Understanding international research funding

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Purpose of this presentation

- Understanding international research
- Management of international grants
- Overview of international funding programs
- ~~Line-by-line detail of each grant scheme~~

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The iPad

Collaborative research funding made the iPad possible.

For bringing the parts together and to make an extraordinary invention Steve Jobs deserves acknowledgement, but without collaboration of many different institutions there would be no iPad.

The AAU compiled this nicely at:
www.aau.edu/WorkArea/DownloadAsset.aspx?id=14900

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The iPad

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The iPad

Microprocessors

Supported by:

Microprocessors are multipurpose, programmable devices that control computation, text editing, multimedia display, and Internet communication in a computer or mobile device. They are the heart of the iPad. To function, the microprocessor depends on an integrated circuit (IC), which is a set of electrical circuits all contained on a single plate or chip of semiconductor material. In the 1960's, the federal government was the only consumer of ICs, needing ever more sophisticated versions for missiles for the military and the space program. It was these federal contracts that made possible the development of the ICs that were ultimately used in the iPad.

LCD Displays

Supported by:

A liquid crystal display (LCD) is a visual display that takes advantage of the light modulating properties of liquid crystals, which are a state of matter that is in between the solid and liquid phase. LCDs can display fixed images, as in digital clocks, or arbitrary images, as in televisions, computer monitors, and the iPad. Arbitrary images are made up of small pixels to display images. A vital component of LCD technology is the thin-film transistor, which was developed by Peter Brody at Westinghouse, funded almost entirely by the U.S. Army. Brody was then given a contract by Defense Advanced Projects Research Agency, after which he established a company to develop LCD technology.

Micro Hard Drives

Supported by:

A micro hard drive is a data storage device in the iPad and other mobile computers that stores and retrieves data. In 2007, Albert Fert and Peter Grünberg were awarded the Nobel Prize in Physics for their work in developing giant magnetoresistance (GMR). The GMR is a quantum mechanical effect that has a main application in the magnetic field sensors used in hard disk drives. Dr. Grünberg's laboratory was affiliated with the Department of Energy's Argonne National Laboratories, and received vital support from the Department of Energy. Companies like IBM were able to use this new knowledge for applications in commercial products.

Lithium-ion Batteries

Supported by:

Lithium ion batteries are rechargeable batteries that are commonly found in consumer electronics like the iPad. They have become one of the most popular batteries for portable electronics because they store large amounts of energy, take up little device memory, and lose their charge very slowly when not in use. The Department of Energy and the National Science Foundation were the main funding sources for John B. Goodenough, who at the University of Texas at Austin conducted critical research on lithium-ion batteries. The electronics industry faced a great challenge in creating battery technology that met the storage capacity needs and size requirements of compact but powerful electronic devices. With the development of the lithium-ion battery, portable devices could become smaller and lighter.

Digital Signal Processing

Supported by:

Digital signal processing allows for real-time processing of sound, such as during a phone call or when playing a movie on a portable device. Use of large audio or multimedia files improves playback quality. Digital signal processing has its origins in "fast Fourier transforms," which was developed through a grant from the Army Research Office in the 1960s and advanced through additional federal funding from the National Science Foundation and the Advanced Technology Program of the Department of Commerce. Digital signal processing is a core feature of the media functions of the iPad and other devices.

Cellular Networks

Supported by:

A cellular network is a wireless network carried over land areas and divided into cells. Each cell is served by a fixed cell tower carrying the network. Using this network, mobile transceivers such as mobile phones and the iPad are able to communicate with each other. Cellular networks include data networks, which are used for communication and interaction alongside the Internet in the iPad. Cellular technology, including cellular networks, has received substantial government support through the U.S. military's advancement of communication technology.

Internet

Supported by:

The Internet is a global system of interconnected computer networks that enable worldwide communication. The various private, public, academic, business, and government networks are linked together through electronic, wireless, and optical network technologies. The Internet has transformed traditional forms of communication, and has facilitated the rise of new ones, like email and social media. During the Cold War, the U.S. military recognized the need for decentralized communication networks that would survive in the event of a nuclear attack. From the 1970s to the 1990s, Defense Advanced Research Projects Agency funded and created the necessary communication protocol, operating systems, and email programs needed for communication. Researchers supported by the National Science Foundation began the development of the first high-speed networks.

Global Positioning Systems

Supported by:

The global positioning system (GPS) is a satellite based navigation system that accurately reports time and location information in all weather conditions. This system of satellites provides important capabilities and information to civilian, military, and commercial users globally. GPS was developed by the Department of Defense to enhance coordination and accuracy of deployed military assets. Its first use in the 1970s was for military purposes only, but today GPS is widely accessible to the general public. Although civilian use of GPS is now far greater than military use, the U.S. Air Force remains at the forefront of enhancing and maintaining the system.

