



## THE SURVEY DESIGN AND QUESTIONNAIRES

National Manufacturing Innovation Survey 2021

# Survey Design

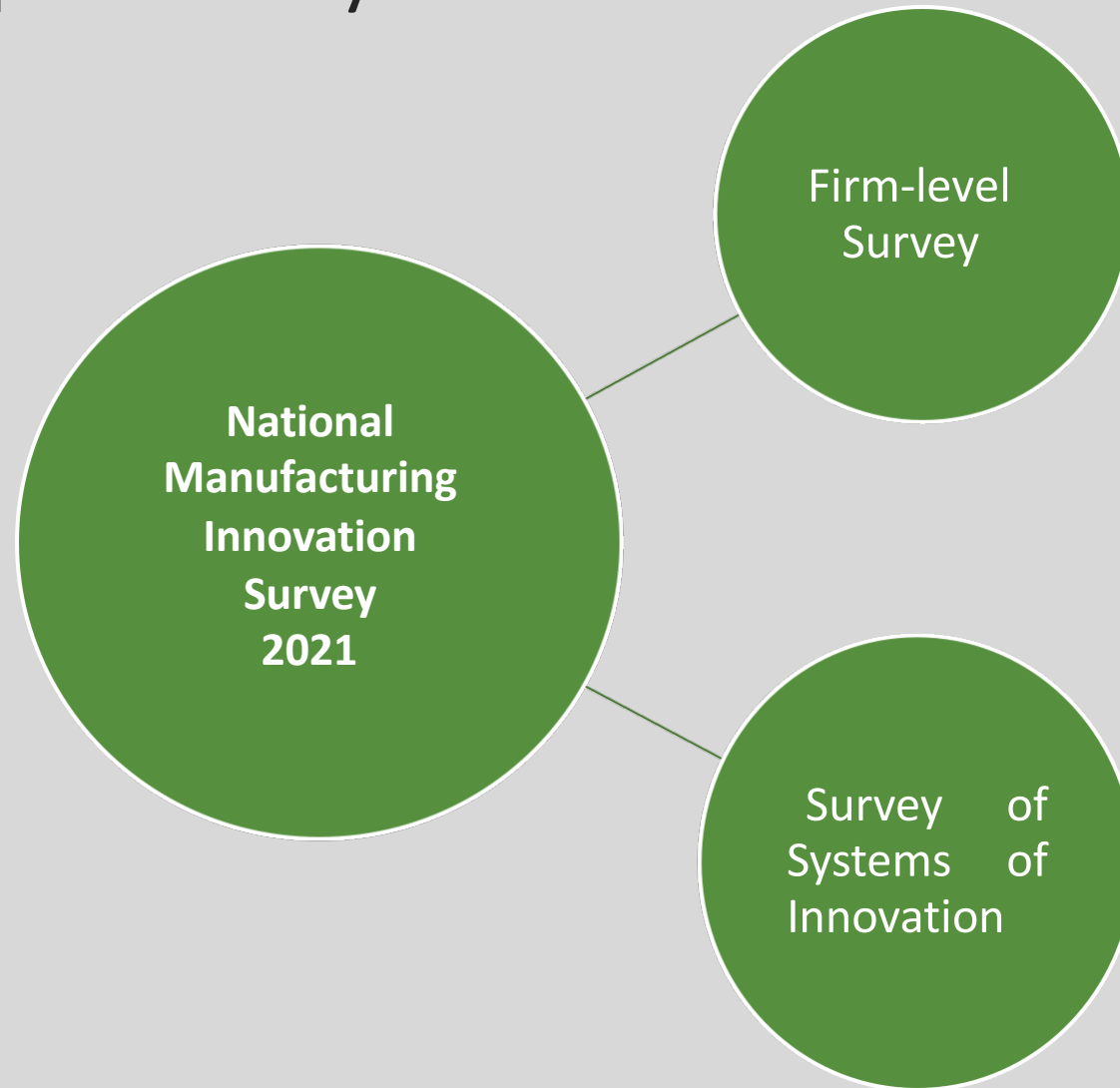
## Manufacturing Innovation Survey 2021

- ✓ Includes large, medium, small and micro firms
- ✓ Firms selected via stratified random sampling and reflects the distribution of the manufacturing industry
- ✓ Survey has 2 key focus:
  - Firm-level
  - Sectorial systems-level
- ✓ Observation period: FY 2017-18 to FY 2019-20

## Questionnaire design considerations:

- **OECD (2018) Oslo Manual: Guidelines for Collecting, Reporting and Using Data on Innovation**
- **National Innovation Survey 2011**
- International Innovation surveys in the past decade (OECD Eurostat Community Innovation Surveys, Japanese National Innovation Survey, Business Operations Survey NZ, etc.)
- Innovation literature: **Global Innovation Index Report 2020**, Global Competitiveness Report 2019, etc.
- Recommendations from Technical Advisory Committee

# NMIS 2021a 2-part survey





SURVEY OF  
**FIRM-LEVEL INNOVATIONS**

# Investigating Productivity & Competitiveness of India's Manufacturing Sector using the lens of "Innovations in Firms"

New or  
significantly  
improved  
goods

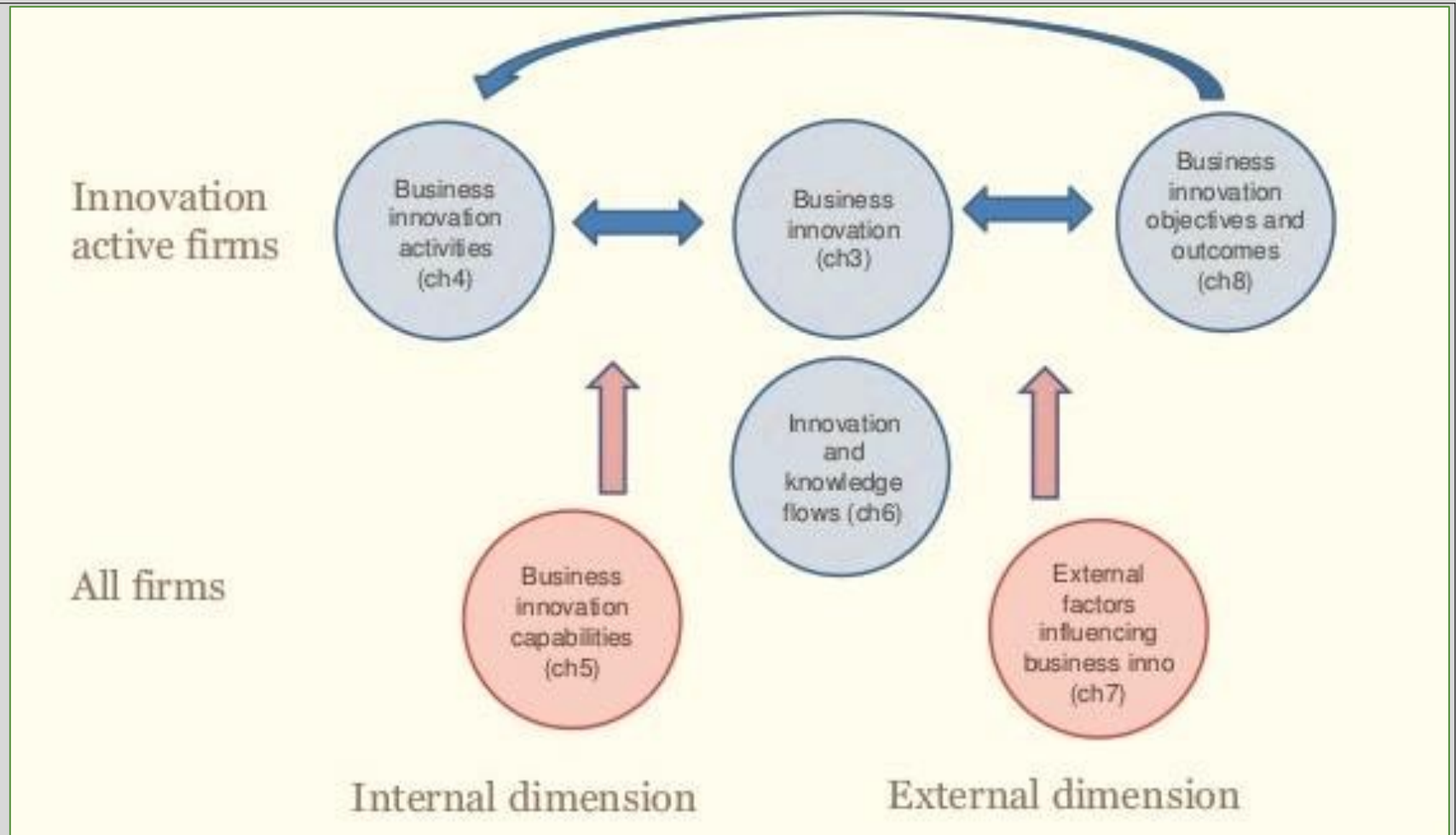
New or  
significantly  
improved  
services

