Redefining Defence Acquisitions: Transitioning from Traditional Qualitative Requirements to Technology-Based Procurement

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Abstract

The contemporary world is characterised by technological advancements, and this has an impact on the defence procurement model as well. The existing General Staff Qualitative Requirement (QR) model negatively impacts agility and innovation, which result in outdated capabilities of the defence forces. This article examines the shift from a QR-based procurement method to Technology-Based Procurement (TBP) model and highlights the importance of adaptability, flexibility, and continuous integration of advanced technologies in real-time. This article highlights the challenges faced by the QR model and what makes TBP model more advantageous. It delineates an implementation framework and outlines a phased approach and essential policy reforms. It further investigates the challenges and proposes risk mitigation strategies, such as a change in management approach, integration of cybersecurity, training programs on modular contracts, and the use of digital tools for all personnel involved in the procurement process. Lastly, the article concludes with tangible recommendations, illustrating how TBP may improve operational preparedness, reduce costs, and foster continuous innovation within defence procurement, which is the need of hour.

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Introduction

To ensure national security, the role of defence procurement is crucial, as it provides the armed forces with adequate resources. However, for the longest time, defence procurement has been based on the Qualitative Requirements (QR) process. General Staff QR-based process constitutes predefined specifications, which have rigid standards of compliance. While this model ensures a high standard of quality, it often hinders innovation and adaptability in procurements. The security landscape today is rapidly evolving; therefore, dynamic procurement frameworks are the need of the hour to meet the strategically evolving demands of modern warfare. It is notable that under the QR-based model, the procurement processes often face delays and may result it exorbitant prices. Although this model might inhibit innovative solutions, it surely does offer strategic advantages. This model is comprehensive and emphasises the quality of defence equipment, but it is unable to incorporate cutting-edge technology during the production process. This is where the Technology-Based Procurement (TBP) model comes to the forefront. Even in the United States (US) Department of Defense, the procurement often encounters delays. This has led to them adopting the TBP model, which lays emphasis on adapting updated technologies in defence acquisitions.[1] Therefore, this article explores the feasibility of TBP model by analysing the limitations of the QR-based procurement model. The aim is to outline a resilient framework for procurement system, which incorporate advancing technologies in real-time and explore the pathway to transition from QR-based model to TBP model steadily.

Analysis of Qualitative Requirements-Based Procurement Process

The QR-based procurement process in defence is characterised by a detailed criteria for military acquisitions, which ensures that the procured equipment meets stringent standards and maintains uniformity across products. The primary stakeholders in this process include government bodies, procurement agencies, and department of defence, and all these agencies collaborate with each other to ensure that all acquired products adhere to adequate standards and comprehensive specifications for defence acquisitions.[2] The primary focus of the QR-based model is to reduce risk; as a

result, it prioritises risk mitigation over flexibility. Therefore, this model constitutes rigid processes, where any change in the initial specification is discouraged or in some cases, even penalised.[3] This type of framework includes detailed documentation, rigorous testing, and stringent standards to exclude and minimise any uncertainties that might occur. While this model takes into consideration quality-control and accountability, it has several limitations.

- **Rigidity**. The entire QR-based model requires strict adherence to criteria and predefined specifications. However, due to rapid technological advancements, the initial requirements often fall out of scope with the emergence of fields, such as Artificial Intelligence (AI), big data computing, and machine learning.

- **Bureaucratic Delays**. The procurement of any equipment requires extensive approvals.[4] Each phase—from requirement assessment to vendor selection to quality assurance—involves multiple levels of authorisation and checks to minimise risks; however, this in turn prolongs the procurement process.

- **Inflexible Process**. It is not feasible to adjust additional requirements or incorporate new changes mid-process; therefore, the model lacks adaptability. It affects the agility of the armed forces by not coping with the changing operational landscapes and emerging dynamic threats. Even if the stakeholders agree to any minor change mid-process, this sole decision again needs to go through a process of revaluations and assessments, which again prolongs the procurement timeline.

- **Innovation**. This in any form is discouraged in the QR-based procurement, primarily because the process requires strict adherence to established criteria and uniformity. This tends to push the defence industry to comply with the standards rather than innovate, as the QR process does not accommodate cutting-edge technologies readily.[5] It is important to note that the service QRs are specific to that service.