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The iPad

This example illustrates how integration through collaboration can culminate in a game-changing product.

Key points of success are:

- Free and timely access to research results
- Understanding of global standards
- The vision for of a global market
- Strategic investment in production on a global scale

This leads to the three pillars of this presentation:

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Three pillars of this presentation

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International programs

We will focus on the most significant research hubs:

- Europe
- USA
- China
- (Australia / New Zealand)

We will primarily utilise our knowledge of Horizon 2020 for highlighting key principles and paradigms

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Strategy

"we will grow our international standing via increased international research collaboration"

- a generic vision statement from any institution
- rarely backed-up by focussed strategic activities and internal support
- translates to the faculty- and individual-level as "get more money from overseas"

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The long game

International engagement (and funding) is a *long* game, played out over years / decades.

Successful management of international grants *requires* researchers & research managers with experience and relationships.

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Strong relationships require & build:

- Trust
- Experience
- Conflict resolution skills
- Intercultural competency
- Interoperability of institutional & national systems

- Relationships = capital

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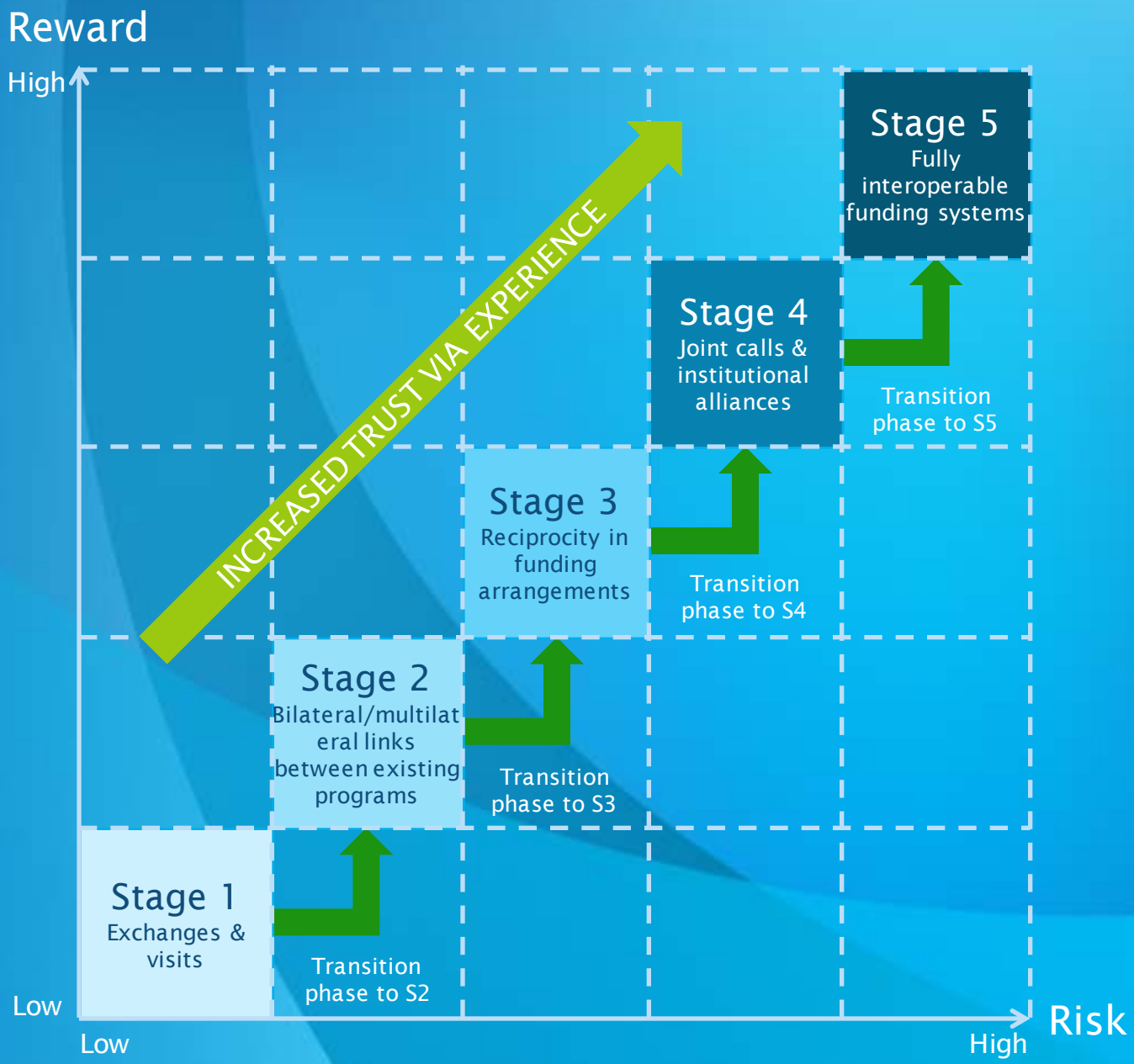

