DEVELOPING COMPETITIVE ADVANTAGE THROUGH STARTUPS AND VENTURE CAPITAL IN EMERGING MARKETS: A VIEW FROM ISRAEL

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Abstract

This article presents an examination of the emergence and co-evolution of startups and venture capital that led to the transformation of Israel into a Start-Up and Innovation Nation since its inception in 1948. Throughout, the co-evolution of startups and venture capital was considered a critical linkage between venture capital emergence and startup intensive cluster. The article also examined the three phased evolutionary model of 1969 to 2000. A discursive approach of related relevant literature was used. The study found out that the co-evolution of startups and venture capital, policy targeting and a network of a number of other factors as will be discussed in the three phased evolutionary model were critical to the emergence and change of the Israeli high-technology industry into a high-technology startup intensive industry. Israel has become the second largest world market for venture capital with more than 240 venture capitals since 1992. Israel has also become the lead in research and development attracting more than 270 multinational companies with more than 250 establishing research centers and employing over 108 000 in the country. The study also found that Israel leads other nations in per capita startups, engineers, scientists and technicians. This article will be critical for policy formulation and implementation especially in Emerging Markets. This article may lead to a shift in strategy in many emerging countries. This article will also help expand the academic knowledge by filling the existing gaps within the body of knowledge. Therefore, the article has academic, economic and policy value.

Keywords: Venture Capital, Startups, Hi-Tech, Competitive Advantage, Emerging Markets, Israel

1. INTRODUCTION

Ideas dominate contemporary society. Ideas feed curiosity, govern decisions and fuel the increasingly knowledge-based economy (Ellison, 2015). The startup world houses an industry of ideas, providing mankind with cutting-edge solutions to everyday problems. In recent years, there has been an influx of young people entering the entrepreneurial world through academic programs, accelerators and startups (SUs). These are surfacing at an astonishing rate. All entrepreneurs establishing a SU do so in order to succeed, to "make it big time." What these entrepreneurs lack, however, is knowledge of the crucial ingredients for success. To Ellison (2015), these entrepreneurs are generally oblivious to their SU`s chances of success. However, not all ideas evolve past their formative stages. Some succeed and some ultimately fail. Ellison (2015) argues that to investors, SUs offer huge opportunities for high returns but alas, the gains exist only in tandem with substantial risk. According to Florida and Kenney (1988:302), "there is little doubt that venture capital plays a critical role in [SU entrepreneurship] and economic [growth]. Clearly, the vibrance and rapid growth of California's Silicon Valley and Boston-Route 128 area, for example, owe much to the significant amounts of venture capital (VC) available there." They further argue that, "the success stories of high flying SUs like Fairchild, Intel, Digital Equipment Corporation (DEC), Apple Computer, Cray Computer, Sun Microsystems, Genentech, and countless others stand in sharp contrast to the stagnation and decline found in older manufacturing sectors" (pp.302). Florida and Kenney (1988:302) opine that "it is not surprising that both private and public sector actors have become enamored with VC as a mechanism for incubating technology businesses and generating economic growth."

According to Barnea (2014), over the past 10 years, Israel has built a strong reputation as one of the leading countries in SUs. Netanyahu (2014) in Maune (2015:179) states that, Israel a Start-Up Nation has of recently graduated into an Innovation Nation. He further states that, "the future now belongs to those who innovate" with those that do not innovate falling behind. Netanyahu (2014) in Maune (2015:179) insists that the Israeli brains are now the global heart for innovative idea generation, scientific breakthroughs as well as an essential element for ground-breaking innovative solutions to the global challenges. Barnea (2014:19) argues that "Dan Senor and Saul Singer`s book, *Start-Up Nation: The story of Israel`s Economic Miracle,* published in 2009, ranked fifth on the business bestseller list of *The New York Times,* has brought recognition to a nation that has produced more SUs than large, peaceful, and stable nations such as Japan, China, India, Canada, and the United Kingdom." Also Jason Gewitz`s book, *Israel`s Edge: The story of the IDF`s Most Elite Unit – Talpiot,* published in 2016, gives never-before revealed information on Israel`s Defense Forces` most innovative thinkers, the Talpiot. The book lists some of the accomplishments of the Talpiot`s outstanding graduates who have created cutting-edge SUs like Check Point, Compugen, Anobit (bought by Apple) and XIV (bought by IBM) after leaving the army, which is the envy of every country in the world.

According to Investopedia (n.d.), "a SU is a company that is in the first stage of its operations. These companies are often initially bank rolled by their entrepreneurial founders as they attempt to capitalize on developing a product or service for which they believe there is a demand. Due to limited revenue or high costs, most of these small-scale operations are not sustainable in the long term without additional funding from venture capitalists" (www.investopedia.com/terms/s/startup).

Avnimelech and Teubal (2006:1477) define SUs "…as young firms that are into research and development up until early selling stage, that is, within five years." The degree to which companies focus on technology does not provide a standard by which to evaluate SUs. While many SUs innovate and rely on technology, SUs are not synonymous with tech-companies. Maune (2015:190) states that the Israelis define VCs as both domestic and foreign companies that invest in the country`s SUs. According to Gompers and Lerner (1999:349) in Avnimelech and Teubal (2006:1477), "VC consists of independently managed dedicated pools of capital that focus on equity or equity-linked investments in privately held, high growth companies." VC is one of the oldest and best-known methods of investment in early stage companies (Ellison, 2015). VCs invest in very young companies and therefore adopting a "build-up" investment strategy.

Avnimelech and Teubal (2006:1478) states that "although the first American VC firm was founded in 1946, a critical VC sector and market ensued in the mid-70s during the stimulation of Information Communication Technology as well as the formation of the National Association of Securities Dealers Automated Quotations exchange in 1971." The dispersion of VC to Israel in the 90s was as a result of globalisation and liberalisation of the stock market that was looking for initial public offerings of small high-tech firms. The diffusion was also associated with the change-over towards a SU intensive high-technology cluster from a military-dominated industry. Avnimelech and Teubal (2006:1478) argue that "when strictly defined Israel`s VC industry in the 1990s became one of the largest VC industries in absolute terms (only second to the U.S.A.) and the largest in relative terms (VC as percentage of GNP)." In their study, Avnimelech and Teubal (2006) found out that VC`s impact on hi-tech was SU and VC co-evolution. Avnimelech and Teubal (2006:1480) state that VC became Israel`s central pivot for the advent of the SU high-technology intensive sector. To Avnimelech (2008:81), previous work "suggests that policy was a central vector in the VC emergence and transformation of Israel`s hi-tech industry into the SU-intensive model." (Avnimelech and Teubal, 2006:1480) further argue that the absence of a VC industry with strong co-evolutionary effects on SUs suggests the non-emergence or little dispersion of America`s Silicon Valley approach to high-technology outside America until the 90s in Israel.

Israel`s high-technology success SUs has attracted attention of large corporations, and each year around 10-15 Israeli SUs are acquired by global corporations for billions of dollars (Barnea, 2014). The tremendous success of the growing Israeli technology market has managed to attract a substantial amount of investors from outside to invest directly in Israel`s technology market through foreign VCs, Corporate VCs, and individuals. Maune (2015:179) states that although it is now public knowledge that Israel has the greatest number of per capita SUs than any other country in the world, the fact that it has also the greatest number of per capita technicians, engineers, scientists and PhD holders than any other nation has not yet been public knowledge. Maune (2015:179) further states that the country now leads in research and development (R&D) spending. It has also managed to attract many of the world`s major international companies to open up shop and establish R&D activities as shown in Table 2 below (IMF, 2014). As of 2011 there were 245 R&D centers by foreign companies in Israel and their countries of origin were: U.S.A. (46%), Europe (46%) and the rest of the world (8%). These foreign multinational corporations employed more than 108, 000 employees. SUs and VCs have proved to be of great importance towards economic development and growth. The co-evolution of SUs & VC will provide a tremendous source of the much needed FDIs in Emerging Markets. According to Maune (2015:179), Israel an Innovation Nation that is smaller than Wales and New Jersey and less than 70 years old with eight million people becomes a typical example that can provide best practices and lessons for Emerging Markets especially African countries to adopt given the successes recorded in the past 68 years. According to the List of Israeli companies quoted on the NASDAQ (2017), "Israel had more companies listed in 2012 on the NASDAQ stock exchange than any [other] country outside the U.S.A., save [for] China.[15] As of 2011, some [60]

[15] List of Israeli companies quoted on the Nasdaq. (2017, May 26). In Wikipedia, the Free Encyclopedia, Retrieved 14:59, June 10, 2017, from https://en.wikipedia.org/w/index.php?title=List_of_Israeli_companies_quoted_on_the_Nasdaq&oldid=782400971.

Israeli companies [were] listed on the NASDAQ.[16] [Year 2000] was the year that saw the most new Israeli listings on the exchange – 33 companies.[17] Since the 1980s, over 250 Israeli companies had an initial public offering (IPO) on the NASDAQ." Israel has managed to develop a vibrant ecosystem that has spurred a high rate of both technological innovation and entrepreneurship through targeted government policies and initiatives as well as the co-evolution of SUs and VC. This article examines Israel`s SUs and VC in developing a competitive advantage as well as exploring lessons that Africa countries can learn.

The remaining sections of this article will be as follows: Section 2 presents a review of literature on Israel`s SU and VC industry, section 3 presents methodology, section 4 presents a discussion of Israel`s SUs and VC, and section 5 concludes by presenting some policy implications.

2. LITERATURE REVIEW

2.1. Start-Up development and funding instruments

The lifeline of any SU is the accessibility to a consistent flow of capital. Throughout a company`s life, a multiple rounds of investment will arise. The first round of investment allows the idea to be translated into a tangible product or solution. Generally, the funding is bootstrapped from the innovators` own pockets along with, if they are lucky, a government or institutional grant. This will be followed by the seed stage, where the investment circle expands to include family members and friends. The SU finally begins to take shape. Investors, usually previously complete strangers to the founder, begin to establish a relationship during this phase. The hope and expectation are that the profit will be substantial, and the reality is that the risks at this point are fairly sizable. As such, these early investors are considered angels. The category of angel investors includes seed VC organizations and crowdfunding[18] platforms.

