Financing of Innovation
Part 2

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Training in the field of Innovation

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Structure of the presentation

Introduction: Why finance is key to innovation?

Module 1. The Nature and Financing of Innovative Enterprises

Module 2. Private Early-Stage Financing of Innovative Enterprises. Business Angel Financing

Module 3. Private Early-Stage Financing of Innovative Enterprises. Venture Capital Financing

Module 4. Public Policy Initiatives to Address the Early-Stage Financing Needs of Innovative Firms

Module 5. The Experiences of Different Countries in the Financing of Innovative Enterprises

Module 6. Interactive Discussion on the Topic

4. Public Policy Initiatives to Address the Early-Stage Financing Needs of Innovative Firms

Issues covered in the module

- The rationale for policy intervention: a systemic perspective
- Main types of policy interventions/instruments
- Public support programmes

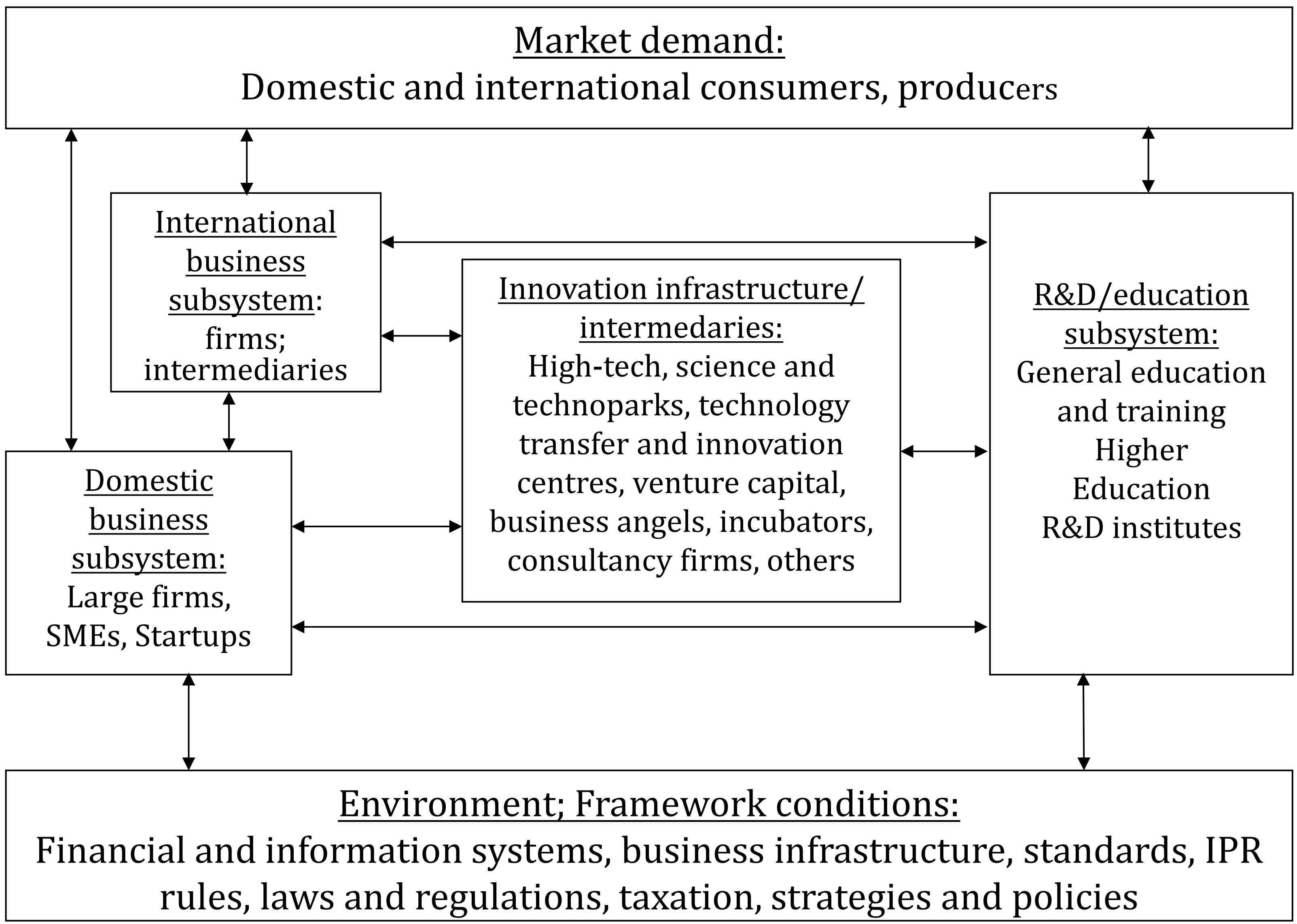
