foundry'

In 2007, AT&T, the world's largest telecommunications company, acquired Israeli company Interwise which offered solutions for online conference calls. Made up of 60 people, the team became AT&T's Israel R&D center in 2010, counting today over 600 employees.

"We are AT&T's most important development center outside the US. AT&T has other development groups, but this is definitely the leading center outside the US." According to Nir Shalom, who runs AT&T's Israel development center, his team is a key contributor to the company's most strategic initiatives, such as Voice-over-IP, Software-Defined Networking, cybersecurity and the Internet of Things in telecommunications.

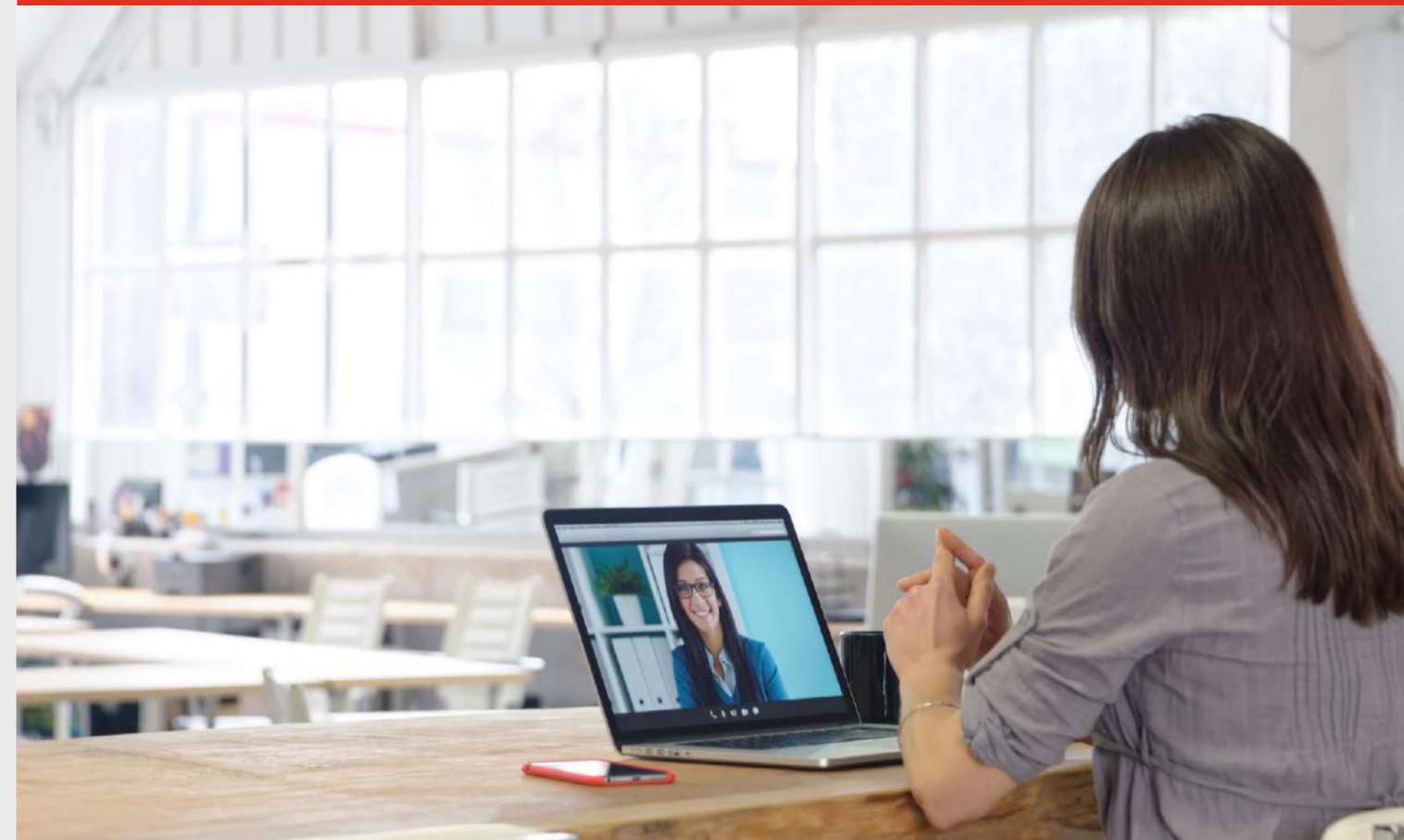
Throughout the organization, the Israeli R&D center is known for having designed the entire customer interface of AT&T's recently launched and very successful service called *DirectTV Now*, which allows customers to access television services on the Internet from any device without a converter at home. According to Nir Shalom, *"it was necessary to bring a solution to market within a very short time, with a large amount of content and a great many features, and to reach the market early. AT&T Israel was extremely significant in the new product."* He believes that the combination of technological expertise, a customer-focused approach, an innovation mindset and the ability to *"get things done quickly and not take no for an answer"* are what make the Israeli center so valuable for the organization.

In June 2011, the company opened the Israeli branch of AT&T Foundry, its global open innovation arm. This was the first center outside of the US, and only the second to a center in Texas opened four months beforehand. According to Igal Elbaz, VP for Ecosystem and Innovation at AT&T services, *"[For] almost every area that AT&T is participating in, leading and having business in, there's a good depth of technologies and variety of companies here in Israel"*. Today AT&T Foundry counts six centers globally, developing over 500 projects since its inception and deploying dozens of new solutions for the company.

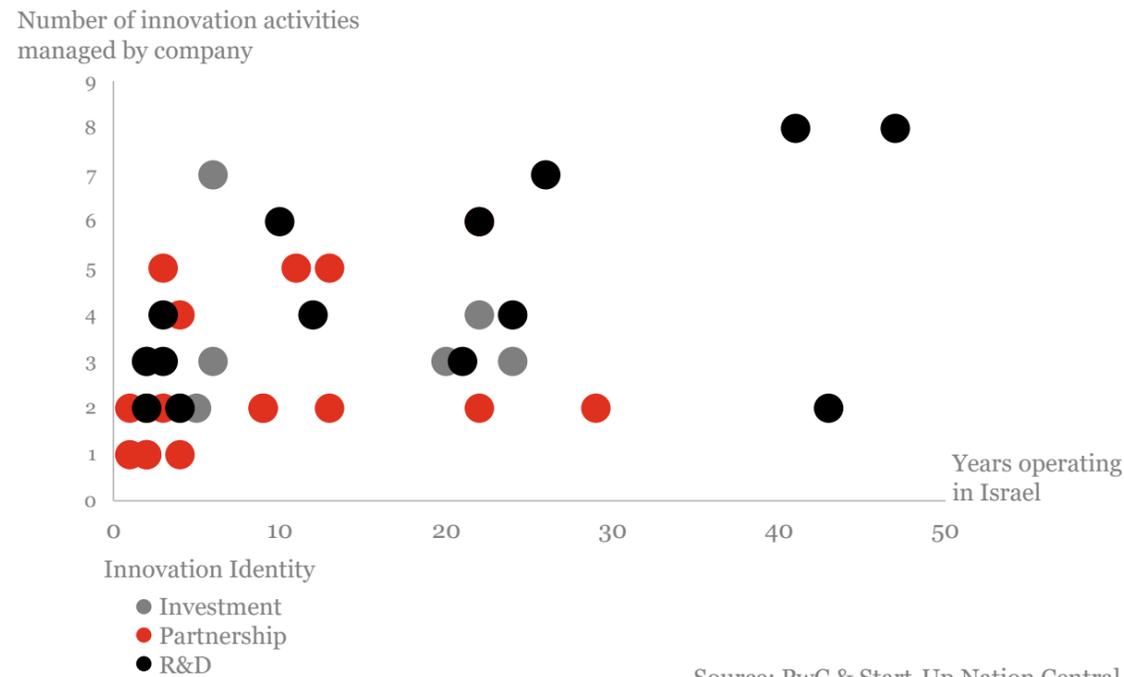
Serving as a connector between the Israeli ecosystem and AT&T in fields such as cybersecurity, automation, operational efficiency, back-office systems as well as entertainment services, the Foundry typically screens approximately 200 start-ups every year, filters the list to about 40 which ultimately lead to around eight commercializations. According to Chris Rice, senior VP for AT&T Labs, Domain 2.0 Architecture and Design, *"AT&T is becoming more and more of a software company, rather than rack-and-stack, rather than equipment. There's a whole new ecosystem that has to be created to do that – that's part of the reach out here [in Israel]."*

Takeaway

MNCs entering the Israeli innovation ecosystem through the 'acquire' model maintain successful local activities by diversifying their innovation portfolio, often combining R&D centers with open innovation programs – accelerators, incubators or other types of innovation centers where local start-ups play a key role. As such, MNCs can leverage everything Israeli innovation can offer in addressing their most pressing challenges.



Feature 10: MNCs tend to increase their range of activity with time in market



Source: PwC & Start-Up Nation Central survey 2019

- As MNCs maintain and develop their Israeli innovation activities, they increase the level of diversification of local operations – an R&D player entering the market through acquire will realize over time the need to open innovation activities to local innovators, primarily start-ups
- Diversifying innovation activities allows MNCs to tap into the wide range of Israeli innovation, developing solutions with early and more mature start-ups, hiring and retaining local talent, or supporting and partnering with leading research institutions



Roughly almost half of (our) healthcare revenue is based on innovation stemming from Israel [...] This tells us a lot of the story of how important Israel is to Merck

Kai Beckmann, CEO of Performance Materials, Merck

Feature 11: Government support programs for MNCs in Israel

The Israel Innovation Authority (IIA) - in addition to offering tax benefits for MNCs with significant Israeli operations – has also established specific innovation incentive programs for MNCs looking to tap into different segments of the Israeli innovation ecosystem, be it start-ups, academia or other corporates. Below are a few examples of such programs.

	Objective	Target Audience	Funding & Benefits
Corporate R&D incentive programs			
R&D fund	Encourage MNC commercial R&D programs Share R&D costs between IIA and MNC	MNCs with significant Israeli R&D activities in emerging fields - healthcare, cyber, AI, fintech, cleantech etc.	Grant of 20% to 50% of the approved R&D expenditures Operations in 'favorable development regions' eligible for additional support of 10%-25%
R&D Cooperation in Bilateral Schemes	Initiate bilateral R&D joint projects between MNC teams in different geographies	MNCs looking for collaboration between R&D activities in Israel and in other geographies	Local R&D funding, identification of foreign strategic partners based on Israeli international agreements (eg. Horizon 2020, bi-lateral agreements)
Industrial-Academic collaboration programs			
MAGNET	Support early-stage R&D projects with long-term industrial applications, using MNC resources	Consortiums of local and global companies and research institutes developing early-stage IP with commercial potential	Up to 66% of the approved budget for an industrial company, 100% of the approved budget for a research institution Three year operating period
MAGNETON	Support technology transfer from academia to industrial companies to implement and commercialize IP	MNCs looking to actively support and participate in research projects with commercial applications	Research grant of up to 66% of the approved budget Up to 24 months operating period
NOFAR	Support early-stage research stage with commercial potential, prior to Magneton eligibility	MNCs looking to tap into research-heavy technologies and IP with tangible commercial application	IIA funds 90% of budget MNC receives first right to negotiate commercialization in exchange for 10% of project costs Program limited to one-year period
MNC-start-up collaboration programs			
Innovation Lab	Connect local early-stage start-ups with MNCs to develop, test and scale up breakthrough technologies	MNCs looking to collaborate with early-stage start-ups.	IIA-funding up to ~4m establishment costs (more in 'development areas'); ~500k yearly operating costs
Incubator	Investment-led program for MNCs, research institutions and start-ups, combining VC money, business mentoring, tech resources, admin support	MNCs looking to invest in and collaborate with start-ups to validate technologies and help reach a fundable milestone	20-50% equity in incubated companies, in exchange for 15% of R&D costs and an eight-year investment commitment horizon IIA funds remaining 85% of R&D costs for no equity

Feature 12 – Case study: Working with a local VC, the ‘win-win-win’ model

In recent years, more global corporates have chosen to partner with local investors (mostly VC funds) often investing as limited partners in the fund or as accompanying strategic investors in portfolio companies. This approach to gaining a foothold in the Israeli innovation ecosystem creates a sort of 'win-win-win' solution for start-ups, investors and global corporates:

- **Start-ups** get access to the resources, often customer data, of global companies to develop and test their products
- **Investors** establish close relationships with fast-growing start-ups who increase their valuation by collaborating with global companies, refining their value proposition and validating product-market fit
- **Global corporates** develop breakthrough solutions with the most promising start-ups whose potential has been validated by independent, local investment professionals

One such program is JVP Play, launched in October 2017 by Israeli venture capital firm Jerusalem Venture Partners (JVP). The program matches global leaders in banking and retail such as Barclays, Tesco or PepsiCo with carefully selected, high-potential Israeli start-ups. The goal is to co-develop solutions that address the MNCs’ most pressing challenges, while providing start-ups with the necessary resources to develop PoCs and run successful pilots. MNCs will typically work with JVP on an ongoing basis to define their business requirements and then collaborate with qualifying start-ups for a period of 4 to 6 months to test, validate and augment relevant solutions. Outcomes of this collaboration can include taking a product to market, implementing a solution within the organization or taking equity in the start-up (directly or through JVP). *“Our framework was designed to dramatically increase the conversion ratios of PoCs and pilots by start-ups by matching corporate demand with the right solution for each challenge,”* explained Yonatan Machado, former JVP Labs Partner and Head of JVP Play.

With JVP’s track-record and reputation as a leading investor in the Israeli market, corporates are able to scan hundreds of high-potential, early-stage start-ups in a matter of a few months, providing both a broad view of the Israeli innovation ecosystem as well as a deep-dive into emerging technologies addressing their most pressing challenges. Serving as proof of the program's value to MNCs is the fact JVP Play is the first initiative outside the UK embraced by Tesco Labs, the global retail giant's innovation arm. In the past year Tesco has already collaborated with several Israeli start-ups in various stages, from PoC development and product definition to running pilots in its UK retail outlets.

i3 Equity Partners offers another example of the MNC-VC collaboration model. Notably backed by Microsoft, Tata, Qualcomm, GE and the HNA Group, i3 Equity Partners invests in early-stage IoT start-ups in verticals including digital health, home automation, consumer tech, automotive and Industry 4.0. Using its deep knowledge of the Israeli IoT space, i3 was able to scout over 700 start-ups in 1.5 years, and find the most relevant start-ups fitting corporate partners' technology and market requirements.

Takeaway

Partnering with a local VC offers a route to align incentives between different groups with complementary capabilities. The incentives require sustained management, but the mutual benefits are significant, and the collaboration is unlikely to constrain other parallel innovation activities selected by a given MNC.



Feature 13: The Israeli innovation ecosystem – who can MNCs partner with?