New or  
significantly  
improved  
business  
processes

Business  
Resilience  
(impacts of  
pandemic)

Energy,  
environment,  
health, safety  
and  
inclusiveness

Customer  
satisfaction



Framework for firm-level  
innovation measurement

## **Product Innovation in Firms**

If/how firms developed or introduced new or significantly improved products/services to be more productive or competitive

## **Business Process Innovation in Firms**

If/how firms developed or introduced new or significantly improved business processes to impact final goods or services

- Operations and Business Process Development
- Procurement, Distribution & Logistics
- Administration & Management

## Why firms pursue innovations in manufacturing firms

Increase range of goods or services

Improve quality of goods or services

Increase capacity for producing goods or services

Improve the quality of production process

Replace outdated products or processes

Increase speed of supplying/delivering goods or services

Reduce labor costs

Reduce material and energy costs

Increase the firm's turnover

Enter new markets

Increase existing market share

Increase visibility in the market

Allow the firm to keep up with its competitors

Meet requirements of clients

Reduce environmental impacts

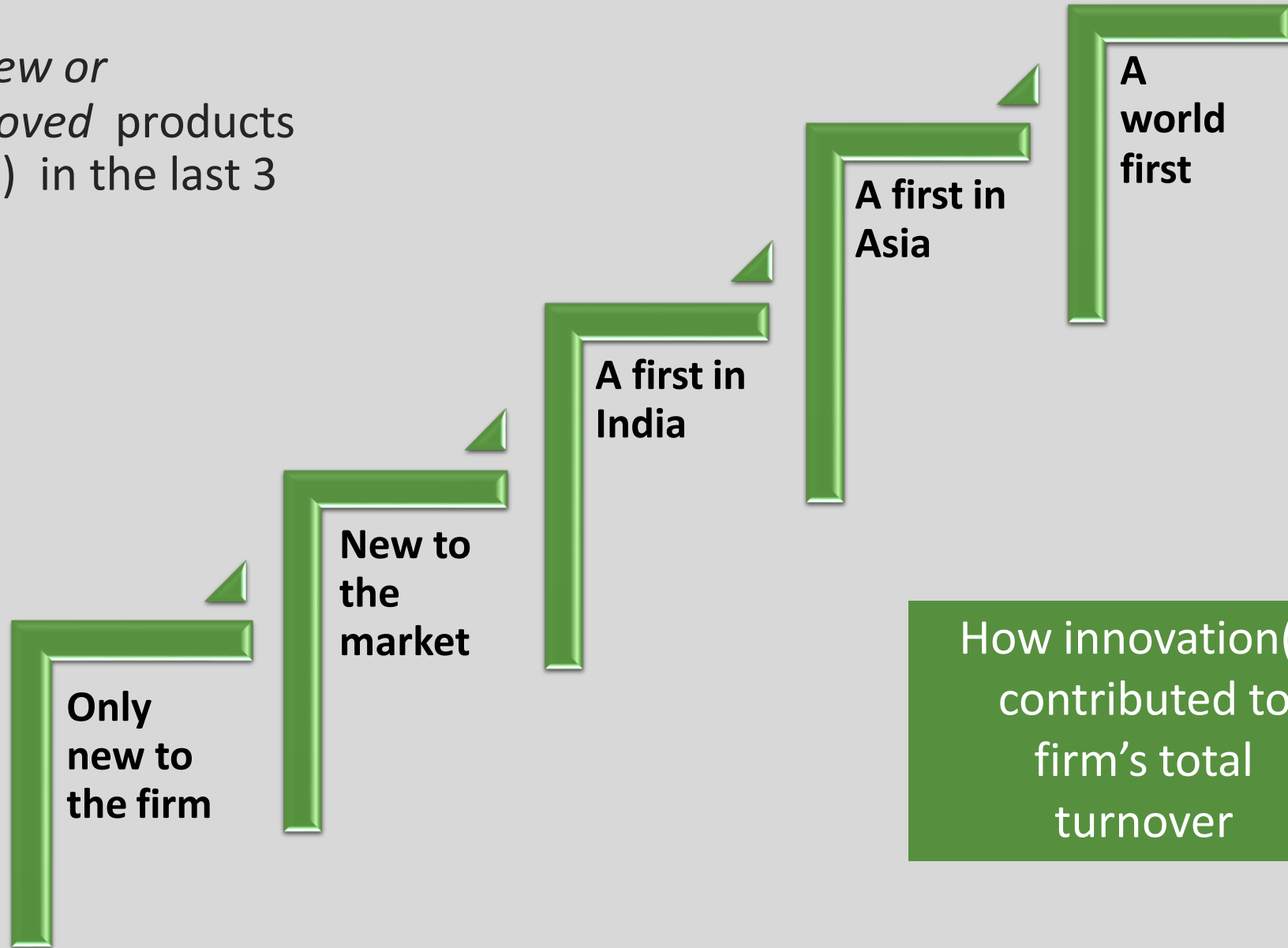
Improve health and safety of the firm's employees

Catering to Corporate Social Responsibility

Meet regulatory requirements (e.g. standards, etc.)



If firms created *new or significantly improved* products (goods & services) in the last 3 years



If/how innovations benefited the firm and its businesses

Open up new market opportunities

Improve firm's turnover

Respond to market pressures

Respond to cost pressures

Comply with existing or forthcoming regulatory provisions







If firms innovated in key areas of operations & product or business process development

-  Assembling products,
-  Producing goods,
-  Providing services,
-  Managing production,
-  Managing services,
-  Fabricating components,
-  Conducting quality assurance or quality control

If firms improved or redesigned products or services by ...

