From Mission Impossible to the Battlefield: Can India Learn to Innovate for the Wars of Tomorrow?

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The wrong question in a changing world

A young Indian start-up founder walks into a room and asks a military officer a perfectly reasonable question: 'What does the Defence Services want?' The officer points him towards the Technology Perspective and Capability Roadmap, and Request for Information (RFI) or perhaps a Request for Proposal (RFP). The young entrepreneur goes away and starts building what has been specified. But there is a problem. Sometimes, the officer himself does not know what he wants—not because he does not understand warfare—he does. He knows the threats; he knows where the gaps are and he knows what his men need. But how do you ask for something that you have never seen, never imagined, and do not know is technically possible?

That is the question India need to confront if India wants to build a truly innovative defence ecosystem. Young innovators are often reminded that much of what was seen in movies such as *Mission: Impossible*, or experienced while playing computer games, is no longer science fiction. Autonomous systems, drones, swarms, persistent surveillance, precision weapons, Artificial Intelligence (AI), satellite connectivity, Electronic Warfare (EW), and increasingly autonomous decision-making are all moving rapidly from imagination to reality. The wars in Ukraine and the Middle East are demonstrating just how quickly this can happen.

The challenge before India is therefore not simply to build another missile, radar, drone, or EW system. It is to create an ecosystem that can imagine capabilities that do not exist today, discover the people who can create them, test those ideas quickly and then scale up the successful ones. This is not an argument for changing the way we buy conventional military equipment. India will continue to need tanks, aircraft, warships, submarines, artillery, missiles and other established capabilities, and the normal acquisition system has an important role in procuring them. The issue is different when we are dealing with technologies that are changing so rapidly that the requirement itself may not yet be clear.

Start with the military effect, not the platform

In such cases, perhaps we should stop asking industry, "What equipment can you build for us?" and instead ask, "What military effect do we need?" Consider a simple example. If the aim is to attack an enemy target, the weapon must be capable of locating the target, reaching it accurately, surviving the enemy's radar and EW environment, defeating its defences, and achieving the desired effect. In some cases, the objective may be complete destruction; in others, it may only be to disable the target. At times, the desired effect may be to deceive the enemy, jam its sensors, or blind its surveillance systems. In certain situations, the most effective outcome may simply be to deny the enemy the information required to make a decision.

Conversely, if an adversary is attacking, the defending force must be able to detect the incoming threat, identify, and track it, understand its intent, and neutralise it before it reaches the intended target. This may require intelligence, surveillance and reconnaissance, sensors, positioning, navigation and timing, radar, EW, cyber capabilities, AI, loitering munitions, hypersonic systems, ballistic missile defence, or directed-energy systems. However, the important point is that the desired military effect should be specified before identifying the technology required to achieve it.

Instead of saying, “Give me a better drone”, perhaps we should say, “The Defence Services need persistent surveillance over this area for 72 hours at an affordable cost. What can you do?” Instead of saying, “Develop an anti-drone radar”, perhaps the question should be, “How can hundreds of inexpensive drones attacking a naval base be detected and neutralised?” Instead of saying, “Give me a new EW system”, perhaps we should ask, “How can I continue to operate when the enemy is actively denying my sensors and communications?” The answer might be a radar. It might be a drone. It might be an acoustic sensor, AI, EW, a distributed network of cameras or smartphones—or something nobody has thought of yet. It is this last possibility for which we must create space.

Distributed sensing and the power of architecture

Consider something as simple as Stellarium, the free, open-source astronomy application used regularly by many people. Point your smartphone at the sky and it not only identifies stars, but also the International Space Station and thousands of other man-made satellites. For a young person, this creates a very different mental picture of the world. The sky is no longer simply the sky. It is a constantly changing collection of objects that can be identified and tracked. Now imagine taking that thought further. If one person can identify something in the sky using a phone, could thousands of people near our borders contribute observations? Could cameras, microphones, global positioning system, accelerometers, and AI turn thousands of inexpensive devices into a distributed sensing network? Could a person report an unusual aerial object and have software help classify it?

