

# Ecosystem approach to the commercialization of technology products and services



Tony Bailetti, Ph.D.  
Carleton University  
[Bailetti@sce.carleton.ca](mailto:Bailetti@sce.carleton.ca)

TIM Lecture Series  
Inaugural lecture, Friday, March 28, 2008

# Contribute using wiki and email

- Add references on:
  - Ecosystems
  - Ecosystem approach to commercialization
- Suggest topics for TIM theses and projects
- Place comments on slides delivered today
- Post lessons learned from today's lecture
- Contact Tony B. via email: Bailetti @ sce.carleton.ca

[http://www.talentfirstnetwork.org/wiki/index.php?title=TIM\\_Lecture\\_Series](http://www.talentfirstnetwork.org/wiki/index.php?title=TIM_Lecture_Series)

# Agenda

- Key problems a technology company faces
- Fundamentals of business ecosystems
- Ecosystem approach to commercialization

15 minute break

- Discussion about:
  - Lead projects that use ecosystem approach
  - Attractive niches in healthy ecosystems
  - Topics for TIM theses and projects

# Motivation for lecture

- Lifecycle from idea to cash is changing rapidly
- Barriers to entry are lower
- Information and communication technology have made the world flat
- Competition is increasingly based on continuous innovation - Innovation in a global context has become very important to making money
- Harnessing innovation distributed globally requires cash, talent, partnerships and approaches/tools that scale

We need approaches to harness and commercialize innovation distributed around the world

# Key commercialization related problems a technology company faces

1. Manage product interdependencies with other companies, open source projects, and standard setting bodies
2. Accelerate adoption of company's products by intermediaries and customers
3. Must create and appropriate value

# Interdependence problems

- Technical challenges cannot be resolved
- Underestimate cost/time to coordinate interdependences
- Reducing development time may not give company much
- Company depends on deployment of complementors' offers, each of which can close window of opportunity
- Joint probability of partners being ready at same time is low, even when each individual probability is high
  - Each of five suppliers has an 80% chance of being ready at T, how confident can they be of all five being ready at T?
  - $.8 \times .8 \times .8 \times .8 \times .8 = .33$

# Examples of complementors not being ready at same time

Case	Was ready	Was not ready
High definition TV in early 1990s	Console manufacturers (e.g., Philips, Sony, Thompson)	<ul style="list-style-type: none"><li>• Studio production equipment</li><li>• Signal compression technologies</li><li>• Broadcasting standards</li></ul>
Third generation wireless networks in late 1990s	<ul style="list-style-type: none"><li>• Mobile operators that bid billions for spectrum licenses</li><li>• 3G handsets and base stations manufacturers (e.g., Nokia, Ericsson)</li></ul>	<ul style="list-style-type: none"><li>• SW to reformat live video streams</li><li>• Routing SW</li><li>• Digital rights management solutions</li></ul>



# Adoption problems

- Sales fail to materialize within time frame required to support investment
- Long adoption cycle
  - Need to convince a large number of intermediaries to adopt company's offer before customers make purchase decision and volume sales are achieved
- Metrics used to assess benefits and costs vary for intermediaries along value chain



# Adoption cycle

Adoption cycle = Time for intermediary 1 to adopt +  
Time for intermediary 2 to adopt +  
...  
Time for intermediary i to adopt +  
Time for end customer to become aware and purchase solution

Case	Supplier	Intermediaries who need to adopt offer
Run-flat tire with electronic signal on dashboard	Michelin in 1997	<ul style="list-style-type: none"><li>• OEMs that design automobile electronic systems</li><li>• Garages</li><li>• Dealers</li></ul>

# Value creation and appropriation problems

- Appropriated insignificant portion of the value company help create
- New product fails to attract customers
- Existing products fail to solve relevant customer problems or accommodate new uses
- Stronger companies become direct competitors
- Flat or declining sales
- Company fails to protect its source of profits
- Expensive advertising and deceptive pricing

# Agenda

- Key problems a technology company faces
- Fundamentals of business ecosystems
- Ecosystem approach to commercialization

15 minute break

- Discussion about:
  - Lead projects that use ecosystem approach
  - Attractive niches in healthy ecosystems
  - Topics for TIM theses and projects