Global companies looking to tap into Israeli innovation – be it to develop PoCs, run pilots, commercialize new solutions or invest in start-ups – have access to a wide range of innovators, each type of collaboration with its pros and cons. Below are a few examples:

Innovation partner	Rationale	Limitations	Examples
Start-ups	<ul style="list-style-type: none"> • Mature start-ups: ‘quick wins’ and immediate impact • Early-stage: access to breakthrough technologies • Government support, collaborative ecosystem 	<ul style="list-style-type: none"> • Challenging interface and different processes • Cultural challenges and different ways of working • Different timescales and incentives 	<ul style="list-style-type: none"> • Intel + Mobileye • JCI + Magos • Genpact + PNMSoft • Nielsen + Vbrand
Local VC	<ul style="list-style-type: none"> • Pre-selection process for high-potential start-ups • Deep knowledge of Israeli innovation ecosystem • Win-win-win model (see feature 12) 	<ul style="list-style-type: none"> • Requires ongoing business requirement definition • Misaligned incentives – financial vs. strategic • Commitment horizon – short/long-term 	<ul style="list-style-type: none"> • JVP Play: Tesco + Pepsi + Barclays + Microsoft • I3 equity: LPs include GE, HNA, Microsoft, Qualcomm, Tata
Academic / research institutions	<ul style="list-style-type: none"> • Access to breakthrough research • Technology transfer exclusivity • Strong government support 	<ul style="list-style-type: none"> • Limited commercial potential • Significant resourcing requirements • Very long innovation cycle 	<ul style="list-style-type: none"> • Deutsche Telekom + BGU • Dell + BGU • Merck + HUJI
Local corporate	<ul style="list-style-type: none"> • Access to innovators through established local company • Similar ways of working (corporate to corporate) • Government support for global-to-local partnerships 	<ul style="list-style-type: none"> • Cultural challenges • Differences in scale and objectives • Differences in scope, technological and markets 	<ul style="list-style-type: none"> • AT&T Foundry + Amdocs • Infralab: Enel + Shikun & Binui • Cockpit: El-Al + Lufthansa + Boeing
Other MNC	<ul style="list-style-type: none"> • Significant potential synergies • Attractiveness for local start-ups looking for clients • Government support for collaborations 	<ul style="list-style-type: none"> • Corporate culture differences • Risk of cannibalization • Limited exposure to local innovators 	<ul style="list-style-type: none"> • Pmatx: Merck + Flex (IIA support) • FutuRx Johnson & Johnson + Takeda + Orbimed (IIA support)

Source: PwC analysis, company information.



02 Findings

2.1 Journeys and starting points

*How do MNCs take their first steps in the ecosystem?
What evolution is expected?*

2.2 Drivers and benefits

*Why are MNCs coming to Israel to innovate?
Are they getting the benefits they expected?*

2.3 Challenges and success factors

*What is hard about innovating in Israel?
How are MNCs getting it right?*

2.4 Governance and metrics

*How are MNCs structuring their innovation teams?
How is success measured?*

The State of Innovation – Summary of findings

2.1

Journeys & starting points

*How do MNCs take their first steps in the ecosystem?
What evolution is expected?*

1. Re-locate, acquire or outsource
2. Defined and improvised innovation mandates
3. The impact of local facilitators
4. The 'Israel-first' model
5. Pivot to venturing activities

2.3

Challenges & success factors

*What is hard about innovating in Israel?
How are MNCs getting it right?*

1. Instability around group ownership
2. Achieving business unit traction
3. Leveraging cultural diversity
4. Aligning corporate and innovation strategy
5. MNCs and start-ups – a different pace

2.2

Drivers & benefits

*Why are MNCs coming to Israel to innovate?
Are they getting the benefits they expected?*

1. Benefits realized match drivers
2. Surprise benefits – openness and challenge mindset
3. Breakthrough vs. incremental innovation
4. Growing focus on commercialization
5. The value of cybersecurity across industries

2.4

Governance & metrics

*How are MNCs structuring their innovation teams?
How is success measured?*

1. Clear KPI maturity curve
2. The value of intangible innovation metrics
3. A variety of innovation governance models
4. Structuring group-level innovation
5. Absence of unified innovation metrics



2.1 Journeys and starting points

How do MNCs take their first steps in the ecosystem? What evolution is expected?

Global innovators arrive in Israel for a journey, not a destination. MNCs innovating in Israel know that the evolution of their model from their selected starting point is both expected, and valuable. 40% of MNCs surveyed made their entry through acquire – establishing Israeli operations with the acquisition of a local start-up team, although R&D-led MNCs are five times more likely to have started their innovation activities in Israel this way compared to others. Over half of MNCs in Israel appear to have started by hiring a local representative (60%). This is a much more commonly cited starting point than relocating group personnel from outside of Israel – an option preferred by only 22% of respondent MNCs.

Beyond starting points, diverse evolution of operating models is observable. MNCs initially prioritizing partnerships frequently add investment activities to their activity portfolios (eg. Takeda, Innogy); R&D-led MNCs develop accelerators (eg. Microsoft, Merck Group); and others ramp up and later downsize innovation operations (eg. GE focusing on ventures and shutting down its Predix start-up accelerator program).

2.1.1 Re-locate, acquire or outsource

MNCs often begin innovation operations quickly after successful executive visits that exceed expectations. Marubeni, a diversified Japanese conglomerate, hired a local scout and relocated an HQ-executive within one quarter of their group CEO's delegation in November 2017.

Sustained models in which there is no permanent local representative are rarer. One example is Henry Ford Health System, whose near-quarterly visits to Israel involve innovation leaders searching for high-potential digital health companies who can help their organization improve quality, increase patient access or reduce group costs. But MNCs typically mobilize with the foundation of a local representative, local acquisition, or local service provider.

- **Local representatives** – often business development, marketing or investment personnel hired to scout for relevant start-ups, build ecosystem relationships and generate deal flow. Most companies looking to establish open innovation activities will choose this path, with or without previous interaction with the Israeli ecosystem. Daimler relocated the CEO of its Korean Financial Services activity and opened a mixed R&D and open innovation center in November 2017 (after it had already invested in Via and StoreDot), realizing it could tap into Israeli innovation in multiple ways. Other companies like Innogy or Haier initially used services from trusted local representatives before expanding their local teams to 3-5 open innovation personnel.
- **Local acquisitions** – acquisitions of Israeli technology companies continue even while the ecosystem matures as described. PwC's 2018 annual exit report notes that Israeli companies made 61 exits for a total of \$4.9bn in 2018. The driver of acquisitions varies however with how proximate the target is to core group operations. EMC (today, Dell EMC) acquired RSA in 2006 to enhance its anti-fraud capabilities and gain access to talent and IP already within the company's horizon. In October 2017, Alibaba opened an Israeli research center with the acquisition of Visualead, which had raised investments from Alibaba in 2015.
- **Local provider** – the Israel market has seen fast growth in the number of third-party innovation facilitators, often with an industry focus (for example The Shelf in the retail sector or The Floor for fintech). These groups leverage extensive industry connectedness to host MNC delegations, scout for bespoke start-up profiles, and coach start-ups in navigating MNC collaborations. Israel-based Earthbound serves as Unilever's Open Innovation Port in Israel as well as Walmart's Anchor Innovation Partner for sourcing Israeli technologies. Coca Cola, Turner, Mercedes Benz and Walmart work with The Builders to source and develop commercialized partnerships (see section 2.1.3).

*How did your company take its **first steps** in Israel's innovation ecosystem?*



Source: PwC & Start-Up Nation Central survey 2019
NB: several MNCs selected multiple responses to this question

2.1.2 Defined vs. improvised innovation mandates

Taking risks, failing fast and trying again is often described as the essence of meaningful innovation. One of the related decisions for MNCs starting innovation activities in Israel is how firm their in-market objectives are at the starting point. Some arrive and innovate in line with a structured plan with a clear commitment horizon, others mobilize and proceed more opportunistically.

Both approaches appear to be valid. The Israeli general manager of a large automotive company explained how his company innovates around a declared strategic agenda focused on autonomous driving and smart mobility, with the rationale that this will lead to higher conversion rates, achieved sooner. In contrast, the Israeli innovation leaders of one Chinese manufacturer described their very open mandate to identify 'horizon 2' technologies and then build the case for their exploration with the group.

There is also a relationship here with the MNCs' appetite for risk. Those who begin their journey more cautiously may favor 'testing the waters', without the constraint of innovating to a pre-defined agenda which usually requires senior group approval in advance. Early wins then tend to secure longer term mandates to explore, with HQ commitment horizons extending to 1-2 years or more.

31%

MNC executives who describe **taking risks, failing fast and trying again** as the **essence of insightful innovation**

Source: PwC Global Innovation Benchmark, 2017

2.1.3 The impact of local facilitators

The growth of well-connected, specialty third parties who facilitate MNCs' entry to Israel's innovation ecosystem is evident. This community of providers, which offers an accelerated route to establishing innovation activities, can be segmented in to a number of specialties:

Industry specialists

These groups focus on exploring technology use cases in a specific vertical, and are usually lead by experienced professionals from the respective sector. Examples include The Shelf (retail), Ecomotion (automotive), BioHouse (pharma) or The Floor (financial services).

Community specialists

These groups cross industry verticals and develop communities of specialists, ecosystem players and corporate backers to position as a meeting point at the interface of MNCs and start-ups. "What we have here is a lot of practical information on what works and what doesn't work", explains Uzi Sheffer, CEO of Israeli-founded SOSA, a global network of tech innovation hubs connecting over 8,500 start-ups each year to MNCs and investors in its Tel Aviv and New York centers (see feature 14).

Commercialization specialists

These groups usually have fewer corporate partners, but provide less commoditized and more bespoke services. WRL Ventures, supporting BASF in Israel since 2013, is a service provider that focuses on a single strategic MNC customer. The Builders, along with its related program The Bridge, supports four MNCs in sourcing and executing commercialization programs through rotating cohorts of carefully selected start-ups. Aster and i3 Equity Partners are examples of investment professionals who work on behalf of MNCs to source and appraise investment targets. Trendlines, in addition to sourcing Israeli investment opportunities for Bayer or Braun, is also an incubator with support from the Israeli Innovation Authority, working with medical and agritech start-ups to facilitate PoCs in alignment with MNC requirements.

Partnership-focused MNCs have a clear upside and minimal risk from interacting with these groups. But they often work with them in parallel with, not as a substitute for their own partnership-seeking efforts. Munich Re is a good example of an MNC partnering successfully with a local facilitator in SOSA, as well as through its own scouting operation.

Feature 14 – Case study: SOSA, a global network of hubs facilitating open innovation

Founded in 2014 by 25 leading Israeli investors and high-tech entrepreneurs, SOSA is a ‘global open innovation platform’ connecting its partners – international companies, investors and public organizations – with local innovation ecosystems. SOSA facilitates corporate innovation by connecting its partners to relevant start-ups across 8 industry verticals: fintech/insuretech, constructiontech, homeland security, industry 4.0, cybersecurity, energy & sustainability, new mobility and supply chain & logistics.

Initially focused on scouting for start-ups in the Tel Aviv and New York City ecosystems, SOSA has in recent years expanded to Germany, Spain, India, Australia, United States and Asia. SOSA won a New York City tender in October 2018 to establish a Global Cyber Center, whose goal is to transform New York City “into a global leader of cybersecurity innovation”. Among its numerous partners in Israel is the Italian utility company Enel, who in 2016 established its Israel-based Innovation Hub in partnership with SOSA and The Junction, a leading Israeli program for pre-seed start-ups to connect with global corporates. Another notable SOSA partner is Landing Pad, initiated in 2016 in Israel, by the Australian government, to help Australian start-ups access global markets, serving as a de facto bridge between the Australian and Israeli innovation ecosystems.

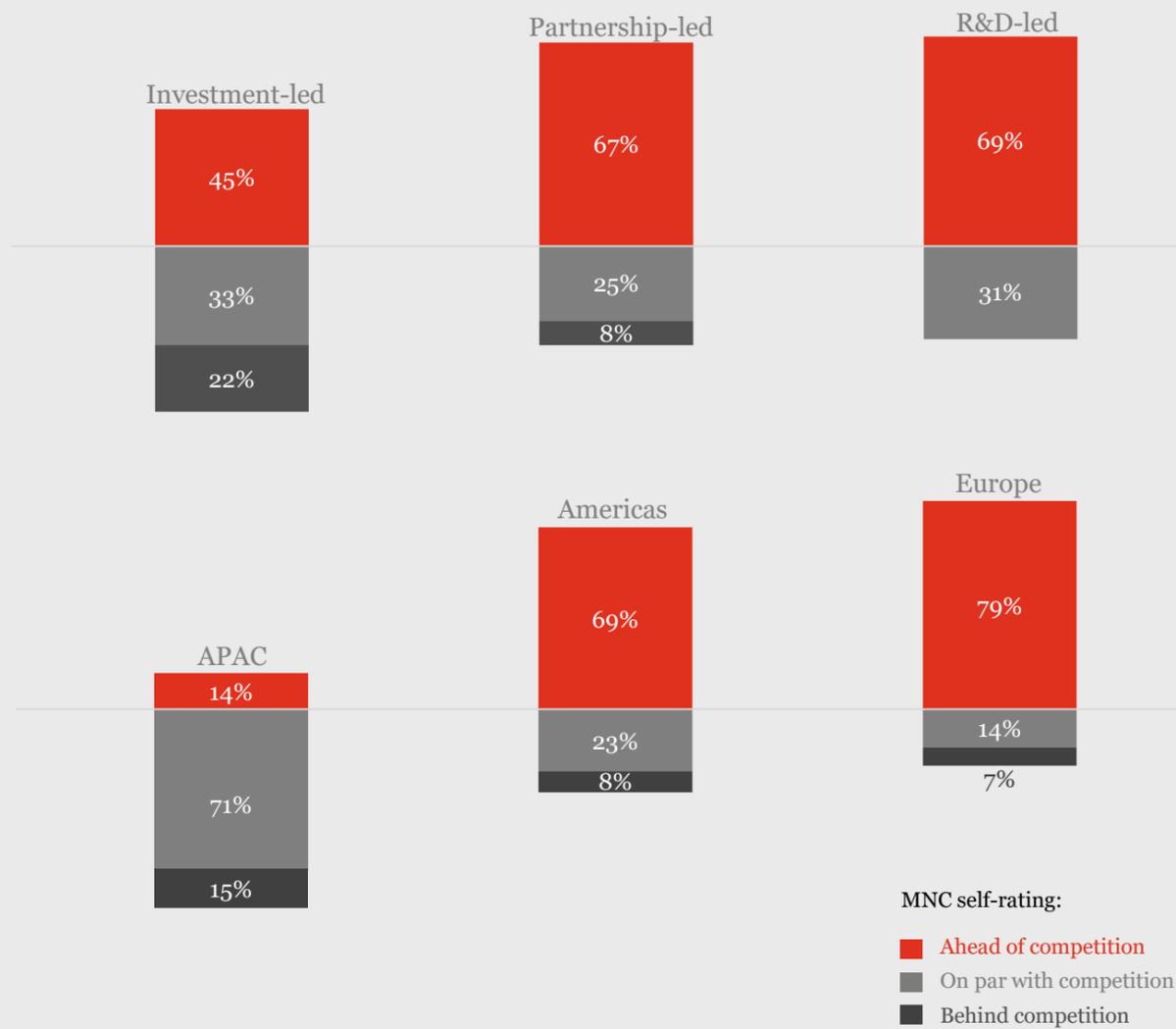
SOSA's value proposition lies in its ability to connect partners with a wide range of disruptive technologies across technology and business verticals, and help move from a continuous flow of innovative start-ups to actually identifying the most relevant ones for global organizations looking to address very specific challenges. According to CEO Uzi Scheffer, “SOSA is a global network of innovators that helps start-ups with access to investors and global markets, and on the other side provides corporations with direct and first access to innovation.”



Takeaway

Partnering with a local provider with deep knowledge of start-up ecosystems and a broad network allows MNCs to commit limited resources while still identifying which local innovators could help them address their most pressing challenges. This type of partnership with a local facilitator can serve as an effective entry point to the Israeli innovation ecosystem, with potential follow-up in the form of a more permanent local scout or investment team.

Feature 15: How would you rate your innovation performance in Israel compared to competition?



- MNCs' confidence in their innovation performance in Israel is very high. Two-thirds of MNCs surveyed perceive themselves as ahead of competition in terms of innovation performance
- MNCs focused primarily on R&D and partnership activities perceive their innovation performance as significantly stronger than innovation-led MNCs in Israel, for whom a minority (45%) believe they are ahead of competitors
- APAC-headquartered companies, who have more recently started establishing activities in Israel, rate their own innovation performance as significantly weaker than competitors. European-headquartered MNCs were most confident

Source: PwC & Start-Up Nation Central survey 2019

2.1.4 The 'Israel-first' model

40% of MNCs surveyed cite Israel as a distinctive location for their global activities, distinct in some way from their other innovation locations.

