Applying Peter Palchinsky's Three Industrial Design to Improve Performance of the Government Venture Capitals in Malaysia

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Abstract. The Palchinsky principles revolves around three industrial designs focusing on variation, survivability and selection. Applying these principles is hoped able to raise economic contribution of government venture capitals (GVCs) towards the gross domestic product (GDP) of Malaysia in the face of substantial declined of foreign direct investments (FDIs) into the country. As a result, several feedback loops are recommended to improve the GVCs' collective performances pertaining two most important activities there. First, GVCs to adopt collective criteria chosen by the technopreneurs when evaluating funds applications. Second, to let them choose among themselves who should get the funding in a given cycle instead of decided by the management of GVCs alone. Third, adopt lottery like selection to choose winners eligible for funding. Fourth, shared responsibility among technopreneurs is another possible method where applicants are organized in a group and funding given to a 'deserving' group rather than to an individual technology-based company. This peer pressure approach could also be an option given the shared wavelength. Lastly, performance bonuses to deserving personnel at GVCs.

Keywords: Palchinsky Principles; Government Venture Capital; Innovation; Failures; Feedback; Learning; Screening; Value-Added Activities

1 Introduction

Peter Palchinsky was a bright, energetic and confident Russian engineer living in the era of the Tsar of Russia. The what is later known as "Palchinsky Principles" was first uncovered to him during his work to study coal mines in the Russia's coal-rich basin , north of Black Sea in 1901. There, he accumulated substantial data by focusing on collecting detailed findings regarding working conditions. He concluded that such living arrangement for miners were not conducive let alone productive for the growth of coal mining industry in which was not favored by his superiors given uneasy political situation at the time. As a result, he was sent to perform not so delicate assignments in Siberia. He slipped Russia and, spent numerous years in cities like Paris, London and Hamburg learning about new ideas in management as well as engineering. He then incorporated latest thinking into organizing workforce as well as cutting-

ICSST 2021, November 25, Tangerang, Indonesia

DOI 10.4108/eai.25-11-2021.2319421

edge science and technology. These principles were finally complete after he returned to Russia and saw how huge Soviet infrastructure projects end disastrously (Graham, 1996). The Palchinsky principles revolves around three industrial designs resulted in the following:

a) Variation where it allows seeking of new ideas and try new things.
b) Survivability where it assumes when trying something new, some of them would fail yet they do not kill the main objective.
c) Selection where getting feedback is paramount to serve as learning to improve on mistakes made as the respective project continues.

On the other hand, government venture capital (GVC) is an entity funded and operated by the government using public fund with typical objectives have always been to select and fund the 'right' technology companies with value propositions consisting of job creation and mastery of new and cutting-edge technologies in various fields (Zhang & Mayes, 2018). Literature indicates, government venture capitals (GVCs) across the world perform well below satisfactory level and not enough if they are up for consideration to justify the spending of public funds on their respective programs. In light of this global phenomena, like any other organizations, GVCs are in dire need to relook and innovate its operations. To achieve that, we need to examine two most important activities taken place inside GVCs consisting of screening and selecting (Afful-Dadzie et. al., 2015) potential portfolio companies and, coaching and nurturing (Luukkonen et. al., 2013; Teker et. al., 2016) them up to a certain level of success thus allowing GVCs to benefit from its investments. Reacting in a useful way to failures occurred in these two important activities could help to make remarkable and unforeseen adaptions, improving flexibility and looking further ahead in the operational aspects of GVCs.

2 Results and Discussion

2.1 Palchinsky's Notable Recommendations

During his time, he has suggested several inconceivable solutions in his native Russia to solve problems regarding technology and engineering related projects. In the area of engineering for instance, upon seeing the designs for the Dnieper Dam on Dnieper river, Peter Palchinsky recommended building a series of smaller dams and coal-fired plants instead of one big dam. According to him, such approach present learning opportunity for those involved in such project to address problems brought about by the early dams, introduce variation in plant designs and select those that best serve local electrification efforts. He hypothesized that this way, power production and capacity to control water could be brought closer to the points of use with a smaller flood plain. Even when these small dams have to be abandoned due some problems, the affected local electrification drive would still survive by for instance, hitchhiking on alternative source of technology. Unfortunately, when the Dnieper Dam was abandoned and demolished by retreating Soviet forces during the Second World War, not only has it stopped becoming source of electrical power to the people of surrounding area, but it also drowned tens of thousands of people with it (Graham, 1993).