As the company continues to grow and begins to deliver some sort of products, the SU begins to offset some of the initial entry costs. True VC dominates investment during this development phase, where venture money will often be referred to as growth capital. VC assembles portfolios from various ventures, or SUs, usually raising funds from large institutions. Like in other SU investing platforms, VC involves significant risks but also offers potentially above-average returns on investment. For example, funds like Sequoia Capital who invested in Whatsapp, Accel Partners who invested in Facebook (NASDAQ: FB) and Benchmark Capital, early investors in Twitter (NASDAQ: TWTR), all saw massive returns from their early stage, risky initial investments. After this period of growth and profit, assuming the company has been successful up to this point, the SU eventually reaches maturity, where it goes forward and hopefully generates a substantial amount of profit, gets bought out by a larger company, or floats on a public exchange. Figure 1 below denotes the SU development and funding instruments as well as the enterprise`s revenues per each developmental stage.

2.2. Financing channels for the Israeli Start-up-intensive cluster

According to IVC and KPMG (2016:1), Israeli technology companies managed to raise USD1.7 billion in the second quarter of 2016, from 187 financing deals. This amount was 55% above the USD1.1 billion that was raised from 174 hi-tech financing rounds in the previous quarter.[19] IVC and KPMG (2016:1) further claims that the largest deal in the quarter was USD300 million that was raised by mobile app company Gett that accounted for 18% of the total proceeds. Even without the Gett deal, capital raised in the second quarter reflects a 27% increase compared to the first quarter of the year.[20] IVC and KPMG (2016:1) further states that the average company financing round peaked at USD9.2 million, higher than the USD6.5 million and USD6.7 million averages of 1st quarter of 2016 and 2nd quarter of 2015, respectively. IVC and KPMG (2016) further claims that in the first half of 2016, the Israeli hi-tech capital managed to raise USD2.8 billion from 361 deals, that is, 35% above the USD2.1 billion raised from 327 deals in the first six months of 2015.[21] IVC and KPMG (2016) indicate that in the 2nd quarter of 2016, the Israeli VC funds invested USD222 million in Israeli hi-tech companies, a record amount accounting for a modest 13% of total investments. That amount was 43% above the USD155 million average quarterly investments for the previous two years, while slightly below the two-year average quarterly share of 15% out of total dollar proceeds[22] (IVC and KPMG, 2016).

According to the IVC & KPMG (2015), the year 2015 was the most prolific year for the Israeli hi-tech capital raising activities with 708 deals accounting for an exceptional USD4.43 billion becoming the highest annual amount or number of financing rounds ever recorded. The amount was up 29% from USD3.4 billion from 690 companies in 2014, and 90% above USD2.3 billion invested in 659 companies in 2013. The average company financing round in 2015 was USD6.3 million, compared to USD5 million in 2014 and USD4 million in 2013. Table 1 below shows Israeli high-Tech capital investment between 2006 and 2015.

[16] Ibid.

[17] Ibid.

[18] Crowdfunding is an up-and-coming format for SU investment, allowing investors to build their own SU portfolios rather than buying into rigid funds. Crowdfunding collectivizes the SU investing process, allowing many individuals to invest smaller amounts, forming what is known as the "crowd." There exist two main forms: reward-based and equity-based.

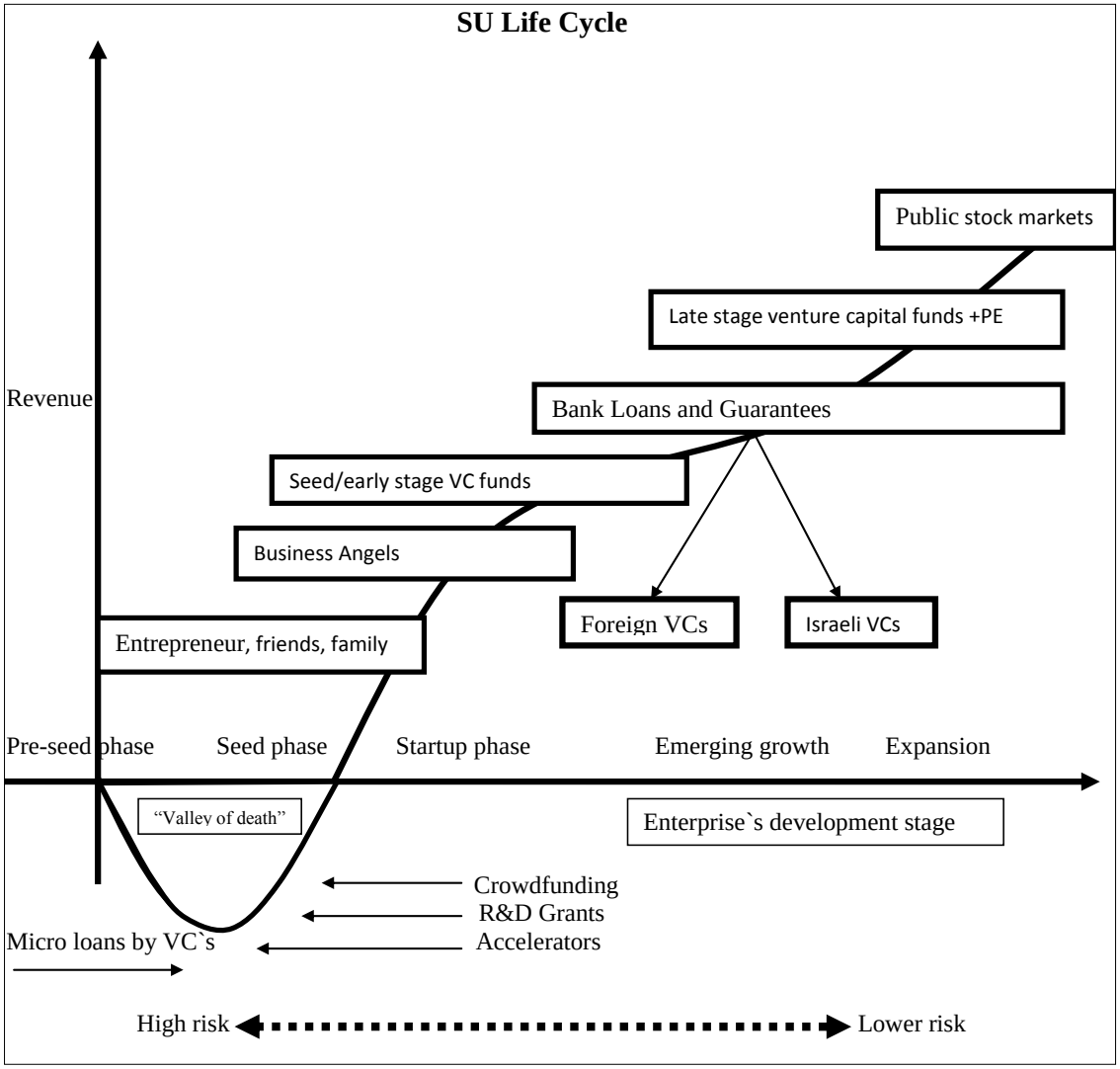
[19] IVC Research center & KPMG Q2/2016 Report

[20] Ibid.

[21] Ibid.

[22] Ibid.

Figure 1. SU Life Cycle and funding instruments



Source: Renda et al. (2006)

Table 1. Capital invested by Israeli VCs, Foreign and others in High-Tech firms

Year	*Capital Invested (USDm)*	*Israeli VCs (%)*	*Amount (USDm)*	*Foreign & others (%)*	*Amount (USDm)*	*No. of deals*
2006	1,622.00	40%	648.80	60%	973.20	402
2007	1,759.00	39%	686.01	61%	1072.99	462
2008	2,076.00[23]	38%	788.88	62%	1287.12	483
2009	1,120.00	36%	403.20	64%	716.80	457
2010	1,219.00	37%	451.03	63%	767.97	386
2011	2,076.00	30%	622.80	70%	1,453.20	534
2012	1,831.00	27%	494.37	73%	1,336.63	567
2013	2,335.00	24%	560.40	76%	1,774.60	659
2014	3,422.00	17%	581.74	83%	2,840.26	690
2015	4,428.00	15%	664.20	85%	3,763.80	708
Total	**21,888.00**		**5,901.43**		**15,986.57**	**5348**

Source: IVC Research Center

[23] October 2008 Sub-Prime crisis

IVC and KPMG (2015:1) indicate that "VC-backed deals accounted for 72% of capital raised in 2015, with an outstanding USD3.2 billion closed in 397 deals, that is, 56% of total deals. The past three years have demonstrated a continuous 30% annual growth in capital raised from VC-backed deals.[24] The 2015 amount was up 36% from the USD2.3 billion raised from 392 VC-backed deals in 2014, and 84% above the USD1.7 billion raised from 393 VC-backed deals in 2013.[25] It seems the increase in capital raised from VC-backed deals can be best explained by the increase in size of the average financing round where VC funds participated. The average VC-backed deal in 2015 reached nearly USD8 million, an unprecedented record, well above the USD5.9 million average in 2014, and much higher than the USD4.4 million average VC-backed deal in 2013.[26]"

According to IVC and KPMG (2015:2), "Israeli VC funds have accelerated their activity in 2015 by investing USD653 million, compared with 2014's USD568 million.[27] The amount was, however, below the all-time Israeli VC fund investment record set in 2008 of USD780 million. Looking at the Israeli VC funds` share placed in total capital raised by Israeli hi-tech companies, it has clearly been decreasing in the past decade, reaching its lowest point of 15% in 2015, compared to a 17% share in 2014 and a 30% 10-year average share.[28] However, foreign and other investors increased from 60% in 2006 to 85% in 2015.[29] The increase in capital invested is a direct result of the increase in capital available to investments by local funds, and is also demonstrated in first investments made by Israel`s VC funds in 2015." IVC and KPMG (2015:2) further states that the Israeli VC funds placed a total of USD236 million in first investments, that accounted for 36% of total placements, up from 30% share recorded in both 2013 and 2014.

IVC and KPMG (2015:2) further indicate that, "Seed stage deals have attracted more attention from investors in 2015, with 194 seed companies (27% of deals) bringing in a total of USD269 million (6% of the total capital), an increase in both compared to 2014's 179 seed deals, which totalled USD178 million (5% of the total capital)." The increase in large deals was a result of 78 late stage companies that led capital raising in 2015, with almost USD1.7 billion, an exceptional amount for this stage, that is, 23% increase from 2014. To IVC and KPMG (2015:2), mid-stage companies also attracted USD1.5 billion in 2015 compared to USD884 million in 2014."