Many developed nations, like the US, adopt approaches such as the Advanced Concept Technology Demonstration, where mature technologies are offered to the armed forces, allowing military commanders to assess their operational suitability and, thereby, leverage the nation's advanced scientific and technological capabilities.[6] The Russians adopt 'Baseline Standards', grouped into basic profiles as modular building blocks, which are later refined into functional standards with specific requirements, an approach well-suited for nations relying on indigenous military hardware to ensure effective lifecycle support.[7] Another example is that of England, which makes its procurement decisions in 'Make' or 'Buy' format. This kind of methodology is highly practical, especially for a country which imports military equipment and simultaneously builds it indigenously as well.[8] In fact, even India, under the Defence Acquisition Procedure[9], categorised the procurement and acquisition of military equipment under 'Buy' and 'Buy and make', in addition to the setting up of Innovations for Defence Excellence to support startups in this sector.[10]

Transition to Technology-Based Procurement

The battlefield of today is characterised by technological advancements, such as AI and unmanned systems, as a result, a QR-based model cannot maintain operational readiness. Therefore, it is only appropriate that technology is incorporated into the procurement model, as it would facilitate the adoption of cutting-edge technologies and ensure that the armed forces are better prepared to respond to threats in a dynamic manner. Defence supply chains are becoming increasingly complex, especially since they involve the movement of parts across various countries, which, if not done aptly, runs the risks of slow delivery of critical equipment and supply chain shocks.[11] The TBP model emphasises the importance of goals, such as battlefield capabilities or improved communications. This not only results in shortened procurement timeline but also helps in integrating incremental changes in the defence acquisition procedure. TBP approach helps in aligning with the rapid pace of innovation and advancements, which further increase the operational readiness of the armed forces.[12,13]

Additionally, the TBP model also helps the private sector, especially the tech-focused industries, to collaborate and engage in the defence sector as they refrained from doing so initially because of the rigid structure of the QR model. The TBP model

helps in expanding the supplier base to deliver the products with sophisticated capabilities.[14]

Countries throughout the world are reforming the procurement models, especially in defence. A recent example of this could be the recent policy paper published by United Kingdom (UK) Ministry of Defence titled *Integrated Procurement Model—Driving Pace in the Delivery of Military Capability.*[15] With respect to technology, it is essential to be informed from the very beginning about factors, such as the industrial base and the exportability of any product or technology, to design resilient supply chains. To tackle the emerging geopolitical challenges, the policy considers the options of delivering 'Minimum deployable capability' rather than waiting, which otherwise might be too long. With this policy, the UK is looking into adapting rapidly to the technology opportunities and evolving threats by incorporating their technological 'Know-how' in their design philosophy to meet the export challenge. This policy aims to work on its methodology to come up with the most apt way to cater to spiral development, technological advancement, and procurement method which is not complex.[16]

Some of the key features of the TBP model include real-time data integration, which help the procurement agencies to quickly make informed decisions by considering market trends, risk factors, and capabilities of the supplier, which further helps in minimising any delay in procurement and helps to tackle outdated technology. Unlike the QR-based model, which is static, the TBP model is more agile as it allows the defence forces to maintain operational advantage by swiftly adopting new technologies and reducing procurement cycles. It helps the equipment production to be expanded and upgraded as and when required. Moreover, the TBP has various advantages such as encouraging innovation throughout the procurement cycle, which helps in incorporating all emerging technologies as they develop.[17] It also attracts multiple suppliers to push for a market which is more competitive and innovation driven. Most importantly, it improves the operational readiness of the defence forces as it can adapt latest technologies without extensive delays.