Innovation in the modern economy

- Innovation is a highly complex phenomenon
- Involves the interactions/collaboration of many “actors” (stakeholders): academic and R&D institutions, firms, public bodies, financiers, users, etc.
- Innovation is a systemic process, where all components: actors/stakeholders; linkages among them and efficiency of their interactions matter

The National Innovation System (NIS)

- **NIS:** the network of institutions in the public and private sectors whose activities and interactions initiate and diffuse new technologies and products
- **NIS agents:** knowledge institutions (universities, research institutes, technology-providing firms), firms and government bodies
- The **interactions and linkages** between the elements of the NIS are also part of the system
- The **flows of ideas and knowledge**, as well as **the ability to learn** are also part of the NIS

The NIS of a small open economy



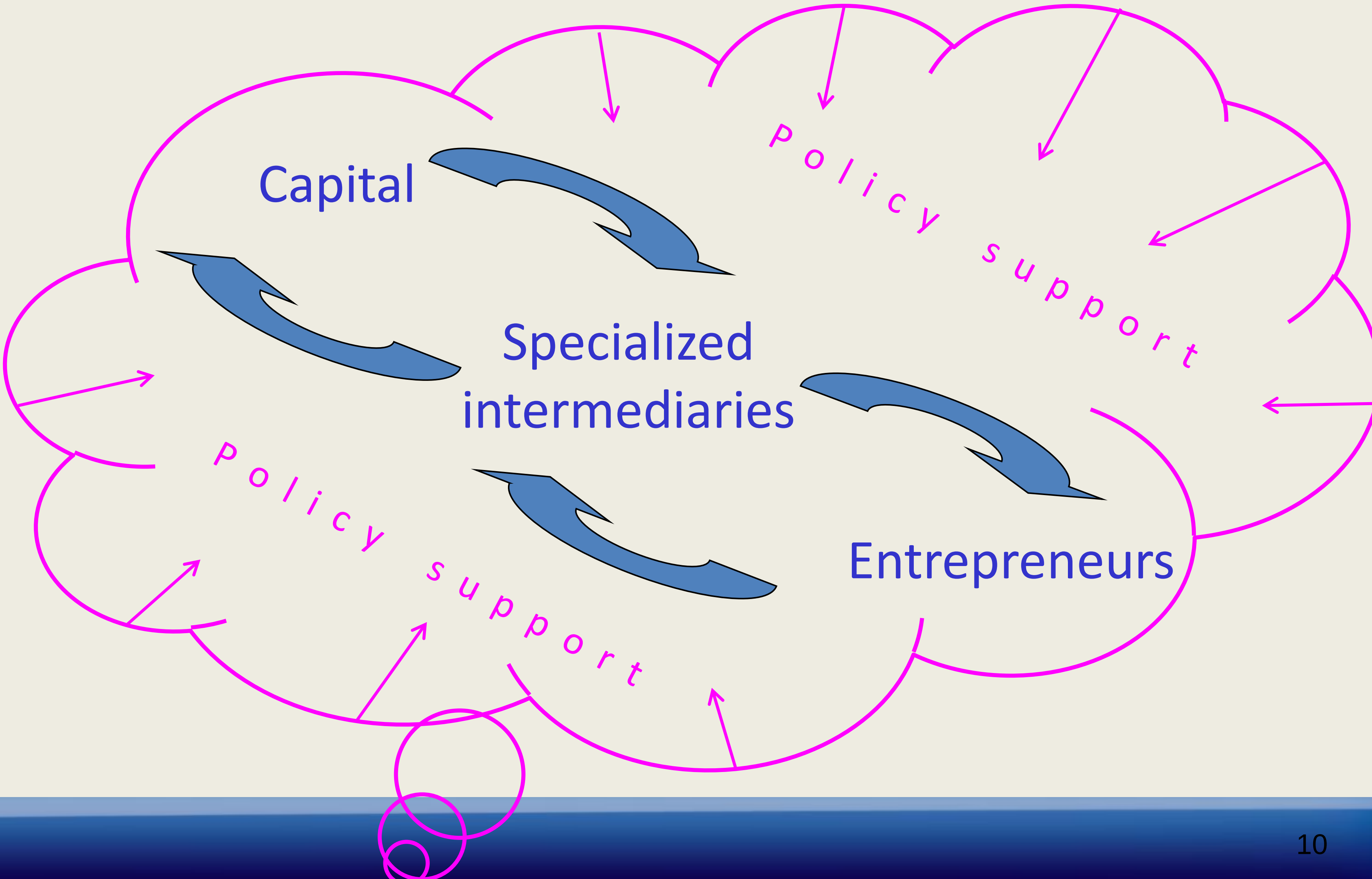
Policy targets and objectives in the NIS

