Supplying defense

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Abstract

If you wanted to build an aircraft, you would need hundreds of last tech parts in 1930's, while today the parts still need to be last tech but the number is about hundreds of thousands. Skunkworks, which is still operational, had only 150 days to build one of the first jets of that day, while today even the same firm might need a decade to build the very first prototype (Miller, 1995).There are two ways to achieve technological development. The first way is to produce it, and the second is to transfer. It was a strategic weapon to produce technology in the cold war. Many of the firms of our time to produce technology has been started then. Most of these firms are still leading the innovation in their domain. The way to accomplish such a long-term effort has not been easy though. Wish lists are given to universities by governmental actors aiming pre-planned technologies. Each study opening up new areas to work, probably makes way to innovation cycle.Another matter to be taken into consideration is the parallel connection between a country's economic growth and technological evolution. Since technology has a very high cost per kilogram ratio, a country can both support it's economy and defense at the same time. Start-ups, a widely used term for the genius small and medium sized firms might be a way to keep up for the followers. This study aims to explain why and how this is possible, using general literature review and analyzing methods.

Introduction

The founder of young Turkey Mustafa Kemal Atatürk's words summarizes the route "the war tools produced in accordance with the evolution of art and technique are about the country's economy. It should be our subject to produce them at home (SSM, 2011). In order to offer an objective result, it would be wise to refer to UNESCO's Science Reports. According to this report in 2007, the numbers of engineers per million of population is, 4663 in USA, 5573 in Japan, 3496 in France, 3532 in Germany, 3305 in Russia, 1070 in China and 680 in Turkiye. Another issue about this report is the positive ratio between nations total income and the number of the R&D engineers.

Country	Total Researcher	World share of Researchers (%)	Researchers per million inhabitants	World share of publications (%)
USA	1425600	% 20	4663	% 27.7
CHINA	1423000	% 19.7	1071	%10.6
JAPAN	710000	% 9.8	5573	% 7.6
RUSSIA	469100	% 6.5	3305	% 2.7
GERMANY	290900	% 4.0	3532	% 7.7
ENGLAND	254600	% 3.5	4181	% 7.2
S.KOREA	221900	% 3.1	4627	% 3.3
FRANCE	215800	% 3.0	3496	% 5.8

Table 1 : R&D Shares (Schneegans, 2010)

Thus except for only two of the ten wealthiest countries', economical leaders are also technologically leaders. It is possible to come up with a conclusion that a country's economical

output is more about quality more than quantity. That's why %50 of university student's of USA are foreigners while the amount is %25 for masters students (Zakaria, 2008). Most of those students keep making their studies in R&D or academics domain in USA as well. Those foreigner students end up working in high-tech or software firms, most of which lead the World. Here is another explanation to the way information age behaves, the price of information. As seen in the table below, what makes a product expensive is the indormation embedded in it.

Concrete	1 Cent
Cement	5 Cent
Iron-steel	50 Cent
Aluminum	1,5 $
Cars	10-100 $
Aircraft	100-1000 $
War helıcopters	2000-3000 $
Fıghter aircraft	10000 $
Satellite	100000 $

Table 2 : Price of Information (Yetiş, 2009)

Start-up's Contributions

Basically start-ups offer a chance to meet the capital and the idea owner. Almost all successful start-ups are launched by geniuses of their domains : this is actually a result of the evolutionary procedure emerging from recent market environment. Risk sharers, governmental or not, are the keys to defining forth runners. As it is put forth in the Spencer's evolution theory, every member of the society has his chance, but its only bests to survive. Since it's a big challenge to keep up, most governments support those with a brilliant idea and enough realistic project because of their contribution to the economy.

Nowadays most start-ups are working on web-based projects. They are made up through an agreement on the share as a percentage. The firm generally evolves into a much bigger one within 3 to 5 years. The product might be an idea or concrete, a percentage is defined after a clear deal. After 1970's, big firms started working with smaller ones instead of making mass production of their own. This approach both increased the number of the firms while increasing specialization as well. Since main suppliers were still big firms, specialization also prevented extravagance. Carlsson points that the big firms of USA started to downsize, and their total deploy of 20% shrinked to 8.5%. According to Parker , studies show that small firms are much entrepreneurial compared to bigger ones. Acs and Armington studied entrepreneurial effects on economy, resulting a positive ratio between these two. Analysis based on 23 economies show that entrepreneurial is the essential driving factor for economic growth, rather than labor and capital resources. The biggest advantage of small firms is their flexibility to enter a new market, and since bigger firms are already big, small ones are more capable to grow. (Gerni, Nişanci, Çelik, & Yurttançikmaz, 2013). This information clearly shows the importance of using small firms and start-ups to get where developing economies want to be. As evolution tells us, almost any attempt on technology production should be treated seriously and tried to be exploited. Because in the end, a successful firm has a pretty good chance to make up for the losses of many unsuccessful ones. This might as well seem to try to run, while you're still trying to learn to crawl. But Nickell's study which analyses 600 English production firms, shows how more firms means competition and competition improves total factor productivity (Gerni, Nişanci, Çelik, & Yurttançikmaz, 2013).