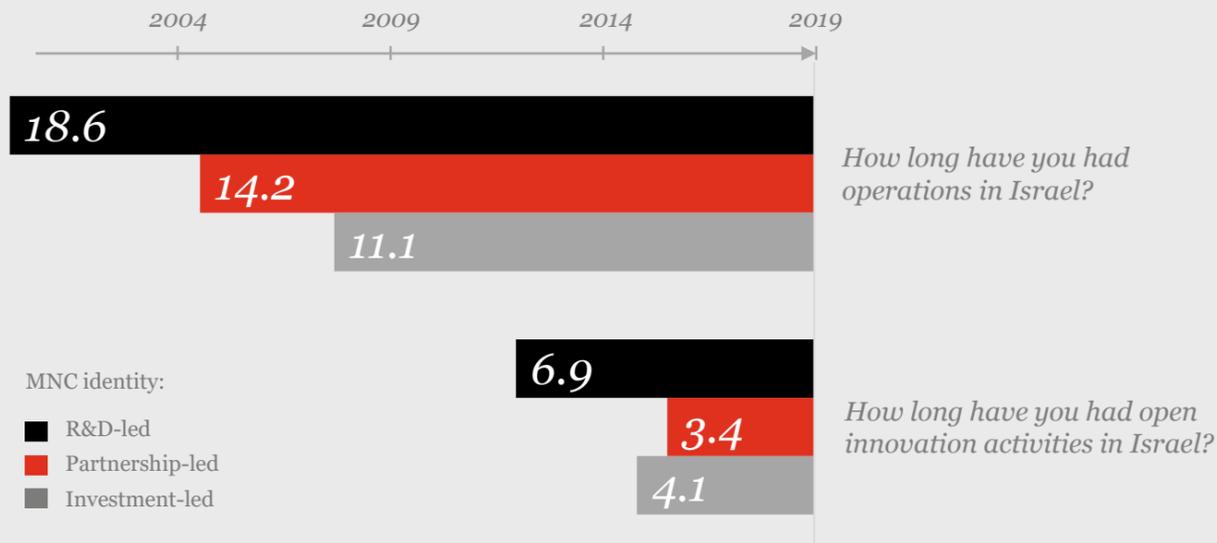
For some of these MNCs, Israel has a distinctive influence on the group due to the revenue impact of past IP innovations. Microsoft's log analytics business and its contribution to Azure's growth, Intel's mid-2000s 'recovery' enabled by their Israel engineers' Banias chip, Apple's iPhone X's face recognition technology following the acquisition of Realface in February 2017, and 50% of Merck Group's global healthcare revenue stemming from Israeli innovation – all of these examples testify to the Israeli ecosystem's distinctiveness.

For other MNCs, Israel is a distinctive innovation location because it was their first outside the HQ location. Examples include Apple's Herzliya R&D center with over 1,000 employees, or the Israeli branch of AT&T Foundry, the company's first open innovation center outside of the US, and only the second to a center in Texas opened only four months beforehand.

Even for the 60% of MNCs citing Israel as one of a number of innovation locations worldwide, Israeli innovation activities often differ from existing structures in Silicon Valley, Singapore, Berlin or Mumbai. In addition to creating an Israeli innovation hub in 2016, Italian utility Enel partnered with Israeli real estate group Shikun & Binui and the Israeli Innovation Authority in November 2017 to create Infralab, an innovation lab with data analysis and simulation tools for early-stage start-ups developing technologies for smart grids and energy infrastructure. Israel often offers faster results and requires smaller teams owing to the more concentrated, networked market and the distinctive execution pace of local teams.



Feature 16: The average open innovation team in Israel has been running for 4.5 years



Source: PwC & Start-Up Nation Central survey 2019

2.1.5 Pivot to venturing activities

Pivots are common amongst MNCs innovating in Israel. They represent a mature process of refining requirements in a still-young open innovation industry as the interface between corporates and start-ups becomes more fluent. The growing focus on venturing activities is particularly observable amongst the MNC community in Israel. 33% of total VC investment in Israel comes from corporate venture capital funds, compared to a global rate of 20%. Many believe that allocating a fund and recruiting a team of 2-3 investment professionals is the right growth step after beginning with asset-light options such as scouting, sponsorships and PoC co-development.

Takeda, Japan's leading pharmaceutical company, is a good example, with their evolution from Takeda's Digital Accelerator to Takeda Digital Ventures. Based in Palo Alto, Takeda Ventures' goal is to support the growth of therapeutic innovation through strategic investments. Innogy's Innovation Hub operates as a CVC, investing in four key areas to address global challenges facing the energy sector. MNCs participating in this research from the financial services, telecoms, utilities and semiconductors sectors have all begun strategic investment programs since 2015.

Other pivots are also observable. MNCs that begin collaborations through pilots with later-stage start-ups – with A or B round financing, initial revenues and a viable product – often later develop a focus on early stage companies, after value has been demonstrated to the group through quick win partnerships. This is why, for example, well-established MNCs like GE, Microsoft or Qualcomm work with i3 Equity Partners to identify early-stage IoT-related start-ups.



Apple is in Israel because the engineering talent here is incredible. You guys are incredibly important to everything that we do and to all the products that we build.

Tim Cook, CEO, Apple



Feature 17 – Case study: Merck Group, maintaining success through diversification

Active in Israel since 1968, 350-year-old German pharmaceutical and chemicals firm Merck Group employs over 300 people in Israel, operating four R&D sites and incubators across Israel for its three business sectors – healthcare, life science and performance materials. In his latest visit to Israel, Kai Beckmann, CEO of the Performance Materials business, provided a compelling argument for Merck's successful and long-standing Israeli operations: *“Roughly almost half of (our) healthcare revenue is based on innovation stemming from Israel. This tells us a lot of the story of how important”* Israel-based innovation is to Merck Group.

Merck has gradually expanded its innovation footprint in Israel. The company has funded several Israeli academic research teams to bring breakthrough technologies to its key markets, often through Israel Innovation Authority (IIA) and R&D incentive programs. In 2015, Merck acquired and integrated Qlight Nanotech, a spin-off from Yissum, the Hebrew University of Jerusalem's technology transfer office. A developer of nanocrystal display technology that enhances the color of display screens, Qlight is now a fully integrated part of Merck's performance materials R&D team and leads its nanomaterials R&D efforts.

In 2011, Merck created its BioIncubator, a Healthcare and Life Science incubator with an initial commitment of €10m investing in four Israeli start-ups – ChanBio, Neviah Genomics, ARTSaVit and Metabomed.

In 2017, Merck and technology manufacturer Flex jointly established PMatX, a technology incubator with a focus on nanotechnologies. PMatX will include a €20m investment commitment for three years and support from the IIA as well as other partners such as HP and Battery Ventures.

Then in 2018, the company established ExploreBio jointly with Wuxi Apptech, Arkin and Pontifax as a pre-seed fund including a €20m, 5-year commitment to invest in biotech start-ups, where start-ups will also develop PoCs and work at Merck's BioIncubator facilities in Yavne, Israel.

Merck Group's history and success in the Israeli ecosystem has enabled privileged access to local innovation. *“Gaining a foothold in the ecosystem is the easy part,”* explains Marc Feiglin, Head of Alliance Management & Partnerships at Merck Group, based in Israel, *“the real challenge is to bring the right start-up to the right business unit. While CEO-level support is critical, finding that fit requires advocating for the ecosystem to both VP and mid-level business unit managers. High visibility and strong relationships with group leaders is the key, because having a champion within the business lines is key for implementing new solutions from the outside.”*

To support collaboration with start-ups and researchers, Merck Group created, in 2016, a Strategy & Transformation corporate function, *“to help support and coordinate collaboration of strategy, innovation and digitalization initiatives across Merck,”* based in Germany with innovation hotspots throughout the world including Silicon Valley, China and Israel.

Takeaway

Merck Group's success at growing a diverse innovation activity portfolio in Israel is a considerable achievement, allowing start-up collaborations at every stage, from research through to active distribution. But the internal process underlying the collaborations is essential too. In particular, the group's innovation leaders actively advocating for exploration, and a mature and supportive governance structure.



Takeaways

Journeys & Starting Points

- 1. Different starting points are suitable for different MNCs**
 For those focusing on quick wins to demonstrate value to shareholders or management teams, hiring scouts, using third party suppliers and sponsorships are most likely to offer the earliest benefits. Regardless of priorities however, some starting points are noticeably rare in the market – MNCs uncommonly start in Israel purely with venture investments, or organic growth of R&D facilities
- 2. Corporates are obtaining profitable innovation outcomes not in spite of pivots, but because of them**
 Pivots take many forms: changing the portfolio of innovation activities maintained, shifting the focus of the technology categories, interacting with stakeholders at different maturity levels. With few exceptions, every MNC with sustained innovation models in Israel pivots
- 3. Engaging third party innovation providers fast-tracks mobilization, but has limitations**
 While these groups offer accelerated deal flow and in-market expertise, many represent a lot of different global organizations. They are likely to fit well with Partnership-orientated MNCs with low familiarity with Israel, and MNCs who define very open, ecosystem integration as a goal. For others, using third parties exclusively will likely delay, not advance plans to build an independent innovation structure in Israel
- 4. The start-up and VC community is maturing, and with it, its interface with corporates will continue to evolve**
 The number of start-ups raising between \$10m and \$20m has doubled since 2015, venture capital is readily available and as such mature start-ups are becoming more dominant within the Israeli ecosystem. Their incentives will adapt accordingly, and MNCs may start finding more success through engaging leading start-ups as customers instead of as investors
- 5. Revenue-generating operations are not a prerequisite for successful innovation**
 The age of the average MNC open innovation team in Israel is 4.5 years, while MNC's average time since first launching operations in Israel is closer to 15 years. But although some MNCs have had historical sales and marketing activity in the market (eg. Takeda, Skoda, Microsoft), many do not and can be equally successful



2.2 Drivers and benefits

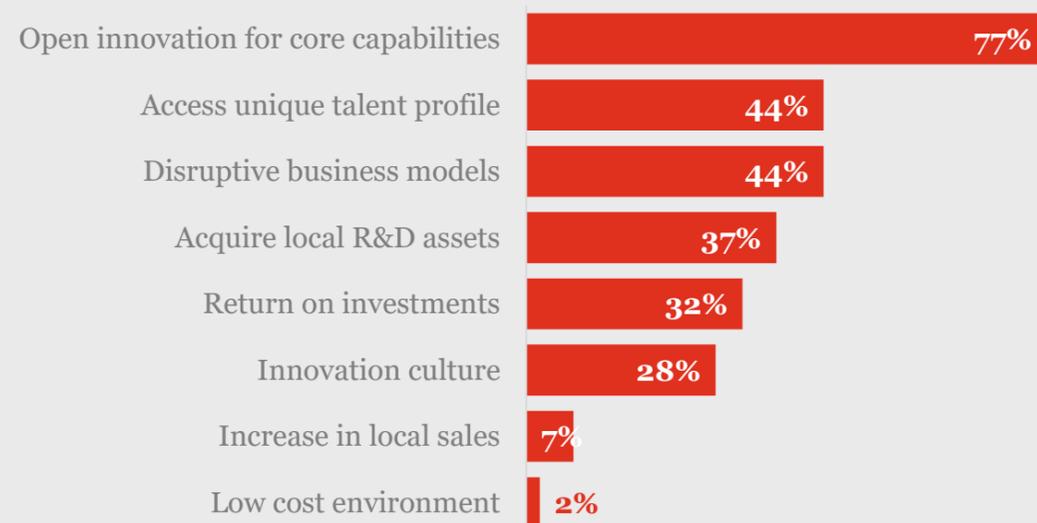
*Why are MNCs coming to Israel to innovate?
Are they getting the benefits they expected?*

Global corporates have been innovating in the Israel market for decades, but their motivations are changing. The number of R&D centers created every year accelerated between 2004 and 2016 (19.5/year on average) but the curve has flattened in recent years. In Fintech, for instance, 20 R&D centers were created before 2017 against only five open innovation programs. Since 2017, only one R&D center was created (BNY Mellon), against 16 Israeli partnership and investment outposts.

It is unsurprising then that MNCs surveyed in this research cite enhancing core capabilities through open innovation as their key driver (77%), now ahead of more traditional drivers such as accessing talent (44%) and acquiring R&D assets (37%).

In fact, though R&D-led MNCs in the local market are as active as partnership-led MNCs in looking for *disruptive* business models, they are only half as likely to also aim to enhance core capabilities through *open innovation*.

Feature 18: What were the key drivers for your company establishing innovation activities in Israel?



Source: PwC & Start-Up Nation Central survey 2019

2.2.1 Benefits realized match drivers

MNCs get what they come for in Israel – and more. 77% of MNCs surveyed establish Israeli innovation activities to enhance core capabilities in current product areas. Of those, 89% cite incremental innovation on existing products and services as a key benefit of Israel-based activities – a high rate of realized benefits.

44% of MNCs look to access Israeli talent – among companies citing these motivators for innovating in Israel, 60% claim to have managed to source and retain highly qualified local talent, primarily engineers and data scientists. Similarly, a clear majority of MNCs looking for financial returns from investments or disruptive business models realize the benefit sought.

2.2.2 Surprise benefits – openness and challenge mindset

MNC innovation executives describe four key benefits of innovating in Israel. Firstly, technology capabilities – the distinctive quality of the IP and technical maturity of Israeli start-ups. Secondly, despite commonly referenced retention and wage inflation challenges, the local talent pool is seen as a significant asset at the group level. The other two are unexpected for most MNCs.

Openness

A majority of respondents enthusiastically describe the openness and accessibility of ecosystem stakeholders in comparison to other innovation locations. The small, highly concentrated market, and culture of 'collaborative co-opetition' generates a level of accessibility that is regarded as very distinctive. One Chinese manufacturer innovating locally explained that only in Israel could their CEO-led delegation meet with their Chinese competitors' CEO for lunch. Cockpit's leadership in building a consortium of global airline companies to benefit mutually from local PoCs and emerging technologies in areas such as smart procurement or flight capacity optimization, is another example (see feature 22). Openness is also detected amongst the start-up community, which is often agnostic regarding their destination market, much unlike Silicon Valley start-ups who reportedly have a general bias towards scaling in the US markets.

Challenge mindset

The second surprise benefit is the highly-valued 'challenge mindset' corporates find in Israel. Local innovation teams impact the broader group by bringing imaginative, more aggressive applications of known technologies. The same Chinese manufacturer's Israel-based team explained that *"the driver of change will not come from the company, it will come from us and that's our benefit"*.

The challenge mindset is also about execution. Local start-ups demonstrate exceptional pace of development. *"The unique advantage in Israel is how we approach problems"* explains Autodesk Israeli GM and Director of BIM 360 Products line, Ilai Rotbaein. *"In the US or UK, when facing a certain problem, we tend to break down the problem and go into detail for a holistic solution that takes a long time. The approach in Israel is very different – iterate, test things, evolve, move on – remove innovation overheads"*.