Traditional policy	Systemic innovation policy
Support R&D institutions	Support specific R&D and innovation projects
Target the concrete agents of R&D and innovation (R&D institutes and firms)	• Systemic coordination of the innovation process. • Support linkages among innovation stakeholders. • Policies to bridge sources and users of innovation. • Promote collaborative models.
Direct involvement in “big science” and large-scale technological project	Catalyze/support the emergence of networks of stakeholders of large-scale innovation projects

The role of public policy

- Commercializing an innovation is a difficult process, especially for start-up entrepreneurs
- Entrepreneurs face a myriad of barriers in bringing their innovation to the market (finance, technology, management, regulatory, administrative, IPR protection)
- The main role of public policy is to establish a conducive environment for entrepreneurs to bring innovations to the market

Supportive framework conditions



The challenges of public policy

- **Probabilistic nature of success**
  - Some enterprises will succeed …
  - But it is not clear which ones
  - The ones that show promise need to be nurtured
- **Balance between screening and nurturing**
- **Operating challenges**
  - Need for diverse, properly situated agents
  - Coordination and incentives for these agents

Main types of policy interventions/instruments

Mode of intervention	Instrument	Recipient(s)
Direct funding	Feasibility grants	Potential entrepreneurs
	Public VC funds	(Potential) entrepreneurs
Indirect funding	Business development grants / loans / equity	Incubators, technology transfer offices, micro-finance institutions
	Fund-of-fund programmes	(Private) VC funds
Credit enhancements	Debt/Credit guarantees	SMEs Financial or micro-finance institutions
	Equity guarantees	Seed- or early-stage private investors
Tax incentives	Tax rebates, loss deduction, exemption or deferral of capital gains	Individual / corporate / institutional investors
Technical support	Information dissemination	Potential entrepreneurs / investors
	Training and knowledge dissemination	Potential entrepreneurs /incubators / business angels
	Business services (feasibility studies, business planning)	Potential entrepreneurs

Direct funding

- **Feasibility grants (innovation vouchers)**
  - Target potential entrepreneurs
  - Aim to identify promising ideas
- **Public VC funds**
  - Target potential or nascent entrepreneurs
  - Feasibility study, start-up process

Indirect funding

- **Business development grants, loans, equity**
  - Provided to incubators, technology transfer offices, micro-finance institutions
  - Investment functions are outsourced
- **Fund-of-fund programmes**
  - Target (private) VC funds
  - Provide legitimacy, leverage, enhanced returns

Credit enhancements

- **Debt/Credit guarantees**
  - Offered to SMEs; financial or micro-finance institutions
  - Eases up qualms about innovative enterprises
- **Equity guarantees**
  - Offered to seed or early-stage private investors
  - Improves economic viability and investment scale

Tax incentives

- **Provided to individual, corporate or institutional investors**
- **Major forms**
  - Tax rebates for investments in certain companies
  - Tax deduction for losses
  - Exemption or deferral of capital gains

Principles of designing tax incentives

General principles	• Incentives are transparent and accessible to many firms • Incentives should not change too frequently
General versus selective measures	• General measures: apply to all firms and maximize the potential increase in R&D (no market distortions) • Targeted measures: to reinforce technological leadership or build a critical mass (but risk creating distortions).
Types of regime	• Volume-based incentives: when market demand for R&D is stable • Increment-based incentives: where there is a specific policy objective to support dynamic firms
Types of relief	Allowing up to the full cost of R&D expenditure to be capitalized and depreciated over a period of time
Level of generosity	The rate should be both attractive and sustainable in the long run
Eligible R&D costs	• R&D current expenses • Certain types of R&D-related capital expenditure (e.g. equipment), at least partly deductible.