-  Developing Business Plans, Products or Services,
-  Researching Products or Services,
-  Analyzing Markets,
-  Designing Products or Services, Testing

If firms innovated for maintenance, automation, design/ redesign of equipment, hardware, software, procedures, and technical knowledge

-  Designing processes, Engineering
-  Managing data, developing, testing software, processing data,
-  Providing software and information and Technology services
-  Developing computer systems, providing internet services, maintenance of computer systems

# Innovations in procurement, distribution and logistics

Digital inventory management systems

E-procurement

New delivery models & improved shipments

Automatic, real-time monitoring, tracking/tracing of delivery of goods

Digital supply chain management

Reverse logistics

Eco-friendly vehicles or multi-modal logistics such as the combined use road transport and inland navigation

Paperless, transparent supply chain transactions, manage supplier relations, unique product identification

## Innovative Administrative & Management measures

New strategic management activities carried out at the highest managerial levels

High-level management adopting new measures for cross-functional decisions - new business practices, investments, divestments, product strategy and long-term goals

Innovative methods of organizing work responsibilities and decision making

Innovative methods of organizing work responsibilities and decision making

New or significantly improved supporting activities for the firm's business processes

Corporate governance, maintenance systems or operations for purchasing, accounting, building services, management, and administrative support activities

# Innovative measures in Marketing & Sales

Measure to impact informing existing or potential buyers of a good or service

Significant changes to the aesthetic design or packaging of a good or service

New methods for product placement or sales channels, including retail management activities

New methods of pricing goods or services

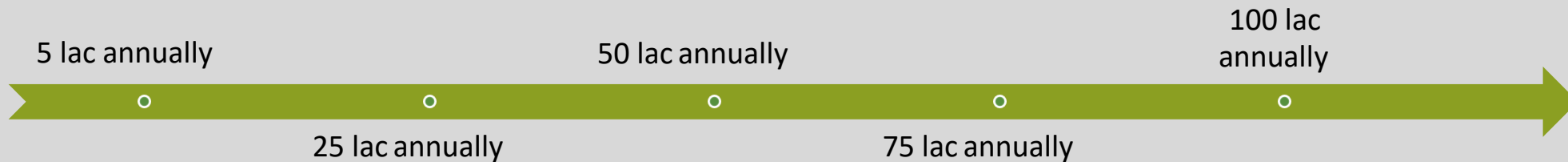
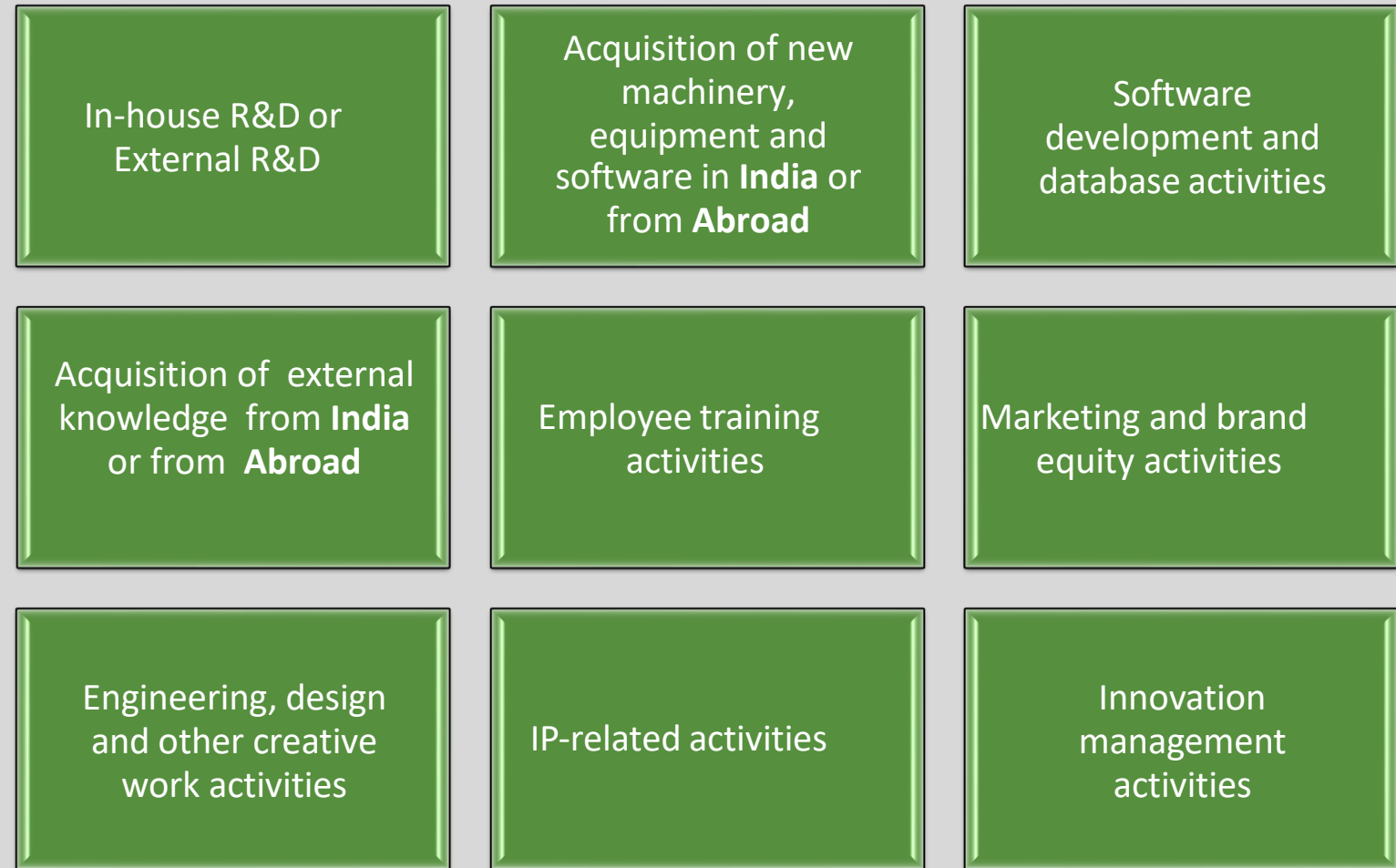
Significantly improved aftersales service activities

Customer relations, training, help desks, call centers, maintaining, and repairing products, and customer support for guarantees & warranties

New media or techniques for product promotion, advertising, branding, conducting market research, telemarketing

# How firms pursue Innovation

## How much are firms willing to spend on innovation pursuits?



# Who do firms engage for knowledge for innovations

Internal (within this firm or firm group)