2.3. Start-Ups established in Israel from 1999 – 2014

Israel has managed to establish 10, 185 SUs from 1999 to 2014, of these 4, 358 (42.8%) failed, 5, 347 (52.5%) are running and 480 (4.7%) became successful (see pie chart in figure 4 below). Figure 2 below shows the number of SUs established, failed, running and successful per each year from 1999 to 2014. Figure 3 below, however, shows Israeli SU success index, that is, the number of companies by segment for the same period, 1999 to 2014. Of the 10, 185 SUs, 4, 699 were inactive while 5, 486 were active. Of the inactive SUs, 664 SUs were acquired, with 487 being venture backed (VB) while 175 were bootstrapped (Bo). Three hundred and three (303) VB and 38 Bo became successful. Five thousand four hundred and eighty six (5, 486) SUs were active with 5,384 being private while 102 public. Two thousand three hundred and four (2,304) were VB and 3080 were Bo. Seventy nine (79) VB and 41 Bo became successful. Of the 102 public SUs, 96 were VB while six were Bo, with 17 VB and two Bo became successful. Figure 2, 3 and 4 clearly show what happened since 1999 to 2014 with regards to the number of SUs that were established in Israel.

2.4. Israel`s Start-Up Ecosystem

In order to build an innovative hi-tech SU-intensive cluster, Israel had to establish and build an ecosystem to support such an industry. Establishing a hi-tech SU ecosystem was basically based on six main components (Getz and Goldberg, 2016). This is shown in Figure 5 below. The Ecosystem in which the Israeli hi-tech SU industry operates has six core components:

- *Technological infrastructure,*
- *Human Capital,*
- *Funding and supporting* business environment,
- *Process Infrastructure,*
- *Innovation in the industry*, and
- *International operations.*

2.5. Foreign Direct Investment

According to Getz and Goldberg (2016:25), "foreign investors have typically used one of the two options to establish their presence in Israel: they have either set up operations directly, or adopted a strategy of mergers with, or friendly take-overs of, small local companies." Foreign Investor operations have placed much emphasis on establishing R&D facilities as denoted by figure 2 below (Getz and Goldberg, 2016). Getz and Goldberg (2016:25) state that firms such as "Microsoft built its first R&D facility outside the United States in Israel; Cisco has its first R&D center outside the United States in Israel, and Motorola's R&D center in Israel is its largest worldwide." To Trajtenberg (2005) cited by Getz and Goldberg (2016:25) states that, "[these] foreign companies [take] advantage of Israel's ample supply of highly skilled engineers, [scientists, technicians] and its solid track record for innovation and problem solving. In this regard, some have argued that the above competitive [advantage has] been a mixed blessing for the Israeli economy; in that research facilities do not generally make the same contribution to job creation and exports as do manufacturing plants. In fact they also act as a drain on limited Israeli brain power which could otherwise be used by local firms."

[24] IVC & KPMG (2015) Report (www.ivc-online.com).

[25] Ibid.

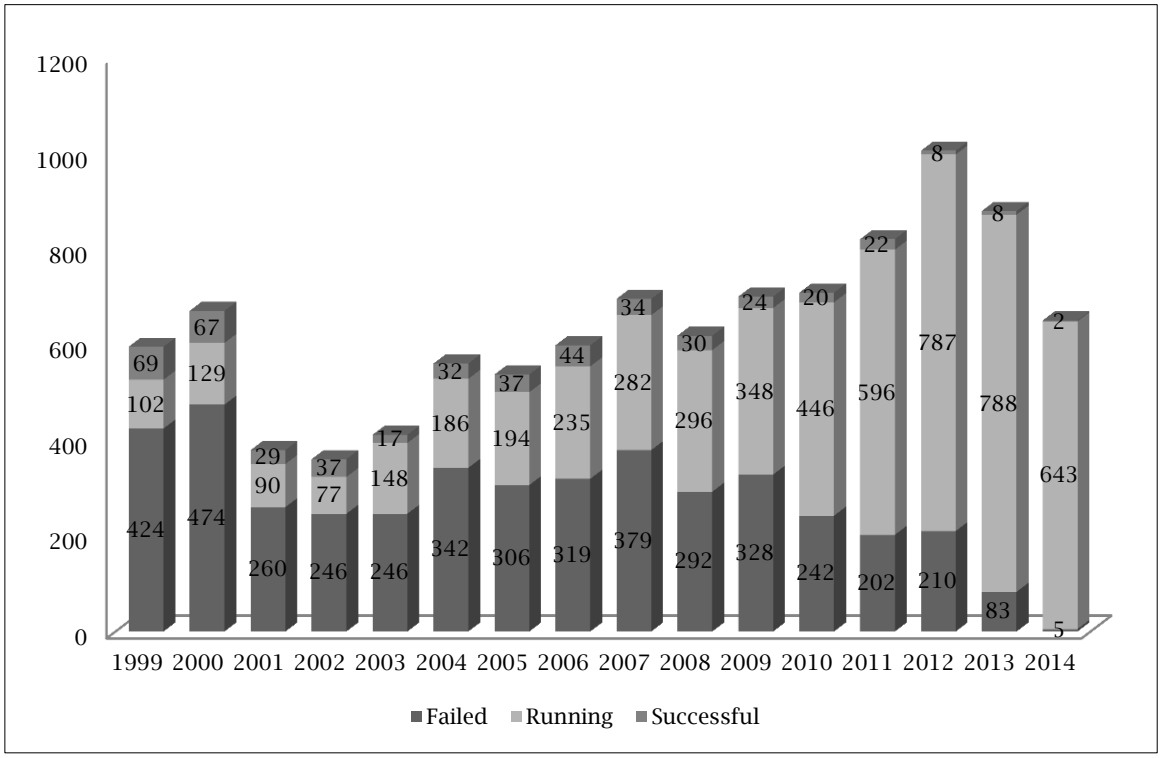
[26] Ibid.

[27] Ibid.

[28] Ibid.

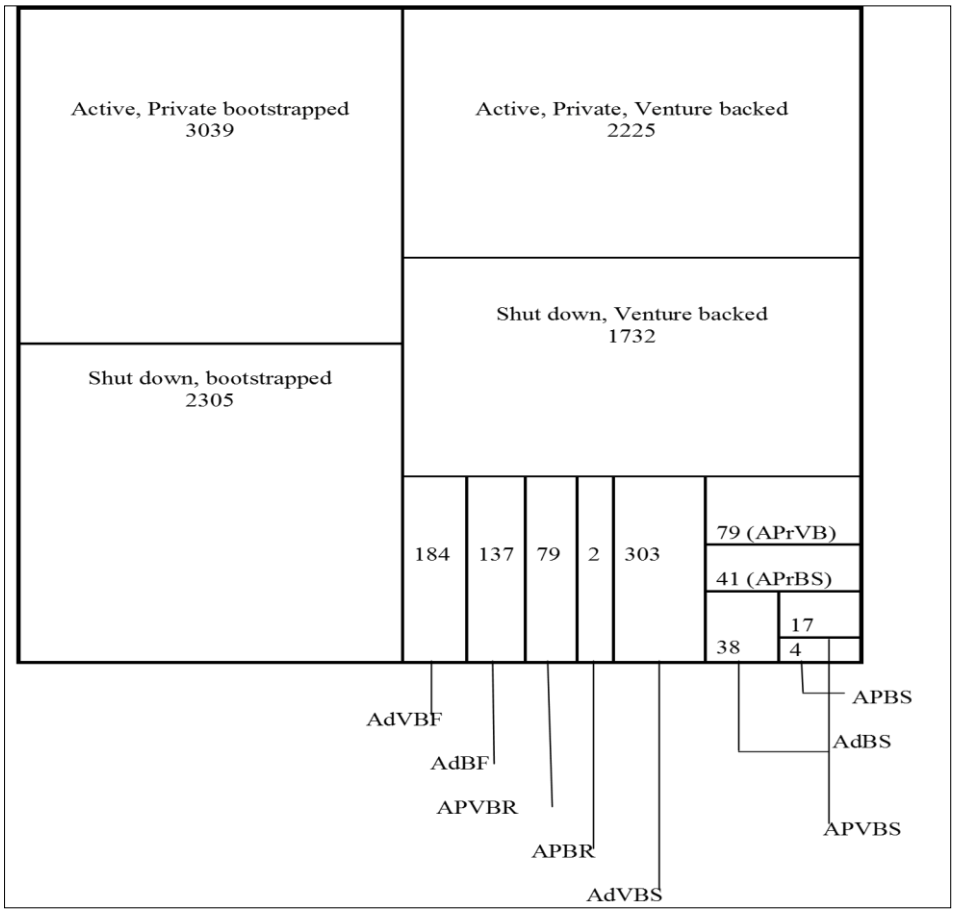
[29] Ibid.

Figure 2. Israeli SUs: Number of Companies by Year Established, by Success Index 1999-2014



Source: IVC Research Center

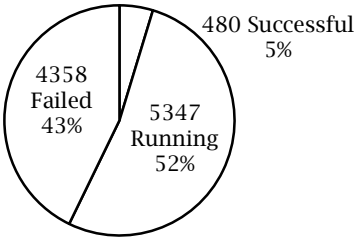
Figure 3. Israeli Startup Success Index (number of companies by segment)