Direct funding vs. tax incentives

Criterion	Policy instrument	
	Direct funding	Tax incentives
Effectiveness in boosting business R&D	Varies depending on selection criteria, design, and capability of administrators	Generates R&D in excess of lost revenue
Ability to target industries/sectors	Good Government can establish criteria	Limited. Some targeting of SMEs
Ability to influence business R&D	Can affect collaboration, management of R&D	Limited. Can encourage increased R&D investment
Selection of projects	Government selects among industry proposals	Industry decides without intervention
Administrative costs	High, need to establish bureaucracy	Low, but hard to estimate. Enforcement costs vary
Government skills needed	Strong skills in selecting projects, managing programme	Effective, efficient tax administration
Scope of participating firms	Limited to selected firms	All R&D-performing firms, but special regimes may exist
Summary	Good for building R&D capacity in specific sectors, concentrating resources Incremental and radical innovation	Good for providing basic financial incentive/reward to business; incremental innovation

"Non-financial" policy instruments

- Instruments that do not involve direct public financial support to actions implemented by non-public bodies
- Rely on the coordinating and convening power of the state and its capacity to stimulate linkages among stakeholders
- Among the most efficient such instruments are those that promote connectivity among stakeholders
- Others efficient instrument are those that promote risk sharing among stakeholders through knowledge sharing among them
- Examples: "information brokerage" (technology forums, fairs, exhibitions); "innovation intermediaries"; knowledge services
- These are relatively "cheap" policies in terms of the claims on public resources

Technical and knowledge support

- **Information dissemination**
  - Support the diffusion of information and knowledge to potential entrepreneurs and investors
  - Close information gaps and fragmentation
- **Training/managerial skills**
  - To boost the capabilities of potential entrepreneurs and investors
  - Increases the rigor in the investment cycle
- **Business services**
  - Feasibility studies, business planning
  - Professionalization of potential entrepreneurs

Issues to address in public support programmes

- **Synergies and complementarities among programmes**
  - High-level coordination of programmes
  - Ad hoc vs. coordinated approaches
- **Learning mechanisms in policy making**
  - Learn for others' experiences
  - Understanding of goals and results
  - Proper and effective measurement and evaluation

Issues … (contd.): Public vs. private funding

- **Would financing be possible without the public programme?**
  - If yes, programme is redundant and inefficient
  - But getting the answer is not easy
- **Does the programme attract enterprises of marginal or poor quality?**
  - Would a private investor invest in these?
  - Expertise and selection criteria of decision maker

Issues (contd.): **Targeting the right recipients**

- **Is this an "innovative enterprise"?**
  - Carefully derived and tested operational definitions
  - "Novelty" can apply to a wide range of domains – product, market, process, location
- **What is a seed-stage enterprise?**
- **What is an early-stage enterprise?**
  - Age
  - Number of employees
  - Assets and revenues

Measuring programme success

- **Success is an elusive concept**
  - Survival, growth, profitability, social impact, etc.
  - Common metrics are necessary for comparisons
  - But focus on single metrics can ignore other, less tangible aspects of the enterprise
- **“Pressure” to show tangible results**
  - Could lead to too much focus on short-term metrics
  - But exclusive long-term focus begs the delicate question of whether further funding is necessary
  - Need for set milestones and staged funding

Programme evaluation

- **Key questions**
  - Have the immediate objectives been achieved?
  - What has the programme’s impact been?
- **Careful design to balance effectiveness and efficiency**
  - Incudes the duration of public intervention/support (the right exit moment - avoid a “lock-in effect”)
- **Key design and implementation issues**
  - Displacement of private funding
  - Targeting the right recipients
  - Measuring success

5. The Experiences of Different Countries in the Financing of Innovative Enterprises

Issues covered in the module

- Types of policy programmes: an overview
- Leading international experiences (US, Israel)
- European experiences (France, UK, Finland, Sweden)

The objectives of public support programmes

- **The overarching objective is to facilitate the journey from from innovative ideas to the market**
- **Specific objectives may include:**
  - Closing the equity gap for startups and SMEs,
  - Facilitating SMEs access to finance (both equity and debt)
  - Support to the commercialization of research
  - Encouraging linkages and connectivity among NIS stakeholders
  - Enhanced provision of innovation support services.

