# THE WORLD BANK EXPERIENCE ON RESEARCH & INNOVATION IN THE WESTERN BALKANS

Paulo Correa
Practice Manager

Financial Instruments Supporting Innovation Workshop

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- The World Bank portfolio on research, innovation and technology in the Western Balkans: few lessons
- The Western Balkans R&D Strategy
  - Knowledge Transfer in the Western Balkans
- Investment Readiness Program: pilot instrument for facilitating knowledge transfer

#### THE WORLD BANK PORTFOLIO IN THE WESTERN BALKANS ON R&I

- Long and diversified experience in the Western Balkans in the area of research and innovation: Croatia and Serbia (institutional reforms of science sector; technology transfer; financing innovation); Montenegro (technology transfer) and Macedonia (firm innovation and technology adoption).
- Different instruments and funding: Croatia and Montenegro (World Bank Loans); Serbia (World Bank Loan and EU TF plus); Macedonia (TF multiple donors).
- **Some results (STP I, Croatia)**: 69 new research contracts with industry (EUR 10.9 million. Establishment of 5 TTOs. 3 spinoffs (EUR 2.0 million plus). 12 licensing agreements, including with the Massachusetts Institute of Technology and Brown University, reaching about EUR 800,000.
- LESSONS: TECHNOLOGY TRANSFER REQUIRES MORE THAN FINANCE Broader Reforms; Holistic Approach
  - Research excellence
  - Better definition of IP rights and IP management capacity
  - Different regime for TTOs (not standard public sector organizations)
  - Simplification of rules for collaboration science-industry and getting the incentives rights for the behavior of key agents (researchers, TTO officers etc)
  - Bridging the 'value of death" for PoC, Prototype and early stage/VC funding.

Part II

# THE WESTERN BALKANS R&D STRATEGY FOR INNOVATION

# THE WESTERN BALKANS R&D STRATEGY FOR INNOVATION – SUMMARY OF TECHNICAL ASSISTANCE

# 18 Months Fact-Based EU funded Consensus Building Exercise

# 4 High Level Workshops with

representatives from governments, research institutes, universities and private sector from all beneficiary entities, as well as international experts



**7** Policy Reviews of

**Reviews** of key institutions,

policies and programs:

Country Papers

**3** Technical Studies (The State of Scientific

Performance of the WBCs; Survey of the status of research Infrastructure and technology transfer activities; and Assessment of Data Availability on Research and Innovation) and 5 technical notes 100+ people involved – representatives of university, research institutes, private sector, government from each country

12 Visits to

the region

Outreach exercise and broader consensus building between 12/2011 and 8/2013 Website:

http://www.world bank.org/en/even ts/2013/10/24/bal kans-innovationevent

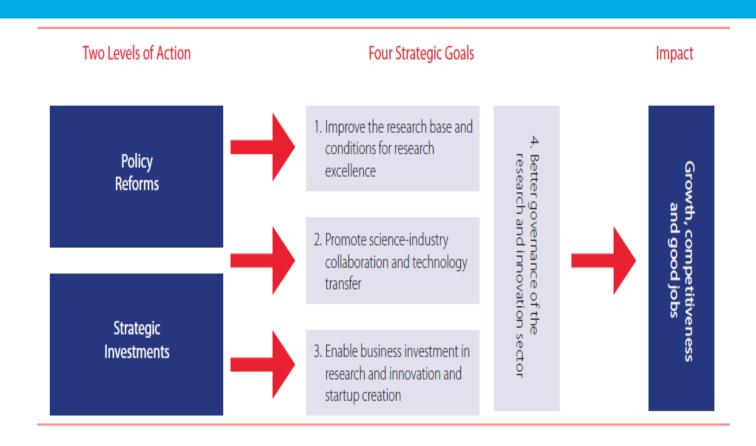
Video: Research for Innovation: The moment for action

# THE WESTERN BALKANS R&D STRATEGY FOR INNOVATION: POLICY REFORMS AND SELECTED INVESTMENTS

The **Strategy** represents a set of **policy and institutional reforms**, and **selected join (regional) investments** to increase the impact of R&D investments and innovation. A **common view** on how to jointly address the challenges of the research and innovation sector in the region.