Unesco 2010 report shows qualitative measurements are more important than quantative ones considering the industrial development (Göker, 2004). This is why this study is more about high-tech production rather than conventional ones (Table-3)

Country	Share within all firms	Share within total employment	Share within total value added
USA	% 98.9	% 57.9	% 50.0
INDIA	% 97.3	% 66.9	---
JAPAN	% 98.2	% 66.0	% 49.3
S.KOREA	% 99.9	% 87.7	% 49.2
GERMANY	% 99.5	% 60.4	% 53.6
ENGLAND	% 99.6	% 54.1	% 51.0
ITALY	% 99.9	% 81.1	% 71.3
TÜRKİYE	% 99.9	% 78.0	% 55.0

Table 3 : Small and medium sized firms economical shares comparison (KOSGEB, 2011)

Innovation and Start-up Firms

The Oslo Manual for measuring innovation defines four types of innovation: product innovation, process innovation, marketing innovation and organisational innovation (OECD). Times editor Zakaria uses innovation,technical infrastructure and research institutes as a display of development while putting World countries in order (Zakaria, 2008). The link between innovation and defense can be related to primitive war tools,including product, process innovation mostly. Will Rogers defines the effort of mankind for war like this "One cannot say that humankind does not evolve, because they will kill you with another tool every war". Many recent technologies were at first put in place in order to gain asymmetric advantage in warfare, if it was not, it was the initial goal to make military use of it. Industrial revolution, steam and rails, steel and heavy machinery, automobiles and mass production, the radio, web and information age all brought to life with innovational products or ideas. Most of those inventions changed the way people fought wars. The will to manage innovation brought techno-parks into life in order to meet industry and academic institutes in 1950s.This led to many emerging tools of our daily lives and many companies producing them. While many start-ups remain to stay small, an increasing number of them are getting to be the biggest like apple and Google. The key feature of the start-ups is the academic side of them. Planet-lab is a good example of this innovative idea. They produce shoe-box sized satellites which are easier to produce and dispensable due to lower price. Those satellites are not the best of their kind, but still inspiring because they have the capacity to view every point on earth daily (Marshall, 2014).

Techno-parks and Start-ups

Technoparks were built for the sake of getting together with industrial firms and universities when needed. HP, Intel, Cisco, Oracle, Apple, Google, Adobe, Ebay, SUN, were all initiated in silicon valley, the famous technopark. Considering the F-35's 30 million-line software, it is not a disadvantage but even an advantage to have techno-parks filled with software firms. Technoparks involve advantages like tax exemption. This area has its own specifics. In order to look for the reasons of R&D decrease, Japanese government had to focus on this matter. According to the results, high salaries of academics were an obstacle in terms of R&D. The high salary prevented them to look for more, search for more. Thus they saw no good in communicating with industry (Kıncal, 2010). As this study suggests, it is a complete different issue to manage the one of the most creative and innovative institutes.

The Role of the Governments

Governmental solutions have played a key role to innovative institutes. Technology's cumulative growth is so fast that it was not possible for private sector or governments to react alone. Some governments have implied rules to force technology transfer, while others completely held every corner themselves. Pentagon for example gave wishing lists to top universities of the country in order to maintain a proper path. Now with the Y generation, it's even getting harder to control freedom-focused labors. One of the most critical domains, cyber now has a major problem. The problem is to keep those geniuses to work like soldiers. It's hard work to satisfy them in terms of salary and working environment while many million-dollar companies are on line waiting to hire those people. But there's a solution for everything. That's why USA launched air force collaboration. The term "collaboration" is pretty kind compared to "subcontractors" which i would prefer to use. Rose is not daisy because you call it that way**.** It should be wise to let those academics and entrepreneurs to use governmental labs and benches. Because those people might be the ones to make the very best use of it. Since a country is on the same ship on this journey, it depends on the way to use all efforts possible on this pace. In order to make a notification, every country pays for R&D, whether its her own or foreign firms. This is because of the fact that every high tech firm spends about 5% on R&D.

Conclusion

In most occasion start-ups are small and medium sized firms. Their core competence is their capability to obtain high tech products in other words, innovative results. They remind us about bourgeoisie who made revolutions possible. Today we are living in an era that's pretty hard to catch up. The information age is open to any contributor. Since it's a government's prior job to make it's people safe and comfortable we need every effort to work synergistically. Peter Diamandis suggests that mankind is living it's most peaceful and comfortable age thanks to modern technology. The key to contribute seems to collaborate. Governmental and private firms have their own reasons to compete, while the pace forces them to take risks. It's possible to manage and control those risks in the information age, we have the fastest tools ever. Information is easier to share. Making subcontractors of academics is a pretty wise way to overcome those issues. That's what makes start-ups so special. They are the subcontractors of information age. This study suggests making use of those applications to defense industry, which is one of the hardest domains to keep up.

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