No, a smartphone will not replace a military radar. But thousands of weak observations, intelligently combined, might create a useful additional layer of situational awareness. The innovation is not the smartphone. The innovation is the architecture. This is where the younger generation becomes particularly interesting. The author enjoys computer games, but is no match for his daughter. She belongs to a generation that grew up with smartphones, gaming, AI, drones, robotics, and virtual worlds. He is reasonably good at solving crosswords, Wordle, Strands, and spotting mistakes in a document. His wife is very good at Sudoku. They all solve problems differently.

That may sound trivial, but there is a serious point behind it. Today’s young people have grown up thinking about worlds that are digital, simulated, connected and increasingly autonomous. They understand concepts such as swarms, multiple

agents, virtual environments, and machine-speed decision-making almost instinctively. A young gamer may look at a battlefield differently from someone who has spent 30 years thinking primarily about conventional military platforms. That does not mean every gamer is an innovator. It certainly does not mean every young person understands warfare. But perhaps we should ask a 20-year-old who has grown up with these technologies: "What do you think warfare will look like in 2035?" That could be a far more interesting conversation than asking him to fill out an RFI.

Lessons from Ukraine and the United States

Ukraine has demonstrated some remarkable examples of this kind of thinking. Its ePPO system enabled citizens to report suspected aerial activity using smartphones, adding a distributed layer of observation to conventional air defence. Citizens did not replace military radars. Rather, many inexpensive observations could be brought together to provide useful information. The lesson is not that every citizen should become a soldier. The lesson is that new technology can create entirely new ways of sensing and understanding the battlefield.

The United States is taking a similar approach with challenges run by its Defence Innovation Unit. Its recent Sailor Warfighting Adaptive Payloads- Unmanned Surface Vessel (USV) USD 100 mn prize challenge, is not simply asking someone to build another unmanned surface vessel. It starts with a military problem: the cost of defending against inexpensive maritime threats is heavily skewed in favour of the attacker. The challenge brings together boat builders, autonomy companies, sensor developers, and unmanned aircraft system companies to find a better answer. A boat company may know how to build the vessel. A drone company may understand autonomy. A sensor company may solve detection. An AI company may solve classification. The final military capability may emerge from integrating several of these technologies together. The lesson is simple: Tell industry the problem. Don't necessarily tell industry the answer.

India's progress and the case for Defence Grand Challenges

India has already taken some important steps in this direction. Innovations for Defence Excellence (iDEX), Defence India Startup Challenge, iDEX Prime and Acing Development of Innovative Technologies with iDEX have created pathways for start-ups, Micro, Small and Medium Enterprises (MSMEs) and individual innovators to work with the Defence Services. iDEX's Open Challenge is particularly valuable because innovators can also bring their own ideas rather than waiting for the Services to define every problem.

But the country needs to go one step further. India needs Defence Grand Challenges. Imagine posing a question such as: "How would an Indian naval base be defended against 1,000 inexpensive drones and autonomous surface vessels?" The participants should not be told that the answer must be a radar. Nor should they be

told to use EW, missiles, interceptors, AI, or another USV. They should be allowed to surprise the Defence Services.

One team may develop a new sensor. Another may develop a swarm. A third may develop an autonomous interceptor. A fourth may create a completely distributed sensing system. A fifth may come up with something none of us had considered. The Grand Challenge then becomes more than a competition. It becomes a laboratory for discovering the battlefield of tomorrow.

Who is an innovator?

But this immediately raises another question: Who is an innovator? This is important because we are witnessing a proliferation of defence start-ups, particularly in areas such as drones. Some companies are genuinely developing new technologies. Others are assembling imported motors, batteries, flight controllers, printed circuit boards, and software into a finished product. There is nothing wrong with being an integrator. Defence needs good integrators and good manufacturers. But one should not automatically equate assembly with innovation.

An engineer is not automatically an innovator. An Indian Institute of Technology (IIT) graduate is not automatically an innovator. A PhD is not automatically an innovator. And, equally, someone who never went to college is not automatically an innovator. What matters is what a person can do with a difficult problem. The stories of people such as Bill Gates, Mark Zuckerberg, Elon Musk, Narayana Murthy, the Bansals of Flipkart, and others are very different from one another. Their educational and professional journeys are not templates to be copied. But they do show one thing clearly: there is no single pedigree that guarantees innovation or entrepreneurship. An excellent education can certainly amplify talent. It cannot, however, manufacture curiosity.