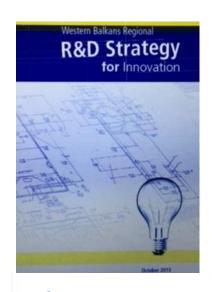
- The document proposes to invest more and better in the research and innovation sector thereby helping to promote knowledge-based economies that will generate higher-value-added jobs and stronger growth.
- Countries intended to mobilize additional resources from public and private sources, to reach an average of 1.5% of GDP on Gross R&D expenditures at the regional level by 2020.

On October 25, 2013, the ministers responsible for science and education in seven Western Balkans countries - Albania, Bosnia and Herzegovina, Croatia, Kosovo\* Former Yugoslav Republic of Macedonia, Montenegro, and Serbia - signed a declaration endorsing the *Strategy*.



The regional strategy complements and strengthens national strategies, policies and programs. It informs the research and innovation pillar for the South Eastern Europe 2020 Strategy and aims to leverage other innovation- relted initiatives such as the Enterprise Development and Innovation Facility (EDIF).

# THE WESTERN BALKANS R&D STRATEGY FOR INNOVATION: POLICY AND **INSTITUTIONAL REFORMS**





#### STRATEGIC CONTEXT

#### THE REFORM PROGRAM

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Improve the Research Sone and Conditions for Basearch Excellence

Direction park has disorder, the Princest Ballions report sales of a second of the state believe by the finished of the backgrown TABLE 1: A Framework for Coordinated Policy Action: The Western Balkans Regional R&D for Innovation Strategy

#### **Key Policy Reforms and Strategic Investments** Strategic Goal/ Metrics **Short-Term Outputs Long-Term Outputs** 1. Improve the research base and conditions for research excellence Metrics: Citations and citation impact; copublications within the region and with external partners; share of young researchers employed; participation in Horizon 2020. 1.1 Slowing down brain drain · Promote the collaboration of local scien-· Eliminate any bias against young researchers that and supporting "brain tists and the scientific diaspora (with full may exist in the research system in comparison to EU gain"; investing in human return of scientists as an open possibility member countries (for example, in career opportunicapital rather than a target). · Advance the reforms to promote mobil-Consider implementing policies to promote young, ity of researchers within the region and talented scientists, the scientific diaspora, and "starbetween the region and foreign countries (brain circulation). Continue enhancing participation in tertiary educa- Continue investing in the qualifications of scientists and researchers (capacity build-Encourage collaboration within the ERA, especially ing, especially in those countries in earlier Horizon 2020. stages of development). 1.2 Improving access to mod-Enable the common use of large research Prepare and systematically update "infrastructure ern research facilities and facilities, optimizing the use of available roadmaps" to increase selectivity in aligning investavailability of research equipment. ments with the priorities of the national research and funding Deepen coordination among research innovation strategies. organizations for better planning of invest-Gradually increase the amount of public funds availments in research infrastructure (avoiding able for research and innovation. duplication of public investments in expen-Consider earmarking funds for research. sive equipment). · Mobilize funding outside the region for research and innovation 1.3 Reforming the incentive Progressively reduce the use of cost-based Improve career selection through clear, transparent, regime for researchers' noncompetitive funds for research instiand merit-based recruitment policies as illustrated by performance tutes and increase the use of competitive the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. funds Review career development rules and remuneration policy, emphasizing transparency and academic performance, including by encouraging research with a high impact factor

(continued on next page)

ACTION PLAN FOR REGIONAL COOPERATION

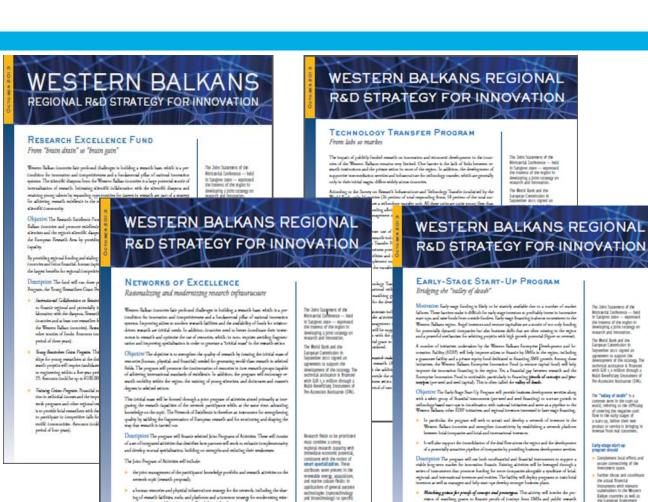
### THE WESTERN BALKANS R&D STRATEGY FOR INNOVATION: SELECTED INVESTMENTS (ACTION PLAN)

The Action Plan: Four Programs. The Action Plan describes the joint investments to be undertaken by the beneficiary countries in the following areas

- a research excellence (young researcher/international collaboration) fund program;
- a networks of excellence program;
- a technology transfer program; and
- an early-stage start-up program.

proposes the creation of the *Western* Innovation Strategy Exercise (WISE) Facility - a nonprofit organization that will support systematic capacity building, learning and policy improvement in the region.