Venture Capitals

Startups

Business Incubators

MNCs

Suppliers of equipment/materials/components/software

Clients or customers

Competitors or other firms

Consultants, commercial labs, or private R&D institutes

Universities or other higher education institutions

Government or public research institutes

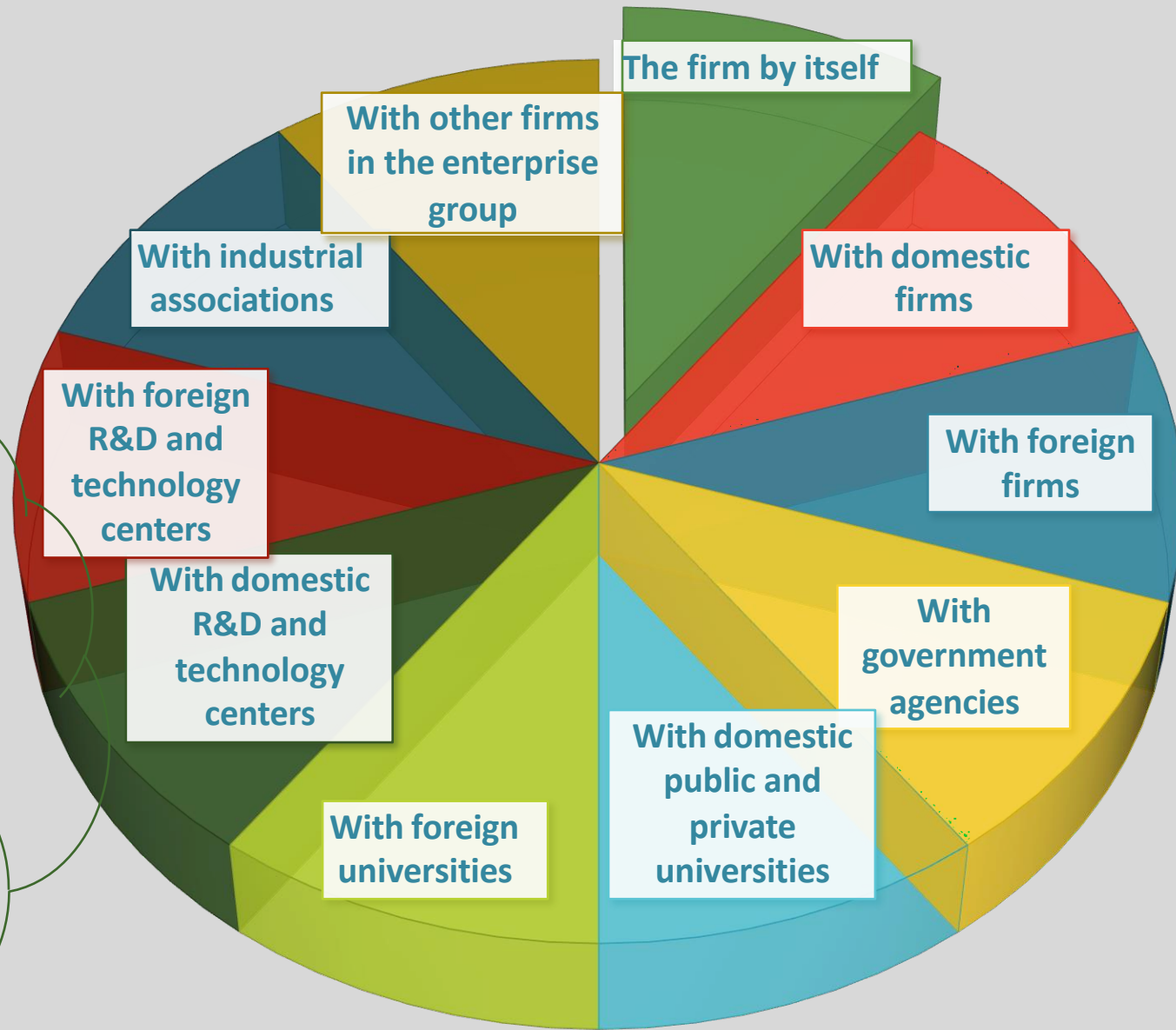
Conference, trade fairs, exhibitions

Scientific journals and trade/ technical publications

Professional and industry associations

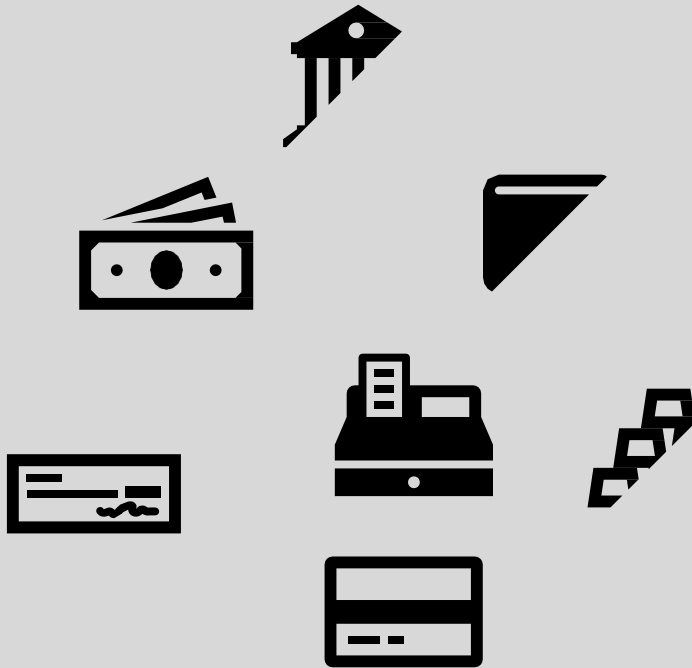


# Partners of the firms in innovation



Venture Capitals  
Startups  
Business Incubators  
MNCs  
Suppliers of equipment,  
materials, components or  
software  
Clients or customers  
Competitors  
or other firms  
Consultants,  
commercial labs, or private R&D  
institutes

# How are innovations financed



Retained earnings

Foreign commercial bank loans

Local commercial bank loans

Central Government subsidized loans

Central Government grants

Central Government subsidies

State Government subsidized loans

State Government grants

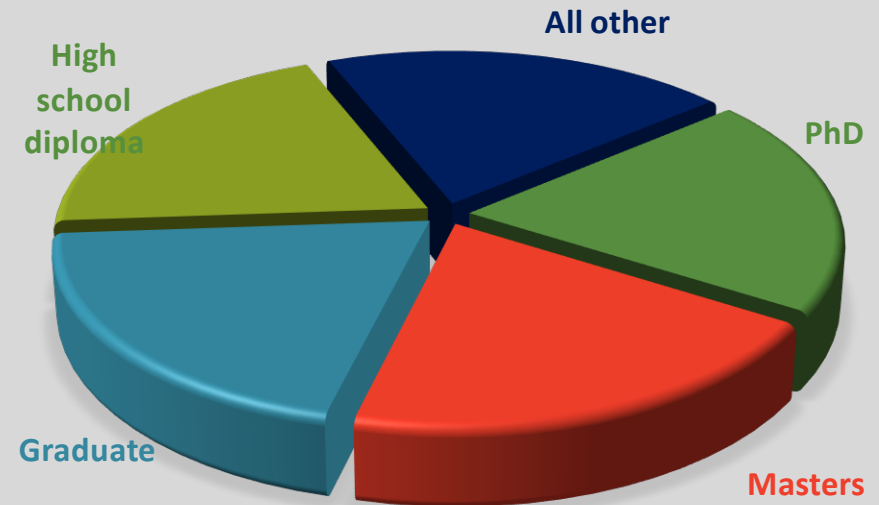
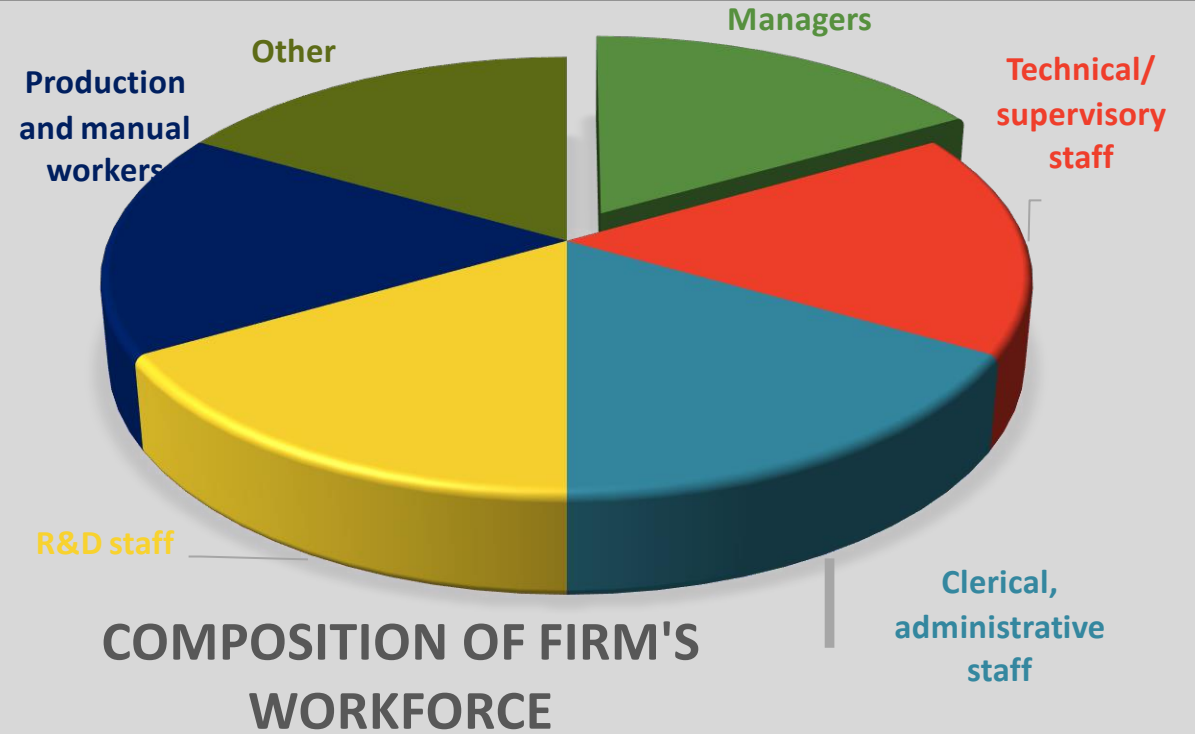
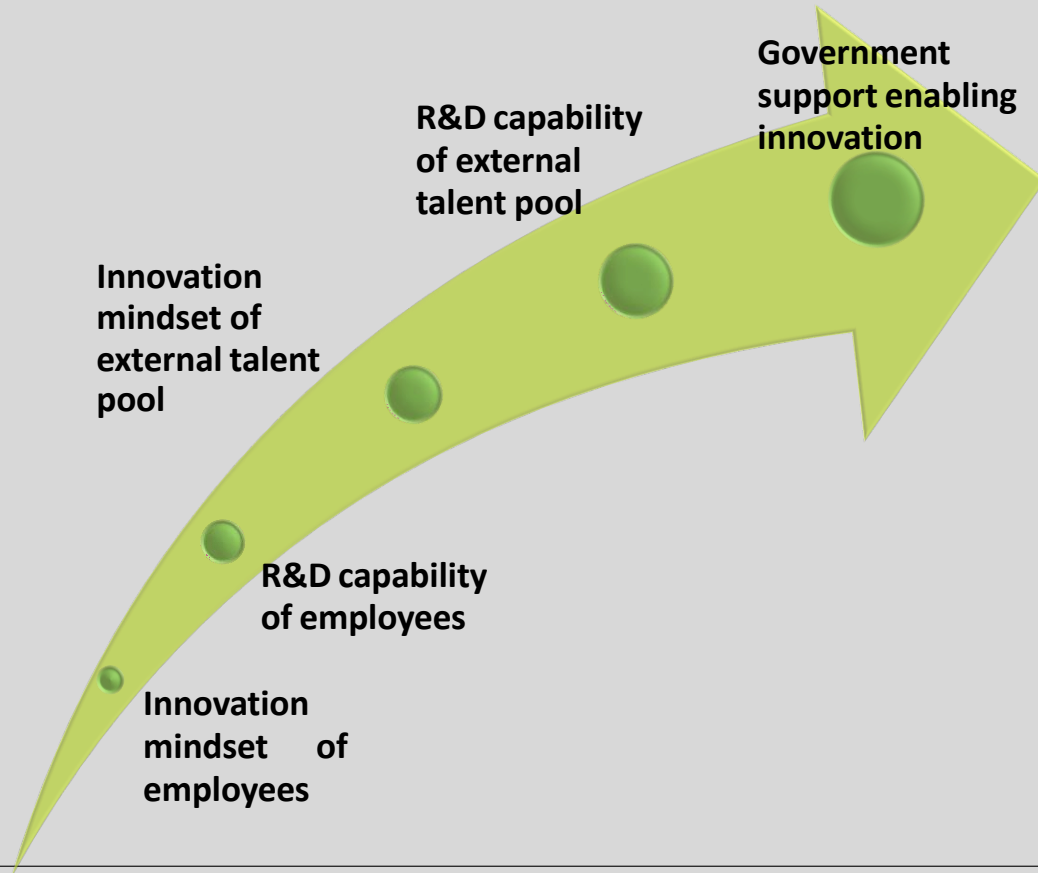
State Government subsidies