Diagram from: Mark Matthews & Merrilyn Fitzpatrick, "A framework for analysing bilateral research cooperation agreements relating to reciprocity", Access4EU deliverable 1.1, 2010

Sustainable international engagement

- Constant capitalisation of resource base
  - i.e. continual investment in activities for relationship-building

- A lack of relationship capital ⇒ insufficient resources to sustain important / complex collaborations and funding arrangements

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Your institution is *awesome*… but

Your value to international partners:

- The expertise and standing of your researchers, and the strength of your labs/teams
- Capacities and capabilities of your institution
- The breadth of your domestic, regional and international networks
- Your ability to deliver results

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Toolkit tip #1

Continuously explore how you can:

- Support your ECRs with international engagement (conferences, fellowships, exchanges, etc.)
- Embed your ECRs into the activities of your international projects

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Time for you to share…

Examples of your institution's initiatives that explicitly support ECRs to develop international relationships

or

Examples of what could be done via other non-explicit programs

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Sometimes your expertise is enough… but mostly it isn't

- 10% of Australians involved in Horizon 2020 are approached on the basis of their international profile and/or unique expertise

- 90% become involved due to their long-standing relationships and history of collaboration with European partners

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What do you get from international collaboration? (1)

- Synergies to exploit economies of scale and complementary expertise
- Broadening networks & relationships
- Access to facilities/resources that would be costly/impossible to replicate domestically

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What do you get from international collaboration? (2)

- Exposure to new (unpublished) research, facilities and methodologies
- Training opportunities
- Platform to showcase your institution and findings
- More publications, more citations
- Funding

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Toolkit tip #2

You can boost your chances of success, with international programs, if you bring your domestic, regional and international colleagues with you. You will be delivering value far beyond your institution's (limited) capability.

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So… what about grant management?

International grants are *identical* to domestic grants!

- Incomprehensible rules, and plenty of unwritten rules and guidelines
- Form is more important that content
- Online submission systems go offline as soon as you are ready to submit
- Everyone else submits on the last day, same as you

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… but, seriously

Despite the differences in detail, most international grants really are the same as domestic favourites:

- Taxpayer funded
- Peer reviewed
- Eligibility conditions & strict submission rules
- Regular reporting requirements
- Open access publication of results
- Your IP is your IP
- Funders want you to succeed

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… some key differences

Throughout the world, most funds that are open to global participation have the following features:

- Full justification of expenses (including timesheets)
- Reporting in the currency of the funder
- Budget for “outreach” activities
- Regular and snap audits, according to the funder’s standards
- Signed in the legal jurisdiction of the funder

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Become an expert

"Try a thing you haven't done three times. Once, to get over the fear of doing it. Twice, to learn how to do it. And a third time, to figure out whether you like it or not."

- Virgil Garnett Thomson

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… *gigantum humeris insidentes*

Domestic funding is *easy* – you are embedded in a team of professionals with decades of collective experience and a proven system for success.

For international funding, you need to seek out and embed yourself in the relevant networks.

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Toolkit tip #3

Get connected to ARMS (Australasia), NCURA (USA), EARMA (Europe), and other networks of professionals who live and breath their flavour of funding.

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Professional networks

These networks offer, e.g.:

- Newsletters
- Call announcements
- Factsheets and tips
- Training events
- Travel awards/fellowships
- Consulting services (free and/or paid)

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Time for you to share…

Who has been to an event (locally or overseas) run by one of these professional networks?

And what did you learn that you couldn't have learnt from reading a rulebook?