All the initiatives are accompanied by concept notes describing the governance structure of the programs, proposed operational procedures, eligibility criteria; as well as of expected outcomes, outputs and costs.



and blook/trology) to specific fields of economic activity (such an agriculture and health(r and

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Part 3

# WESTERN BALKANS VC ACTIVITY/INVESTMENT READINESS PROJECT

#### WESTERN BALKANS VC ACTIVITY/INVESTMENT READINESS PROJECT

**Objective:** help beneficiary countries to develop their venture capital industry and facilitate startups' access to capital.

### Addresses both sides of the problem:

#### **DEMAND-SIDE**

**Venture Capital Activities** 

Provide an assessment of the ecosystem for venture capital activities and contribute to its improvement through policy advice and support to institutional and policy reforms

Albania, Croatia, Macedonia, Serbia

#### **SUPPLY-SIDE**

**Investment Readiness Pilot** 

Increase the investment readiness of entrepreneurs in the region by assisting with the design and implementation of a pilot program for mentoring/nurturing the transformation of entrepreneurial ideas into business propositions

Croatia, Kosovo, Macedonia, Montenegro, Serbia



#### INVESTMENT READINESS PILOT: EXPERIMENT DESIGN

- Technology transfer instrument with measureable impact
- Five-country randomized experiment in Croatia, Kosovo, Macedonia, Montenegro and Serbia to test the effectiveness of the program.
- A sample of 346 innovative SMEs was randomly divided into two groups:
  - Treatment group: received a high-cost and intensive program, and a
  - Control group: received access to an inexpensive online-only basic investment readiness course.
- A group of 66 independent judges was used to do the scoring. Judges were blind to treatment status, and were not provided with any information about the company in advance of scoring.
- Panels of five judges were assigned to judge a session of 6 firms (3 treatment, 3 control) at a time, then rotated.

#### Firms were scored on 6 factors (weighted):

**Team:** the skills and capabilities of the entrepreneur and his or her team

**Technology:** the degree of innovativeness and technological advancement

**Traction:** indications of measureable market success

**Market:** commercial market attractiveness and size of the potential market

Recent business progress: the amount of progress firms have made during the last three months (time elapsed since initial application)

#### **Presentation performance**



# PILOT PROGRAM IMPACT: DISTRIBUTION OF TREATMENT VS CONTROL

Figure 1a: Baseline Distributions of Investment Readiness for Treatment and Control Groups

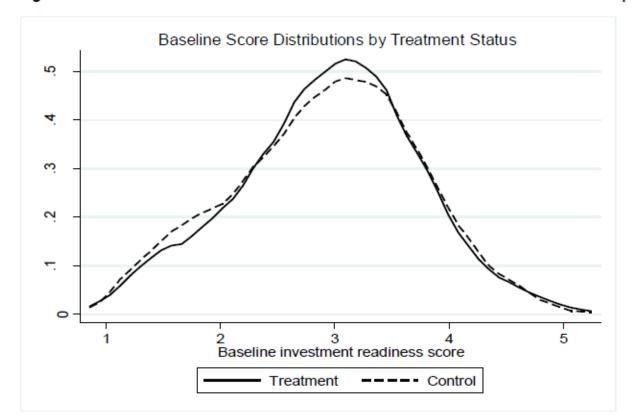
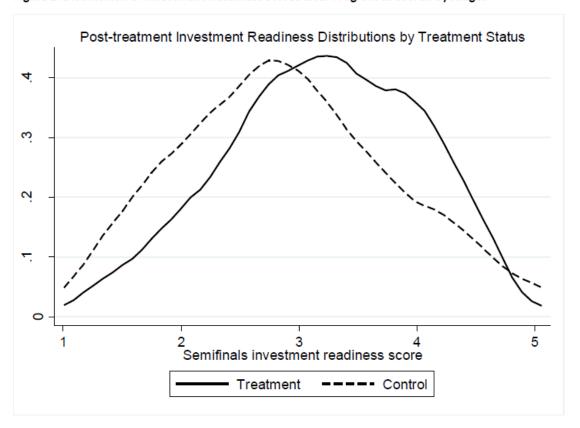