In the area of economy for instance, he has suggested reform for the centrally planned economy of the Soviet Union (Davies, 1994). During this time, he was against the grain given the success of Soviet Union's economy as compared to Western Europe's major economies. So much so, by the 1950s, some western experts even concluded that communism was more effective than the capitalism as a way to run an economy (Tim Harford, 2012). This however

did not last as the centrally planned economies (communism) started entering period of gradual decline, market economies (capitalism) on the other hand were experiencing the opposite effect by continuing to evolve based on Palchinsky principles. With the benefit of hindsight, the opposite effect can be explained where markets with many competing producers create variation in supplies. The failure of a single product is survivable for the economy and even for most companies. The best ways to produce will win a dominant market share. In evolution, the fittest genetic variants get selected to the next generation, while the species survives a single organism's failure to reproduce.

2.2 Overcoming Present Economic Challenges

Recent report by the United Nations Conference on Trade and Development (UNCTAD)(2021) saw a sharp 68% decline in foreign direct investment (FDI) into Malaysia last year to a mere US$2.5 billion could be an impediment to Malaysia's objective of becoming a high-income nation when we are so close of achieving the status. FDI is always seen as a particularly important aspect of growth and development to the host economy especially so for developing countries, ASEAN included. Its overall effects other than growing the size of the economy, it influences country's structural, technological and skill and welfare which further improves the economic growth. Other than FDI, commercial transactions are equally important factors to the economic growth processing of any country. In this regard, government venture capitals (GVCs) have a role to play because commercial transactions originated from the entrepreneurial activities of commercial companies. Granted that most big tickets commercial transactions of high-tech nature supplied by foreign and international companies in almost all economic and non-economic sectors imaginable right down to our social lives where Malaysians rely on Facebook, Google, Alibaba and a host other social apps to communicate with each other and even to market product and services.

That is not to undermine the role and contribution of local companies such as Lazada, Mudah.com and other local companies providing similar services. Commercial transactions of high-tech nature consisting of high-growth industries among others namely life sciences, agriculture sciences/agricultural engineering, environmental sciences, advanced materials science, chemical sciences, physical and mathematical sciences, engineering, medical and health sciences involving locally grown technology companies are still less visible but equally important in expanding the gross domestic product (GDP) of the country. In line with the country's aspiration and at the risk of sounding too ambitious, it would not be a stretch of imagination to suggest that the slack caused by the declined in FDI could have been taken up by the Malaysian's government venture capitals (GVCs), to some impactful degree, had our GVCs were effective at the things that they are supposed to do – to develop technology companies mastering in new or cutting-edge technologies. Close to three decades now in which the Government has spent billions upon billions of Malaysian Ringgit (MYR) where Malaysia Debt Ventures Berhad (MDV) alone has spent MYR12 billion to date with another MYR4 billion in its coffer. And MDV is not even the biggest or the oldest GVC in Malaysia. This begs so many questions that can be asked such as where did it not go right? Were innovation related policies the problems? Was implementation the problems? Did we have people with wrong skill set managing the GVCs? Did the strategies ineffective? Did the GVCs used the ineffective criteria to screen and select portfolio companies? Or GVCs were not doing enough to assist portfolio companies? Or probably the taboos' question of all, did the politicians meddled too much in the affairs of GVCs?

Truth be told, there is no easy way to answer those questions simply because there is lack of studies undertaken towards this regard in Malaysia. On the academic front, the literature search regarding GVC in Malaysia revealed the last published journal found was in 2015. Communication with one of the GVCs' official revealed unavailability of data that can be used to empirically investigate and verify such claims put a hamper on any initiative towards that direction. The absence of such important studies and data eludes the opportunity for policy makers, academics and the management of GVCs to formulate plans and take corrective actions towards improving financial and non-financial performances of portfolio companies of GVCs. Despite the setback however, applying Peter Palchinsky's three Principles could help to improve performance of GVCs in Malaysia hence meet the present challenges by adapting by the three essential steps promoted by Palchinsky's principles where GVCs can try new things and expect some will fail; to make failure survival, because it will be common; and to make sure they know when they have failed.

2.3 Limits of Expert Judgment

Failures are a result of risks and uncertainties (Ferreira et al., 2019) hence the need for more effective method of judgment to assess factors causing them in a systematic way (Guo et al., 2021). In doing so, relying solely on experts or in the case of government venture capitals (GVCs) where the management (and their chosen experts) of these institutions to make all the decisions regarding which technology-based companies qualify for funding seem to run counter with Palchinsky principles because even the best available expert on a given subject does not substitute variation, selection and feedback. To be fair, investing in technology-based companies has always been a difficult challenge even for private venture capitalists (PVCs) who are often claimed to have better experience and reputation plus better motivation. Even more so for GVCs with their twin priorities of meeting socioeconomics' objectives. That said, in such situation where problems are more complex and elusive, the more effective trial and error becomes, relative to the alternatives.