Feature 19 – Case study: Schneider Electric, going beyond R&D as the driver of innovation

According to its Business Incubation VP, Rodolphe Heliot, Schneider Electric, the multinational energy management powerhouse, has a key objective in mind for its global open innovation activities: *"disrupt [our] own business and build the next two-billion dollar business unit."*

While Schneider operates more than 20 innovation centers worldwide, the Israeli outpost is thought to offer a distinctive opportunity. During his last four-day visit in Israel in 2018, Chief Strategy Officer Emmanuel Lagarrigue cited competition for talent from the likes of Amazon, Google or Microsoft to explain why creating a local R&D center is not necessarily the best option for the company, and why it has opted for an open innovation model in Israel:

"It could be that a company like ours won't be the best alternative for such talent, but we are likely to be the best alternative for entrepreneurs who want to solve challenging problems and are looking for a platform on which to sell and try out their technology. Cooperation like this is therefore more significant than establishing an R&D center – it means investing in Israeli businesses, being present in Israeli industry, and connecting Israeli entrepreneurs and innovation with our businesses".

Consequently, Schneider runs a number of open innovation programs in parallel, with a particular interest in IoT. Its business incubation program aims to create *"new growth opportunities at the edge of our core business models and technologies."* The company also collaborates with other MNCs operating in Israel, and partners with Aster Capital (alongside Alstom), a global VC fund with over €500m in assets under management and offices in Paris, San Francisco, and since 2017, Tel Aviv.

Takeaway

Non-technology companies from traditional industries have much to gain from open innovation activities – partnerships, investments, structured innovation programs – especially given the competition for talent driven by US technology corporates with R&D operations. Israel's grade of technology and imaginative applications offer significant potential for creating MNCs' "next two-billion dollar business unit."



2.2.3 Breakthrough vs. incremental innovation

Searching for a radical step-change is not always the driver of innovation. According to PwC's 2017 global innovation benchmark, both breakthrough (34%) and incremental innovation (43%) are prioritized by of MNCs. Israel is no exception – MNCs innovating locally are motivated by both categories – innovating at the edges of their business as well as at the heart – and realizing associated benefits.

MNCs in industries facing the fastest-moving change often consider Israel a source of technologies for re-imagined business models. The outsourcing industry for example is racing to replace enterprise solutions based on labor arbitrage with robotic process automation tools.

Genpact's 2016 acquisition of Israel-based PNMsoft, a case management and work optimization solutions provider, is a good example. PNMsoft Sequence™, the company's Intelligent Business Process Management Suite, complements Genpact's existing AI and natural language processing (NLP)-based automation tools. MNCs like Genpact may choose to develop solutions through which local start-ups' capabilities are combined in a process automation value chain where digital scanning could combine with NLP and zero-touch technologies.

Sanjay Srivastava, Genpact's Chief Digital Officer, explains the synergies generated by this acquisition: *"PNMsoft will help us deliver agile, focused workflow interventions tightly aligned with business outcomes, that leverage data analytics in real time, use machine learning to learn over time, and utilize integrated machine intelligence."*

Other MNCs set up their innovation models with equal focus, but less urgency. German energy company Innogy, in looking to tackle the sector's three big trends - decarbonization, decentralization and digitalization - has built an effective investment-focused innovation team in Israel, aware that nearer-term, incremental value is available despite the long time horizons involved in transforming energy distribution networks.

2.2.4 Growing focus on commercialization

MNCs taking their first steps often start by mapping the ecosystem, collecting group requirements and driving group awareness of the range of technologies available. AIG Israel's VP Strategy, Innovation and Business Development spent their first year in the role meeting technologists from every sector before formulating precise collaboration objectives for year two and onwards. Other MNCs spent their early stages with the limited objective of experimenting with innovative methodologies like design thinking and agile through small-scale, sponsored collaborations.

But as the Israeli innovation ecosystem matures, MNCs are showing greater interest in targeting commercialization, rather than exposure to use cases. For open innovation programs, this means demonstrating that local investments and partnership agreements can eventually help the group to 'increase revenue or reduce costs' as expressed by one German multinational.

Many already prioritize commercial agreements. Johnson Controls (JCI), whose Israel Open Innovation team lead startups-partnerships efforts globally for the US-headquartered corporate, are very focused on reaching scaled agreements – with JCI as an integrator and reseller or licensor / joint developer of emerging technologies. In late 2017 for example, JCI announced plans to introduce Magos Systems' perimeter protection radar to the North American commercial security market, as a cost competitive alternative to traditional camera-based perimeter securities.

For R&D players, where the driver was once the relative cost competitiveness of recruiting local engineers, it has today become more about shortening the time-to-market through collaborating with start-ups. Countless unicorn technologies trace their IP origins to teams in Israel, like Microsoft's log analytics business, the iPhone's face recognition feature and Mobileye's breakthrough technology for autonomous vehicles, acquired by Intel in 2017.

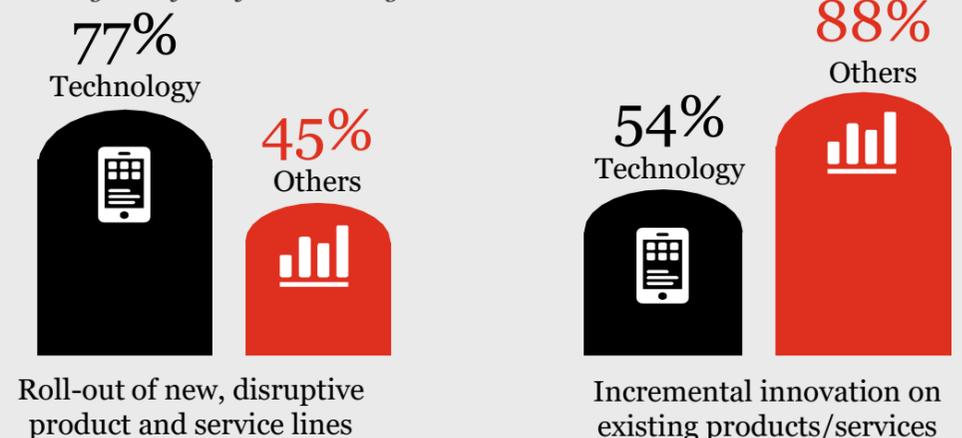


In the US or UK, when facing a certain problem, we tend to break down the problem and go into detail for a holistic solution that takes a long time. The approach in Israel is very different – iterate, test things, evolve, move on – remove innovation overheads

Itai Rotbaein, Israeli GM and Director of BIM 360 Products line, Autodesk

Feature 20: Technology companies look for disruption, while other companies focus on incremental innovation

Q: What are the key benefits of innovating in Israel?



Source: PwC & Start-Up Nation Central survey 2019

2.2.5 The value of cybersecurity across industries

Israel is seen as an unmatched cyber innovation destination: over 300 cybersecurity start-ups (approximately half founded since 2012) and 19% of global cybersecurity investment. A number of ingredients has made Israel a leader in fields such as data protection, mobile security, authentication, encryption or cyber-insurance: a highly experienced local talent pool holding military-grade capabilities; a community of start-ups, industry experts, and defense stakeholders; clear government commitment including grants and subsidies (notably in the southern city of Beer-Sheva, the “new cyber capital of Israel” according to a Dell EMC executive).

MNCs are driven to interface with this capability pool in a number of ways.

Academic research to limit threat vulnerability

In June 2018, the Royal Bank of Canada announced a \$2m investment into research at Ben-Gurion University’s (BGU) cybersecurity research center, focusing on machine learning-based cyber mitigation techniques. Dell EMC's cyber solutions group is based at BGU’s cyber park, and realizes value through cooperating with academia, government, and other corporates.

Searching for horizontal applications

Other MNCs are driven to explore how local cyber expertise can secure or disrupt their traditional industry vertical. A few powerful examples are the extremely active automotive sector exploring technologies to secure driverless vehicle systems; several large diversified food companies looking to secure transactions from farm to shelf using cybersecurity and blockchain-related solutions; and industrial players looking for secure sensor technologies to enable predictive maintenance and process automation.

Household names like Apple, Amazon, Intel, IBM, Broadcom and Qualcomm all come to Israel to develop chip-design abilities, with a strong focus on security – top of mind given the spate of global concerns late in early 2019 over hardware security.

2X

Investment-led MNCs more likely than peers to look for Israeli innovation to disrupt their business

Feature 21: What are the key benefits of innovating in Israel?



Source: PwC & Start-Up Nation Central survey 2019

“

Israel is a high-profile source of digital innovation. Having a presence in Israel and direct access to innovative projects, high-tech start-ups, and IT talents is of great importance to Skoda Auto.

Bernhard Maier, CEO, Skoda Auto

Feature 22 – Case study: Cockpit, El-Al's corporate venture arm serving the global airline industry

Launched in Q3 2015, Cockpit is El-Al's corporate venture arm and the first ever of its kind in the traditionally risk-averse airline industry. According to Cockpit's CEO, Henry Chen Weinstein, *"Airlines are not pure tech companies. They don't necessarily understand technology or how to implement it. Their mission is to help people travel. Really big companies work slowly, because that's their DNA, it's dangerous for them to work too fast. Start-ups are exactly the opposite. They need to work fast, because otherwise they'll die fast."*

El-Al opened Cockpit to start-ups outside of Israel and other international airline companies, understanding that start-ups attempting to break into the airline industry need industry-wide support to scale while El-Al can serve as a beta site for these start-ups. During the three and a half years since it was established, Cockpit partnered with Lufthansa Systems, Boeing and Gate Group and is working with start-ups from the US, EU, as well as Israel, operating as a *"venture arm for the entire industry."* Collaborations often combine direct investments in start-ups with PoC co-development, product design, data simulations or commercial pilots on emerging products. To date, Cockpit has co-developed 10 PoCs, five of which have successfully commercialized, and has grown a portfolio of 12 start-ups (including five outside of Israel).

In some cases, Cockpit has worked with start-ups with customer-facing solutions to strengthen El-Al's brand and customer focus. One example is SmartCover, a blanket that stays put during a passenger's flight, regardless of movement. In other cases, Cockpit generated solutions that impact top and bottom-line financial performance: examples include ePlane, an Online Aerospace Marketplace for aircraft spare parts allowing El-Al to reduce procurement costs by up to 20%; or BidFlyer, an analytics platform allowing El-Al to auction unbooked tickets for flights predicted to be under-capacity.



Takeaway

The co-opetition model exemplifies a distinctive possibility that is unique to Israel's Innovation Economy: the ability of global corporates within a industry to build systems of vested, mutual interest, in which natural competitors in a traditional industry vertical can mutually benefit through jointly interfacing with the start-ups community. For many MNCs, this offers a new source of innovation synergies.

Takeaways

Drivers & Benefits

1. Consider the market dynamics

The biggest obstacle cited by many stakeholders is the shortage of talent – according to Start-Up Nation Central’s 2018 Human Capital report, there are 15,000 open positions in Israeli hi-tech. Wage inflation amongst in-demand engineers and slowing growth in new start-ups founded each year mean that MNCs driven purely by talent acquisition are out of sync with the ecosystem’s sweet spot – skunkworks-style models leveraging open innovation

2. Embrace cyber capabilities regardless of your industry

Israel’s cyber sector is seen as part of the local ecosystems ‘innovation USP’ – a distinctive, competitive edge, owing in part to the application test ground offered by the military. MNCs are particularly drawn to cyber capabilities as data assets, currencies, control systems and authentication processes become increasingly networked and virtual in every industry

3. MNCs increasingly expect to realize benefits measured in dollar terms

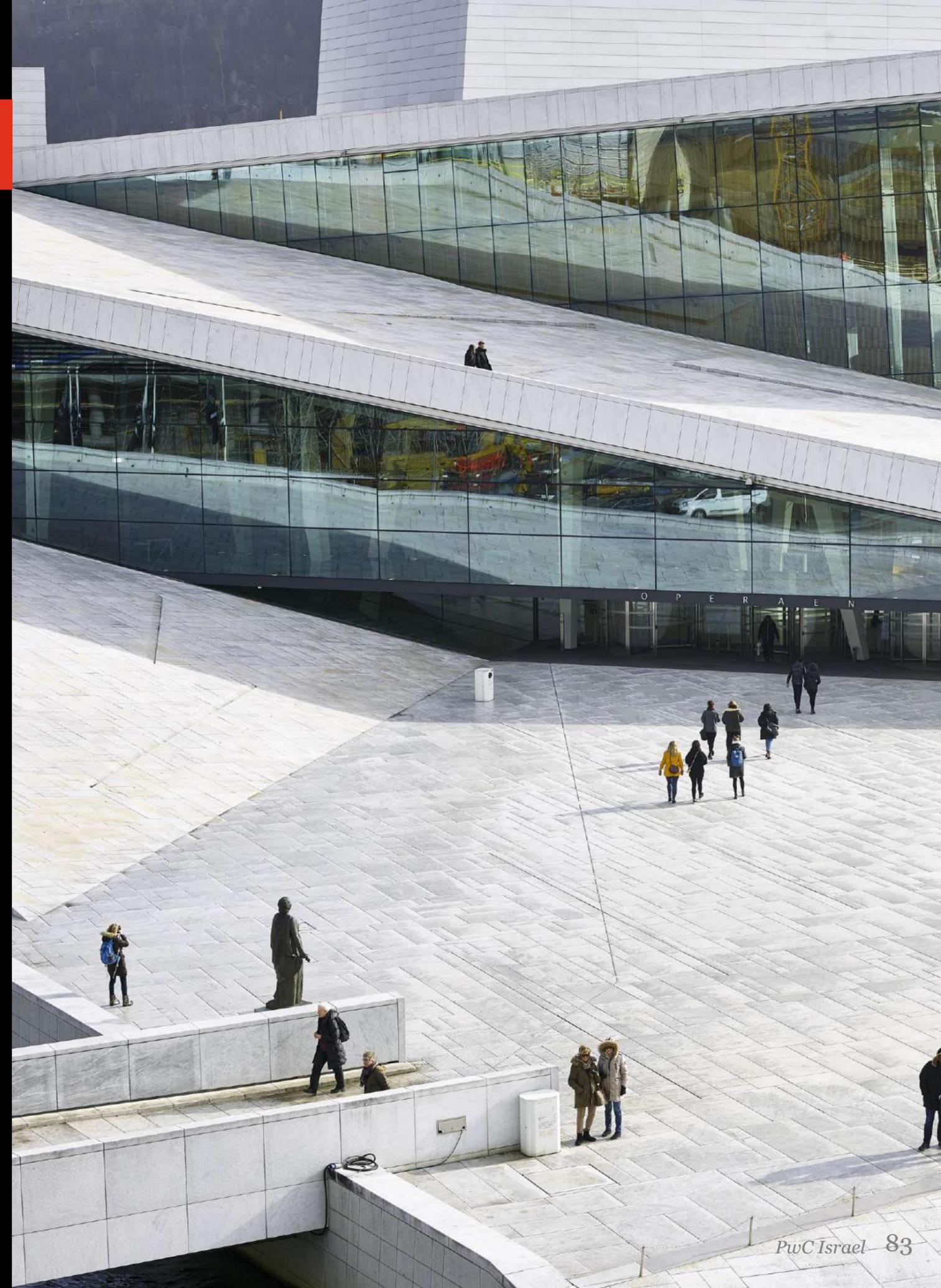
Collaborations without a clear commercial end-game are becoming less common. MNCs increasingly see the benefits of contracting commercially with start-ups as greater than the opportunity cost of establishing structured programs like accelerators for earlier-stage companies, which offer longer-term strategic assets but often less near-term top or bottom line value

4. Leverage the openness and collaboration-oriented ecosystem

By dispelling the surprise factor around this widely recognized benefit, MNCs can be quicker to experiment with open, integrated innovation activities which they would not otherwise consider. Merck Group and Flex for example, with their relatively long-standing footprint in Israel’s Innovation Economy know this well, and jointly developed the PMatX IIA-funded incubator around nanotechnology, realizing significant mutual gain

5. Strategic value more tangible than financial

While there is consensus that innovation must eventually point towards cost reduction or revenue generation, MNCs still appear to be more confident about finding strategic assets than realizing financial returns of innovating in Israel. The corporate venture community in Israel is buoyant, but the 6+ year horizon required to assess portfolio returns is in many cases still out of reach. Expect continued focus on nearer-term objectives