Figure 2: Distribution of Investment Readiness Scores after Program as Scored by Judges









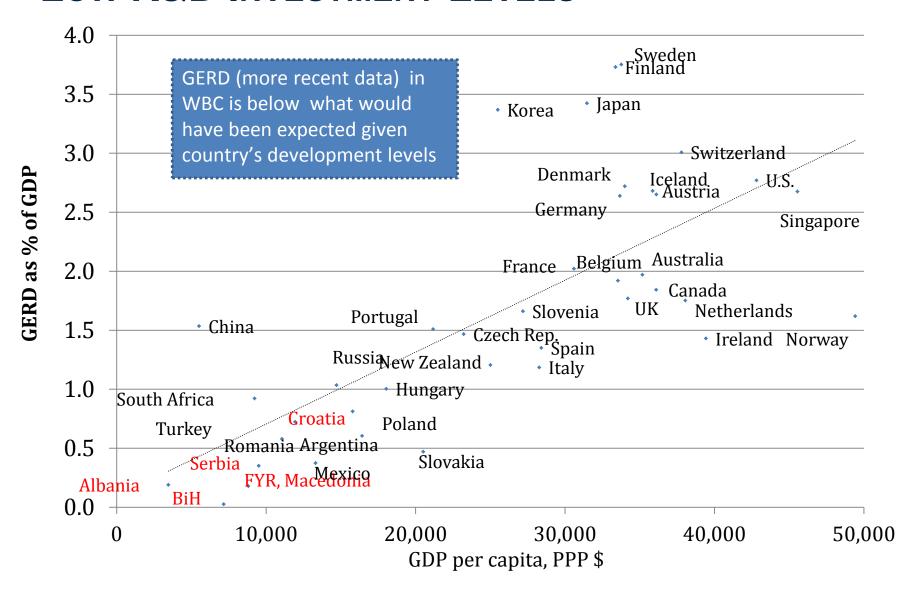
Thank you!

### **ANNEX**

# THE VALUE OF REGIONAL COOPERATION

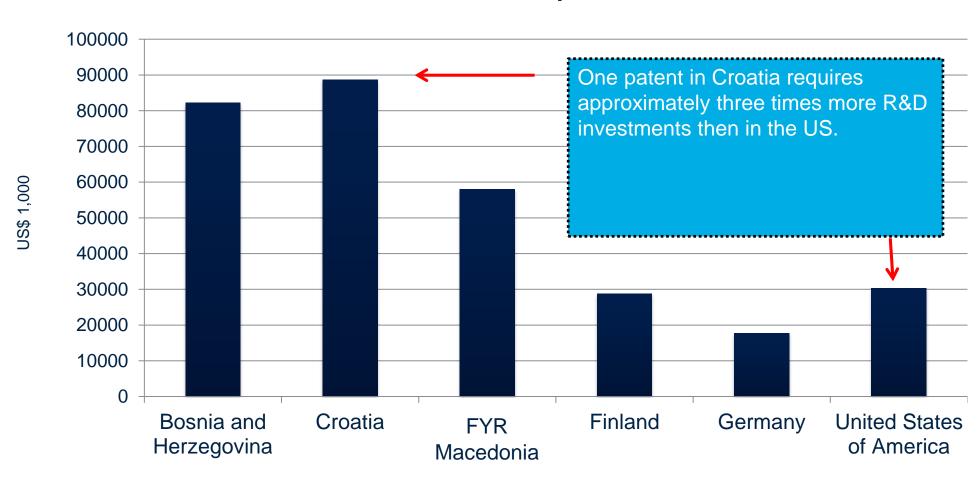
- **STABILITY** of programs and policies (including predictability of funding);
- MERITOCRACY (as the rule of the game for the research community);
- SCALE (avoiding duplication and reaching appropriate critical mass in key sectors)
- GOVERNANCE and results orientation; cost reduction by rationalizing the usage of resources
- POSITIVE PEER PRESSURE, helping the development of country reforms