Source: IVC Research Center

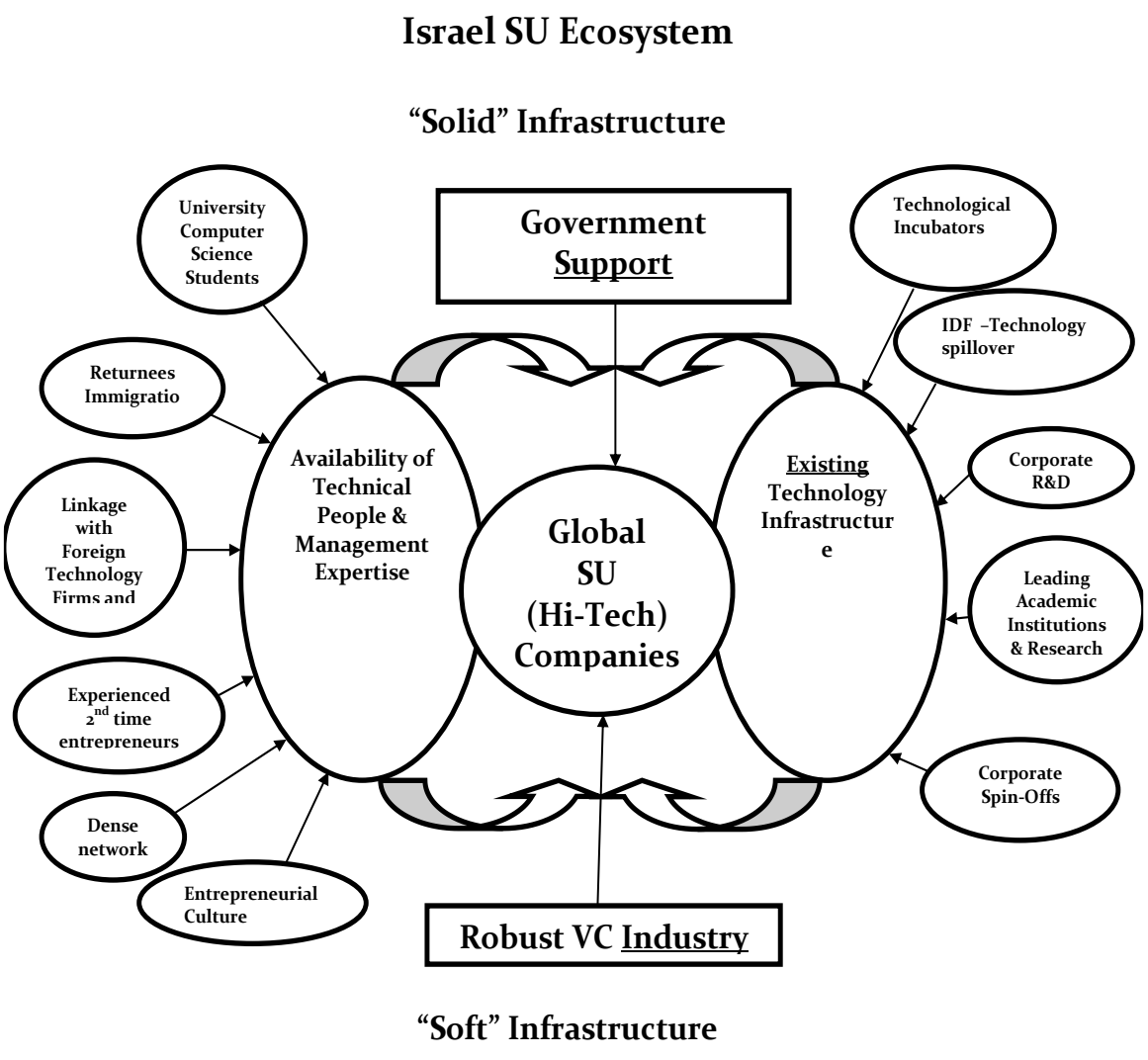
Where: *AdVBF = Acquired, Venture backed, failed*
AdBF = Acquired, bootstrapped, failed
APVBR= Active, public, venture backed, running
APBR = Active, public, bootstrapped, running
AdVBS = Acquired, venture backed, successful
APrVBS = Active, private, venture backed, successful
APrBS = Active, private, bootstrapped, successful
APBS = Active, public, bootstrapped, successful
AdBS = Acquired, bootstrapped, successful
APVBS = Active, public, venture backed, successful

Figure 4. SUs established in Israel 1999-2014



Source: IVC Research Center and Reversexit

Figure 5. Israeli SU Ecosystem



Source: IVA & EY 2014

Table 2. Multinational Companies with R&D centers in Israel (Partial list)

R&DCentre	*R&D Centre Sector (IVC classification)*	*No. of R&D Centers in Israel*	*Year of establishment in Israel*	*No. of employees in Israel*	*Key innovations/technologies/ products*
Apple	Semiconductors	3	2011	500	Development of hardware & chips for Iphone and I-pad
General Motors	Miscellaneous Technologies	1	2011	60	Autonomous Vehicles; Human Machine Interface (HMI); Connected Vehicle
Yahoo!	Internet	2	2008	50	Time Traveler application, smart advertising (market segmentation)
Google	Internet	2	2007	250	Google Autocomplete, Live Results, Google Related, Google Instant, Google Analytics
SanDisk	Semiconductors	3	2006	700	Trusted Flash technology; digital cameras (with Zoran); SSD drivers
Samsung	Semiconductors & Communications	2	1999	250	Galaxy Camera, eye tracking system for Galaxy S4 smartphone
HP	Miscellaneous Technologies	4	1994	5,700	Enterprise Swarm; Automatic Print Quality Inspection; Semantic Automation from Screen Capture; HP Indigo Photo Enhancement Server
Qualcomm	Semiconductors & Communications	3	1993	260	Wi-Fi technology and the next generation of wireless LAN connectivity; Mobile enterprise security technologies; Qualcomm Snapdragon Mobile Development Platforms; Digital pen and gestures based on ultrasound technology
Microsoft	IT & Enterprise Software	2	1989	800	Business Intelligence in the Cloud and in Office, XBOX Analytics: building a novel real-time recommendations platform for the Microsoft entertainment business
Intel	Semiconductors	5	1974	10,500	Pentium M microprocessor Sandy Bridge and Ivy Bridge family of Processors
IBM	IT & Enterprise Software; Semiconductors	3	1949	1,000+	ECO-2000 Optimized Crew Scheduling System; WebSphere Content Discovery Server; mobile shopping app

Source: Cohen (2013) cited in Getz and Goldberg (2016:26)
Note 1: MT = Miscellaneous Technologies; SW = IT & Enterprise Software; Semi = Semiconductors. R&D Centre Sector (IVC classification).
Note 2: Today there are more than 250 foreign R&D centers active in Israel[30] and over 270 foreign multinational corporations operating in Israel employing over 108, 000 employees.[31]

[30] Invest in Israel – "Foreign R&D centers in Israel"

[31] Zetelny, I. (2014). The Israeli Hi-Tech industry, EY, Israel.

Getz and Goldberg (2016:26-27) state that "the contribution made by multinationals to the development of the Israeli hi-tech industry [in particular the SU cluster] is generally viewed as positive, given the many spillovers to the local economy, such as easy access to international financial and business markets, improved export channels, and the transfer of know-how and managing/marketing skills from the personnel of multinationals to local companies." Getz and Goldberg (2016:27) further add that, "in addition to creating state-of-the-art R&D centers, companies such as Intel and Motorola have established manufacturing facilities, which rapidly became some of the largest private employers in Israel." Getz and Goldberg (2016:27) further state that "in 2003 Intel was employing more than 6,000 workers at its several plants scattered around the country (Haifa, Jerusalem, Kiryat Gat, Petach Tikva, and Yakum), and has developed into one of the top Israeli exporters, with a volume of USD1.6 billion in 2003, equivalent to 13% of total Israeli electronic exports." By December 2014, Intel had 10,500 employees and exported USD4.5 billion. To Getz and Goldberg (2016), the linkages that exist between Intel and Israel are very strong as evidenced by the existence of multibillion dollar world class research and innovation investments.

2.6. Israeli Hi-Tech Exits Analysis

According to IVC – Meitar hi-tech exits H1/2016 report, Israeli hi-tech exit activity has accelerated. It has reached USD3.32 billion in 45 deals. It reached 41% of the total exit proceeds in 2015 (USD8.04 billion) and 43% of the total proceeds in 2014 (USD7.78 billion). The average exit deal was USD74 million in H1/2016, slightly above the USD72 million annual average in 2015. The number of exists in H1/2016 reached 41% of the 2015 figure and 37% of the deals in 2014. According to IVC – Meitar Exits Report for the first six months of 2016, the current rate supports a projected annual figure of around 100 deals and an estimated total of USD7 billion in exits. Israeli high-technology IPO activity has plunged to a single company, which raised just under USD6 million, that is, 0.2% of the total H1/2016 exit proceeds. The company that went public was TrendIT. The IPO took place on the London Stock Exchange (LSE) at USD17.6 million at the valuation time of IPO. Table 3 below shows the top eight exits in H1/2016.

2.6.1. Mergers and Acquisitions – 2015

With USD7.5 billion in 95 deals, 2015 was the third highest in the past 10 years in terms of Israeli hi-tech M&A exits. This amount exceeded the total for 2014 – USD5.67 billion – as well as 2013`s USD6.35 billion. The 95 deals in 2015 were slightly below the 99 M&A exits in 2014 and slightly above the 92 M&As recorded in 2013. In addition, the average M&A deal grew to USD78 million in 2015, compared with USD57 million in 2014 and USD71 million in 2013. Although fewer deals closed in 2015, the size of deals seems to be growing. Nearly 40% of the deals signed in 2015 were above USD50 million. According to IVC & Meitar the number of deals remains the same as those of 2014. Year 2015 was the second best year for VC-backed acquisitions since 2006 in terms of deal number and a 38% increase since 2014. It was second highest by dollar amount in the past 10 years, after 2013. Table 4 below the M&As of Israel`s hi-tech companies since 2006 while Table 5 shows the largest M&A deals in 2015.

Table 3. Top Deals (USD million) in H1/2016

Company	*Exit Value*	*Buyer*	*Field*
EZChip	811	Mellanox Technologies	Semiconductors
XURA	643	SIRIS Capital Group	Communications
Ravello Systems	430	Oracle	Software
MIS Implants	375	Dentsply Sirona	Life Sciences
Leaba Semiconductor	320	Cisco	Semiconductors
Cloudlock	293	Cisco	Software
Altair Semiconductor	212	Sony	Semiconductors
FreeD (free dimensional video)	175	Intel	Internet

Source: IVC[32] – Meitar Exits Report – H1/2016

Table 4. Mergers and Acquisitions of Israeli Hi-Tech Companies, 2006-2015

Year	*Total Exits (USDm)*	*Total Number of deals*	*Number of VC-backed deals*	*Volume VC-backed (USDm)*
2006	10,064	96	51	2,804
2007	3,729	91	30	1,786
2008	2,701	87	40	1,594
2009	2,630	80	32	1,567
2010	2,499	75	29	1,417
2011	5,257	102	38	2,504
2012	9,752	91	41	2,874
2013	6,352	89	35	3,814
2014	5,675	99	34	2,476
2015	7,483	95	46	3,576
Total	**56,142**	**905**	**376**	**24,412**

Source: IVC Research Center

[32] H1/2016 exits amounted to USD3.32B – 41% of the 2015 total proceeds. IVC–Meitar exits Report H1/2016.