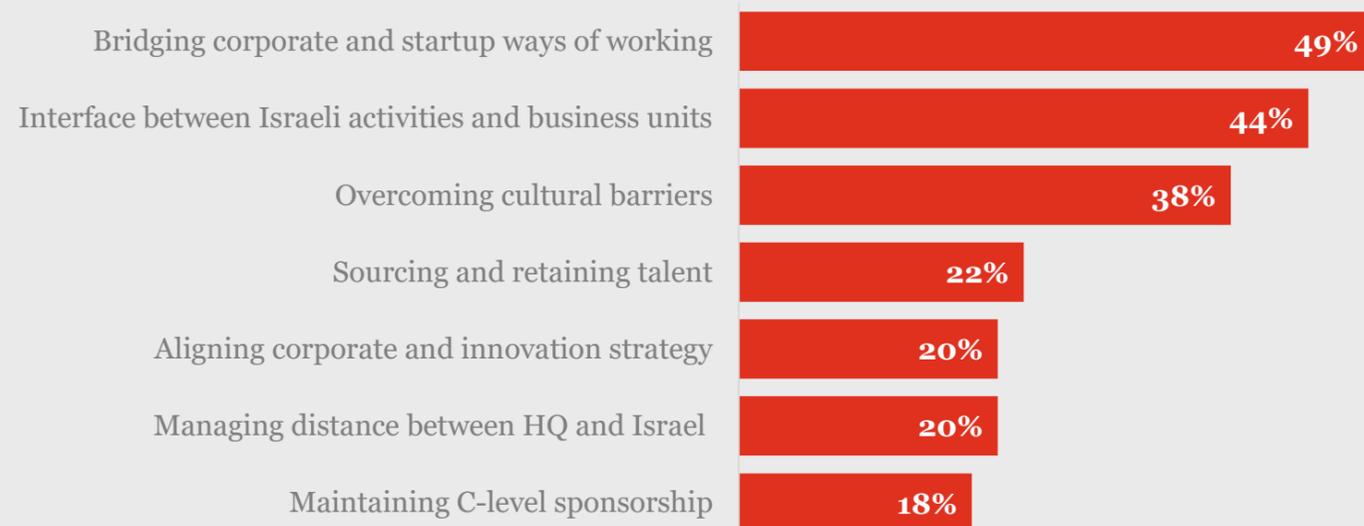
2.3 Challenges and success factors

*What is hard about innovating in Israel?
 How are MNCs getting it right?*

The distinctiveness of the Israeli ecosystem – a concentrated hub of highly innovative and fast-moving start-ups in all product and funding stages – creates distinct challenges for MNCs looking to innovate in this type of environment. These challenges relate to core differences in the ways MNCs and start-ups mobilize – from strategy to governance, processes, execution and culture. According to PwC's global innovation benchmark, the main challenge is the ability to align innovation and business strategy (54%), though this is less of a challenge in Israel (20%). Instead, the top challenge cited in this survey is bridging differences in ways of working (49%) between MNCs and start-ups.

Nevertheless, unique challenges create unique opportunities. Israel has a high acceptance of failure, readiness to grant autonomy and a permissive approach to risk. It also attaches importance to giving innovation teams independence and space to innovate. These are the core characteristics of the environment allowing MNCs to step outside of their comfort zone, re-think their approach to innovation and effectively tap into the Israeli talent pool.

Feature 23: What are the key challenges of innovating in Israel?



Source: PwC & Start-Up Nation Central survey 2019

2.3.1 Instability around group ownership

Many corporates struggle to create effective, group-wide governance structures around innovation activities. While senior-level support is commonly identified as a critical innovation enabler, and CEOs love visiting Israel (Alibaba's Jack Ma visited Israel twice in 2018 only) – governance still remains a concern, for a number of reasons:

Mandates

Open innovation activities in particular are still in flux at most MNCs operating in Israel, and a high rate of change in the governing function or role is frequently described. One European corporate described more than five reporting levels between the local innovation team and the Group CEO, and how accountability had switched more than three times in recent years between executive functions like VP Technology and VP Corporate Development. The result can be a level of uncertainty experienced by innovation personnel based in markets outside the HQ about their mandate and precise objectives.

Incentives

Since the returns on innovation are often not immediate, there can be a disincentive for profitability-focused business leaders to engage in the short term, especially when initiated by groups outside their scope. For example, situating innovation under the Group's CTO can constrain potential due to that function's overriding focus on current (instead of breakthrough) operations. R&D-led corporates also describe the 'Not Invented Here' barrier to adopting innovation, when an acquired technology becomes an affront to the pride of ownership. Misaligned incentives slow innovation adoption.

Ownership

Where should innovation sit? The common belief is that while CTOs have a very good understanding of products and technology, they are less focused on strategy and fail to 'see the big picture', as opposed to VPs in Strategy, Corporate development or even M&A. While American company AIG is the only foreign insurer to sell policies directly in Israel, it is one of many to create mature innovation activities in Israel, with an accelerated open innovation program and market disruption team. According to company executives, the guiding principle for innovation governance is that innovation needs to be 'in the business' somehow, and not 'owned from outside'.

2.3.2 Achieving business unit traction

Very few MNCs doubt the potential of Israel-based technologies in areas as diverse as 5G, 60gb next-gen wi-fi, data storage, cybersecurity, nano-research and autonomous transportation however, 44% of companies surveyed describe the challenge of creating effective interfaces between local innovation and business requirements. In particular, MNCs that self-define as behind their competitors on innovation were twice as likely to cite this challenge.

Innovation executives call this the 'proximity challenge' – innovating inside Business Units (BU) constraints imagination, but innovating far from core product teams requires too much attention and imagination from BU leaders to interpret the potential. Traction is hard to build and sustain.

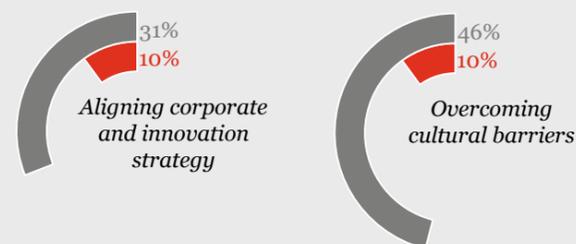
Finding fit

For most companies looking to develop innovation partnerships in Israel, the interface with start-ups is still evolving. Haier, a Chinese electrical and home appliance company, has been developing its innovation center in Israel, as part of its global “platform to exchange resources and to connect with global channels – including more than 200 universities, 100 technology incubators and thousands of tech companies” as described by Wang Ye, VP of Haier Appliance Industry Group.

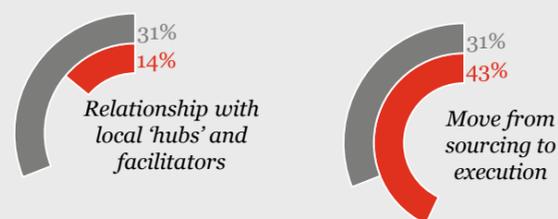
Haier’s three-person Israel team actively suggests local technologies (such as advanced motion sensors for predictive maintenance of appliances) to the group’s Qingdao-based HOPE (Haier Open Partnership Ecosystem) – a centralized unit to manage and prioritize innovation projects. Other businesses operate without such dedicated matchmaking units, and can struggle to convey the relevance of local technologies.

Feature 24: Self-defined innovation leaders have distinct characteristics from competitors

Q: What are the key **challenges** of operating Israeli innovation activities?



Q: What are the key **success factors** for your Israeli innovation activities?



Source: PwC & Start-Up Nation Central survey 2019

■ Behind competition
 ■ Ahead of competition

2.3.3 Leveraging cultural diversity

More than a third of participants cite challenges of overcoming specifically cultural barriers, particularly investment-lead MNCs. MNCs in Israel prize what they describe as the bold mindset, solution creativity and execution pace they encounter. The cultural challenge identified therefore has little to do with communication styles. Rather, it largely relates to the different ways of working – with efficiency-focused and commercially-driven corporates on the one hand, and unconstrained technologists who drive Israel's start-up and research engines. Three cultural differences are described by MNCs in Israel.

Appetite for risk

The different approach to risk is one barrier. Some MNCs define the objective of exploring the breadth of ideas available, but are slow to commit to exploring individual collaborations. This can be critical for start-ups who have no financial basis to 'tread water' while the MNC continues exploring. Equally, some local representatives of MNCs express frustration at their group's reluctance to say no to certain projects, out of fear that competitors could find a commercial application of a distinctive technology first.

Approach to failure

TÜV Nord, a German SME providing B2B certification services, describes 'zero defects' as its performance standard, enrooted in the company's DNA. The company acknowledges that this represented a constraint on innovating, and focused powerfully on developing an internal culture that embraces innovation while maintaining quality. In contrast, Israeli entrepreneurs have a different mindset which values risk-taking, failure and lessons learnt.

Independence

Another difference which can inhibit innovation collaborations lies in the different approaches to independence. While start-ups often develop unique IP through unconstrained development, MNCs typically have more experience managing enterprise contracts with suppliers at scale after competitive processes and requirement prioritization. Co-developing with start-ups can lead to a 'coachability' challenge as the two parties adapt. One global insurer innovating in Israel believes that the desire to be independent is sometimes exaggerated, and explains that being coachable is a very big part of what makes companies successful.

2.3.4 Aligning corporate and innovation strategy

Random acts of innovation rarely pay off. To deliver value, the effort must align with a company's business strategy, and a quarter of respondents describe the difficulty of maintaining this alignment. In fact, MNCs that self-rate their innovation performance in Israel as ahead of their competitors are three times less likely to cite this challenge.

Balancing 'push' vs 'pull' of emerging technologies

Managing an effective process of matching group requirements and emerging technologies is particularly challenging. This may be because satellite innovation teams feel they do not have enough visibility to the 'most wanted' solutions from the group, or because their channel to pitch potential in-market solutions to lines of business is limited.

A global payment solution provider's local innovation team adopts a 'push' approach, aiming to "identify synergy with start-ups, for example in the areas of security and antifraud, and then go to the [relevant] product owners within the company. It's less successful to bring company executives to meet with start-ups directly".

A large German automotive company has taken a different approach, scouting for technologies only when the demand is in place: "We realize that scouting for scouting doesn't make sense. Our philosophy is to understand the needs and then to connect them with the tech ecosystems. When we do the connection, its based on a real need or a project that has come up".

3X
Self-defined innovation leaders less likely to cite the challenge of aligning corporate and innovation strategy

Feature 25: What are the key success factors for innovating in Israel?



Source: PwC & Start-Up Nation Central survey 2019

2.3.5 MNCs and start-ups – a different pace

MNCs are profit-orientated; Israel-based start-ups are scale-orientated. The resulting incentive gap can pose a challenge for sustaining common ground on the commercial agreements that underpin collaborations. This gap takes effect in three ways.

Time – One issue described frequently is the speed of execution, whereby start-ups operating with clear capital limits want to proceed with pilot execution at a faster pace than their MNC partners, who do not face the same pressure, and often juggle their co-development responsibilities with business as usual activity.

Funding – Some MNCs have expanded their innovation activities to include funding, believing that exchanging funding for equity can attract elite start-ups and incentivize their participation in accelerated development. But associated exclusivity requirements, demanding equity stakes of sometimes over 50%, and royalty structures can constrain future growth options for smaller partners.

Verticals – Thirdly, a lot of co-development over technologies happens in verticals, exploring a narrow use case of a potential technology. Realizing that MNC-start-up commercialization success is not guaranteed, participating start-ups see an opportunity cost associated with committing their development activity in a single industry. An Augmented Reality start-up may be hesitant to collaborate exclusively with a healthcare company if it precludes parallel development of use cases in the construction industry for example.

Feature 26: Cultural barriers vary by MNC HQ location



Source: State of Innovation Survey 2019

Feature 27 – Case study: Nielsen, operating a successful incubator with the support of the Israel Innovation Authority (IIA)

A global information and data firm providing advanced analytics on what consumers watch and buy, Nielsen has well established processes and a proven structure for driving cross-company innovation. Nielsen combines a global R&D and engineering team with a central corporate unit responsible for connecting various innovation siloes within the organization. Currently about 30 employees are dedicated to open innovation in a number of teams throughout the organization.

Israel, according to company executives, plays a key role in the company's innovation agenda. "There is nothing quite like what we have in Israel", according to Eric Ho, Director at Nielsen Ventures, the company's global corporate venture arm.

In 2013, Nielsen's Israel team won a tender issued by Israel's Office of Chief Scientist (today the Israeli Innovation Authority or IIA) to establish an eight-year incubator to invest in and partner with Israeli start-ups. According to Dov Yarkoni, CEO at Nielsen Innovation, "competing for the tender helped us define our local model, it forced us to show the Office of Chief Scientist we know how to help start-ups grow". Since 2013 a number of co-investors joined as limited partners; Nielsen today owns 48% of the fund.

The investment process is structured and lean: after sourcing relevant opportunities and deciding to invest, Nielsen Innovate will look for a go-ahead from the IIA. Following approval, ₪2m ILS in seed funding is provided to the start-up: ₪1.7m ILS from the Innovation Authority and ₪300k ILS from Nielsen Innovate. Following seed investment, start-ups work at Nielsen Innovate's incubator for 18 months and receive tailor-made strategic guidance, technological expertise and access to Nielsen global resources and partners.

While Nielsen does not hold exclusivity or a right of first refusal on follow-on investments, 70% of incubated start-ups have received follow-on funding from multiple sources such as CVC's, VC's, angel investors and Nielsen has also made several direct investments as well as acquired incubated start-ups.

To date Nielsen Innovate has made 28 investments in Israel and three exits – examples include VBrand, which initially operated as a video recommendation engine and pivoted to providing AI-based solutions in sports marketing; or BrainVu, which develops VR/AR technologies for analyzing real-time human response to media content or mental reaction to specific products.



There is nothing quite like what we have in Israel.

Eric Ho, Director, Nielsen Ventures

Takeaway

Partnering with local government bodies such as the IIA can help MNCs refine their local innovation model while minimizing risk. Investing successfully with IIA support is a way for MNC executives based in Israel to solidify their position across the organization, and subsequently obtain a C-level support for riskier, more forward-looking innovation initiatives.



Takeaways

Challenges & Success Factors

1. Revenue, not only funding

Early-stage venture capital is increasingly available for qualified start-ups in Israel's buoyant ecosystem: 2018 saw \$6.4bn raised in venture capital across 623 deals, an 17% rise on 2017. But MNCs can reduce their commercial disparity with start-ups by offering something more unique than funding: a first, scaled contract as an iconic enterprise customer. One insurance executive explained, *"after the successful CEO visits [Israel], the plan was to build an accelerator, but start-ups said that they want a customer more than they want investment"*

2. Getting out the way

Surveys often emphasize the importance of management support as critical for innovation. But 'creating space' for innovation is equally important. Effective innovation leaders promote BU partnership and secure budgets, but also step back from constraining the innovation projects selected. Microsoft's log analytics business - today a core component of Azure Monitor - was conceived by a small team of Israeli engineers shortly after Microsoft opened their first global accelerator in Israel in 2012 (there are eight today). Crucially, the team were given resources and autonomy in response to an idea, and subsequently developed a product today generating 'unicorn' level revenues

3. Re-imagining incentives

Creative incentives help break down functional silos. For some MNCs in Israel, this involves targeting a percentage of sales deriving from incremental or breakthrough technologies. Another approach is mandating group policies requiring personnel rotation between BUs and innovation units, thereby incentivizing BU leaders to extract the maximum value from their team's 'innovation secondments'

4. Innovating in parallel layers

Leading MNCs in Israel innovate in tiers - creating programs for different objectives. MNCs with investment activities like Samsung do this by creating separate funds for early and later stage start-ups. Enel has two distinct Israeli open innovation programs - its innovation hub, targeting market-ready start-ups; and Infralab, a lab for pre-seed and seed stage start-ups. Others use their diversified portfolio of innovation activities to focus in parallel on depth and breadth of technologies in the market, or on different future horizons

5. Develop an internal culture first

MNCs accelerate the realization of value if they can create an internal innovation culture before interfacing with remote players. Global leaders see internal employees as the most important partners for innovation (60% according to PwC's 2017 global innovation benchmark). TÜV Nord created a digital six-week academy helping employees to embrace digital technologies, focused on agile methodology and design. *"We nominated participants from each business unit, built prototypes and pitched to the executive board. These colleagues act as catalysts and customers have since asked for this program externally"*.