# Low R&D Investment Levels



# COSTLY RESULTS OF R&D INVESTMENTS

#### **GERD/ Total Triadic patents**



# RESEARCH COMMERCIALIZATION AND INDUSTRY SCIENCE COLLABORATION: POLICY REFORMS

Intermediate Goals	PROPOSED ACTIONS	Measurement
Build expertise and infrastructure for Intellectual Property Rights (IPR) management  Promote higher levels of industry-science collaboration	Reform of IPRs legal Framework for publicly-funded research  Employment and Higher Education Laws encourage commercialization and collaboration with industry  INVESTMENT TECHNOLOGY TRANSFER OFFICES: provide assistance in the management and commercialization of research outcomes; training and expertise development for TTOs; link with TT intermediaries.  FUNDING of Prototype Development and Proof-of-Concept; and Grants for industry-science collaboration	<ul> <li>Increased share of research pool coverage by TTO services</li> <li>Increased number of research results disclosed to TTOs</li> <li>Increased number of patents and other IPRs</li> <li>Increased licensing activity</li> <li>Larger number of spinoff companies</li> <li>Higher number and value of licensing agreements &amp; spinoff companies</li> <li>Increased volume of contract research</li> </ul>

# TECHNOLOGY TRANSFER PROGRAM; PROPOSED INVESTMENTS AT REGIONAL LEVEL

- Technical Assistance activities.
  - Establish tech transfer offices
  - Training in tech transfer management
  - Mentoring in tech transfer activities
  - Transplanting best practices (e.g. IP rights, etc)
- Matching grants for research-industry collaboration.
  - Provide up to 50% of funds for joint research, matched by the private sector
  - Applicants from industry or academia
  - Maximum support of EUR 200,000 over 2 years
- Technology parks for research-industry collaboration.
  - Assist governments in identifying demand for, designing, and implementing science and technology parks.
  - Cofinancing programs as needed
  - Restructuring of existing parks



### **INVESTMENT READINESS IMPACT**

Table 3: Impact of Program on Investment Readiness as Scored by Judges

	Overall		_				_	Std Dev	Selected
	Readiness	Team	Technology	Traction	Market	Progress	Presentation	of Judge	to go to
	Score	Score	Score	Score	Score	Score	Score	Scores	Finals
Base Specification									
Assigned to Treatment	0.284**	0.167	0.372**	0.206	0.268*	0.373***	0.372**	0.006	0.115*
	(0.126)	(0.150)	(0.152)	(0.130)	(0.137)	(0.137)	(0.164)	(0.049)	(0.068)
Including Judge Fixed Eff	ects								
Assigned to Treatment	0.409***	0.369**	0.476***	0.295**	0.463***	0.440***	0.514***	-0.017	0.090
	(0.135)	(0.158)	(0.174)	(0.142)	(0.139)	(0.143)	(0.191)	(0.051)	(0.076)
Sample Size	211	211	211	211	211	211	211	211	211
Control Mean	2.908	3.042	2.970	2.541	3.406	2.794	3.042	0.723	0.122
Control Std. Dev.	0.903	1.068	1.031	0.947	0.940	0.937	1.145	0.317	0.328

#### Notes:

Robust standard errors in parentheses. Regressions control for randomization strata. \*, \*\*, \*\*\* indicate significance at the 10, 5, and 1 percent levels respectively. Judge fixed effects controls for which five of the sixty-five judges judged a particular firm.



### INVESTMENT READINESS IMPACT CONT'D

Table 4: Heterogeneity in Impacts on Investment Readiness

	Overall							Std Dev	Selected
	Readiness	Team	Technology	Traction	Market	Progress	Presentation	of Judge	to go to
	Score	Score	Score	Score	Score	Score	Score	Scores	Finals
Assigned to Treatment	0.203	0.014	0.405**	0.138	0.009	0.314	0.249	0.020	0.177*
	(0.178)	(0.208)	(0.193)	(0.192)	(0.180)	(0.197)	(0.230)	(0.062)	(0.101)
Assigned to Treatment*Baseline Readiness below Median	0.210	0.378	-0.083	0.183	0.646**	0.169	0.310	-0.019	-0.179
	(0.254)	(0.305)	(0.317)	(0.251)	(0.275)	(0.270)	(0.335)	(0.105)	(0.127)
Sample Size	211	211	211	211	211	211	211	211	211
Control Mean	2.908	3.042	2.970	2.541	3.406	2.794	3.042	0.723	0.122
Control Std. Dev	0.903	1.068	1.031	0.947	0.940	0.937	1.145	0.317	0.328

Notes:

Robust standard errors in parentheses. Regressions control for randomization strata. \*, \*\*, \*\*\* indicate significance at the 10,

5, and 1 percent levels respectively. Regressions also control for level effect of having a baseline investment readiness score below the median of 3.