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Toolkit tip #4

Learn how to articulate your competitive advantage:

- Genuinely unique expertise, facilities, capabilities, assets, etc.
- Know the value of your position

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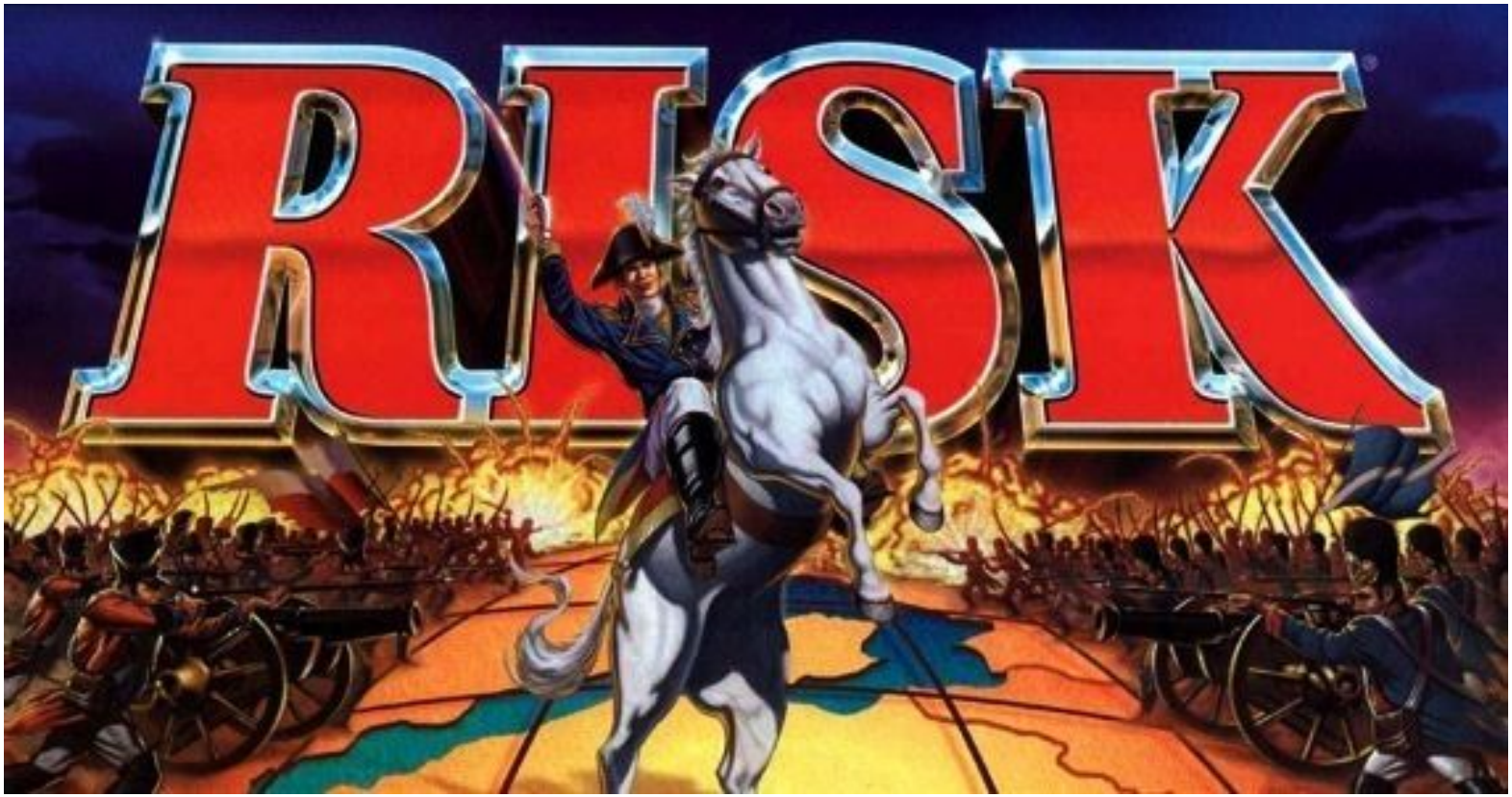
Know the risks, and what to do



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Currency risks

Some grants let you:

- Keep bank interest (e.g. H2020)
- Cover some of your forex losses (e.g. USA)

Some institutions will shelter departmental budgets from forex movements, others won't. You need to know your institution's policy and practices.

Do they hedge? Can you create your own hedge? Can you keep the funds in the original currency? Can you track your expenditure in the original currency?

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Toolkit tip #5

Know how your institution handles foreign currencies, and communicate this to the relevant researchers and your departmental or faculty head.

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Unsecured funding

For collaborative proposals, you *must* know where you are getting your funding from.

You *must* have a backup strategy in case you don't get funds from the grant.

You jeopardise the entire consortium if the proposal is successful but you cannot secure funds in time.

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Blackmail

Sometimes, researchers join a proposal without their institution's knowledge.

The institution first hears of it when it's time to sign.

Institutions often feel "blackmailed" into signing (and financially supporting) due to:

- Risk of damaging international relations
- Opportunity for increased positive exposure

Find a way to *encourage* researcher to come to you prior to submission!