2.4 Governance and metrics

How are MNCs structuring their innovation teams? How is success measured?

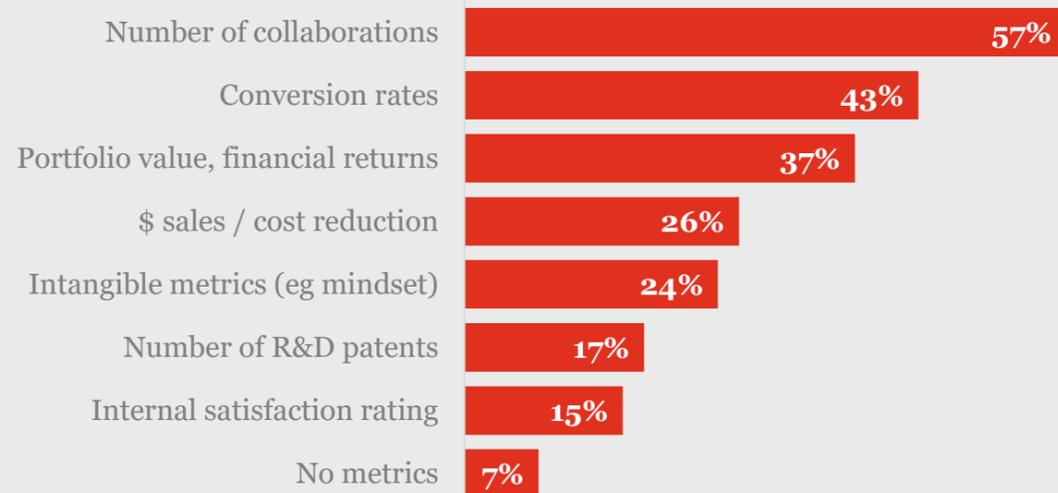
Corporates innovating in Israel need a coherent governance structure and clarity around reporting processes. There are many viable governance options, depending on the MNC's level of urgency to innovate, their activity focus, and business objectives.

But while R&D centers usually benefit from legacy management structures, or slowly-evolved metrics, open innovation is more poorly understood. Two key observations by MNC executives underlie how Israel is in a fast-track process of emerging as an innovation destination: first, the lack of consensus around how to govern local innovation teams amongst the MNC community; and second, the level of skepticism expressed by executives about their own metrics.

"You can't define KPIs before actually engaging in innovation activities. There are too many unknowns," explained the local GM of a global software company operating in Israel. Innovation executives, when asked about measuring innovation performance in this survey repeatedly relayed a series of KPIs, and then cast doubt on their validity. This is because the returns on innovation are often necessarily indirect, intangible and long-term.

The takeaway is that measuring too stringently runs the risk of disqualifying valuable experimentation in the absence of measurable returns.

Feature 28: Which metrics do MNCs use to measure the performance of Israel-based innovation teams?



Source: PwC & Start-Up Nation Central survey 2019

2.4.1 Clear KPI maturity curve

MNCs' approach to measuring the performance of their local innovation operations generally evolves through four phases: from traffic, to relevance, to conversion, to value.

Volume

MNCs firstly measure *volume* – usually the number of target companies appraised, start-ups met or PoCs facilitated. Volume of innovation 'traffic' is a common starting point for new entrants eager to understand the range and depth of technologies available in Israel. 57% of MNCs in Israel measure the number of PoCs, pilots and collaborations they facilitate – the most frequently cited innovation metric.

Relevance

The problem is that volume is no guarantee of impact, so metrics often evolve to measure the *relevance* of collaborations initiated. As Merck Group's Head of Alliance Management & Partnerships explained, *"when we started it was number of deals, but that ignores quality."* Samsung Electronics' Head of Strategy and Innovation Center in Israel agrees: 'I believe in quality, not quantity'. Relevance may mean that PoC's result in solutions that match existing requirements, or that result in commercial opportunities that align with corporate strategy.

Conversion

However, measuring relevance of collaborations still only tracks activity levels, not results. So MNCs usually begin looking at third-stage metrics around *conversion* and start to measure the percentage of PoCs that lead to scaled commercializations (or introductions that lead to a PoC). The Bridge Builders, a leading commercialization program based in Israel that facilitates service agreements for Coca Cola, Mercedes Benz, Turner and Walmart, define and measure their successful results: *"5 cycles of 53 portfolio start-up companies, over 190 pilots and 40 service agreements."* 43% of MNCs surveyed in Israel are currently tracking conversion in a similar way.

Value

The fourth stage in the maturity curve revolves around *value* realized, in dollar terms – technology companies three times more likely to be measuring innovation through topline performance than other industry verticals. This can be costs saved, or revenue generated, or some related, derivative metric. Schneider Electric's Business Incubation VP explains that *"the metric is business creation – how many new businesses have we created is the key question."* Measuring the bottom or top line impact of innovation is an important success factor for achieving breakthrough traction with results-driven business units.

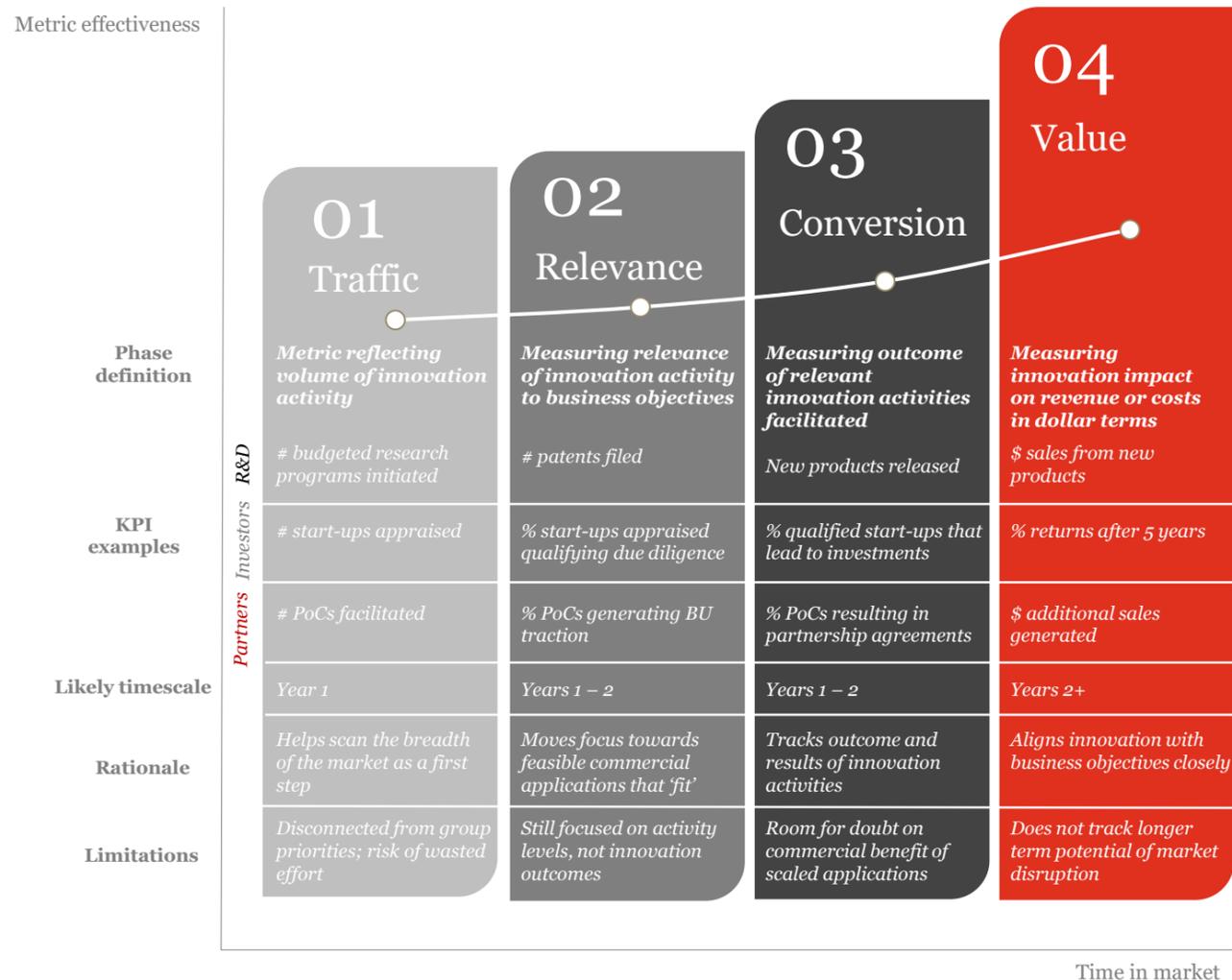
3X

Technology companies more likely measure innovation performance through revenue impact than other industries

2.4.2 The value of intangible innovation metrics

“Success is qualitative - it’s a return on knowledge,” explained one global innovation leader based in Israel. Wherever innovation teams are on the maturity curve, they still express wide appreciation of qualitative, non-financial metrics. Innovation executives know that the causal chain between innovative collaborations and impact on revenue or costs can be long and indirect. As expressed by Merck’s Head of Alliance Management & Partnerships, “it’s very hard to measure returns on external innovation. It can be ten years before we see revenue.”

Feature 29: KPI maturity curve – how MNCs measure innovation over time



Time in market

Source: PwC analysis

Intangible metrics are also valued in their own right. When innovation executives describe what 'good innovation looks like', they spontaneously refer to the mindset shift engendered through novel applications of known technologies. A second intangible measure of successful innovation performance cited is the level of visibility enabled by local operations to global leading practice around innovation – both in development and experimentation. A third intangible metric related to the value realized through upskilling of teams when innovation is mobilized through the group.



Feature 30 – Case study: Kamet Ventures, creating a distinctive group program in Israel

Kamet – AXA’s “*company that creates companies*” – was established in 2016 with the goal of building teams of entrepreneurs to scale start-ups from the ground up, while addressing specific strategic challenges defined by the French multinational insurer.

Kamet start-ups have access to AXA resources, and AXA, via Kamet, remains the exclusive investor until the start-up reaches a pre-defined growth milestone (before Round A). AXA may be the exclusive investor in the start-ups, or there could be other participating investors.

Where AXA remains the exclusive investor, the start-up, at a certain level of maturity, may be incorporated into the AXA group, or spun off as an independent entity working with other partners.

With three offices in Paris, London and Tel Aviv and an initial five-year, €100m investment fund, Kamet has developed 20 start-ups in less than three years. Kamet and its portfolio now employs over 250 employees in five different countries: France, UK, Israel, Germany and China.

In Israel, Kamet is the only innovation representative of AXA - interfacing with more than 90 people working on different start-ups. One of them, Setoo, a parametric insurance-as-a-service platform has a mission to “*empower e-businesses to create new, super-targeted protections within minutes, addressing consumers' actual concerns, and generating automatic compensation without the need to file any claim*”. Setoo has recently raised \$9.3 million from AXA. According to Group CIO, Guillaume Borie, the “*investment in Setoo supports AXA's strategy to build more impactful insurance platforms as one of our four key priorities for innovation*”.

Takeaway

Israel Innovation Economy offers many MNCs the opportunity to mobilize distinctive innovation programs that are not always feasible in other global locations. Furthermore, the distinctive programs observed in the market offer multiple ‘exit points’ for the MNC-start-up collaboration: scaled licensing agreements, joint research ventures, full acquisitions, spin-offs and others.

2.4.3 A variety of innovation governance models

There are more than 300 foreign R&D centers in Israel, exhibiting relatively consistent governance models, often with a nationwide leader reporting directly to an HQ-located senior executive. But amongst the investment and partnership-led models, governance structures vary extensively, particularly across three parameters.

Method of triage

Some MNCs have a group-wide team which acts as a point of consolidation: business units communicate internal requirements (outbound) and satellite innovation teams recommend emerging technologies (inbound). These teams are effective to the degree that they successfully match-make between the two communities. Haier's Open Partnership Ecosystem based in Qingdao and founded in 2009, and the Volkswagen Group's *Konnect* are notable examples. Other MNCs' regional innovation teams and business units interface directly and jointly identify the fit between group requirements and in-market capabilities – an approach taken by Gemalto, Johnson Controls and others.

Business function

Innovation teams in Israel, like those in other locations, still show very little consistency regarding the executive function accountable. Examples abound of local innovation teams reporting to Business Unit heads, Heads of R&D, Chief Strategy Officers, Chief Technology Officers, and a number of other executive roles. Global benchmarks confirm the same situation – by far the most common response in PwC's 2017 benchmark was that responsibilities were distributed throughout the organization (34%).

Directness

A number of MNCs involved in open innovation structure their teams very close to the group CEO, while others describe a much less direct reporting line. One Japanese MNC's Israel innovation team are formally part of the Europe division, report to a regional Chief Digital Officer in Switzerland, with HQ involvement only for final approval of investments. Many other MNCs enjoy very active support from Group CEOs, while simultaneously working through a number of reporting lines.

2.4.4 Structuring group-level innovation

MNCs innovating in Israel often segment their innovation activity portfolio by technology horizon, by business unit, and by geography.

Executives often set up and govern innovation activities along a scale of disruptive potential. Kamet Ventures, an insurtech 'start-up studio' powered by AXA, is the insurer's only innovation arm present in Israel (see feature 30), while the company also runs AXA Partners and AXA Digital partnerships, dedicated to partnerships with innovative, established companies; AXA labs, located in Shanghai and San Francisco, scanning local markets to detect emerging trends and identify promising start-ups; and AXA Venture Partners, a \$275m CVC with offices in Paris, San Francisco, New York and London.

Other MNCs make a similar distinction using different 'horizon' timescales. Outside Israel, Ericsson have a number of innovation teams (including Ericsson ONE and the Ericsson Garage) that explore technology applications across different horizons in parallel – some more future-focused than others. Still others create and manage separate innovation programs for early stage and later stage start-ups.

A final approach, taken for example by TÜV Nord is to situate innovation teams separately in each business unit. This is seen as the ideal way to ensure innovation is interwoven with operations throughout the group, and aligned with corporate objectives, although there may be some important limitations of situating innovation directly under business units already (see feature 34).