# WESTERN BALKANS

REGIONAL R&D STRATEGY FOR INNOVATION

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### GROWTH THROUGH RESEARCH AND INNOVATION: THE MOMENT FOR ACTION

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During the development of the Strange policy main and studies have been commissioned. Country profiles for each brookting Genery were developed, study incomes need regional "need works of extellector" were organized, and have Consensed building specifies— to the former of transactive manipulation—have taken plate. The neighbor the profess, these collaboration with studies regional institutions has been parameted. On the lasts of data work a Strategy method has been developed. The extend half of the project involved facilies distinctions with stakeholders regarding the Strategy and Action Plan. The results of the commissions protein were interpreted tools the deals of the Strategy. The Strategy Convends has the support of the leading universities, means is instituted, private artists readen been and minimized of the Strategy and relation in the order. Days and Both

## WESTERN BALKANS REGIONAL R&D STRATEGY FOR INNOVATION

#### THE WESTERN BALKANS INNOVATION STRATEGY EXERCISE FACILITY (WISE)

Policy stability and distribute of reference or critical challenges faced by Western Balkan Constitute in Improving the quality of guidat expenditures on research and tournation. In addition, the artists also rated to addition the generalization related almostles Community to developed examines. The Western Balkane Regional BildD Sourcey for Immunition trivialized a number of stranged objections and policy reference that "If implemented—Could applicately information refers to impact of the respect and belongitudes and policy reference where on the regions of countries.

Objective The objective of the Western Ballacen Increasion Scotogy Baretter Ballacy (WISE Battley) is so processed policy stability and directionly of reference to the Western Ballacet research and increasion section. This action which approach will alternately help tempores the quality of public expressions on research and increasion and thereby between the action transition in elements: proveds and job Countries.

The WISE Builty will (I) who are for the templementation of the policy referen agenda for the measured and homeostates without and (2) manager the implementation of the force proposed regional programs to talkhoration with national parameter. In addition, the WISE Facility will provide a platform for the Conditional contracting, and evaluation of denoted support to execute and immension in the explore, including accepting as a "technical extraction" for the distinction coalies the RMI pilks of the SIX WISE.

Description Contributes a small and agin on the profe organization with a strong compliant on results orthogotism and eigeness evaluation, the WESI Battley will instrument on non-main Computation.

- Informal accounter and appearsy braining. The certhorical automatic and capacity braining components will preferre the following functions (1) facilities pullity shalogue among policy makes to the orgins to which the WISE facility will play an enabling min (2) possible analysis and advisory services, which will constant of smaller on serbandings and publicy towards to transactional good practices, and the like, activality, or the referent and program conduct (2) towards constituting and evaluation (MSE), including constituting do implementation of the publicy offices, constituting progress, and evaluating in impacts, and (6) providing a data information.
- Program deign, receivering steal-enabation. This temperature will territor of the design, more teaching, and realization of the few programs of programs the Research Entrelients Fund, the Newtonian of Entrelients Program, the Technology Transfer Program, and the Enrich Stage Start Up Program. All feat are detailed to repeate project programs.

Structure and Government A Supervisory Board (SR) for the WSSI Builty compared of our representative from such benefitiary country will be appointed. The SR will be expandible for respecting and guiding the operations of the facility. The structure of the facility will include an estimate direction two electrons have for reflected automate and one for program designs mentioning, and realization), and right active or program managers, terresponding to each of the attitude obstabled to figure on reviews. The John Scrawment of the Rintisertal Conference — balli to Saughers store — expensed the Inspect of the region to developing a joint variancy or

The Retal Bank and the Language Camelitation in Expression with highed an agreement to support the development of the strategy. The societies and substance in financial with SUR 1, 6 or Store strongly a Raido Senethciny Designation of Re-Accretion Assistance (CRA).

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WISE facility activisis will include the coordination of perhalic replaced meetings, the adirectory of goldsy selected, and the dissentration of good positions and policy positions. It will also connection the capacity of Western Ration countries to confluct meetioning and evolution of introduction politics.