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IP protection

USA – different states have different laws regards IP. A collaboration with one state might result in equitably IP sharing, but the same collaboration with a different state could see you lose all IP rights

China – even registered patents offer no protection if your design/technology has in any way been made public previously

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IP leakage

Brief your staff before they go overseas, or before they host foreign guests.

One of the benefits of collaboration is to learn *inside secrets* (techniques, methodologies) of other labs. It goes both ways!

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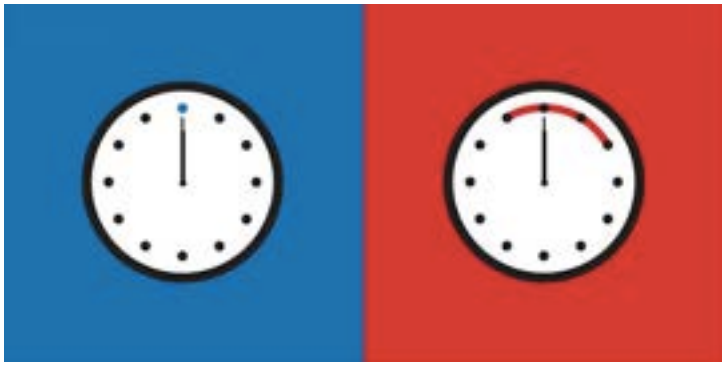
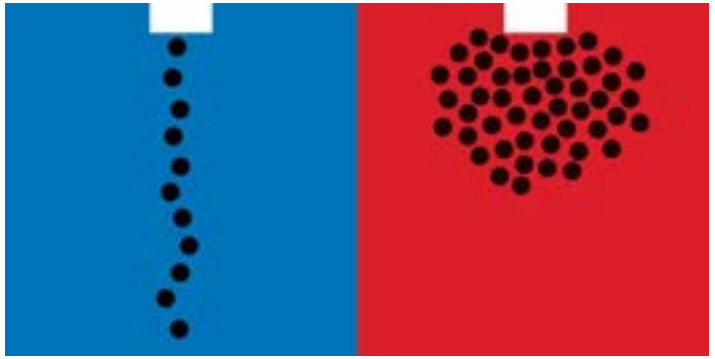
Toolkit tip #6

Whatever *you* think the rules are – no matter how fervent your belief – other cultures are similarly fervent with their own understanding of the rules.





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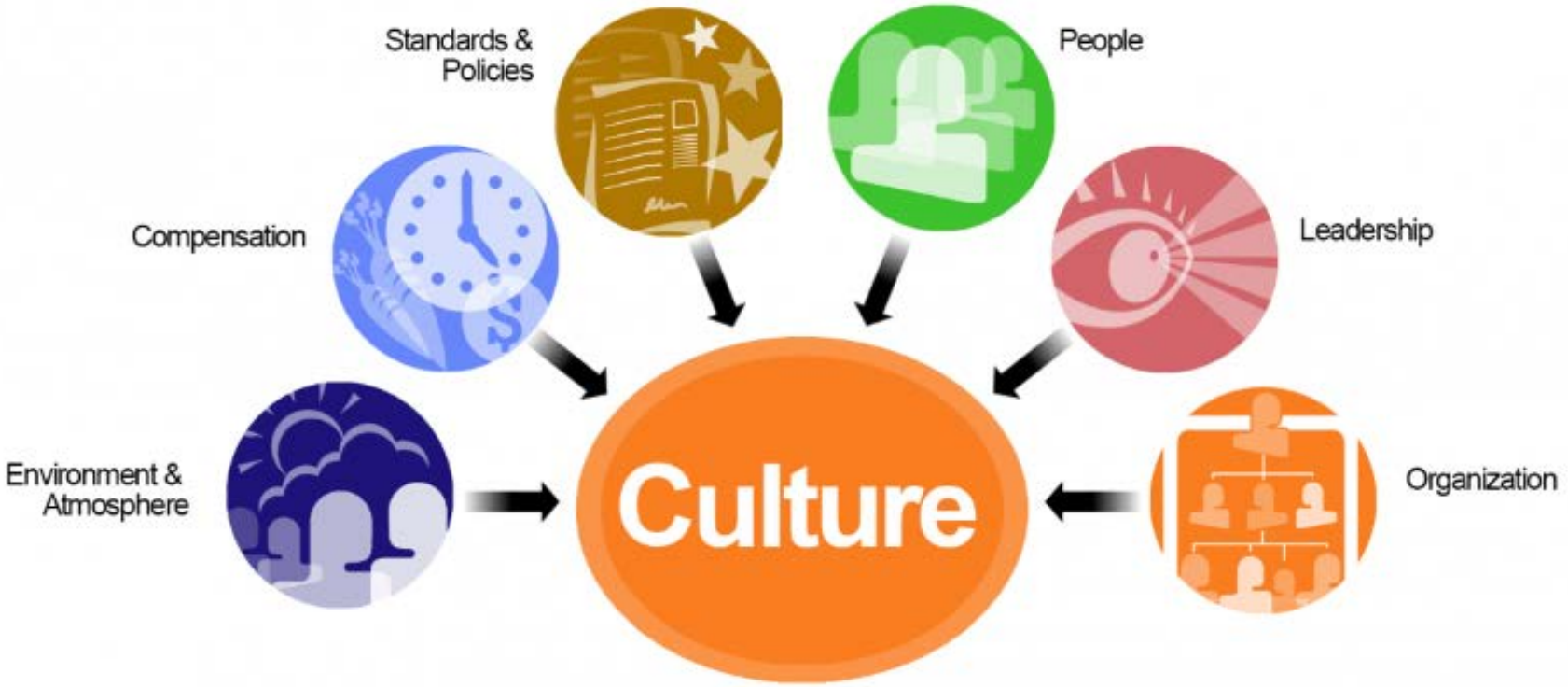
Culture