Summary of programmes operated by country

Type of measure	CA	US	EU	AT	BE	DK	FI	FR	DE	GR	IE	IT	NL	PT	ES	SE	UK	BG	CZ	EE	HU	LT	LV	PL	RO	SK	SI	IL	NO	CH	BL	KZ	RU
Direct funding																																	
Investments through government VC funds	√				√	√	√			√				√	√	√										√			√				
Investments through other government agencies																																	
Feasibility studies and other seed-stage activities		√		√	√		√		√	√			√	√	√	√	√			√	√												√
Innovative SMEs		√		√			√					√			√			√	√		√		√	√			√					√	
Co-investments with private investors in innovative SMEs		√					√	√	√					√			√											√			√		
Indirect funding																																	
Investments in privately managed VC funds	√	√	√			√	√	√	√	√	√				√		√						√	√				√	√			√	√
Financing of incubators and other early-stage intermediaries	√					√		√			√	√			√	√	√			√	√				√		√	√	√			√	
Guarantees and incentives																																	
Debt guarantees for investments in innovative SMEs			√	√				√					√	√			√	√	√				√										
Equity guarantees for investments in innovative SMEs				√		√		√				√	√	√																			
Tax incentives for financing innovative SMEs		√			√			√		√	√						√																
Tax incentives for investments in VC funds	√	√			√			√									√													√			

Types of early stage support programs

Type of programme	Description	Example
Public fund	100% publicly owned funds focused on pre-seed and/or seed stages	Twinning Growth Fund and Biopartner (The Netherlands)
Public/private equity fund	Fund in which government and private sector co-invest with same focus as previous	University Challenge Funds (UK); Technologiebeteilungesellschaft (Germany)
US (SBIC)-type of refinance schemes	Schemes which leverage the deals made by adding public money to the private investment	Arkimedes (Belgium); SBIC (USA); Kreditanstalt für Wiederaufbau (Germany)
Guarantee schemes	Insurance schemes in which the government guarantees part of the VC money in case of bankruptcy	Various, in each country
Fiscal incentives	Tax reduction schemes on value added or income tax deduction	Aunt Agaath Scheme (Nl); Banque de Développement des PMEs (France); Trust Capital Funds (UK)
Incubation scheme	Scheme which pays salaries of coaches, offers facilities and/or which offers network opportunities	National Incubator Programme (Sweden); DIILI Programme (Finland); Innovationsmiljoer (Denmark); Exist (Germany); Les Incubateurs Publiques (France)

Leading international experiences: USA

- **The SBIC (Small Business Investment Companies) Programme**
  - Small Business Act (late 1950s)
  - The lunch of The Small Business Investment Company programme (1958)
  - Establishment of Small Business Investment Companies (SBIC), designed to increase the availability of funds to new ventures
  - Still in existence, after several reorganizations

USA: the SBIC Pgm

Regulation	Definition
SBICs must only invest in Small Businesses	Small Businesses are defined as businesses with tangible net worth of less than $18 million AND an average of $6 million in net income over the previous two years at the time of investment.
SBICs must invest 25% of their capital in Smaller Businesses	Smaller Businesses are defined as businesses with tangible net worth of less than $6 million AND an average of $2 million in net income over the previous two years at the time of investment.

USA: the SBIC Pgm (contd.)

- **Small Business Loans:**
  - General Small Business Loans
  - Microloan Program
  - Real Estate & Equipment Loans
  - others
- **The Small Business Technology Transfer (STTR)**
  - Supports public/private research partnerships for the commercialization of new technologies
- **Grants**
  - Small Business Innovation Research (SBIR), launched in 1982 (The Small Business Innovation Development Act)

USA: Small Business Innovation Research (SBIR)

- The **SBIR Program** enables SMEs to explore their technological potential and provides incentive to profit from its commercialization.
- The most significant public support programme in the US: accounts for some 60% of the public funds in support of SME
- The most successful US public support programme: evaluations consistently confirm that the survival and growth rates of SBIR recipients exceed those of non-recipients.

