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3D Printing vs Gun Control: Navigating the Paradox

By Vincent Mack and Tan Ming Hui

Synopsis

3D printing or additive manufacturing technology is lauded for its seemingly limitless potential, enabling us to print everything from shoes, medicine, to replacement human organs, and even firearms. How can Singapore safeguard its gun-free environment without smothering innovation?

Commentary

ON 28 AUGUST 2018, Cody Wilson, founder of a company that builds 3D printed guns had begun [selling](#) the weapons' blueprints to circumvent a court order that prohibits him from giving them away for free.

Described as “downloadable death”, 3D printed guns are one of the latest security challenges that stem from the additive manufacturing technology. If these plans are widely circulated, anyone with access to a 3D printer could potentially have access to a gun. Guns printed from plastic could bypass metal detectors and could be utilised by criminals and terrorists intended on causing trouble, be it on a plane, in a crowded area, or a government office. This poses several security implications, especially for a gun-free country like Singapore.

Cause For Concern?

Singapore is one of the safest countries in the world, with one of the strictest gun control laws. The [1973 Arms Offences Act](#) criminalises anyone for unlawful possession of a gun or ammunition with imprisonment and caning. The death penalty also applies to anyone using or attempting to use arms, and may also apply to traffickers.

Under the [Arms and Explosives Act](#), manufacturing or attempting to manufacture any arms or the components without a licence is also a prosecutable offence. 3D printing technology and the sharing of gun blueprints on the Internet, however, have raised the possibility of troublemakers downloading and printing firearms in the privacy of their own homes, escaping detection.

There are however some arguments against the viability of 3D printed guns, especially in the Singapore context. First, current 3D printing technology is not advanced enough to manufacture guns at a consistently high quality. In fact, a gun printed from [low quality plastic cannot survive sustained firing](#) and lacks accuracy, unless one buys a much more [expensive 3D printer capable of printing metal](#), or print with [high grade plastics](#). Second, not everyone operating a 3D printer can do so skillfully enough to produce a functional high quality gun. Third, guns require bullets, and both cannot be purchased in the Singapore context.

While the current state of 3D printing technology dissuades all but the most ardent and motivated people from manufacturing firearms, the risk that a small minority might attempt the feat still exists, as already demonstrated by Cody Wilson. The ban on ammunition sales may not dissuade aspiring gun manufacturers as it is even possible to manufacture bullets privately. With the rise in education levels coupled with instant connectivity to the internet today, someone equipped with adequate chemistry knowledge and Internet search skills could easily research the technique. Thereafter, he or she could attempt to produce [crude gunpowder](#) from basic household items.

Transitional Solution

The current state of 3D printing technology in its transitional phase. At this time, 3D printing guns is not that easy or accessible, and printed guns tend to be of very low quality. Nevertheless, when fired at a close range, 3D printed guns can still produce serious or even fatal injuries. Furthermore, with rapidly advancing technology, it is not unforeseeable that 3D printed guns will become a larger threat to public safety and national security in the near future. This necessitates sensible policies to address both short term and long term risks and challenges.

At this transitional stage, policies would need to address several dimensions – notably the supply of raw materials necessary to build guns, and the monitoring of 3D printers capable of manufacturing these guns.

Due to wide ranging nature of 3D printers and their possible products, an interagency task force comprising Enterprise Singapore, Economic Development Board, Singapore Customs, Ministry of Defence and the Ministry of Education should come together to centrally coordinate 3D printing related matters and implement control mechanisms. This task force should be subjected to annual audits by a government agency for transparency and accountability purposes.

Since high quality plastics are prerequisite to the printing of functional guns, an accounting and auditing system backed by blockchain technology monitoring the movement of such plastics in the country is required. Whether from exports or by local

manufacturers, this blockchain accounting system could track the production and transfer of high grade plastics in Singapore throughout the supply chain.

Backed with data analytics and smart algorithms, any shortfall or discrepancies in the movement of these higher grades of plastics would be flagged and sent to the relevant monitoring agencies for action.

The proposed task force could also facilitate the registration of licences for a list of commercial or sophisticated 3D printers capable of printing guns and other similar weapons in Singapore. One possible idea to explore is to mandate that products created by 3D printers on this list would be required to contain a unique identifier such as a serial number or signature.

This would allow the tracking and matching of products to printers. Such policy is not without precedence, as observed in the case of optical discs (CDs/DVDs) writers per the [Manufacture of Optical Discs Act](#), which was used to manage intellectual property violations of the previous century. Unlike CDs/DVDs however, these proposals do not require new legislation, as they could be gazetted under the existing [Control of Manufacture Act](#) (COMA) which was enacted in 1959.

Turning Challenges into Innovative Culture

In this day and age, technology is progressing and evolving rapidly. Correspondingly, the security and risk implications of 3D printed firearms will continue to evolve. This means that policymakers will have to approach security assessments and formulate deterrence policies in an innovative and flexible manner.

Given the organic nature of the risk, registration and regulation have their limitations. One possible long-term method is to adopt a technological approach by kickstarting an open source initiative. IT specialists from all sectors or even the general public could be incentivised and invited to contribute their ideas to safeguard the firearms-free environment of Singapore.

For example, hackathons or competitions could be held on an annual basis, motivating people to come up with innovative solutions to monitor, filter and control the movement of undesirable software or technology. Possible solutions could be of a technical and non-technical nature.

Potential benefits could be two-pronged. First, Singapore would increase its capacity to respond quickly and effectively to future risks if equipped with a growing pool of up-to-date solutions. In addition, encouraging citizens' active participation in solving future challenges could help invigorate Singapore's start-up ecosystem by cultivating a conducive and positive environment for science and technology innovation. If successful, we could potentially create the next tech unicorn, placing Singapore on the technology world map.

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