Table 5. Largest Merger & Acquisition Deals involving Israeli Hi-Tech companies, 2015

Rank	*Acquired Israel Company*	*Sector*	*Acquired Company*	*HQ*	*Deal Amount (USDm)*	*VC-backed*
1	Fundtech	SW	D+H	Canada	1,250	Yes
2	Exlibris	SW	ProQuest	USA	500	Yes
3	Borderfree	Internet	PitneyBows	USA	450	Yes
4	Annapurna Labs	Semi	Amazon	USA	360	Yes
5	Adallom Technologies	SW	Microsoft	USA	320	Yes
6	Xura	Comm	Amdocs	Israel	272	No
7	Atltoc	LS	Blackberry	Canada	250	Yes
8	Panaya	LS	Infosys	India	230	Yes
9	Trade FX (Markets Com)	Internet	Playtech	Israel	225	No
10	Red Bend	SW	Harman	USA	200	Yes
	eXelate	Internet	Nielsen	The Netherlands	200	Yes

Source: IVC 2016 Yearbook
Note: CI = Cleantech; Comm = Communications; LS = Life sciences; Semi = Semiconductors; SW = IT & Enterprise software; HQ = Headquarters (refers to the acquiring company).
1. The Xura deal was a partial sale. 2. The Atltoc deal was IVC estimated.

Investor evaluation of VC fund performance is a bit more scientific. Individual fund performance can be assessed through various ratios, such as the internal rate of return and distributions to paid-in capital. In regard to a country's VCs in the aggregate, a simple but key measure of VC performance can be used. This is the exits to investment ratio, which relates the value of VC-backed M&As to the total of VC-backed investments. Looking at Israel's performance on this basis, observers can see a dramatic improvement in investment results that reflect the large number of acquisitions of Israeli SUs by overseas companies. Table 6 below shows the exits to investment ratios from 2003 to 2013. In 2010 the ratio was 1:1. In 2013, the ratio expanded to 2.5:1. That was a striking result and a more positive reflection of the strength of Israel's VC sector, which – in contrast to its early years – has reached a high level of sophistication and maturity. Tellingly, when the ratios of exits to investments in Israel and exits to investments in the United States are compared, Israel comes out on top.

Table 6. Israel`s VC Sector – Dramatic Improvement in Exits to Investment

Year	*VC Investments (USDb)*	*VC-backed M&As (USDb)*	*Exits/Investments ratio*
2003	1	0.6	0.6
2004	1.5	0.8	0.53
2005	1.3	0.9	0.69
2006	1.6	2.8	1.75
2007	1.8	1.7	0.94
2008	2.1	1.5	0.71
2009	1.1	1.5	1.36
2010	1.3	1.3	1.00
2011	1.7	2.5	1.47
2012	1.4	2.8	2.00
2013	1.7	4.2	2.47

Source: IVC Research Center

2.6.2. Public Offerings

Initial Public Offering exits dropped substantially in 2015, similarly to the U.S.A. hi-tech IPO trend that same year (IVC High-Tech Yearbook, 2016:27). According to IVC High-Tech Yearbook (2016:27), eight Israeli high-tech IPOs accounted for USD609 million in 2015, that is, 7% of the total exit proceeds, compared to 2014`s outstanding 27%. The number of deals was lower than expected, as many companies had shelved their IPO plans in responds to worldwide IPO markets` adverse conditions. The top three IPOs raised a combined total of USD427 million on NASDAQ during that same period. According to IVC 2016 Yearbook, only two Israeli companies, which raised a combined total of USD48 million, completed their IPOs on European stock exchanges during 2015, a notable decrease from five European IPOs, totalling USD391 million in 2014. Tables 7, 8, and 9 below shows amounts raised by Israeli and Israeli-related companies in IPOs in US, European and Israeli stock exchange since 2006.

Table 7. U.S.A. Initial Public Offerings of Israeli Hi-Tech Companies, 2006-2015

	All IPOS		*VC-backed*	
Year	*Number of offerings*	*Capital raised (USDm)*	*Number of offerings*	*Capital Raised (USDm)*
2006	4	139	2	118
2007	5	431	4	401
2008	0	0	0	0
2009	0	0	0	0
2010	2	73	1	11
2011	1	790	1	90
2012	0	0	0	0
2013	3	223	3	223
2014	12	1,710	8	527
2015	6	561	5	479
Total	**33**	**3,227**	**24**	**1,849**

Source: IVC Research Center

Table 8. European Initial Public Offerings of Israeli Hi-Tech Companies, 2006-2015

	All IPOS		*VC-backed*	
Year	*Number of offerings*	*Capital raised (USDm)*	*Number of offerings*	*Capital Raised (USDm)*
2006	4	485	1	13
2007	1	7	1	7
2008	0	0	0	0
2009	0	0	0	0
2010	1	2	0	0
2011	0	0	0	0
2012	0	0	0	0
2013	2	79	0	0
2014	5	391	1	70
2015	2	48	0	0
Total	**15**	**1,012**	**3**	**90**

Source: IVC Research Center

Table 9. Israeli Initial Public Offering of Israeli Hi-Tech Companies, 2006-2015

	All IPOS		*VC-backed*	
Year	*Number of offerings*	*Capital raised (USDm)*	*Number of offerings*	*Capital Raised (USDm)*
2006	12	62	3	18
2007	13	81	7	121
2008	0	0	0	0
2009	1	22	1	22
2010	6	52	4	37
2011	4	36	3	30
2012	0	0	0	0
2013	2	12	0	0
2014	0	0	0	0
2015	0	0	0	0
Total	**38**	**265**	**18**	**228**

Source: IVC Research Center

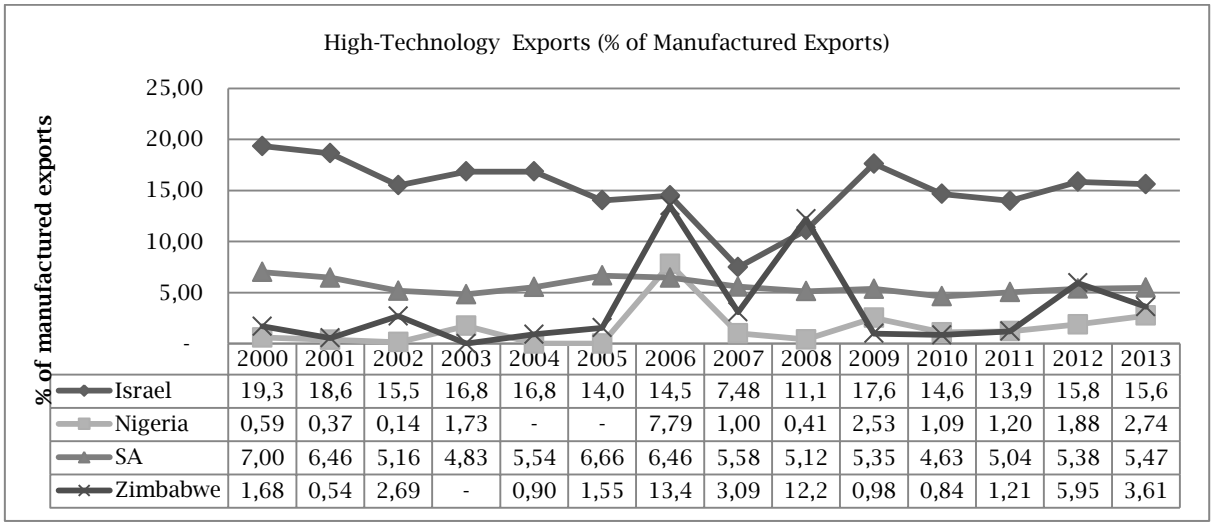
2.6.3. Israeli Start-Ups and the NASDAQ Composite Index

According to the IVC 2016 Yearbook analysis, Israeli hi-tech capital raising and the NASDAQ Composite Index continued to scale up, as in the previous two years, with a 29% and 12% annual growth, respectively. However, the global markets suffered some slowdown in 2015, compromising both stock and VC performance, as compared to the 47% growth in Israeli hi-tech total capital raised and 23% increase in the NASDAQ Composite Index of 2014 as compared to their 2013 results. As opposed to the somewhat erratic correlation patterns demonstrated throughout 2014, Israeli capital raising corresponded to the NASDAQ Index`s increase in 2015 (see IVC 2016 Yearbook for the Israeli SUs – NASDAQ Composite Index trend relationship from 2006-2015).

2.7. Hi-Tech Exports

Figure 6 below compares Israel with other three countries from Africa. The World Bank (2015) in Maune (2015:188) defines high-technology exports as products with high R&D intensity. Such products are usually found in electrical engineering, aerospace, computer and software technology, scientific instruments and pharmaceuticals. The graph in Figure 6 shows Israel on pole position with a 15.42% average on a yearly basis with a significant drop in 2007. Hi-tech exports provide a health source of FDIs for a country unlike most African countries that rely on external loans that comes with interest and prescriptions.

Figure 6. High-Technology Exports (% of Manufactured Exports)



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Israel	19,3	18,6	15,5	16,8	16,8	14,0	14,5	7,48	11,1	17,6	14,6	13,9	15,8	15,6
Nigeria	0,59	0,37	0,14	1,73	-	-	7,79	1,00	0,41	2,53	1,09	1,20	1,88	2,74
SA	7,00	6,46	5,16	4,83	5,54	6,66	6,46	5,58	5,12	5,35	4,63	5,04	5,38	5,47
Zimbabwe	1,68	0,54	2,69	-	0,90	1,55	13,4	3,09	12,2	0,98	0,84	1,21	5,95	3,61

Source: Author (Data collected from World Bank`s World Development Indicators, 2015)

2.8. Scaling Up the Israeli Startups

Innovation is driven by many factors that include the tripartite role played by academic institutions, private sector and government. Figure 7 below provides three important life cycle phases that fosters innovation-driven entrepreneurship. These phases are Stand up, Start up and Scale up. Each phase highlights different key influencing factors, that is, individual and ecosystem factors. According to IVC High-Tech Yearbook (2016:34), "Israel has been branded the 'Startup Nation,' for good reason." According to Bussgang[33] and Stern[34] cited in the IVC High-Tech Yearbook (2016:34-35), "Israel a tiny country of only eight million people – 0.1% of the world`s population – has more companies listed on NASDAQ than any country in the world save for the U.S.A. and China, and more SUs per capita than any other country in the world." However, what is more worrying and of concern is that many Israeli SUs have been struggling to scale. To Bussgang and Stern cited in IVC High-Tech Yearbook (2016:34-35), "that is disappointing for a country with so much potential." But is not all that changing? Bussgang and Stern (2016) cited in IVC High-Tech Yearbook (2016:34-35) confirm that, "for the first time in history, there are Israeli companies scaling up successfully as global market leaders, and the

[33] Harvard Business School Senior lecturer quoted in IVC High-Tech 2016 Yearbook.