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World Values Survey

The World Values Survey (WVS) data provide interesting insights in the cultural variation around the world.

Cultural diversity has substantial impact on the preparation, negotiation, implementation and management of collaborative research projects.

There are two major dimensions of cross-cultural variation in the world…

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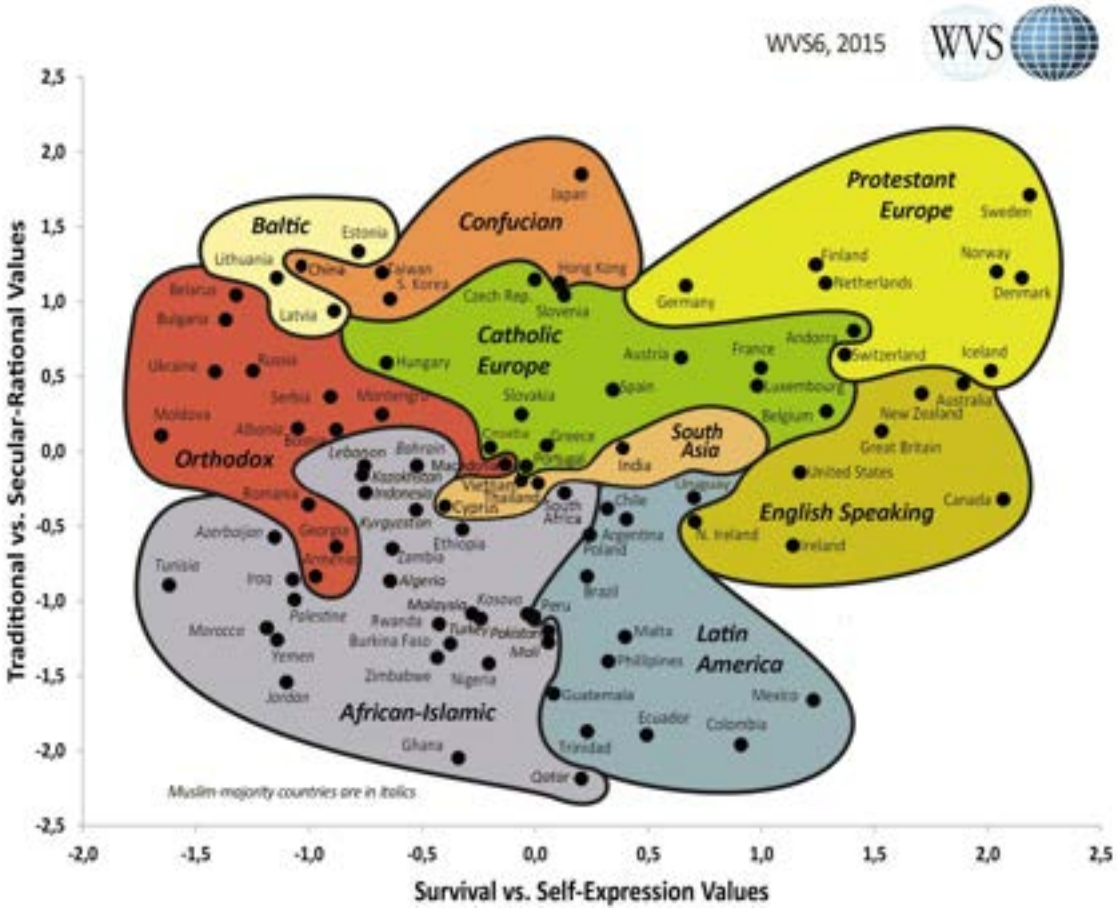
Cultural map



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Traditional vs Secular-rational

Traditional values emphasize the importance of religion, parent-child ties, deference to authority and traditional family values. People who embrace these values also reject divorce, abortion and euthanasia. These societies have high levels of national pride and a nationalistic outlook.