Business angel funds (individuals)

Venture capital funds (companies)

Funds from supranational and international organizations

# Skills accessible to a firm to enable innovations



# Infrastructure impacts on innovations of firms

Transport conditions

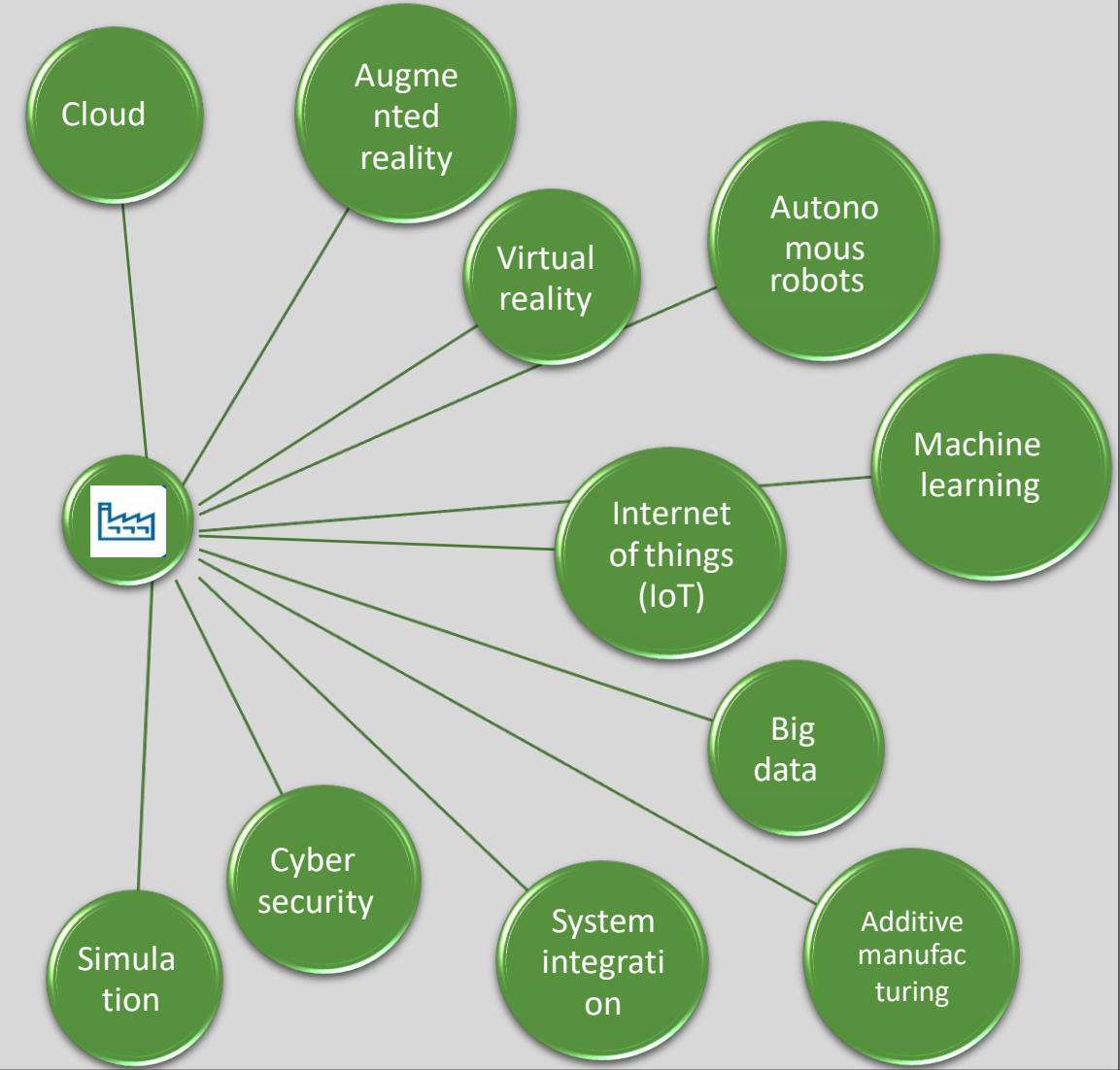
Connectivity (internet, telephone service, etc.)