2.4 Designing Better Feedback Loops

The good news however, based on the literature review regarding failures and errors involving organizations, groups and individuals by Dahlin and fellow researchers (2017), shows that failure can yield crucial insights in various contexts that range from small mistakes and errors, product recalls, accidents, and medical errors to large-scale disasters as opposed to popular practice where organizations and individuals tend to focus on learning from success. Literature identifies opportunity, motivation, and ability as the three factors, in the context of this conceptual study, influencing organizations to learn from failure. Building bridges over the gaps between these factors allow for a comprehensive analysis of improving GVCs performance to take place. Opportunity to learn from failure mostly takes the shape of more information about errors and failures that are generated by one's own and others' prior failures or near-failures. Motivation to learn from failure is hindered by punitive leaders and organizations. Finally, the ability to learn from failure partly relies on inherent attitudes and characteristics but can be further developed through thoughtful analysis and transfers of successful routines (Dahlin et al., 2017).

As Matt Ridley, the author of "How Innovation Works' put it in his book regarding innovation, he describes innovation as a product of accidental discovery (pp. 247, 2020). According to him, that is probably the most well-known attribute of innovation. By default,

accident discovery also suggested that innovation activities are predestine filled with errors, which only possible due to numerous trials. Such description however is not by far, a bad endeavor because innovation is about iterative process and not a product of linear model. In other words, in the process of pursuing objectives, we must be ready to face failures, and learn from them. In the context of government venture capital (GVC) firms, understanding that innovation is partly a function of failures can help them designing an implementation plan that uses failures as a competitive advantage to reinforce organizational performance (Ferreira et al., 2019; Geroski et al., 1993; Koch & Strotmann, 2008). Another dimension of accidental discovery attribute (by definition) is its flexibility to allow the use feedbacks consisting of failures to alter purposes as shown by numerous innovative product and services known and used globally today. Take twitter and Instagram for examples – two established technology companies in the world, their founders were originally set out to achieve something else but ended up being known and used for different purposes altogether. Twitter for example was initially developed to allow people to find podcasts, whereas Instagram was for online gaming.

This attribute of innovation of course did not just become prominent during the information age, such phenomena have also been documented decades or centuries ago on products such Teflon, Kevlar, and probably the most effective genetic fingerprinting ever developed – DNA identification – where its initial purpose was to identify people and their relatives, ended up being the most reliable method to isolate the innocent from the guilty. The literature further acknowledges that the effective implementation of innovations is synonymous with developing sustained competitive advantages, thus reinforcing organizational performance (Ferreira et al., 2019; Geroski et al., 1993; Koch & Strotmann, 2008). Feedbacks on failures inventory are paramount should organizations wish to improve performance because according to Asplund and Sandin (1999) and Cozijnsen, Vrakking, and van Ijzerloo (2000), out of five commercial undertakings by organizations, only one is deemed feasible. And that is only at feasibility level; before real work of tweaking to supply, budget, workmanship, changes in market demand, and other challenges stand in the way of successful completion. Drawing parallel analogy for government venture capital (GVC), challenges are plentiful in screening and selecting technology companies with uncertainty surrounding the technology businesses with uncertain future cash flows and beyond screening point, lies ahead challenges in coaching and nurturing portfolio companies to a successful financial and non-financial performance.

Mathew Syed in his book, Black Box Thinking (2020 pp. 216-230) relates the story of James Dyson, the founder and chief engineer of Dyson, a UK based company. Dyson is a man known for his super-efficient cyclonic vacuum technology and a host of other technological based products. In all, he has applied for more than four thousand patents. According to Dyson, it took him many years and 5127 prototypes to achieve the efficiency of the first world's bagless vacuum cleaner. The innovation sparked by his frustration of weak suction of the vacuum device he used to vacuum his family home. This constant bugbear led him to open up the device and started tinkering with the motor, the bag (which also doubled as filter) and the tube. The vacuum operating logic is the air and dust are sucked into the bag, the air escapes through the small holes in the lining of the bag and into the motor, while the dusk (which is thicker than the air) stays in the bag. He discovered that the thin lining in the bag was the problem because it blocked subsequent dusts. That is where he gets the idea of bagless vacuum device. But from the realization of idea to an efficient bagless vacuum cleaner, it was only three years later that he managed to come up with the first prototype built upon gaffer tape, cardboard and a motor. The rest is history.

Dyson's bagless vacuum cleaner journey of discovery indicates other than time as an important essence of innovation also alluding to the aspect of feedbacks as he reacted to the problem at hand by inspecting and testing solutions which oftentimes needs to be repeated over and over again. In other words, this iteration process of getting feedback from failures he encountered allowing him to innovate. This iteration process continues at several level of product development process such as design, prototyping, manufacturing, marketing and other steps. Every time he tries something new, responses (mostly consisting of failures) are catalogued into a feedback database acting as a fuel to his imagination and innovation. That is why collecting feedbacks is such as an important must-do behavior which later organized into a must-have database. To use other scientific examples of how innovation is a response to failure, take relativity theory which was a response to the failure of Newtonian mechanics to make accurate predictions when objects were moving at fast speeds and, masking tape was a response to the failure of existing adhesive tape that would rip the paint off when it was removed from the cars and walls.