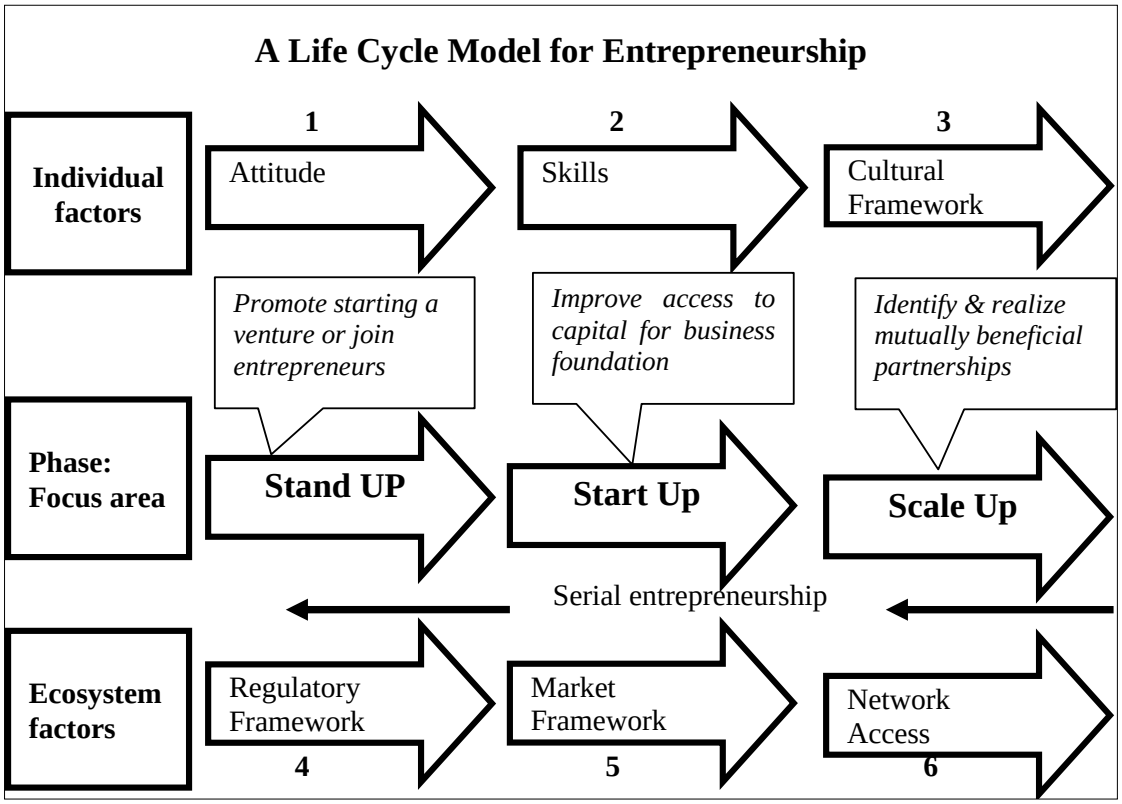
[34] Recent graduate from Harvard Business School quoted in IVC High-Tech 2016 Yearbook.

ecosystem is evolving to support them. In 2014, for example, 18 IPOs raised a record-breaking USD9.8 billion, compared to just USD1.2 billion in 2013." According to World Economic Forum (2014:14), arguments are that "for [Israel] to realize maximum potential of its innovative entrepreneurial ventures, the ventures must scale well beyond simply being viable local businesses employing a handful of people and serving a small customer base." The World Economic Forum (2014:14) further states that "some of the primary ways for SUs to achieve scale tend to be: organic, acquisitions or collaboration. While the first two options generally require large levels of equity or debt financing, collaborative strategies enable 'win-win' situations for both partners while offering potential for the SU partner to profit from the resources and backbone of the large corporation partner."

Bussgang and Stern cited in IVC High-Tech Yearbook (2016:34) find the following interesting facts about the Israeli SUs:

They are Israeli-run but with global footprints. Eighty-two percent (82%) have global offices, and yet 91% are still run by Israeli CEOs, as opposed to foreign executives hired abroad. American VCs are critical to growth. Ninety-one percent (91%) of the firms have received funding from foreign (mainly American) VCs. The founders have started companies before. Sixty-three percent (63%) of SUs currently scaling up are run by Israeli entrepreneurs with prior founding experience.

Figure 7. A Life Cycle Model for Entrepreneurship



Source: World Economic Forum (2014)

3. METHODOLOGY

This article extensively discussed the Israeli experience, using literature, in leading to its competitive advantage through hi-tech oriented entrepreneurial system or cluster as a result of the co-evolution of SUs and VC in the 1990s. This discussion is, however, based on the VC market and SU intensive cluster conceptual framework that reflects a strategic and competitive innovation policy. Without weakening other approaches by other researchers (Avnimelech and Teubal, 2006, Senor and Singer, 2009 and Teubal, 2013) on Israel`s SU and VC experience, the article remains original, useful and of interest.

A discursive approach of related literature enabled many relevant issues to be identified. The approach reveals the importance and relevance of Israel`s case towards Africa`s Agenda 2063, whether the success of Israel was as a result of special circumstances and the role of other special conditions for development. The author argues that the Israeli experience might be a perfect example that can be copied by many African countries that seek to develop economically as well as creating a competitive advantage through SUs and VC. Taleb (2009) cited by Teubal (2013:8) states that policy issues are critical towards SU/VC co-existence and success. The whole issue that surrounds Israel`s success dovetails around policy issues, that is, the criticality of long term policies to economic development as well as the importance of future options. A country must be able to create future options given the global world`s dynamism. There must be linkages between government priorities and policy objectives and critical to this is the importance of intelligence in policy formulation and

prioritisation. Also along policy issues is the nature of policies that are critical in the face of uncertainty whether political or economic uncertainty. Teubal (2013:8) cites the importance of policies that are based on an explicit strategy.

To Teubal (2013:8), policy targeting has been of great importance towards Israel`s success stories. This article seeks among other things to unveil Israel`s policy targeting with the objective of identifying how best can the SU/VC policy targeting initiative or approach fit into Africa`s Agenda 2063.

Israel was chosen as a case study for the purpose of this research because of its political and economic situation before and after its inception in 1948. According to Wade (2014:72), Israel`s story is one of the greatest success stories to be told in the world in terms of economic development. Israel was under the British occupation and mandate since 1917 until 1948, that is, 31 years. Britain controlled Israel after defeating Turkey in WW1. Turkey had controlled Israel since 1514 CE and ruled for 400 years. However, many mind boggling questions are yet to be answered concerning how Israel has transformed to become an economic powerhouse. How Israel which in the middle of the 19th century was largely a barren desert with some small Jewish communities in places like Jerusalem, Safed, Jaffa, Akko and Tiberias has a current population of around eight million, with life expectancy around 82.5% as of 2015, as well as an intellectual intelligence score that places her among the most developed countries (Skolnik and Berenbaum, 2007; Wade, 2014 and Times of Israel staff, 2016)? How the Israel survived from a besieged backwater province under the Turkish Empire into a technological heart for the last 68 years after her establishment in 1948? How a country once regarded as a country of impoverished immigrants and desolate, changed according to Mark Twain in (1869) described in his book, *The Innocents Abroad or The New Pilgrims` Progress,* published in 1996 as a deserted country, a silent and sorrowful stretch of land, (pp.349) to become a major powerhouse? Why the Holy Land is currently flooded by seekers of a different sort unlike in the past when it used to attract only pilgrims?

According to Senor and Singer (2009:60), the State of Israel had suffered isolation long before her establishment in 1948. Senor and Singer (2009:60) further state that a protracted embargo by the Arab States that seeks to ban trade with any Israeli company was mooted in 1943 some few years before the establishment of Israel as a Jewish State in 1948. According to Christopher Joyner[35] of George Washington University cited in Sarna (1986:xiv) cited in Senor and Singer (2009:60), the current embargoes against Israel by the Arab States are political, ideological as well as legally the most bold, dangerous, complex and prolonged in nature. How Israel which was attacked seven times in the first 60 years of its existence and subjected to comprehensive diplomatic and economic embargoes has positioned itself global knowledge and innovation economy? How the Israeli companies despite all these challenges have managed to firmly integrated into economies of China, India, U.S.A., Europe and Latin America? According to Senor and Singer (2009:11-12), Israel`s VC market investment per capita was 350 times higher than that of India, 80 times higher than that of China, 30 times higher than that of Europe and 2.5 times higher than that of the U.S.A. in 2008. Israeli 2015 exports totalled USD53.4 billion an increase compared to USD47.9 billion in 2014. High-tech exports accounted for USD22.5 billion, compared to USD19.9 billion in 2014. Exports to the European Union amounted to USD13.8 billion, Asia USD11.6 billion and U.S.A. USD10.7 billion. All these achievements if not miracles will provide the much needed solutions for Emerging Markets` problems given the vast natural and human resources that it is endowed with as it travels the journey towards attaining its 2063 aspirations for economic development. Following is a discussion of some of the findings of this research study.

4. DISCUSSION OF FINDINGS

This article examined Israel`s transformational SU-intensive cluster and VC market model success and explored the potential lessons that Emerging Markets can learn in developing competitive advantage. This section presents a discussion of some of the critical findings in Israel`s developmental growth since its establishment in 1948. Central to this was the SU and VC co-evolution and policy targeting under the Israeli government`s Yozma program. The discussion will follow the headlines below;

a. SU and VC`s three phased evolutionary model of 1969 and 1993 to 2000 respectively,

b. Israeli Yozma government program of 1993 to 2000,

c. SU and VC Co-evolution and

d. Policy Targeting.

4.4. Start Up and Venture Capital three phased evolutionary model

A SU/VC co-existence approach is critical in calling for linkages of long term policies, prioritisation and formulation of policies as well as harmonising policy formulation and prioritisation. Teubal (2013:10) provides the numerical indicators of the evolutionary process leading to the Israeli SU and VC cluster. Some of these features are summarized in Table 10 below.