Secular-rational values have the opposite preferences to the traditional values. These societies place less emphasis on religion, traditional family values and authority. Divorce, abortion, euthanasia and suicide are seen as relatively acceptable (suicide is not necessarily more common).

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Survival vs Self-expression

Survival values place emphasis on economic and physical security. It is linked with a relatively ethnocentric outlook and low levels of trust and tolerance.

Self-expression values give high priority to environmental protection, growing tolerance of foreigners, gays and lesbians and gender equality, and rising demands for participation in decision-making in economic and political life.

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Become better at “culture”

Language:

- Different cultures use different strategies in expressing facts and fiction. The more knowledge you have of these strategies the better your negotiation position will be.

Management:

- Different cultures use different management styles. Team work in multi-cultural projects require team building efforts. The better team members can understand each others’ expectations and boundaries, the better for the success of the project.

Perceived and real time management:

- Different cultures have different perceptions of time – and therefore priorities. Agreement on priorisation of tasks (reports, deliverables, accounting etc.) before the project starts are key to its success.

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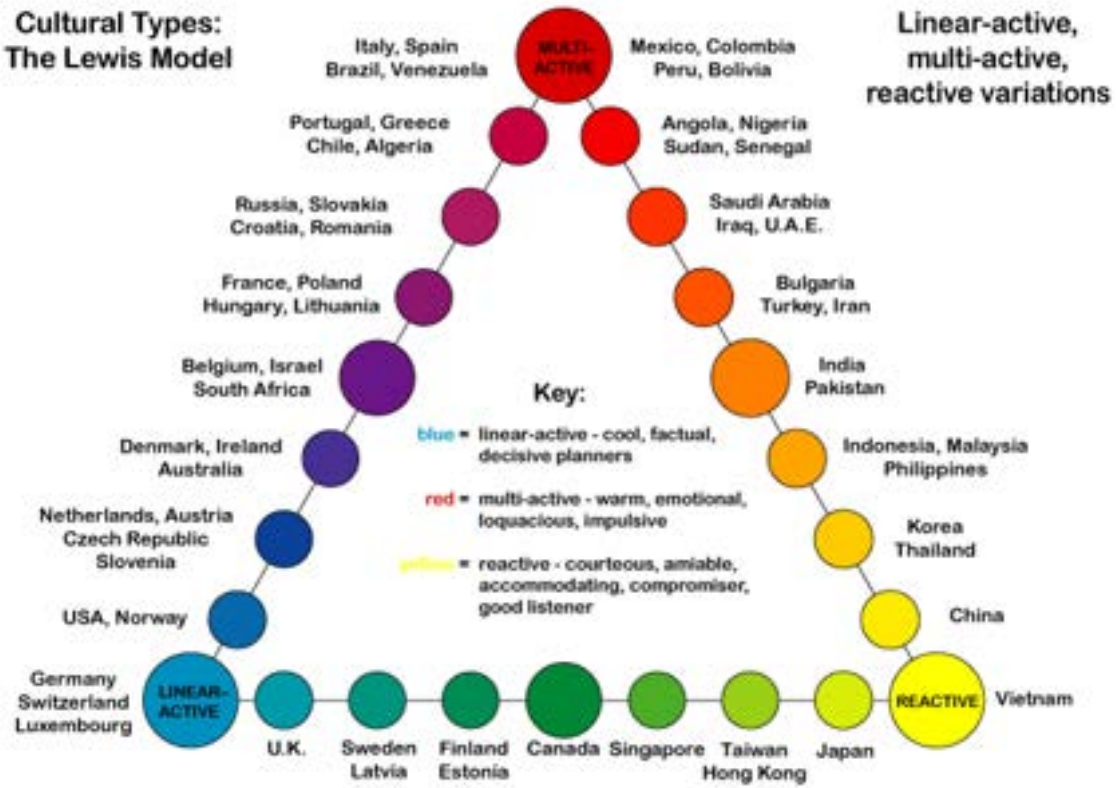
Every culture is different



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Time for you to share…

Have you experienced any work-related misunderstandings that had *cultural difference* at the heart of the problem?

How did you resolve them?