Implementation Framework for Technology-Based Procurement

In contemporary times, the defence industry follows a TBP model, which is structured and is implemented through a phased approach. In addition to this, it also includes policy reforms and stakeholder engagement. For instance, incorporating cutting-edge technology in weapons system is crucial and this can only happen through collaboration with strategic partners.[18]

Technology-based Procurement (TBP) Model - Implementation Framework	**Phased Approach**	**Planning**
		Execution
		Evaluation
	Stakeholder Engagement	**Leadership**
		Procurement Teams
		Technology Providers
		End-users
	Policy and Regulatory reforms	**Flexible Policies**
		Cyber Security Standards
		Private Sector Collaboration

Table 1: Technology-Based Procurement Model—Implementation Framework

Source: *Compiled by the author*

As illustrated in Table 1, a structured approach is essential to optimise the resources, manage risks, and transition to a TBP model. This framework can further be categorised as phased approach, stakeholder engagement, and policy and regulatory frameworks.

- **Phased Approach to TBP**. A phased approach can further be divided into planning, execution, and evaluation. The planning phase sets the foundation of TBP. It establishes

the objectives, timelines, and resource allocations. This phase allows defence agencies to conduct a comprehensive need assessment, wherein TBP can bring immediate and long-term benefits. This phase involves market research to understand the present technologies and potential industry partners. To engage the technology providers enables defence agencies to gauge the feasibility of integrating innovative solutions and to form an outline of procurement strategies that are adaptable to the evolving capabilities.[19] In this phase, strategic roadmaps can be developed outlining short-term and long-term milestones. These effective roadmaps would present measurable benchmarks that enable stakeholders to track progress, identify challenges, and implement corrective measures as prescribed. Another important plan is financial assistance needed, as TBP models often involve incremental funding to support an agile procurement cycle. By breaking down into phases, defence agencies can allocate resources more efficiently, reducing financial strain and allowing more agility in response to the emerging technologies.[20] The execution phase emphasises on active engagement with vendors, iterative testing, and real-time adaptability. This phase would allow defence agencies to implement agile procurement practices, facilitating continuous testing, and refinement of technologies throughout their development. One of the options is to go for modular contracts as they ensure the updating of equipment, as the new technology becomes available. It allows the defence forces to quickly and efficaciously respond to ever-changing operational landscape. It also enables the agencies to monitor progress and performance metrics during the procurement cycle to make data-driven decisions. It is the adaptability during this phase that helps the defence agencies to remain dynamic and adapt new technologies without restarting the entire procurement process again, as was the case with stringent specifications of the QR-based model. The third phase under this approach is the evaluation phase, wherein the primary focus is laid on assessment of the performance of the procured technologies. The factors that are considered are its scalability, adaptability, and performance which further helps the defence agencies in making informed decisions about any future procurements. This phase also constitutes the valuable insights of the end-

users, which serves as feedback and helps in improving usability and efficaciousness of the any acquisitions in the future.[21]

- **Stakeholder Engagement in TBP**. In addition to the phased approach, another factor to successfully transition to a TBP model is effective stakeholder engagement. The primary stakeholders in the defence procurement include defence agencies, civilian leadership, technology providers, and the end-users, and all these stakeholders play a significant role in implementing any model successfully. Leadership is crucial in defence acquisitions because it is responsible for the funding and adequate policy support through continuous commitment. Leaders with the defence agencies and the government can help in pushing for a TBP model by emphasising the benefits of the TBP model, as it is cost-efficient and bolsters innovation. To incorporate technological advancement, the technological providers become equally important in the planning and the execution process, as they facilitate a steady integration. Moreover, the role of procurement teams is significant as it is their knowledge and expertise that allows for greater incorporation of cutting-edge technologies in the field of defence. Finally, end-users also form the crucial part of the procurement process as the acquired products and technologies should be in consonance with the needs and demands of the military personnel. The feedback provided by the end-users is critical as it enhances the overall effectiveness of the TBP model.[22]

- **Policy, Regulation, and Innovation Enablers in TBP**. Policy and regulatory framework form another important pillar of the comprehensive framework of the TBP model, as it is these frameworks that bolster innovation and push for modular contracting. Traditionally, the acquisition procedure emphasised strict compliance with specifications, which were often restrictive in nature. However, the TBP model promotes continuous improvement by encouraging incremental funding and flexible contracting. This type of procurement model helps the defence agencies to procure the components of the project, as and when they become available, rather than waiting for completing of the entire project. Another factor to be taken into consideration is the alignment of cybersecurity

standards with the TBP model. Incorporating technology into the procurement process involves real-time data and potentially vulnerable technologies; therefore, policies must ensure that both suppliers and defence agencies adhere to regular cybersecurity assessments in order to maintain robustness in the procurement process.[23] While the capabilities of the public sector have significantly improved in the 21st Century, collaboration with private sectors is the need of the hour as it would bring expertise in defence acquisition. To encourage private sector collaboration, the government should work on coming up with a single window to accelerate approvals, reduce bureaucratic delays, and simultaneously promote tech-startups. For instance, the US has the Federal Acquisition Regulation, which supports rapid acquisition through programs like the Defence Innovation Unit and encourages innovation by allowing flexible contracting options.[24]