Storage facilities (warehousing)

Electricity (or energy) supply

**Impact of infrastructure constraints**

## Level of adoption of ICT or Industry 4.0 in firms



# What hinders innovation activities in firms

Lack of funds within the firm or group

Lack of finance from sources outside the firm (credit)

Innovation costs too high

Excessive perceived risks

Innovation potential (R&D, design, etc.) insufficient

Lack of qualified personnel

Lack of information on technology

Lack of information on markets

Deficiencies in the availability of external services

Difficulty in finding cooperation partners

Organizational rigidities within the firm

Market dominated by established firms

Uncertain demand for innovative goods or services

Lack of infrastructure

Weakness of intellectual property rights

Legislation, regulations, standards, taxation

Low demand for innovations in the market

No need due to prior innovations by this firm

No need due to very little competition in firm's market

Lack of good ideas for innovations

# Effect of legislations or regulations on firm's innovation activities

Product safety/consumer protection rules

Operational & worker safety rules

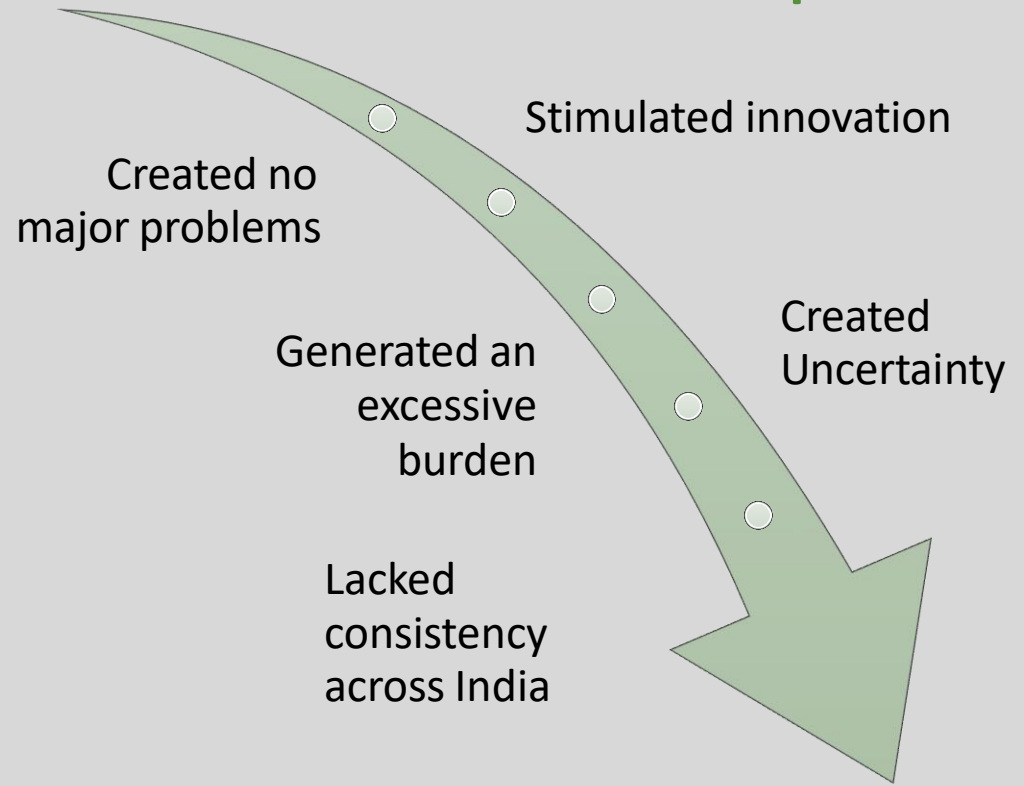
Environmental rules

Intellectual property

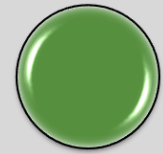
Tax (introduction of GST)

Employment or social affairs rules

## Impact of legislations or regulations on innovation pursuits



Outcome of product or service innovation in firms



**A world first**



**A first in Asia**



**A first in India**

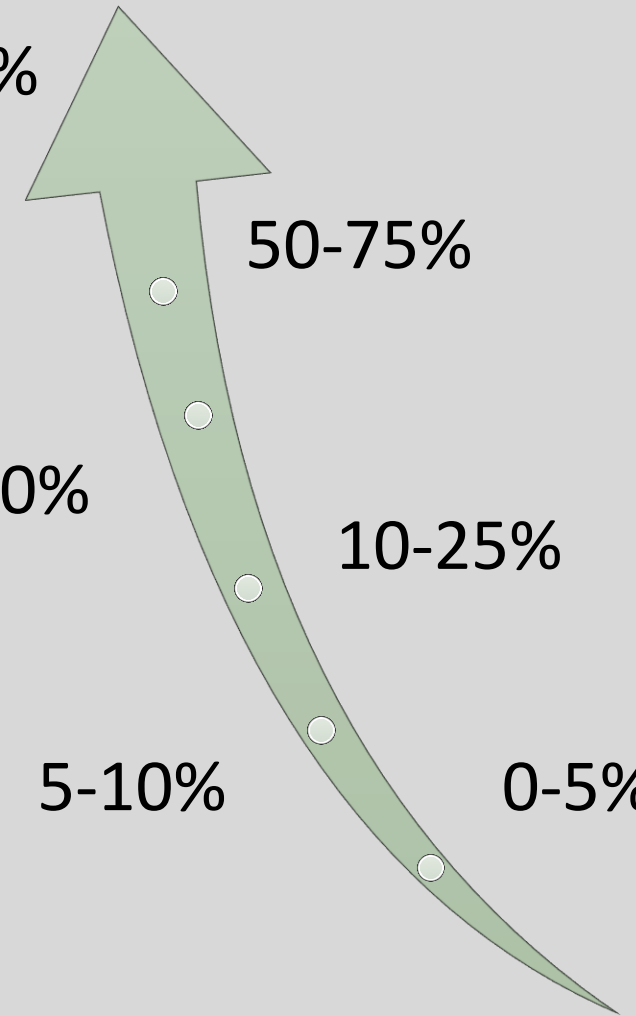


**New/ significantly improved product/service new to the market**



**New/ significantly improved product/service only new to the firm**

75-100%



Innovation impact on firm's profit margins

50-75%

25-50%

10-25%

5-10%

0-5%

Examining the  
resilience of firms  
under COVID-19  
pandemic

Entrepreneurship

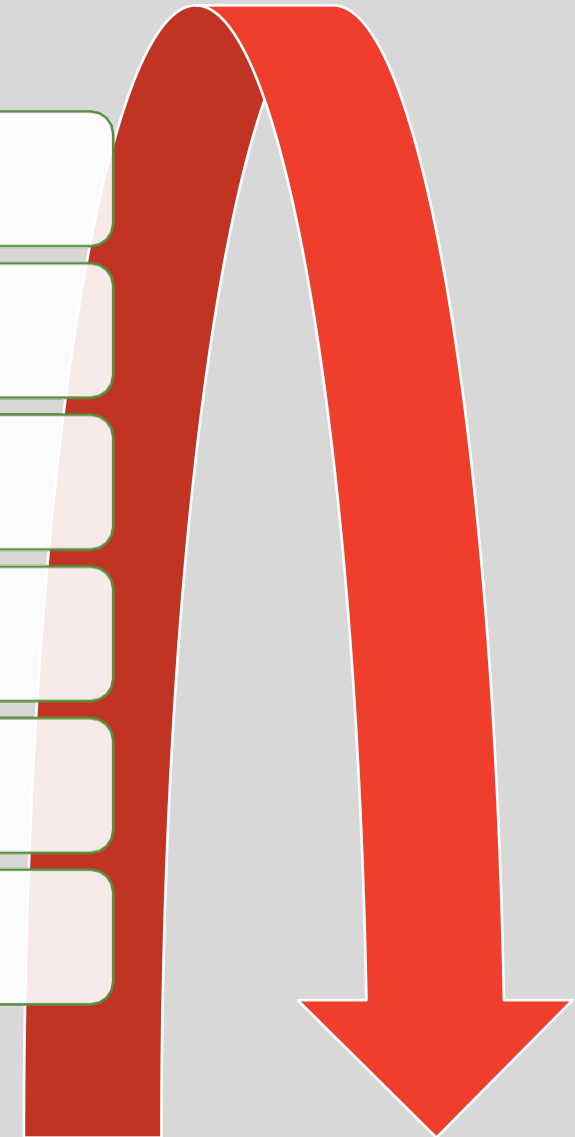
Finances

Customers

Supply chains

Operations

Manpower  
(incl. Health/Safety)







