

Intellectual Property Development Indices (IPDIs) and Contractual Agreements: RTO's Perspective

Intellectual Property Development Indices (IPDIs) can be used to assess readiness of an R & D programme being undertaken by Research and Technology Organizations (RTOs). Generally, RTOs are responsible for ideation, development and demonstration of technologies so that transfer of demonstrated technologies can be planned effectively and efficiently. At the same time, entering into suitable Agreements at the right stage with collaborators (from industry, academia and/or R & D) to make ready a transferable technology, and with prospective technology receivers to effect technology transfer is crucial for giving the right impetus to the Technology Value Chain (TVC) comprising development, demonstration and transfer. It also helps in setting realistic goals. An attempt has been made to correlate crucial aspects of the IPDIs and contractual Agreements for the TVC. A schematic model has been proposed in Fig. 1 for the advanced materials TVC activities being pursued by RTOs like ARCI. The basis of such correlation is briefly described as follows:

IPDI →	1	2	3	4	5	6	7	8	9	10
Activities →	Basic concepts and understanding of underlying scientific principles	Shortlisting possible applications	Research to prove technical feasibility for targeted application	Coupon level testing in simulated conditions	Check repeatability/ consistency	Prototype testing in real-life conditions	Check repeatability/ consistency	Reassessing feasibility (IP, competition technology, commercial)	Initiate technology transfer	Support in stabilizing production
IP Chain Milestone(s) →	Exploratory studies		Laboratory testing			Field demonstration			Technology transfer	
Role of CTATIC →	<ul style="list-style-type: none"> Competitive intelligence Identification of possible collaborators Selecting appropriate engagement model (decision variables: IPDIs, collaborators, IP ownership & licensing methodology, deliverables, milestones, financials etc.) Preparing/finalizing contractual agreement Patent analysis and filing 					<ul style="list-style-type: none"> Activities mentioned from IPDI 1 to 5 Preparing status reports on ongoing R&D projects and using them for IP/Technology Marketing efforts Feasibility assessment Costing of technologies and projects 			<ul style="list-style-type: none"> Activities mentioned from IPDI 1 to 8 Receivables management (collection of technology transfer fees/royalties) even beyond IPDI 10 	

Fig. 1 Schematic Showing IPDIs and Applicable Contractual Agreements

Exploratory studies can be used to initiate a new technological programme. Idea can be screened keeping in view the possibility to address a problem. Collaborations can be initiated at this stage. Contractual Agreements that can be signed at this stage include Co-operative R & D Agreement, R & D Consortium Agreement, Inter-Institutional Agreement and Sponsored Research Agreement. Completion of scientific studies and forecasting of possible applications shall be titled as Intellectual Property Development Index 2 (IPDI 2). In that case, study may not go beyond IPDI 2 if initial results are not promising. Coupon level testing is conducted with miniaturized version of real-life component and gets completed at IPDI 5. This should be followed by developing prototypes. Testing prototypes at identified end-users' sites shall be regarded as achieving IPDI 6. Pilot production to undertake limited field trials and to check consistency should initiate after completing IPDI 6. Repeated and expected performance of prototypes in real-life conditions shall be termed as achievement of IPDI 7. At this point, reassessment with regard to competing technologies and potential financial feasibility needs to be conducted (IPDI 8). While moving from IPDI 6 to IPDI 8, Joint Demonstration Centre (JDC) Agreement, or Technology Demonstration and Transfer (TDT) Agreement can be signed. The JDC Agreement is signed to leverage complementary capabilities of an RTO and an industrial partner (having commercialized the same technology usually in a foreign country) for technology demonstration initially at a facility established at the RTO's premises. In case of a TDT Agreement, an industry partner can seek a technology transfer on exclusive basis while committing to co-operate for field trials. However, an RTO should attempt to involve industry partners ready to accept nonexclusive technology transfer. In that scenario, a technology can be offered to multiple technology seekers for widespread dissemination of the technology. To enhance the chances of commercialization success, an RTO should initiate technology transfer after arriving at IPDI 8. At this stage, either a Technology Transfer Agreement or an Option Agreement can be used to interact with potential technology seekers. An Option

Agreement, providing either an exclusive or non-exclusive option to the industry partner, minimizes risk of investment in commercializing a new technology. However, if a technology seeker is convinced of potential market success of an RTO's technology, it would be appropriate to execute a Technology Transfer Agreement without going through the route of Option Agreement.

It will be pertinent to briefly discuss about different models being adopted by ARCI to engage with other organizations for technology development, demonstration and/or transfer. Following prominent Agreements are being signed by ARCI to implement such engagement models:

* **Cooperative R & D Agreement**

Through Cooperative R & D Agreements (CRADAs), ARCI associates with an industrial organization for the scientific and technical conduct of a project. Collaborative and intellectual contribution by RTO's partner organization is expected in this mode. Modus operandi for utilizing CRADA results is a crucial component of CRADA.

* **R & D Consortium Agreement**

ARCI collaborates with academic institutions and private industrial organization(s) either from a single nation or from different nations, to implement these Agreements. These projects, involving pre-competitive research, aim to find innovative solution(s) that can potentially benefit an industry sector.

* **Inter-Institutional Agreement**

These Agreements are being used by ARCI to forge alliances with academic or R & D institutions to collaboratively develop and/or demonstrate a technology.

* **Sponsorship Agreement**

ARCI enters into such Agreements with private or government organizations, which are interested to leverage ARCI's knowledgebase, tangible and intangible assets.

* **Joint Demonstration Centre Agreement**

Such Agreements are being used to accelerate ARCI's international technology collaborations. Implementation involves establishment of a Joint Technology Demonstration Centre by ARCI and partner industrial organization generally from a foreign country. Partner industrial organization has already demonstrated the usefulness of a technology by proving applications in a country other than India. Joint work – utilizing technological understanding of a partner organization and ARCI's technology transfer/commercialization experience - is carried out to demonstrate newer applications in India.

* **Technology Demonstration and Transfer Agreement**

ARCI executes these Agreements with appropriately identified industrial partners for technologies, which need to be demonstrated for applications of interest to the associated industrial organizations.

* **Option Agreement**

These Agreements are being used by ARCI to provide an opportunity to possible technology seekers to assess the commercialization potential of a technology that is available for adaptation/transfer.

* **Technology Transfer Agreement**

These Agreements are being signed for to effect transfer of those technologies, which have already been developed and demonstrated.

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