While the shift from the QR-based model to the TBP model is sought after, this transition also presents several challenges that defence organisations must address to ensure effective implementation. The first challenge is to get the traditional stakeholders to adopt the TBP model as they are accustomed to the QR-based approach. The defence procurement has been QR-based since long, therefore, incorporating technology in the process is bound to encounter resistance. A few reasons for this resistance could be the vulnerability and unpredictability of a TBP model and familiarity with the already existing model.[25] Secondly, data security concerns arise as a direct consequence of incorporating technology into any defence acquisition procedure. Defence agencies manage a vast amount of sensitive information, and the use of technology increases the risk of data breaches; therefore, adequate security protocols must be enforced. Finally, the workforce should be proficient and skilled in comprehending modular contracts, real-time data, emerging technologies, etc. This necessitates training and skill development to optimise the benefits of the TBP model.[26]

Risk Mitigation Strategies

To address the risks and challenges for successful TBP implementation, a structure risk mitigation approach is essential. Firstly, a gradual change in management strategy would be highly

effective, the phased implementation allows the stakeholders to adapt progressively, easing the transition from traditional QR-based procurement. Further, early involvement of procurement teams and leadership, along with fostering a culture of innovation, can further reduce resistance to some extent. The leaders can build stakeholder confidence and support by communicating the benefits of the TBP model, such as faster acquisition cycles and increased flexibility. Secondly, the data security risks can be mitigated by integrating robust cybersecurity measures throughout the TBP process. Defence agencies should establish strict cybersecurity standards for vendors, ensuring that any integrated technology meets high security benchmarks and helps mitigate the risk of data breaches. The integrated procurement model would acquire a better military capability.[27] Also, regular cybersecurity assessments, along with vendor compliance with government data protection protocols, become extremely crucial. The real-time monitoring systems can also help detect and address potential threats quickly, minimising vulnerabilities tied to digital integration.[28] With respect to skill development, which is another essential risk mitigation measure, training programs in agile procurement, modular contracts, and digital tools should be available to all procurement personnel. Partnering with technology vendors for specialised training can enhance team capabilities, especially in managing innovative technologies and real-time data. Cross-functional skill development and blending technical and procurement expertise enables teams to effectively navigate TBP's demands.[29] The defence procurement procedure, often amended more frequently than weapon systems, has increasingly served merely as a procedural guide open to flexible interpretations. Therefore, the focus should be on civil-military fusion, with works on cyberspace, AI, space, robotics, and so on, leveraging India's substantial technological and knowledge resources.[30] To conclude, addressing the challenges of TBP requires thoughtful change management, strengthened cybersecurity practices, and targeted skill development.

Conclusion

The adoption of a TBP model necessitates a strategic, phased approach to maximise its efficacy and minimise challenges. The defence agencies should first push for incremental changes, for instance, the entire transition could initially start with pilot programs

to refine the model and tailor it according to India's strategic requirements and defence acquisition landscape. This would help the stakeholders to familiarise themselves with the TBP process based on real-time feedback. Second, the 21st Century has seen a phenomenal increase in the use of information technology across almost all sectors. Therefore, collaboration with experts in the private sector becomes critical for a successful defence procurement process, as it would promote innovation. Third, utilising technology has its cons, primary being its vulnerability to cyber threats. Therefore, strict data protections should be put in place. And lastly, as already stated, all these incremental changes are devoid of foundations if the government does not invest in skill development. To conclude, the transition to a TBP model is transformative step to modernise defence procurement as it would help defence forces to enhance their operational readiness and aim for a long-term success in a rapidly evolving security landscape.

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