2.5X

Self-defined innovation leaders **less likely to use intangible, qualitative innovation metrics**

Source: PwC & Start-Up Nation Central survey 2019

Feature 31 – Case study: Deutsche Telekom, an early entrant to the Israeli innovation ecosystem

Deutsche Telekom (DT), the largest telecommunications provider in Europe, was one of the first German companies to actively engage with the Israeli innovation ecosystem. DT first partnered with Ben-Gurion University (BGU) in 2004, and in 2006, Telekom Innovation Laboratories (T-Labs), the company’s R&D unit, formalized this relationship by working with BGU to research network security and data analytics, investing over €50m to date. The company has since deepened its reach in Israel, innovating through several, parallel routes:

- DT partners with start-ups in Israel to bring new products and services to DT's businesses and customers – examples include CyberX, which provides industrial security solutions and has a close collaboration with Telekom Security
- DT's venture arm, Deutsche Telekom Capital Partners, has outposts in Hamburg, Silicon Valley and Herzeliya in Israel, and has invested in eight Israeli start-ups to date, focusing on cybersecurity and network technology
- DT's tech incubator, *hub:raum*, connects early-stage start-ups with business unit teams to co-develop technologies in sectors like 5G networking, robotics and IoT
- In 2017, DT expanded its longstanding collaboration with Israeli cybersecurity leader Checkpoint, to include consumer and advanced business solutions

Their broad innovation activity portfolio has engendered a mature process of interfacing between the group and Israel-based ecosystem players including academia, start-ups, local corporates. The resulting value has been recognized by the company’s senior executives. CEO Timotheus Höttges, in a 2017 visit to Israel, cited Israel's collaborative innovation ecosystem as a *"perfect match for the culture we want to promote at Deutsche Telekom: being innovative, trying things out and making them a reality"*.

Takeaway

Maintaining successful innovation activities in Israel requires a combination of active, top-level management support with an empowered local team with a clear mandate to explore novel technology applications. When executed successfully, this combination should spread across the group through a number of complementary activities in a broad, coherent innovation portfolio.

2.4.5 Absence of unified innovation metrics

MNCs attribute great importance to their innovation activities, both including and excluding third parties like start-ups. It is therefore surprising to note that there is not yet any movement to unifying the governance of metrics of open and closed innovation operating models.

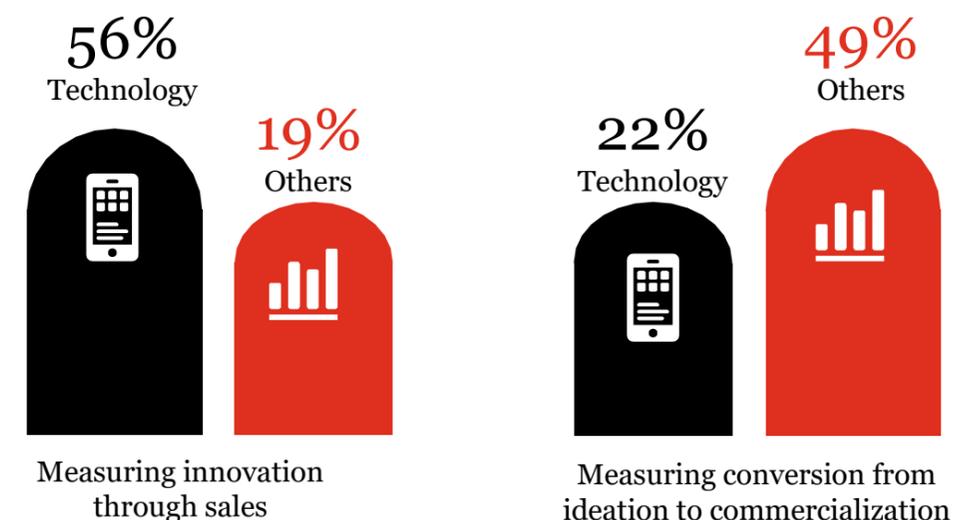
A number of barriers are preventing MNCs from using any overall metrics for innovation performance, although none of these barriers are permanent.

Siloed jurisdictions are one reason why innovation governance remains compartmentalized amongst the MNCs innovating in Israel. Qualcomm, the world's largest chip-maker for mobile phones, has been active in Israel since 1993, manages a successful CVC and two R&D centers in Israel. Its corporate venture arm invests in order to cooperate with local technology innovators, while its R&D centers tap into the Israeli talent pool and incorporate new technologies through the company’s numerous Israeli acquisitions. Yet the teams operate quite separately, with no combined metrics, and distinct management teams.

As the industry matures, it is possible the level of integration will rise and unified metrics emerge.

Feature 32: Technology companies measure revenue impact, more than traffic, relevance or conversion rates

Q: Which metrics do you use to measure the performance of Israel-based innovation teams?



Source: PwC & Start-Up Nation Central survey 2019

Feature 33 – Case study: Johnson & Johnson, R&D and advanced manufacturing

According to Uri Yaron, R&D Vice President and former GM of the Israeli technology center of Johnson & Johnson (J&J), "Israel is where a lot of ideas come from but it goes beyond ideas. It is taking these ideas into products". J&J began its innovation activities in Israel in 1997, with the \$400m acquisition of Biosense, a company that develops solutions for cardiac arrhythmias. J&J later on expanded its Israeli activities through acquisitions, notably of Omrix Biopharmaceuticals in 2008.

In 2014, J&J, in partnership with Takeda, OrbiMed and the Israel Innovation Authority, established FutuRx, a biotech incubator whose goal is to support early stage innovation projects and to be "a catalyst for drug development." J&J employs around 1,000 people in Israel, with a reported operating budget of a few \$100m.

According to Uri Yaron, the "proximity of R&D and operations is the key to success." Indeed, J&J does not only leverage the innovation value of the Israeli economy, but also combines a range of innovation activities with scaled manufacturing activities nationwide. "The efficient transfers to manufacturing in the life cycle management are key. Our ability to move quickly to design to prototype to develop to manufacture cannot be replicated anywhere else in the world."

Takeaway

J&J is not the only MNC leveraging Israel's concentrated, hyper-connected economy to efficiently combine innovation and manufacturing activities. HP Indigo operates R&D centers and manufacturing facilities across seven different Israeli cities. Applied Materials similarly runs R&D and manufacturing activities and Intel, beyond its well-documented R&D operations, has some of Israel's largest hi-tech manufacturing facilities and is among Israel's largest private sector employers, employing nearly 13,000 people nationwide.



“

Israel is where a lot of ideas come from but it goes beyond ideas. It is taking these ideas into products.

Uri Yaron, Senior Executive, Johnson & Johnson and Former GM, Haifa Technology Center

Feature 34: Five innovation governance models

	1. BU-led Innovation	2. Innovation-as-a-Service	3. Centralized coordination	4. External unit	5. Co-opetition
Characteristics	<ul style="list-style-type: none"> • Devolved mandate to each BU to use or re-sell technologies case by case • Variable PoC execution and collaboration profile by geography and BU • Direct sourcing from start-ups • Likely MNC sponsor – Head of BU 	<ul style="list-style-type: none"> • Dedicated internal unit for breakthrough or incremental innovation • ‘Cost center’ to serve revenue-generating BUs, incentivized to take risk • Channel for coordinated selection of start-ups, partnerships or investments • Likely MNC sponsor – Chief Innovation Officer or Chief Digital Officer 	<ul style="list-style-type: none"> • Market-facing innovation unit(s) with group-wide mandate and centralized team and budget • Works collaboratively across BUs, geographies and support functions • Higher degree of knowledge sharing, group visibility and coordination • Likely MNC sponsor – VP Strategy, Corporate Development or Corporate Finance 	<ul style="list-style-type: none"> • Dedicated research subsidiary, external incubator or investment group • Independent from, but funded by MNC parent • No constraints approach to exploring potential technologies and commercial opportunities • Likely MNC sponsor – VP Strategy, Corporate Development, Chief Innovation Officer 	<ul style="list-style-type: none"> • MNCs oversee co-creation with external innovation stakeholders like other MNCs, customers and universities • Involves a multi-party innovation council with a focus on creating companies • Likely MNC sponsor – CEO, VP Business Development
Rationale	<ul style="list-style-type: none"> • Maximum freedom for BUs to engage with start-ups • Opens up Israeli innovation to MNC’s fastest-movers • No group-level innovation overheads 	<ul style="list-style-type: none"> • ‘One address’ for group-wide innovation sourcing activities • Greater specialization at deal-flow generation and investment appraisal • Lean, efficient team 	<ul style="list-style-type: none"> • Incentivizes BUs to contribute resources and collaborate together • Company strategy alignment across group for start-up interactions • Promotes market awareness and MNC brand 	<ul style="list-style-type: none"> • Provides requisite space for successful innovation without corporate constraints • Delegates responsibility for start-up sourcing and selection to independent specialists 	<ul style="list-style-type: none"> • Reduced MNC risk through consortium-based investment • Broader opportunity portfolio between stakeholder community • Multiplier benefits from participating in a self-sustaining ecosystem
Limitations	<ul style="list-style-type: none"> • Limited cross-functional ideation, knowledge sharing • Lack of goal definition and company-wide alignment • Constrains potential MNC use cases for start-ups still in development 	<ul style="list-style-type: none"> • BUs may compete for resources or priority • Relies on innovation team understanding BUs’ businesses and markets deeply 	<ul style="list-style-type: none"> • Step removed from customer, regional or technology needs • Risk of ‘centralization’ becoming ‘standardization’ • Sustainable matrix requires change management and budget 	<ul style="list-style-type: none"> • Traction depends on ability to commercialize opportunities together with BUs • Likely to offer two alternative interfaces for the MNC with start-ups, reducing sense of coordination • More substantial investment costs likely 	<ul style="list-style-type: none"> • Commitment horizon is usually greater, requiring more up-front capex • More challenging to sustain aligned interests between multiple external stakeholders • Relative loss of control vs internal governance options
	<p> </p>				

Source: PwC analysis

Takeaways

Governance & Metrics

- 1. Israel as a lead location**
 A growing number of MNCs have concluded that Israel's combination of execution pace and technology quality make it the ideal location to situate their global leadership of innovation activities. Pfizer, Genpact, Flex and Johnson Controls all have senior executives located in Israel who manage their companies' global scope of technology scouting, product development and open collaboration activities
- 2. Governance model alternatives**
 The key decision point for an MNC structuring their innovation governance models in Israel is how close the innovation activities should be to near-term BU priorities. If the focus is primarily on incremental functionality on existing products, then BU-led, innovation-as-a-service or centralized models are more likely to feature. For 'horizon 3' focused MNCs, external units and co-opetition models are often preferred
- 3. Expect metrics to evolve**
 As any MNC's familiarity with the Israeli ecosystem grows with time-in-market, the relevant metrics will likely evolve (see feature 29). Metrics also typically fit to the different stages of the innovation lifecycle from initial ideation, to project selection, to product development and finally commercialization
- 4. Consider Israel as a MNC sandbox**
 Many MNCs set up and govern innovation vehicles in Israel that are not replicated elsewhere in the group's global innovation portfolio, even when they are interacting with start-ups in other markets. Rolling out template-based innovation operations in Israel may not offer the group the maximum possible returns from Israel's distinctive technology environment
- 5. BU incentivization is key to success**
 Situating innovation activities exclusively under business unit heads increases traction, but can limit incentivization. Without a budgeted unit encouraging Israeli innovation teams through subsidizing the costs of start-up collaboration, there is a risk that BUs regard off-shore innovation teams as a research overhead



Feature 35 – Case study: The ‘Venture Client’ model

In 2012, Gregor Gimmy assumed his new role at BMW’s corporate R&D function with a key priority: re-imagine how BMW innovates. He realized the company needed to improve the way it leverages the creative spirit of start-ups, whose success lies in three main factors – capital, coaching and clients.

His main observation was that global corporates have largely failed in attempting to compete with VC funds and other professional investors for the first two success factors – they don’t have VCs’ experience in helping build and grow start-ups, they struggle in transferring innovation from CVCs and accelerators to business units, and operating CVCs and accelerators is usually a costly and complex endeavor.

However, only large corporates can offer the third key to start-ups’ success – clients. Realizing this, Gimmy came up with the ‘venture client’ model, a new way for companies to attract top start-ups, achieve high integration rates to business units and minimize operating costs. Essentially, the corporate ‘venture client’, instead of providing capital, buys start-up technology services and lets VCs and other accelerators filter high potential start-ups. This purchase is considered a ‘minimum viable purchase’ as the company buys a sample of the technology, to be validated through pilots in relevant business units. As a result, start-ups become real suppliers from day one, benefiting from corporate commercial and technological resources and expertise, as well as VC investment at key milestones.

This model eventually led to the creation of the BMW start-up Garage, where, by the summer of 2017, 90% of accepted start-ups pursued collaboration with BMW business units (against a 20% global average). The real reason for the model’s conversion success was that it allowed all innovation stakeholders – corporations, start-ups and VCs – to focus on what they excel in.

BMW announced in February 2019 that it will open an “office for trend and technology scouting in Israel”, continuing its track record of success through collaboration in 1999 with what was then an early-stage start-up, Mobileye.

Takeaway

The ‘Venture Client’ model helps innovation executives to leave behind the illusion that elite start-ups want collaborate with MNCs primarily in exchange for funding. In fact, many scaling-up businesses have more to gain from establishing a steady revenue stream and a portfolio of iconic clients.



03

Resources

3.1 Takeaways

Practical suggestions for innovating in Israel

3.2 Ecosystem map

Overview of Israel's MNC innovation community

3.3 Additional resources

Tools for taking early steps in the ecosystem



3.1 Takeaways

Practical suggestions for innovating in Israel

Israel as your open innovation sandbox

MNCs are today overwhelmingly driven by the benefits of open innovation (OI), particularly in the last five years. Israel's distinctive execution pace, high start-up concentration and the breadth of technology applications make partnership and investment-led innovation models in Israel a must for global corporates.

01

Treat start-ups as suppliers

Leading MNCs in Israel are rejecting the illusion that start-ups are primarily attracted to collaborate in exchange for funding. Top-tier start-ups' founders are often more interested in steady revenue and iconic clients. Regular purchase orders (POs) make start-ups more self-sustainable, and reduce the risk of MNCs investments in collaborations by strengthening their smaller, strategic partners.

02

Prepare your business for traction

The most common challenges for innovation executives are around the internal rate of traction, not external factors related to Israel's Innovation Economy. CEO-level advocacy, BU-level resourcing and reimagined incentives can all help reduce the barrier and see the value flow from Israel-based innovation activities.

03

Involve customers virtually

Without a sizeable domestic market, Israel-based innovators exhibit a bias towards export. But leading innovation teams in Israel's MNC community still involve customers in the ideation and even project selection stages of the innovation lifecycle. Virtual ways of working have removed barriers of distance.

04

Leverage the openness

MNC executives see the local culture as an enabler, not a barrier to successful innovation. The level of access to innovation stakeholders across the ecosystem, and the many precedents of successful co-opetition point to a unique benefit available to MNCs in Israel – the distinctive openness of the local innovation ecosystem.

05

Invite the mindset challenge

MNC executives in Israel agree unanimously that local innovation teams reframe business challenges creatively, reimagine technology applications and refresh the commercial horizons of business lines at risk from disruption. Innovation teams in Israel routinely push out the frontiers of what is possible.

06

Pull and push innovations

Many MNCs set up to 'pull' solutions from the local innovation community, in response to defined business challenges. Others encourage Israel-based innovation teams to 'push' technology solutions to the group based on fast-emerging market capabilities. Leading MNCs in Israel see the two approaches as complementary and balance them effectively.

07

Get out the way

Management support is critical, but so is guarding space for teams to innovate without constraints. Empower local innovation leaders to act like a venture capital investment committee – they should have a delegated mandate to double down on great ideas or kill projects without commercial promise.

08

Aim at top line impact

Revenue or cost-related benefits must supersede metrics like brand position, product performance, and customer satisfaction. MNCs innovating in Israel can accelerate through the KPI maturity curve by targeting quantifiable financial benefits at an early stage of the innovation life cycle.

09

Experiment with innovation identities

Diversified innovation activity portfolios are the rule, not the exception in Israel. MNCs increase the range of their innovation models with time in market – experimenting with investment, partnership and R&D-focused activities in parallel can be highly productive if the strategy is coherent.