The real innovator keeps asking: Why does this have to be done this way? And then: What if we did it completely differently? The next defence innovator may be an IIT graduate. He may be an Industrial Training Institute student, a programmer, a gamer, a scientist, a technician, a veteran, or a hobbyist. Talent does not carry an IIT label. India should also accept that it is unlikely to discover an Archimedes, Ramanujan, or Einstein every day. Genius is rare. But we can create an ecosystem in which the probability of finding exceptional people becomes much higher.

Multiple pathways are required through which talent can enter the defence innovation ecosystem, including school competitions, robotics, gaming and simulation, hackathons, universities, iDEX, Grand Challenges, Defence Research and Development Organisation laboratories, and military experimentation. Instead of determining whether an individual is formally qualified to be an innovator, the emphasis should be on what the individual has demonstrated. Potential innovators should be given difficult problems and opportunities to build, experiment, and demonstrate their

solutions. Ultimately, demonstrated performance should serve as the basis for identifying talent.

Innovator, engineer, entrepreneur: not the same thing

There is another important distinction here. We often use the words innovator, engineer, entrepreneur, and start-up founder as though they mean the same thing. They do not. The innovator creates something new. The engineer makes difficult things work. The entrepreneur takes risks, builds an organisation, and brings people and capital together. The start-up is the vehicle through which these capabilities may be combined. Sometimes all of these are embodied in one person. Often, they are not.

That is why, when a defence start-up is evaluated, there is one question that should always be asked: "Who is the technical mind in this company?" Who really understands the technology? What has this person or team invented? What does the company actually own? Which part is genuinely indigenous, and which part has simply been assembled? What is the technology roadmap for the next five or ten years? Can the team explain not only what the system can do today, but what it could become tomorrow? The chief executive officer may be an excellent entrepreneur. The sales team may be excellent. The investor may have provided valuable capital. But somewhere inside a genuine technology start-up there should be a person or a technical team that understands the technology deeply and has a vision of where it can go. The start-up may be the vehicle. The innovator is the mind inside it.

Talent pipelines: from Talpiot to the Kalam phenomenon

This is one reason Israel's Talpiot programme is worth studying. It does not wait for exceptional young people to become start-up founders. It attempts to identify exceptional scientific and technological talent early, develop it through academic, military, and leadership training, and place it where technology and military problems meet. India needs to think similarly—not necessarily by copying Talpiot, but by recognising that talent discovery must begin before the start-up.

And then there is what I call Kalam phenomenon. Dr APJ Abdul Kalam was much more than a brilliant engineer. He could understand technology, inspire people, build teams, lead complex programmes, communicate a vision, and develop the next generation. One such person can become a force multiplier for hundreds of innovators. We need both kinds of people. We need the young person who says: "I have an idea nobody has thought of". And we need the person who says: "Give me 500 talented people and I will turn their ideas into a national capability". Sometimes they will be the same person. Often, they will not. Both are essential.

The commercial world has already developed many ways of finding such talent. *Shark Tank* brings entrepreneurs with ideas before experienced investors who question them, assess the people behind them and, when convinced, provide capital and mentorship. Technology companies use hackathons and open innovation programmes to discover solutions that may never emerge through conventional

organisational structures. Indian industry is beginning to do the same. Larsen & Toubro, for example, has been actively engaging start-ups in areas such as drones and autonomous systems, looking not only for technologies but also for opportunities for proof-of-concept work, collaboration, investment, and eventual scaling. This is an encouraging development. Large industry should increasingly become a hunter of innovation, not merely a recipient of government orders. The start-up brings speed and imagination. The large company brings engineering depth, manufacturing capability, supply chains, capital, and the ability to scale.

From prototype to production: the scale-up challenge

That brings us to the next challenge, one that is much debated in the defence innovation ecosystem. Finding the innovator and building a prototype is only the beginning. A start-up may build five excellent drones but have no money to manufacture 5,000. It may demonstrate one autonomous boat but have no capacity to manufacture 1,000. It may develop an extraordinary AI algorithm but lack the resources to integrate, maintain, and upgrade it across the armed forces. The journey must therefore be: Idea → prototype → military experimentation → validation → initial order → private capital and industry → mass production → export.

Government does not need to fund everything. Its most important roles are to provide access to the user, provide testing and experimentation facilities, de-risk early-stage technology and create a credible pathway to the first customer. Once military utility has been demonstrated, venture capital and industry should increasingly take the technology forward.

