# Figure 1: India Biotech’s Fermentation Skill Base

Statins

Enzymes

Immuno-suppressants

r-insulin

Recombinant Therapeutics

Statins

Enzymes

Monoclonal Antibodies

EPO

1978 – 1990s

Mid 1990s- 2000

2000 - 2003

# Figure 2: Leveraging Technological Base

**Enzymes**

* Pectinases
* Hemi-Cellulases
* Amylases
* Proteases

**Small Molecules**

* Statins
* Immuno-suppressants

**rDNA Protiens**

* r-human insulin
* Streptokinase
* GCSF
* HGH

**Mammalian Cell Culture**

* h-R3 MAb
* EPO

Exploitation of fermentation skill base in manufacturing / producing generic small molecules

Exploration of co-development of new cancer drugs in strategic alliances with international partners. MAb’s are complex molecules

**Ambidextrous design**

# Figure 3: Historical evolution of India Biotech

**t**

India Biotech amongst the first Indian companies to manufacture enzymes for the beverages industry

It is able to scale up its in-house research programme, based on a proprietary solid substrate fermentation technology, from pilot to plant level

India Biotech sets up a subsidiary custom research company to cater to the growing need for outsourced R&D in the pharmaceutical sector

It leverages its technology platform to manufacture biopharmaceuticals and statins and sets up a dedicated manufacturing facility

The company establishes a clinical research organisation to pursue clinical research and development

It receives US FDA approval for manufacturing cholesterol-lowering molecule

Becomes one of the few companies worldwide to develop human insulin on a specific (Pichia) expression system

India Biotech forms joint venture with CBI to manufacture and market a range of bio-pharmaceutical products already developed by CBI’s renowned research centre.

India Biotech goes public with a hugely successful IPO

It enters into an alliance with US DBF 1 to discover and co-develop therapeutic products

India Biotech enters into collaboration with US DBF 2 to co-develop oral insulin

Forms an alliance with US DBF 3 to co-develop new class of immunoconjugates for targeted immunotherapy of cancers and infectious diseases

**Period I:**

**Late 1970s - 1990**

**Period II:**

**1990 – 2001-02**

**Period III:**

**2002-03 – 2008-09**

# Figure 4: Qualitative data structure

|  |  |  |
| --- | --- | --- |
| First order concepts | Second order themes  (processes, structures, mechanisms) | Aggregated Dimension |
| **Phase 1: 1970s – 1990**  ***Exploration***  Attempts to scale up the fermentation process from laboratory / pilot scale to plant scale in the backdrop of limited in-house knowledge and published information.  Success in developing proprietary solid substrate fermentation technology and scaled up from pilot to plant level.  ***Exploitation***  Manufacturing Papain, a plant enzyme, and Isinglass, a marine hydrocolloid, key ingredients for the brewing industry.  Exporting to the USA and European countries for usage in other industries such as textiles, biofuels and animal feed.  **Phase 2: 1990s to early 2000**  ***Exploration***  Attempts to scale up manufacturing recombinant insulin and achieving success after many attempts  ***Exploitation***  Use of proprietary fermentation technology to manufacture statins and immunosuppressant, along with enzymes.  US FDA approval for development of statins using proprietary fermentation technology  **Phase 3: 2003 – 2008-09**  ***Exploration***  Learning from CBI to develop MAbs from pilot to plant level  Developing oral insulin for local and export markets  ***Exploitation***  Commercialisation of recombinant insulin developed using proprietary fermentation technology.  Approval and marketing of MAb based drug for treatment of cancer.  **Management of strategic partnerships**  **Opportunity approach to partner selection.**  **Negotiation and contract drafting process centralised with the R&D**  **The founder and the Head of R&D as central actors in partnership formation and negotiation and operationalisation process.**  **Relationship between members of alliance management team and operation team as fuzzy, limited by hierarchical and cultural aspects.**  The founder as the central actor in the partner selection process  Emergence of new processes in negotiating and contract drafting.  Legal division become a key stakeholder in the process  Strategic Management Committee assumes the overarching body to oversee the formation and operation of strategic partnerships  Institutionalization of monthly interaction between the Head of R&D (AMT member) and the operation team  AMT member to seek approval prior to AMT meetings and brief SMC and operation team  **Structural Ambidexterity to manage strategic partnerships** | **Corporate Vision and goal setting**  **Phase 1:** *Aspiration to grow from a supplier of enzymes to undertake large scale manufacturing and become a supplier of active pharmaceutical ingredients (APIs) to pharmaceutical companies globally.*  **Phase 2:** *Aspiration to grow a supplier of active pharmaceutical ingredients (APIs) to become a full-fledged biopharmaceutical company*  ***Phase 3:*** *Aspiration to be at the forefront of handling MAb based molecules and become partner of choice to small DBFs*  **Fostering a culture that encourage experimentation and learning.**  **Acceptance of failure in pursuit of technical skill development**  **Attracting expatriate scientists to join the company**  **Contextual Ambidexterity**  **Use of strategic partnerships with international DBFs and research organisations.**  **Contextual Ambidexterity** |  |