**SURVEY OF  
SECTORIAL SYSTEMS OF INNOVATION**

# Survey of the Sectorial System of Innovation (SSI)

SSI Survey measures **Systems** and **Actors** of innovation

To assess the innovation ecosystem composed of Government, Medium and High-tech industry, Knowledge-based Institutions (KBIs), Arbitrageurs, Industry Associations, Start-up Incubators and Institutions supporting technical change, the survey has prioritized 5 key sectors: Food & beverages, Textiles and apparel, Automotive, Pharmaceuticals, and ICT

## Context for Survey of Sectorial System of Innovation (SSI)

The importance of actors in the sectorial system of innovation is not evident

The linkages between the actors of the system are weak

Indian firms are not part of international networks

Relationships with knowledge-bases are traditional in nature, if any

Reliant on traditional information sources

Examining the impacts of existing policy instruments in promoting innovation

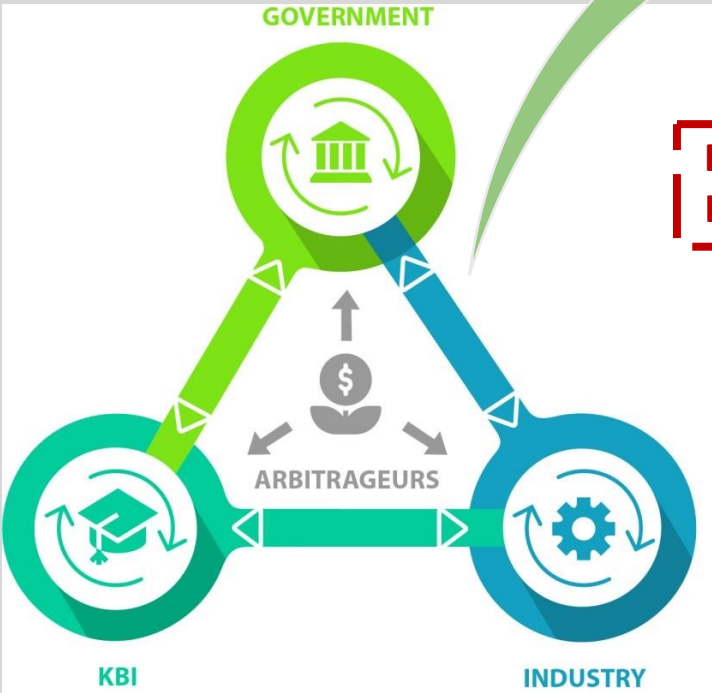
Some sectors have high barriers to innovation

Performance of the sectorial system of innovation is low

Firms are isolated from other actors of the system for innovation activities

Majority of firms are not involved in industry 4.0 related manufacturing activities

# Dynamic outputs anticipated from Systems Mapping



**BARRIERS TO INNOVATION**

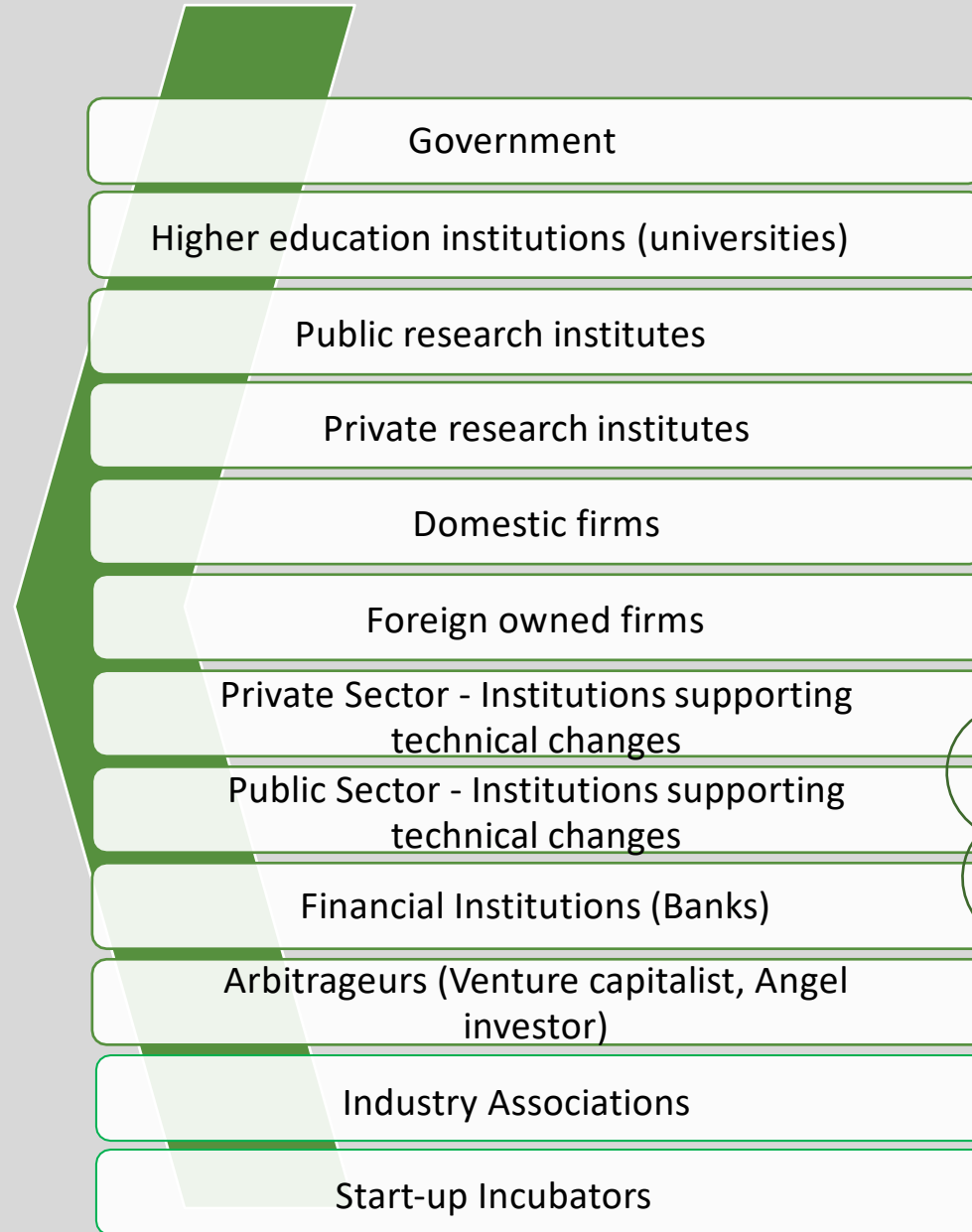
**SSI ACTOR  
INTRA- &  
INTER-LINKAGES**