Procurement: the make-or-break link

But there is one more obstacle, which most of us are aware of: procurement. The entire innovation ecosystem can be destroyed if an excellent start-up eventually encounters a procurement system designed only for established technologies and large contracts. The United States has recognised this problem. Its Federal Acquisition Regulation (FAR) was originally conceived to deliver “The best value product or service to the customer, while maintaining the public’s trust and fulfilling public policy objectives”, yet over four decades it has swollen into a 2,000-page rulebook widely seen as excessively complex and bureaucratic. In Apr 2025, an Executive Order (EO 14275, “Restoring Common Sense to Federal Procurement”) mandated a comprehensive review and simplification of the FAR, and by mid-2026 the FAR Council had begun issuing proposed rules to overhaul parts of the regulation and make it more friendly to fast-moving technology. India too is moving in the right direction with proposed changes in Draft Defence Acquisition Procedure (DAP) 2026, including mechanisms for fast-moving technologies, spiral development, and more flexible acquisition pathways.

These are welcome. But India must ensure that a new innovation pathway does not simply become another lengthy procedure. We need less process, not less

accountability. And accountability should increasingly be about whether we achieved the operational outcome—not merely whether every procedural box was ticked. Under the draft DAP 2026, Low-Cost Capital Acquisition allows initial orders of up to INR 75 cr per project (with an annual cap around INR 2,000–2,500 cr) for rapid induction of indigenous, fast-cycle technologies from start-ups and MSMEs. Spiral development requires all stages to be defined upfront, with provisional qualitative requirements and an assurance of five years of order continuity to provide industry with demand visibility.

A cultural shift: from specification to possibility

Ultimately, this requires a cultural change. For decades, our acquisition system has often asked industry: "What can you make according to our specification?" The future should increasingly ask: "What can you make possible?" That requires a continuous loop between technology and operations: new technology, experimentation, wargaming, operational concepts, field trials, rapid procurement, feedback from the user and another round of improvement. Not simply: Requirement → RFI → RFP → trials → contract → production.

India has never lacked imagination. Its civilisational stories contain extraordinary concepts—the *Sudarshan Chakra*, *Vajra*, *Pashupatastra*, *Pushpaka Vimana* and many others. We should not claim that these were ancient versions of modern weapons and platforms. But they can use them as thought experiments. What would a modern Sudarshan Chakra mean? Perhaps a highly precise, intelligent weapon capable of finding its target, navigating countermeasures, and achieving the desired effect. What would a modern Pushpaka Vimana mean? Perhaps an autonomous, persistent aerial system capable of operating without conventional infrastructure. The purpose is not to recreate mythology. It is to stimulate imagination. Because the most important question an innovator can ask is simply: "What if?"

A new mandate for Indian innovators

Perhaps, therefore, the question with which we began. Instead of asking young innovators: "What does the Defence Services want?" they should be told: "India want Indian innovators to imagine capabilities that do not exist today". "Study the wars being fought today, but do not merely copy the weapons being used in them". "Imagine the weapon, sensor, platform, network or system that will dominate the battlefield of 2035". "Use Indian science. Use Indian engineering. Use Indian imagination. Draw inspiration wherever you can—even from India's own civilisational stories—but convert imagination into science, science into technology, technology into prototypes and prototypes into military capability". And when somebody demonstrates something extraordinary, the country must provide the capital and industrial capacity to turn it into 100, 1,000 or 10,000 systems.

That, in turn, represents a much more compelling vision of *Atmanirbharta* (self-reliance) than simply replacing an imported product with an Indian copy. The ultimate test of defence innovation is therefore not how many start-ups India create, how many

challenges we announce or how many prototypes we fund. It is whether India can discover a capability that the Services did not know they needed, demonstrate that it works, field it quickly, manufacture it at scale and change the balance on the battlefield. The journey should be: Imagination → talent → innovation → experimentation → military capability → industrial scale → global competitiveness. Perhaps the most important outcome is not the product we create today. It is the people we create for tomorrow. One exceptional Kalam can inspire hundreds. Those hundreds can inspire thousands. And among those thousands may be the person who invents something that changes warfare.

The ambition should therefore be bigger than Make in India. Do not just make in India what somebody else invented. Invent in India what everybody else will want tomorrow.

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