The SBIR Programme is structured in three phases

- **Phase I.** To establish the technical merit, feasibility, and commercial potential of the proposed R&D efforts. Phase I awards grants ≤ $150,000 for 6 months.
- **Phase II**. To continue the R&D efforts initiated in Phase I. Funding is based on the results achieved in Phase I, the S&T merit and commercial potential of the project. Phase II awards grants ≤ $1,000,000 for 2 years.
- (Phase III. Where appropriate, to pursue commercialization objectives resulting from the Phase I/II R&D activities. Not funded by SBIR but success in Phase I/II give good chances to raise funding from other sources)

Other US policy initiatives

- **The Advanced Technology Programme (ATP):**
  - established in 1988 to support the development of early-stage, innovative technologies by funding high-risk R&D performed by public-private partnerships
- **California Technology Investment Partnership (CalTIP)**
  - provides grants of up to $250,000 to technology companies that receive competitive federal grants
- **The Massachusetts Technology Development Corporation (MTDC)**
  - The oldest state managed VC fund (1978)
  - targets early-stage and mezzanine investments, typically in the $250,000 - $500,000 range
  - funds provided by MTDC are matched by private funds

Leading international experiences: Israel

- **The YOZMA programme:**
  - Launched in 1992 with the objective of creating a competitive VC industry
  - A $100 mn government VC fund, which were invested
    a) in private VC funds ($80 mn in "Yozma" funds) and
    b) directly in high-tech companies ($20 mn)
  - Established ten drop-down funds, each capitalized with more than $20 mn
  - Each Yozma fund had to engage one international financial institution and one domestic institution ($100 mn of government capital matched with $150 mn of private capital)
  - Continuous growth of the programme itself: a second wave of funds attracted pension funds and other institutional investors.

Israel (contd.)

- **The YOZMA programme (contd.):**
  - The $250 mn was invested in over 200 start-up companies
  - The drop down funds had a call (buy-out) option on the government shares for up to five years – could continue to be engaged in the growth phase of these companies
  - Made direct investments in about 50 portfolio companies.
  - Helped a number of its portfolio companies go public on stock exchanges in the US and Europe.
  - Was instrumental in positioning its portfolio companies for acquisition or an investment by leading corporations (incl. America On Line, Cisco, General Instruments, Johnson & Johnson, Microsoft, etc.)

Israel (contd.)

- **The MAGNET programme:**
  - Sponsors innovative industry-oriented technologies to strengthen the country's technological expertise and enhance competitiveness
  - Funding is conditional on industry-science collaboration: partners must form a consortium including partner(s) from industry and academia
  - The industrial partners enjoy a grant amounting up to 2/3 of the approved R&D costs; the academic partner can receive a grant of up to 90% of such costs

Israel (contd.)

- **The Global Enterprise R&D Cooperation Framework:**
  - Objective: to encourage industrial R&D cooperation between Israeli firms and MNCs
  - Joint projects between MNCs and Israeli companies are entitled to financial assistance of up to 50 per cent of the Israeli company's approved R&D expenses
  - Direct investment made by MNCs in R&D projects of Israeli companies can be credited (for tax purposes in Israel), with 150% of the value of such investment

European experiences: France

- **The OSEO-Garantie Programme**
  - The oldest loan guarantee scheme for SMEs
  - Provides a guarantee to entrepreneurs who do not have easy access to the banking system
  - Also provides guarantees to VC funds investing in innovative SMEs in exchange for a share of the fund profits
  - Since 1982 has provided €4.2 bn in guarantees
- **The Mutual Funds for Innovation (FCPI) programme**
  - Provide tax incentives (income tax reduction of 25% of the invested amount) to individual investors investing in funds targeting innovative private SMEs

France (contd.)

- **The Regional Incubator Structures programme**
  - Supports cooperation between public research bodies and enterprises to encourage creation of technology-based firms
  - Selected incubators have to include partnerships between universities and/or public research organizations
  - Public grants cover 50% of the incubation expenses, linked to the number of supported projects
- **The Seed Capital Funds measure**
  - Assists funds that invest in innovating companies
  - The support constitutes an advance of capital to the funds reimbursable in a time span of 12 years
  - 8 national seed-capital funds and 10 regional seed-capital funds manage some €300 mn, supporting >200 companies

France (contd.)