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Toolkit tip #7

Have thee an overseas research experience:

- Via a travel grant or award
- As part of a research project
- Convince your director
- Tax deduction on your next family holiday

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You, Ess, Ay

Europe may lay claim to the single largest research funding program, but the USA is still the leader in overall public funding for R&D

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USA vs EU

	USA	EU
Funding for you	Yes, for some programs	Yes, for Fiji & other PICTs
Stand-alone application	Yes	No
IP	Varies, can be owned by partners, but…	Owned by partners
Funded costs	Varies, often direct costs plus overheads	100% direct costs, 25% overheads
Salary costs	Yes	Yes
Audits	If over threshold (US$ 500k), plus may require pre-award compliance	If over threshold (€325k)
Payments	Varies	Up-front float, plus interim

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USA vs EU (continued)

	USA	EU
Timesheets	Mandatory	Mandatory
Relationship with funder	Preferred	No
Proposal evaluation	Peer review	Peer review
Purchase restrictions	Yes, buy American	No
Document/record retention	3 years	2 years
Ethics	Federal & state laws	EU and Member State laws

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Some major US federal funders

- DARPA: Defence Advanced Research Projects Agency
- DOE: Office of Science
- IARPA: Intelligence Advanced Research Projects Agency
- NASA: National Aeronautics and Space Administration
- NIH: National Institutes of Health
- AFOSR: USAF Office of Scientific Research
- + many, many more

Each has it's own processes for calls, submissions, evaluation, contracting, reporting, funding, etc. But they must all, generally, comply with the same federal funding principles.

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A few notable notes

- Note that the Federal Government retains IP privileges, but you can also claim your ownership under most circumstances (Bayh–Dole Act)
- Generally high degree of negotiability in contract negotiations (with regards to content, and some terms)
- A pre-award audit may be required
- Openness leads to flexibility, deceit leads to legal action

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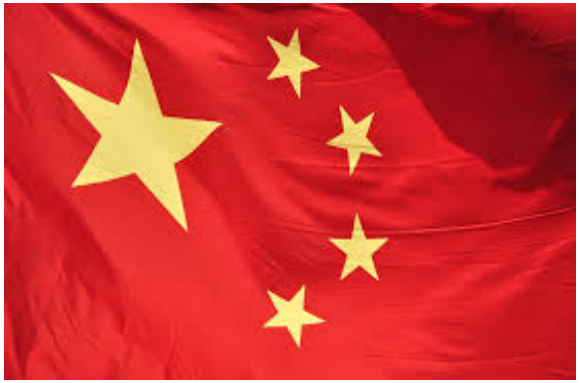
你好 Ni hao

China is emerging quickly as a R&D hub, in line with a government push to promote innovation and a race by Chinese companies to catch up with Western competitors.



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13th Five-year plan

- A blueprint for a significantly upgraded and modernized manufacturing and technological base
- A cleaned up environment and greener way of life
- A more consumption-oriented economy with increased support and room for entrepreneurs, and improved healthcare and social security systems

Outlines a tremendous amount of infrastructure spending for airports, sea ports, bullet trains, subways and expressways to connect regional municipalities into megacity clusters of 100 million people or more.

No longer an emphasis on the benefits of a solely market driven economy.

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13th FYP

Competition to be further improved in national monopoly sectors, including electricity, telecommunications, transportation, petroleum, natural gas and public services.

Some highlights:

Cybereconomy to be further expanded and Internet Plus plan implemented. Network speed to be increased and fees lowered, along with support for innovation in cyberspace of related industries, business methods, supply chains and logistics chains.

Innovative teaching abilities to be raised to ensure some universities meet world standards. Modern vocational school system to be set up and universities encouraged to transform into vocational schools.

Clean production to be promoted and green and low-carbon industry systems set up. Green finance to be promoted and a green development fund established.

Reform of the military to be speeded up, with the goal of establishing a modern military system with Chinese characteristics by 2020.

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Why China?

- 2nd largest economy – will be the 1st
  - All roads lead to… ~~USA~~ China
- Scale and mobilisation is incredible
- They take innovation seriously, and a centralised "unelected" government allows long-term focus and investment in priority areas

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Programs / funding

- Unlike EU & USA, China's public funding schemes are domestic only
- Formal collaborations rely on joint programs / calls, or on individually negotiated deals

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Australia / New Zealand

- Research is limited to funding local actors, but international partners are welcome.
- Both countries have seed funds for kick-starting collaborations:
  - AU: Global Connections Fund http://globalconnectionsfund.org.au
  - NZ: Catalyst Fund http://www.royalsociety.org.nz/programmes/funds/international/catalyst-fund

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