Dahlin and fellow researchers (2017) further discover the noisy learning environment lowers the opportunity to learn for organizations collectively exists when successful outcomes as a result of erroneous processes termed as spurious successes, when coupled with correct processes yet yielded adverse outcomes. Such described learning environment is dime and dozen events confronting organizations. Identifying and understanding this phenomenon could help GVCs to improve innovation at their respective organizations by overcoming this failure to learn and creating a fast-learning environment. Innovation is the process by which opportunities are transformed into practical utilities (D'Este et al, 2016; Kleinknecht et al., 1997). However, latest research by Danneels & Vestal (2020) and earlier research by Chesbrough (2010) indicate that failure can be treated as an opportunity given its positive role in organizations' activities. The same with near failure yet survived such as companies experiencing difficult situations to stay afloat and operational during the coronavirus pandemic that compelled them to come out with creative solutions (Desai, 2010a, 2010b; Leoncini, 2016).

2.5 Feedback Loop to improve Government Venture Capital Performance

If government venture capitals (GVCs) wish to improve their performance with the Palchinsky principles, it can be done by monitoring, analyzing and rebuilding screening and selecting potential portfolio companies and, providing value-added activities to portfolio companies approaches continuously. GVCs can variate the approaches, as long as they are resource efficient enough to be survivable yet able to gather feedback beneficial to allow for further incremental performance improvement. It is best to be reminded that investing in technology business is always hard given the complexity nature of the business and solving it would be too complex for experts to solve by planning. Feedback loop for screening and selection is possible if GVCs allow active participations from the entrepreneurial technology companies to be part of the process. For example, probably by conducting a survey among owners of entrepreneurial technology companies on what criteria they think they would prefer to be evaluated on when applying for funding. Even more radical, to let them choose among themselves who should get the funding in a given cycle instead of decided by the management of GVCs. Maybe a weightage between the management of GVC and pool of applicants can be introduced in the selection decision making process.

A lottery like selection is also possible to choose winners for funding from GVCs simply because choosing between applicants involved in technology business is too complex for a

structured approach to solve. It saves valuable time as a resource to GVCs to focus on effort to assist portfolio companies to navigate ever-changing challenges in their respective markets. Or create a shared responsibility among them is another possible method where applicants are organized in a group and funding given to a 'deserving' group rather than to an individual technology-based company. Performance which includes repayment of financing provided becomes sort of peer pressured behavior rather than driven by GVCs. Furthermore, it eliminates the 'noise' of having to listen to too many advises.

Again, this peer pressure approach as mentioned in the preceding paragraph could also be an option that can be adopted given the shared wavelength between owners of portfolio companies hence making it equally applicable to value-added activities in the post-investment phase. Having key personnel with appropriate venture capital industry's experience and reputation are expected to further improve the performance of GVCs. Introducing performance bonuses to deserving personnel could serve as an extra push for the GVCs' personnel to compete among themselves to coach and nurture portfolio companies under their care. This performance bonus initiative (read as carrot) however is incomplete without the exit clause (read as stick). If private venture capital industry norm in this regard could serve as an indicator, attrition rate is always high because performers should be rewarded, while non-performers should not be allowed to stay. Otherwise, it would be a drain to GVCs resources and potential, not only in term of fixed expenses of overhead, but most certainly in term of holding back the potential of portfolio companies to contribute to the nation's wellbeing.

3 Conclusion

Other than bridging the financing gap to support local entrepreneurial technology companies, guiding them to success and harvesting from the investments are equally important objectives to the government venture capitals in Malaysia and elsewhere. The successes of portfolio companies are imperative to the country's economic growth given the potentials in term of contribution to the gross domestic product (GDP) and employment these companies could offer collectively. In an era where innovation is considered as one of the driving factors of economic growth as the norm, countries around the world are racing to mobilize and implement venture capital programs as one of key economic policy approaches. Having said that, it is only logical to put the house of government venture capitals (GVCs) in order as they are endowed with substantial public fund slotted in national annual budget. This initiative should be treated with topmost priority because as the literature indicates, GVCs around the world collectively do not have such a stellar record at coaching and nurturing their portfolio companies in which the proxy measurement of their performances despite some isolated successful programs in countries such as the United States (U.S.) China and Australia. Malaysia in that regard should be aspired to replicate those successful but rather isolated programs to bolster its economy through innovative programs headed by GVCs in the face of declining foreign direct investment (FDI) into the country, if only we could tweak the approach. With that in mind, applying Peter Palchinsky's three Principles in key activities at GVCs would probably help to improve the odd in the country's endeavor towards that direction.

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