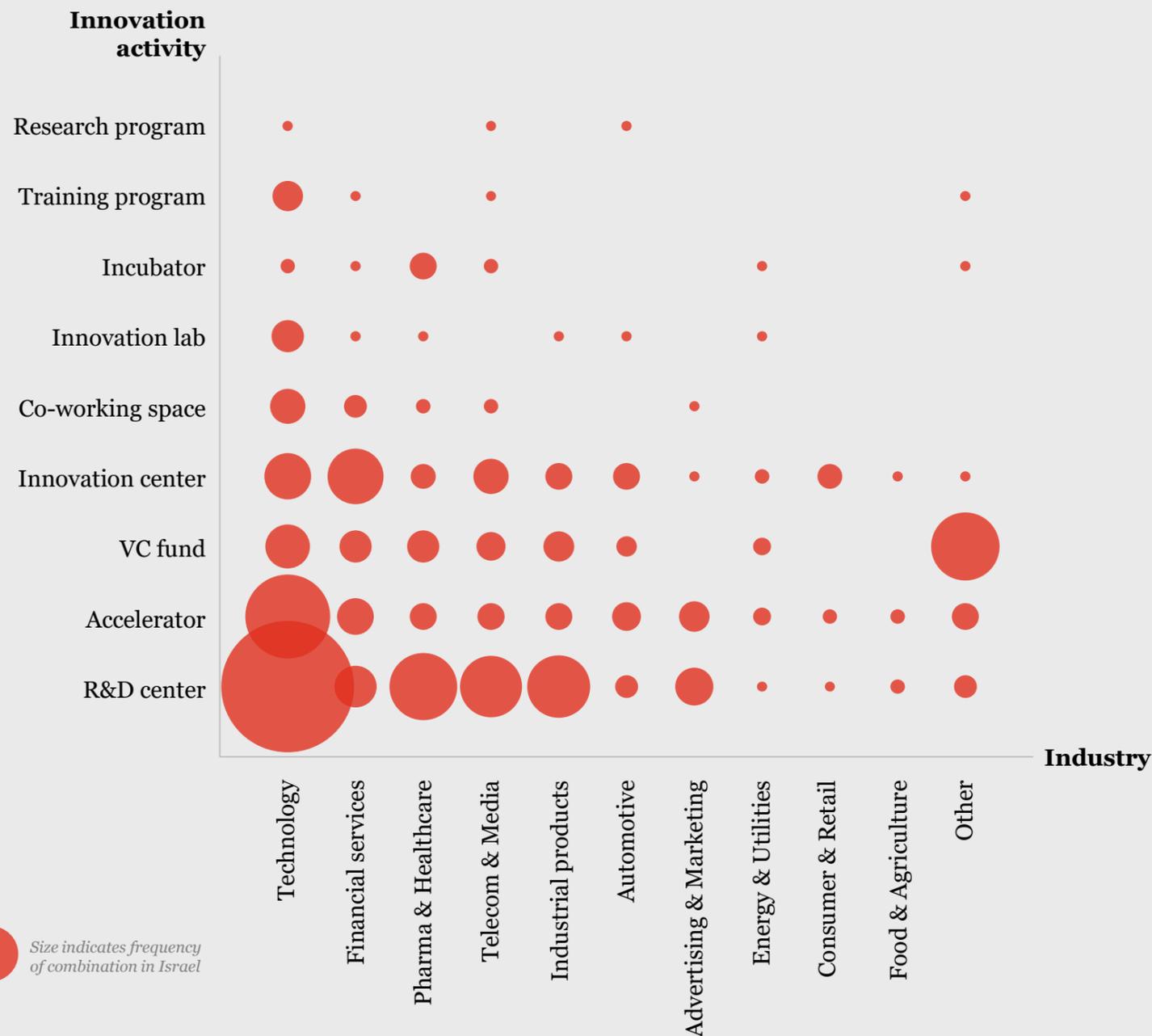
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3.2 Ecosystem map

Overview of Israel's MNC innovation community

The following visuals represent the various innovation activities undertaken by over 500 MNCs with Israeli innovation activities. It is particularly useful for executives interested to know how developed the MNC community is in Israel, and which activity types are common in which industries.

Feature 36: How 500+ MNCs innovate in Israel



Size indicates frequency of combination in Israel

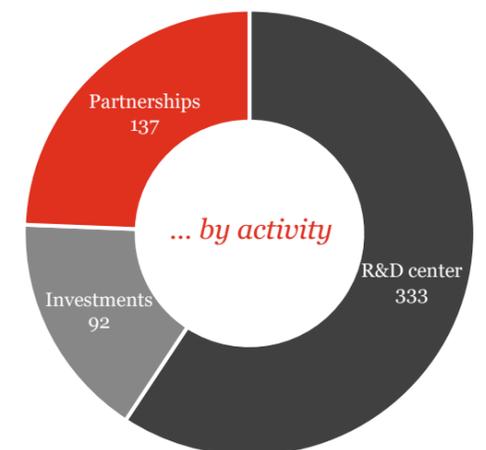
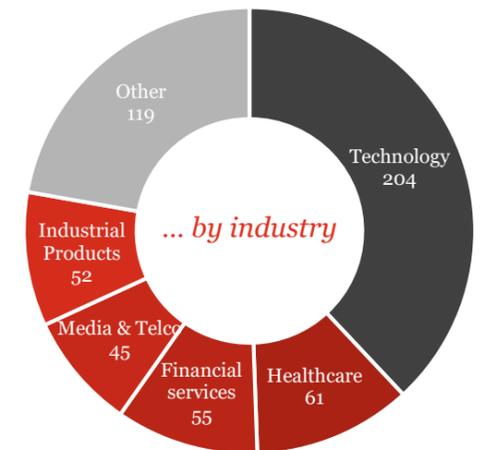
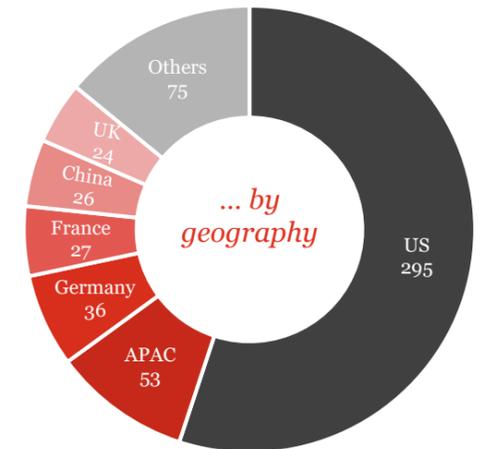
Feature 37: How does Israel's MNC community segment?

While technology R&D centers still dominate Israel's MNC community, global corporates have been increasingly building small open innovation teams to increase interaction with local start-ups and other ecosystem stakeholders.

This mapping provides a snapshot of the activities of over 500 MNCs currently innovating in Israel, either through permanent representatives or through intermediaries.

Key findings

- 55% of the MNCs innovating in Israel are headquartered in the US; 27% in Europe and 15% from Asia-Pacific, including China
- Technology companies account for 38% of the MNCs innovating in Israel – by far the most significant industry vertical
- Pharmaceuticals & Healthcare (11%), Financial Services (10%), Industry Products (10%) and Telecommunications & Media (8%) also have a significant footprint
- These MNCs often build up a combination of traditional R&D activities with diversified open innovation activities – innovation centers, accelerators, incubators, research programs, co-working spaces and corporate venture funds
- The list of specific innovation programs mapped can be segmented in line with core innovation identities – R&D-led programs account for 59% of MNC programs in Israel, partnerships-led programs 25% and investment-focused programs 16%
- MNCs build broad portfolios of programs. To illustrate the diversity of programs with an example, in addition to Microsoft's R&D, CVC and Accelerator programs, the company also partners with programs such as AtoBe, Madgera, Team8, she codes, i3 Equity Partners, and many others.



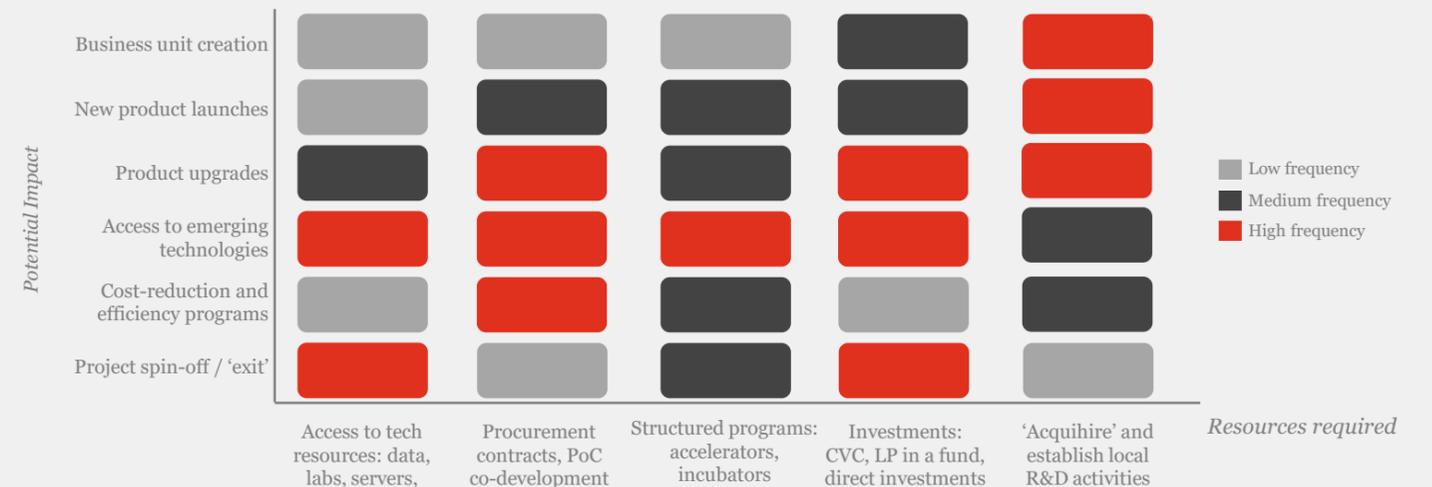
3.3 Additional resources *Further resources are available on-demand...*

Innovation capability matrix | Characteristics of 'starter' and 'advanced' level innovation across five key parameters

	Starter	Advanced
Strategy	How aligned is your innovation strategy? Are your desired outcomes clear? What is the rationale for your priorities?	
Culture	Are your teams incentivized to innovate? How do employees contribute to ideation? What is your actual level of traction with business units?	
Process	What is your process for project selection? When are initiatives cancelled? Where is your focus in the ideation-to-commercialization innovation lifecycle?	
Organization	How are your satellite innovation teams structured? What is the channel between business units and innovation personnel? How standardized are your programs?	
Partnerships	What is the approach to sourcing emerging technologies? How do R&D interface with external partners? What level of ecosystem integration is optimal?	

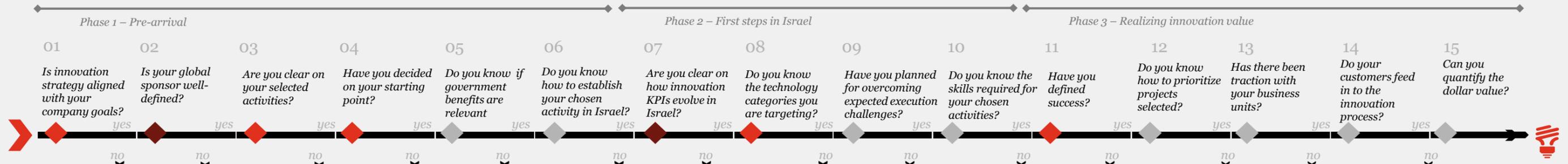
Useful for – Executives looking to understand how to assess innovation performance and level-set current capability levels against leading practice

MNC - start-up collaborations | Options along the impact vs resources scale



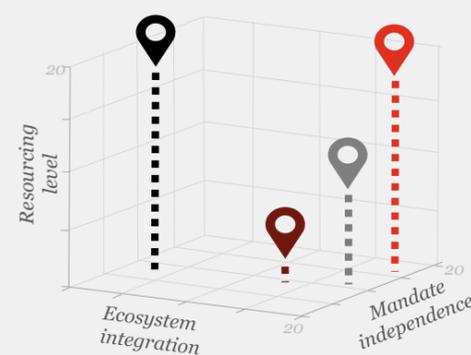
Useful for – MNC leaders interested to know which collaboration activities generate which level of impact, the frequency of those activities in Israel, and the resource level required

Decision tree roadmap | Milestones and guidance for realizing successful innovation outcomes in Israel



Useful for – Executives looking to understand the key steps towards successful Israeli innovation activities, from pre-arrival strategy to mature operating models realizing value

MNC innovation profiler | What works for different profiles?



Characteristics

- Diversified, big players; long-term presence; mature R&D; experimental
- Focused big players; conservative on IP sharing; talent acquisition key driver
- Lean open innovation teams; early-phase in market; quick wins
- Established open innovation programs; Venturing activity

Useful for – Executives actively planning their Israel innovation activity portfolio, and determining which options will help realize their specific objectives

For more information... for full access to this resource pack and a deeper discussion on your organization's innovation objectives, contact:

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Appendix

Note on methodology

Acknowledgements

References

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Note on methodology

The evidence used in this report has been extensively referenced in this appendix. Readers are invited to use the links provided to learn more. Analysis and surveys performed by PwC have also been used extensively, with sources clearly identified where required.

Part of this research was conducted through in-depth interviews with MNC executives, PwC innovation experts and innovation leaders in Israel and globally between September and December 2018. These interviews constitute the PwC & Start-Up Nation Central survey 2019.

- For the survey, qualitative and quantitative data points were collected from analysis of more than 90 MNCs in total
- 73 executive interviews were conducted as part of the survey, with local and global innovation leaders from 22 countries, across every industry vertical
- Wherever features in this report cite this survey, the source is clearly mentioned

This report also uses data from surveys conducted by PwC's global network, including:

- PwC's 2018 Global Digital IQ Survey surveying 2,280 executives in more than 60 countries
- PwC's 21st annual Global CEO Survey (2018), surveying 1,293 leaders of companies
- PwC Strategy&'s 2018 Global Innovation 1,000 investigating trends at the world's 1,000 largest corporate R&D spenders
- PwC's 2017 Global Innovation Benchmark with 1,222 global innovation executive respondents

The Ecosystem Map in section 3.2 was built following a comprehensive market scanning and analysis exercise performed by PwC between September and December 2018, based on closed and open sources.

- In total 536 MNCs were identified with innovation activities in Israel
- As many MNCs operate multiple innovation programs, the total number of innovation programs equals 562, based on the following program categories: Applied research program, Accelerator, Venture Capital, Co-working space, Innovation lab, Incubator, Training program, R&D center, Innovation center
- Innovation center is defined according to Start-Up Nation Central's Finder database as open innovation outposts not explicitly defined as any of the other programs listed above

Feature 8, *'The most common innovation activities managed by MNCs in Israel'* was created using RAWGraphs – a visualisation platform to create open outputs. Learn more [here](#).

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About Start-Up Nation Central

Start-Up Nation Central is an independent non-profit that builds bridges to Israeli innovation. We connect business, government, and NGO leaders from around the world to Israeli innovation, through highly customized business engagements, and through Start-Up Nation Finder – an easy to use, up-to-date, free online platform for discovering and connecting with thousands of relevant innovators.

We identify technological sectors with high-growth potential, and help them develop to maturity. We currently focus on the Digital Health, AgriFoodtech and Industry 4.0 sectors, exposing them to global audiences, helping them develop practical tools, attracting investors, and establishing and nurturing tech communities to increase collaboration, knowledge-sharing, and skill expansion.

We accumulate knowledge and generate in-depth insights about Israel's innovation sector, and share these findings with our clients and partners.

Start-Up Nation Central – your partner for Israeli innovation.

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The State of Innovation



*Operating model frameworks, findings and resources for
multinationals innovating in Israel*

April 2019