- DENSITY
- DISTRIBUTION
- DIRECTIONALITY
- SYMMETRY

**Longitudinal Policy  
Monitoring & Management**

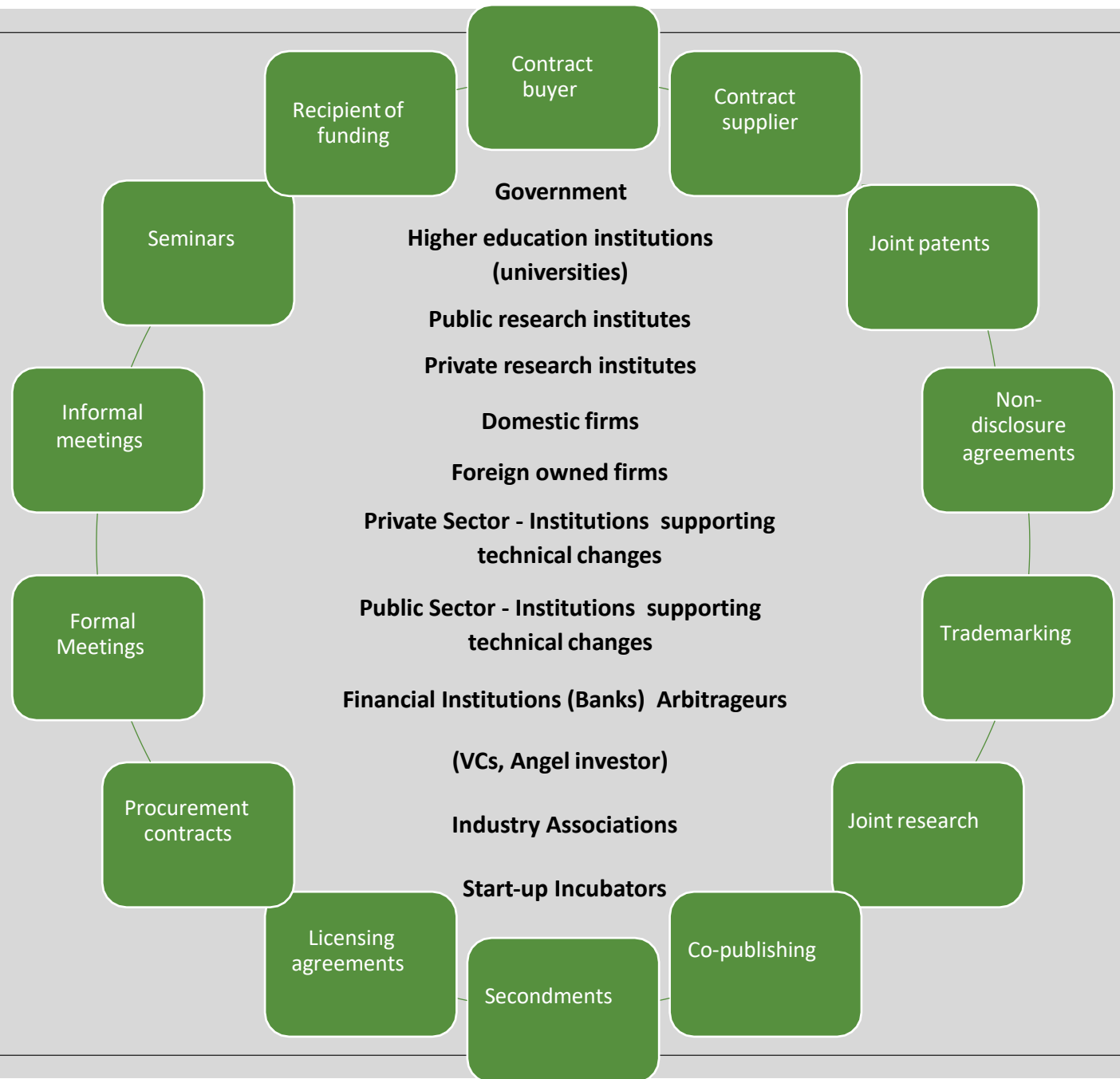
**POLICY INSTRUMENTS  
FISCAL  
MONETARY  
REGULATORY  
STANDARDS SETTING  
PERFORMANCE REQUIREMENTS**

# Understanding the relevance of Actors of the Sectorial Systems of Innovation to firms



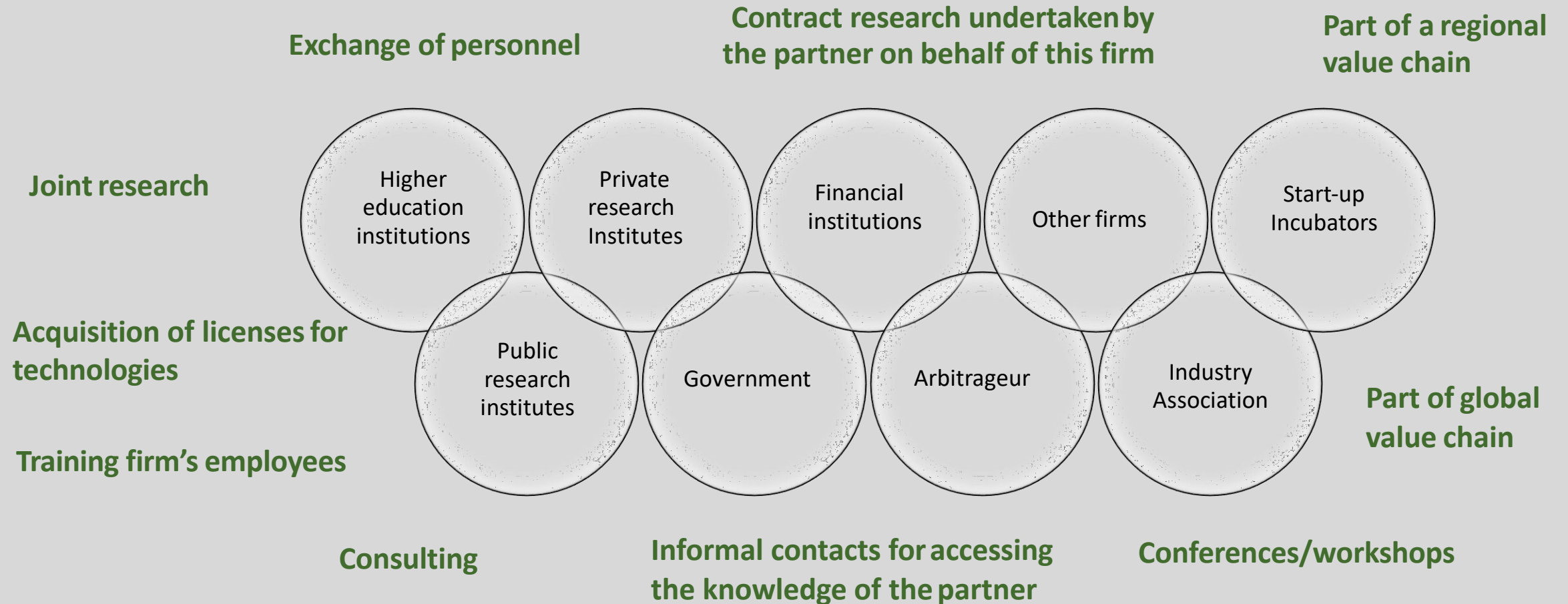
Institutions for tech change examples: Cleaner production centers; Metrology and certification; Quality Standards and Accreditation bodies)

# What kind of relationships/linkages exist between manufacturing firms and SSI Actors



# Most frequent type of collaboration with SSI

## Actors and the purpose



# Information sources for the firm's innovation activities





# Key factors that influence the cooperation of firms with the Actors of SSI

---

To use the know-how of the partner

---

Desire to forge long term business alliances Access

---

to new markets

---

Increase market share

---

To reduce the time span for development of an innovation (new products, new process, etc.)

---

Increase the turnover

---

Risk sharing

---

Cost sharing

---

Enhance reputation and image

---

Develop or gain familiarity with tools, techniques or practices To enclose

---

new and profitable market segments

# Steps taken to design and operationalize NMIS 2021

Review results of DST 2011 innovation survey

Inputs from Oslo Manual 2018 incorporated

Inclusion of  
UNIDO systems of innovation tool

National consultations for sector selection

Flash survey - cross-governmental insights

Pilot survey & review

Launch of **National Manufacturing Innovation Survey 2021** in February

## Queries

Reshmi Vasudevan

National Project Coordinator, UNIDO

[R.Vasudevan@unido.org](mailto:R.Vasudevan@unido.org)