Phase 1 (1969-84) - the background conditions. This period was so critical towards Israel`s SU intensive cluster embedded with a VC market. It marked the beginning of a transformative three phased evolutionary model in Israel. The period saw Israel`s R&D and innovation diffusion. The national concern during this period was the financing of R&D in firms which were overwhelmingly small to medium enterprises at the time. Twenty one (21) years after the establishment of Israel as a State, government created the OCS within the Ministry of Industry and Trade that launched a special R&D grants program. The program called the Horizontal Grants to Business Sector R&D of 1969 became the cornerstone for Israel`s R&D as well as her innovation strategy for economic development and growth. This program became open to all companies from different economic spectrum as well as to all

[35] Christopher Joyner, quoted in Aaron J. Sarna (1986) cited by Senor and Singer (2009:60).

R&D related initiatives across the board. Teubal (2013:14) argues that the Horizontal Grants to Business Sector R&D program gave supremacy to project recognition and creation. Every OCS accepted R&D project receives a 50% subsidy irrespective of the company`s sector from the Horizontal Grants program.

Table 10. Israeli High-Technology Phases from1969 to 2000

1: Cumulative periodic figures	*Phase 1 (Background Conditions 1969-1984)*	*Phase 2 (Pre-Emergence 1985 -1992)*	*Phase 3 (Emergence 1993-2000)*
Hi-tech SU creation (VC-backed) - numbers	136 (0)	349 (23)	2,436 (855)
Israeli VC Fundraised/VC invested in Israeli SUs (MUSD)	0/0	~85/~50	7,480/~5,600
IPOs at U.S.A./at EU & TASE - numbers	14/7	19/15	101/75
Trade Sales (M&As) (numbers)	0	2	91
Public markets & M&As (BUSD) - amount	0.3	0.8	36.7
2: Yearly actual figures	**1984**	**1992**	**2000**
%age of ICT in Manufacturing Exports	14%	28%	53%
ICT Professionals (000)	~42.9	61.7	152.4
U.S.A. Patents /ICT Patents Issued	193/44	355/89	969 /417
R&D [% of GDP]/OCS R&D Grants MUSD	24% /97	2.6% /199	4.5% /440

Sources: Adopted from IVC (2008), USPTO (2008), OCS (2008) cited in Teubal (2013:10-11)
Note: MUSD – USD million, BUSD – USD billion

Phase 2 (1985-1992) was the Pre-Emergence period that strengthened the ties between private sector, academia and government through R&D linkages, SU/VC experimentations as well as through supporting the ICT sector. This was done through expanding technological infrastructure that included R&D and Science laboratories. The expansion was also done through inculcating existing personnel as well as attracting migrant engineers, technicians as well as scientists among others through employment creation. The period marked the emanation of an Israeli SU/VC marvel, a revolution in technology that gave assurance to a continuous flow of breakthroughs for SU/VC and a constant supply of high-technology technocrats from the IDF as well as migrant technocrats especially those from Russia. The innovation and technology policy programs which were launched during this period included: Inbal (1991), Magnet Program (1992) and Technological Incubators (1992). Teubal (2013:12) felt that the combined effect of the activities in this phase as well as the increase in private sector R&D resulted in the early 1990s SU increase.

To Teubal (2013:12-13), during this phase only government supported VCs and other initiatives existed with no professional or private VC market in existence. The following support initiatives existed to SUs; angels, OCS subsidies, private owned VCs though very few, tax concessions, VC that financed group projects only. This phase resulted in the formation of about 300 SUs by 1992 with a few IPOs offered at NASDAQ stock exchange. This saw an increase in VC activities. Then the availability of funds through Yozma in 1993 triggered a worthy SU/VC co-existence that was driven by the market. The existence of good external factors such as the liberation of the world communications industry, stimulation of the ICT sector as well as the influx of technical skills brought by migrants from Russia contributed in a positive manner towards the strength of private, academia and government R&D linkages as well as the SU/VC experimentations.

Phase 3 (1993-2000): Emergence (of SU-intensive cluster and VC market). This phase saw the unveiling of the Yozma program (a VC funding program), targeting VC, ICT and high technology clusters. Israel`s VC market and SU-intensive cluster that begun in the late 90s saw an increased growth in a number of areas that include; SUs, VCs ICT employees, productivity, technocrats, IPOs as well as M&As (Teubal, 2013:13).

4.5. Israeli Government`s Yozma Program

The period 1980 saw Israel experiencing economic challenges such as high inflation, macroeconomic meltdown as well as unemployment with the security sector laying off many technocrats, that is, engineers, technicians and scientists. Many among these found new heavens in SU creation with very few of them (SUs) surviving the turbulent economic environment. By the end of 1980, the government of Israel then realised that its R&D support initiatives were failing due to either system nor market failures. This, however, resulted in SUs formation and development failure. These failures were not as a result of inadequate financial follow-up resources for R&D but were due to lack of knowledge and expertise in some cases as a result of managerial incapability as well as lack of SU support by independent players especially regarding integrated financing and unavailability of value added support that usually follow the early VC phase. Officials in Treasury and OCS departments were then prompted to find solutions to these challenges. The process kicked off with consultants in Israel as well as in America. Key individuals with experience and knowledge in the field were consulted. These consultations resolved that the only way to go was to formulate a home grown VC sector that became the government`s strategic priority. The Israeli government had to shift its policy towards the formulation of a home grown VC sector and promoting R&D in high-technology firms as well as promoting the creation, development and growth of SUs and finally promoting a SU-intensive cluster and VC market. This process (consultation) is very critical in policy formulation.

The migrants from Russia during the 90s became a priority focus area for government of Israel as it looked for opportunities to channel the skilled labour from Russia, who came in their thousands, into the main stream economy. Amongst them were technicians, medical doctors, engineers,

scientists and mathematicians. This influx of skilled labour helped strengthening government`s SU and VC policy related prioritisation and formulation. Government in the process then unveiled a number of programs that included the Inbal program in 1991, the Technology Incubators program in 1992 as well as the Yozma program in 1993 (Teubal, 2013). See Maune, 2016 on human capital intelligence and migration in Israel in the 90s. One might be forced to ask what then the results of these strategic priorities were. These priorities led to the acceptance of a SU/Hi-Tech intensive cluster policy. For specific features of the Yozma Program see an extensive analysis in the works of Chaifetz (2002), Avnimelech and Teubal (2005, 2006 and 2008a) and Senor and Singer (2009).

Why did Yozma Program become so successful? Yozma became a success because it was a home grown revolutionary VC policy initiative that triggers the evolution of the VC market SU-intensive cluster and also due to its specific features. Yozma`s features include; the program was fully financed by government to the tune of USD100 million with USD80 million being a fund of funds that targeted early stage (limited partnerships) and private VCs. The fund also provided incentives as well as requiring a financial institution or foreign investor of repute. Yozma was, however, a catalytic program that saw the USD100 million government investment recouped by 1998. Government had to privatise its share in Yozma`s private funds (that is, USD20 million). Treasury`s direct cost became nil. However, for a detailed and critical argument on the originality of Yozma, see Teubal (2013:23).

How did Yozma differ from other processes or approaches in the world? Saxenian (1998) and Breshnahan et al. (2001 & 2008) all cited in Teubal (2013:23) provide some interesting incites regarding Yozma`s approach. Literature provides that the Yozma approach was different from other processes and approaches in the world in a significant way thereby rendering it a very unique program in its approach. For example, Yozma differed with the Silicon Valley approach in its emergence phase as the latter takes into account VC as one more input that is critical for a SU-intensive cluster`s effective operation. Israel`s technology sectors and Yozma experiences suggest that in the emergence phase, not all inputs are similarly vital due to the vibrant process associated with that phase. Early stage VC plays an important role in the emergence phase due to SUs of high quality. The co-evolution and existence of SU/VC results in the attraction of external factors that are critical to the whole process as these leads to collective methods that are nourished by reputational outcomes that enhances the local presence of investors, bankers, private VCs as well as other important visible agents with all of them adding to the whole. The Yozma Program was very critical to VC and SU co-evolution.

4.6. Start-Up and VC co-evolution

The study shows that the variables influencing SUs and VC market have something in common amongst them given all the three phases of evolution. These variables have linkages that influence the SU-VC formation in these defined three stages which linkages connect the phases in a chain-like formation. The SU/VC co-evolution is thereby not independent from other economic sectors. Profiling of SU/VC becomes easier as the identity of causes of these profiles is easily identified. Moreover, financial institutions are very critical to the formation and emergence of high-technology, hence the need to develop these financial institutions and systems that are critical in facilitating the emergence and development of high-technology. Results of U.S.A. and Israel`s SU and VC sectors show that the sector cannot survive on its own. There are other factors that are important and required before the VC formation. Avnimelech and Teubal (2006:1491), however, argue that a high level of high-technology activity, high-technology innovation as well as other positive surroundings or circumstances are critical before the VC formation for it to become a success.

Avnimelech and Teubal (2006) `s SU and VC co-evolutionary article provides an analysis of several relevant 'chains' of interactions. These include demand and supply, strong user-producer learning linkages as well as re-configuration of high-technology due to a wide indirect influence. Avnimelech and Teubal (2006:1492) state that "there are several 'sources' of SUs." Stuart and Sorenson (2003) in Avnimelech and Teubal (2006:1492), argue that although SUs that are formed by the country`s nationals coming from abroad, University graduates and other spillovers from the military are very critical, research has shown that experience gained through working in MNCs, for example, has proved to be a major source of critical managerial and innovative skills that are necessary for SU formation and development. According to Avnimelech and Teubal (2006:1492), Klepper (2001) and Gompers et al. (2003) have supported this notion by coining the term 'entrepreneurial spawning,' that is, the laying, breeding as well as generation of entrepreneurship. To Avnimelech and Teubal (2006:1492), many well established corporates have provided breeding and grooming grounds for personnel capability development critical for new VC entrants.

The early 80s marked Israel`s starting point for SU/VC co-existence with opportunities emanating from ICT and Software development that provided a firm foundation for SUs as well as the development of unique SU models. These new models had linkages to new financing models that included limited partnerships between foreign investors and the OCS, investment bankers financing high-technology firms and initiatives as well as the VC-Atena founded in 1985. The growth of NASDAQ stock exchange in 1993, the globalisation of high-technology stock markets as well as the ongoing innovations created a more advanced SU process that emanated in the early 90s. Avnimelech and Teubal (2006:1492) "estimate that by 1993 more than 300 SUs were already operating in Israel." However, before Yozma and the development of the VC market, demand had already been high for VC activities. This demand was, however, triggered by policy targeting that saw the unveiling by government of the Yozma program which market systems had failed to promote the development of a local VC sector. To Gilson (2003) in Avnimelech and Teubal (2006:1492), the lack of local market-tested SU/VC during the early 90s to partner with foreign based VCs as well as SUs, VCs and risk capital harmonisation challenges created problems to the

emergence of the SU/VC sector. Yozma program and funds, however, provided the much needed assurance to the pre-emergence period`s financial demands which program led to profitability, brighter future, that inspired new VC market entrants and growth.

