



# NITI Aayog Unveils TCRM Matrix Framework

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## Why in News?

[NITI Aayog](#) has introduced the Techno-Commercial Readiness and Market Maturity Matrix (TCRM Matrix) framework, an innovative assessment tool aimed at transforming technology evaluation, encouraging innovation, and nurturing entrepreneurship in India.

## What is TCRM Matrix?

- **TCRM Matrix stands for Techno-Commercial Readiness and Market Maturity Matrix.**
  - It is an assessment tool designed to revolutionize technology evaluation, foster innovation, and fuel entrepreneurship in India.
- The framework presents an integrated assessment model that offers in-depth insights and actionable intelligence to stakeholders at every stage of the technology development cycle.

## How will TCRM Matrix be Useful?

- TCRM framework provides a robust analysis of the joint readiness of a project.
  - The scale is intended to give a standard language for innovators, researchers, and investors to communicate about the readiness of a technology for commercialization or deployment.
- **The Technology Readiness Level (TRL)** was designed to give a **framework for assessing a technology's readiness** and communicate more effectively about the risks and opportunities associated with a given technology by **utilizing standard language to express the maturity of a technology.**
  - This framework was developed from the study of innovation from an economic perspective and looks at the increase in performance of a technology over time.
  - It finds that **from the point of introduction of the technology** by an innovator, the **improvement in performance of a technology** usually starts very slowly with early adopters.
- The **Commercialization Readiness Level (CRL)** will assess **various indicators which influence the commercial and market conditions** beyond the technology maturity.
  - It assess how a new technology could be commercially successful all the way through to commercial availability and wider acceptance within the target market.
  - This enables key barriers to be addressed to **support the commercialization of a technology.**
  - It is intended to **supplement the TRL scale by providing increased focus on a technology's preparedness for market launch** and commercial success through specific and clearly defined business indicators.
- **Market Readiness Level (MRL)** is a methodology used to **evaluate how close to the market the project outputs.**
  - It is used to **assess how ready your product or service is to take to market as a commercial offering for a group of customers.**
  - It relies on extrinsic indicators like the awareness of extrinsic market indicators.
  - It is intended to supplement the TRL and CRL by focusing on a technology's preparedness

for the purpose of customer adoption and market success

## What are the limitations of TCRM Matrix?

- Each of the TRL, CRL, and MRL systems, have certain limitations which are:

Technology Readiness Level (TRL)	Commercialization Readiness Level (CRL)	Market Readiness Level (MRL)
<p>TRLs only take into account a technology's technical readiness, ignoring other elements like market demand, cost-effectiveness, and regulatory compliance that are crucial for commercial success.</p> <p>TRLs do not specify how to advance a technology from one level to the next, making it difficult to design and implement technological development and commercialization strategies.</p>	<p>CRLs are concerned with commercialization readiness and may overlook technical elements of a technology.</p> <p>External variables, such as changes in rules or market conditions, might have an impact on a technology's commercial readiness.</p>	<p>The MRL system may be subjective, and various stakeholders may perceive it differently, resulting in contradictions in ratings.</p> <p>MRLs may fail to account for external factors that can influence technology adoption such as changes in customer tastes, competition, or technological improvements.</p>

## Why is TCRM Matrix Needed?

- According to the **Global Innovation Index 2022**, India was ranked **40th** in the world in terms of R&D expenditure as a percentage of GDP.
- India's start-up ecosystem has grown rapidly, with over **50,000 start-ups** in the country. This is supported by a strong network of incubators and accelerators, which have helped to nurture and support these innovative companies.
- The **IT and software sector** contributed USD 191 billion to India's GDP in 2020, accounting for **7.7% of the country's total GDP**.
- The Indian **pharmaceutical industry is the world's third largest** by volume, with over 20,000 registered companies.

## Way Forward:

- The adoption of the TCRM Matrix framework necessitates a comprehensive analysis and contextualization within the unique national and sectoral innovation landscape. This will help policymakers in making effective decisions to foster innovation and drive growth.

## What is the Global Innovation Index?

- The Global Innovation Index (GII), which is **published annually** by World Intellectual Property Organization (WIPO).
  - The GII has also been **recognized by the UN Economic and Social Council** in its 2019 resolution on Science, Technology and Innovation for Development as an authoritative benchmark for measuring innovation in relation to the [Sustainable Development Goals \(SDGs\)](#).

## What is WIPO?

- WIPO is the **global forum for intellectual property (IP) services**, policy, information and cooperation.
- It is a **self-funding agency of the United Nations**, with 193 member states.
- Its aim is to **lead the development of a balanced and effective international IP system**

that enables innovation and creativity for the benefit of all.

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