- **The Fund for the Promotion of Venture Capital (FPCR-2000): fund of funds**
  - Takes minority shares in private venture capital funds investing in innovating companies <7 years old
  - These funds must invest >50% of their capital in French companies and >75% in European countries

- **The Co-Investment Funds for Young Enterprises**
  - Takes minority participations in the young technological enterprises (<7 years old) together with other investment funds established in EU countries

European experiences: United Kingdom

- **Guarantee and tax schemes**
  - Small Firms Loan Guarantee Scheme:
    - A guarantee covering 75% of the loan amount; the borrower pays a 2% premium on the outstanding balance of the loan.
    - Guarantees loans of up to £250,000 up to ten years maturity
    - Available to businesses that are up to five years old and with an annual turnover of up to £5.6 million.
  - Enterprise Investment Scheme (EIS): income and capital gain tax reliefs for early stage investors
    - Income tax rebate equal to 20% of investments up to £400,000.
    - Exemption from capital gains tax on angel investments
    - Income tax relief of 40% on failed investments
    - Deferral of tax on capital gains if reinvested in EIS companies

United Kingdom (contd.)

- **Direct VC funding**
  - University Challenge Seed Funds
    - Objective: to provide access to seed funding and facilitate the transformation of research ideas
  - The Enterprise Fund initiative
    - Objective: to stimulate the availability of finance for small firms as well as foster regional development via 2 pgms:
    - UK High Technology Fund: fund of funds which invests in VC funds targeting the early stage high technology SME sector
    - The Regional Venture Capital Funds programme: a network a of regional VC funds, raising additional private investment
  - The Community Development Venture Fund
    - Objective: to increase private investment in enterprises in disadvantaged communities
  - … and many others

European experiences: Finland

- Overall coordination by the Finnish Funding Agency for Innovation (**TEKES**)
- Provides innovation funding for:
  - companies,
  - research organisations
  - public sector service providers
- The main target group consists of SMEs seeking growth in internationalisation.

Finland: select current TEKES programmes

- 5th Gear 2014–2019 (wireless data communications)
- BEAM – Business with impact 2015–2019 (dev-ping countries)
- EVE – Electric Vehicle Systems 2011–2015
- Feelings – Intangible value creation and experienced value 2012–2018 (social innovation)
- Green Growth – Towards a Sustainable Future 2011–2015 (energy efficiency, green growth.
- Industrial Internet – Business Revolution 2014–2019
- Innovations in Social and Healthcare Services 2008–2015
- Innovative Cities 2014–2020
- Liideri – Business, Productivity and Joy at Work 2012–2018

Finland: other public support institutions

- **Tekes Venture Capital**
  - Invests in venture capital funds, which invest in the early stages of development of Finnish companies
  - Partner in 17 domestic and 27 international venture capital funds
- **SITRA (Finnish Innovation Fund)**: runs a **PreSeed Finance Pgm**
  - Invests in domestic early stage companies mainly through venture capital funds.
  - Partner in 17 domestic and 27 international venture capital funds
- **Finnvera** (specialised financing company):
  - Direct investments in early-stage enterprises through Seed Fund Vera Ltd

European experiences: Sweden

- Overall coordination by the VINNOVA, Sweden's innovation agency
- Mission: to promote sustainable growth by improving the conditions for innovation, as well as to fund needs-driven research.
- Manages programmes for strengthening Sweden’s innovativeness

Sweden: VINNOVA programmes

- Programmes in “strategically important knowledge areas”:
  - Health and Healthcare
  - Transportation and Environment
  - Services and ICT
  - Manufacturing and Working Life
- Programmes fostering innovativeness of specific target groups:
  - Innovation Capacity in the Public Sector
  - Innovative Small and Medium-sized Enterprises
  - The Knowledge Triangle
  - Individuals and Innovation Milieus

FURTHER READING ON FINANCING INNOVATION

- *Financing Innovative Development: Comparative Review of the Experiences of UNECE Countries in Early-Stage Financing* (available at www.unece.org)
- *Policy Options and Instruments for Financing Innovation: A Practical Guide to Early Stage Financing* (available at www.unece.org)
- *A Guide to Financing Innovation* (available at www.biochem-project.eu)
- *European Private Equity Activity*, various years (available at www.evca.eu)
- *Evaluation of EU Member State Business Angel Markets and Policies* (available ate ec.europa.eu)

THANK YOU!

Thank you!

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