Yozma, however, first targeted current SUs and thereafter catered for new SUs that came into being as a result of an expanded VC market and the late development VC enlargement was as a result of potential and current SUs while the formation of new SUs was as a result of both current and potential future VCs. Yozma program was a perfect and successful example of policy targeting by the Israeli Government.

4.7. Israeli Policy Targeting

The VC sector became central to the Israeli Innovation and technology policy (ITP) process, that is, policy targeting. The Israel` VC sector development process comprised of four phases; phase 1 (background conditions -1969-1984); phase 2 (pre-emergence – 1985-1992); phase 3 (emergence – 1993-2000) and finally phase 4 (maturity – 2001-2006). These phases represents the industry life cycle (Avnimelech and Teubal, 2008b). Critical to this industrial life cycle was the emergence phase as well as the SU-intensive high-technology development. The SU-intensive high-technology cluster came after the pre-emergence phase as well as after more than 20 years of positive circumstantial conditions. Globalisation as well as developments in the ICT sector created opportunities for Israel`s SU-intensive high-technology sector and the VC market. Israel`s high-technology sector transformation has been a result of the emanation of VC in 1990. This cluster now has many SUs with many support structures available. The VC market emergence was not spontaneous, however, prior positive circumstantial conditions, that existed between 1969 and 1992, success resulted from a successful policy targeting that was implemented between 1993 and 1998 (Avnimelech and Teubal, 2008b).

The Israeli policy targeting (Yozma) was characterised by a clear government VC component that targeted privately managed and owned VC funds, sharing of risk and other incentives as well as foreign VC partnerships. This program was to overcome stock market and systems failures associated with infant VC sector development. This resulted in hastening the development of the VC sector (Avnimelech and Teubal, 2008b). The pre-emergence phase of 1985 to 1992 saw the formulation of a number of other sub-processes which helped focusing the SU-intensive sector`s future. Numerous activities by government as well as by other agents related to the establishment of SU/VC firms also helped in coming up with the best features of SU/VC firms. The emergence phase of 1993 has led to the hastened entrance of VC firms with positive feedback. The size attained by industry enabled it to sustain many supporting institutions and services (Avnimelech and Teubal, 2008b).

5. CONCLUSION

This article has examined how Israel has managed to develop a competitive advantage through SUs and VC. The SU world houses an industry of ideas, providing mankind with cutting-edge solutions to everyday problems. Critical to the success of Israel`s SU and VC market was government policy intervention, SU and VC co-evolution as well SU development and funding policies among others. The article highlighted major critical areas towards developing a competitive advantage through SUs and VC. The article provides a strong argument for developing competitive advantage through SUs and VC considering the contributions of the SU and VC market to the Israeli economy since 1948. This article has proved how critical is this sector in attracting FDI. There are a number of direct and indirect economic benefits of adopting such a policy. The Israeli SU/VC cluster became a critical foundation for major breakthroughs in many fields across the country.

Israel became one of the few countries with a lead density of SUs and VCs in the globe. It boasts of over 3000 high-tech firms, 80 of which are among those on the New York Stock exchange a number that far exceeds Japan, South Korea, Germany, France, India, Singapore and Hong Kong combined. Israeli firms` total market capitalisation on the NASDAQ exchange was in excess of USD85 billion as of 2015. Israel`s VC industry and SU-intensive cluster represent exceptional development success stories since 1969. These events are a helpful source of ideas in policy formulation especially in Africa. This will help develop an African competitive advantage, that is, Agenda 2063.

In summary, the following are some of the factors that are believed to be behind the successful emergence of Israel`s VC market and a SU-intensive cluster that can help transform many Emerging economies.

· *Spending on R&D:* Israel has become a global leader in R&D spending. It has become a powerhouse to reckon with in R&D. Israel spent approximately 4.2% of its GDP towards R&D in 2013 which is a significant amount greater than Japan, USA, China and India which spent 3.4%, 2.4%, 1.9% and 0.85% respectively during the same period. This shows Israel`s strength that is powered by its R&D hubs as well as its technological institutions that ranks first in global achievements as recorded in the WEF Global Competitiveness yearbook of 2013. Israel also boasts of having many per capita engineers, scientists, technicians as well as PhD holders the world over. It also ranks 3rd and 4th respectively in scientific support and state of the art technology infrastructure. The Israeli government strongly supports fundamental and applied research with a high potential for commercialization through a number of policy initiatives.

· *Hi-Tech "Iron Triangle":* Israel ranks first in know-how transfer and among the top ten in industry and academic cooperation. The country has also managed to formulate stimulating innovative structures that are effective and efficient. Israel`s three legged approach to economic development and growth saw the creation of a high-technology triangle that helps convert innovative ideas into great companies that have provided breakthroughs

in some of the world`s challenges. This has also helped Israel earning the much needed FDI net inflows. Israel is currently earning around USD25 billion in technological exports annually through these dynamics (Shkedi, 2015).

· *High Quality University System – S&T Excellence*: A well-educated workforce is an absolutely critical pre-condition for the development of any technology cluster. To Maune (2015:182), Israel has managed to mould a people of high academic prowess that is incomparable globally. This has been made possible through SETI initiative (Science, Engineering, Technology, and Innovation) (Maune, 2016). Getz and Goldberg (2016:18-19) provides that soon after the establishment of Israel as a nation in 1948, government prioritised education as well as scientific R&D. This prioritisation saw the establishment of six universities by 1970. Three Israeli institutions ranked among the top 100 world universities as of 2015. These institutions were also amongst the 2013 Academic Ranking of World Universities. These institutions include; Hebrew University of Jerusalem, the Israel Institute of Technology (Technion) and Weizmann Institute of Science. They ranked 59th, 77th and 92nd respectively. Israel also boasts of 12 Nobel Prize winners. These are in the field of Chemistry (6), Peace (3), Economics (2) and Literature (1). This is an indicative of the Israeli brains as well as institutions of high quality.

· *Government Support (OCS):* The *Encouragement of Industrial R&D Act* of 1984. According to Shkedi (2015:3), the Act "constitutes the general mandate of the OCS." The Israeli government through the OCS has unveiled a number of SU/VC support programs and channels. These support initiatives were home grown programs that were tailored to support Israel`s SU/VC cluster. These channels included; *Tnufa* Program, *Magnet* Program, the *R&D Fund,* and *Global Enterprise Collaboration Program* among others. The OCS also unveiled a number of bilateral financing initiatives meant to support the Israeli cause, which became conditional grants. The funds became loans on commercial success while the funds are forfeited on non-commercialisation or failure of the project. The OCS further unveiled the Technology Incubation Program to provide beginner entrepreneurs with ground-breaking ideas or projects to transmute them into reality. Israel had around 20 incubators as of 2015 specialising in different areas across the whole country with around 160 firms at different R&D stages. Israel`s OCS budgetary support, however, declined by 7.9% since 2009 to approximately USD395 million as of 2013.

· *Development of VC market/industry*: While countries can develop SUs without VC, clearly the most innovative clusters are tightly linked to thriving VC markets. The development of a VC market in Israel dramatically increased the growth rate of SUs and transformed Israel into a Silicon Wadi. Israel managed to attain its current status, the Innovation Nation because of the SU&VC co-evolution. This has proved very critical towards the development of a viable SU-intensive cluster.

· *Strong community/diaspora*: The Israeli example also shows the importance of developing a strong global community of Israeli nationals or people sympathetic to Israel (overseas Jews). Without the global Jewish community, Israel would likely not have received as much FDI as it did and its companies would certainly have been more hampered in their ability to establish operations in overseas markets. The Israeli example shows that if countries can develop a strong enough community and sense of loyalty, many overseas nationals can significantly aid the development of local SU clusters by returning to their country of origin or by supporting cluster development in their adopted countries.

· *Return on Government Investment*: The Israeli government shows that sustained R&D investment is correlated with technological success. However, it would be assuming too much to suggest that direct funding on specific companies was a key success factor. To Berry and Grayeff (2009) cited by Maune (2015:180) argue that Israel`s R&D investment policy achievements have been realised through many ways across the country. To Saul Lach of the Hebrew University, a quantitative base to demonstrate Israel`s R&D policy return on investment in high-technology shows average returns between 473% and 1000%. On a broader perspective, government has achieved a lot through the creation of a vibrant high-technology SU and VC cluster. Four thousand high-technology firms were formed by 1993 placing Israel on second position after the USA in firm concentration. High-technology firms became the highest employer in the economy with an approximate figure around 250, 000[36] employees as of 2014 while in 2007 had a share of 9%. The presence of MNCs as shown in table 2 above indicates Israel`s industrial strength as these MNCs are critical to economic development and growth in a number of ways.

· *Military spill-over*: Israel was successful because they allowed spill-over from University and military research. The military has played a pivotal transformational role in Israel through R&D. Peled (2001) cited in Maune (2015:186) claims that the Israeli Defence Forces as well as the Ministry of Defence provide cutting edge breeding space that is critical to high-technology formation and development. These trainings have proved critical in many commercial set ups. The Israeli Defence Forces has also proved critical in fostering Israel`s technocrats with multitasking skills that is a surprise to many the world over. See Dvir and Tishler (1999) and Maune (2015) for some of the high-technology firms founded former military personnel.

· *Technology Transfer Organizations (TTO):* The efficient technological transfer as well as its commercial apparatus have become the key drivers in Israel`s technological innovative capacity. The three legged approach became critical in the commercialisation of Israel`s scientific thoughts. The following are some of the lead companies that drive the TTO agenda; *Yissum Ltd.* (Hebrew University of Jerusalem), *Ramot* (Tel Aviv University), *Yeda R&D Company Ltd.* (Weizmann Institute of Science), BGN Technologies (Ben-Gurion University) and the T3 – Technion Technology Transfer (Technion). The TTOs cooperated to create an association with 12 partners. It must be noted that these TTOs have produced satisfactory results in the

[36] Ellis and Drori (2010) and Zetelny (2014).

past, for example, the *Ramot* has generated 65 SUs as well as registering more than 70 patents per year. At the current moment there are 300 additional commercial patents waiting to be patented (Shkedi, 2015).

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