# Three perspectives to address key problems

Perspective	Focus on	Company using perspective finds it	Best suited for
Market	Transactions of <b>goods</b>	Difficult to align many product road maps of customers and other companies	Craft production
Hierarchy	Control over <b>activities</b> that produce goods	Difficult to address breadth and importance of inter-firm relationships	Mass production
Business ecosystem	Coordinate <b>innovation</b> across a large number of diverse companies	Easier to combine its offers into marketable solutions, accelerate customer adoption, and create and appropriate value	Flexible specialization and peer production

# Business ecosystem (Moore, 1993)

- Economic community supported by a foundation of interacting organizations and individuals which produces goods and services that customers value
- Over time, members' capabilities and roles become mutually supportive
- Members tend to align themselves with directions set by central companies
- Leadership role is valued
  - members align their investments, find mutually supportive roles, and move towards shared vision

# Main benefits of a business ecosystem

- Aligns resources and energy from large number of diverse companies, organizations, and individuals all over the world
- Combines participants' contributions to create significant value for customers
- Fosters collaboration on activities that significantly improve market offers
- Removes roadblocks and bottlenecks to growing a market
- Provide gateways to relationships in other ecosystems



# Importance of innovation spreads ecosystems

- Ecosystems are core to growth strategies of companies across many industries
  - Fashion, oil production, commercial printing, financial services, basic materials, logistic provision
- Ecosystems that are most open are in telecommunications, media and software
- While business ecosystems have been with us always, new managerial organizational form grew out of computer industry in late 20<sup>th</sup> century
- Volunteers are part of every ecosystem, some ecosystems use volunteers more than others
- Business ecosystems are not yet addressed by anti-trust laws



# Foundation platform is the

## Combined base of:

- Technologies
- Architectures, designs and assets used to build market offers
- Components, products and services
- Contracts
- Processes

which anchors economic community

# Space

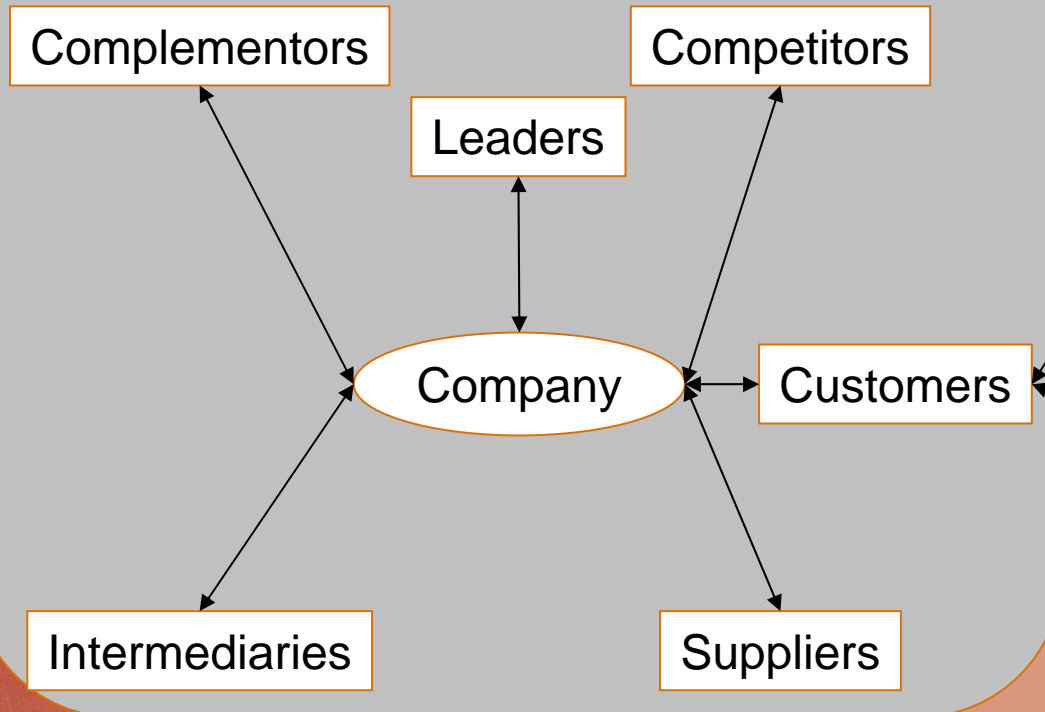
- Bumper sticker used to identify the ecosystem and distance it apart from other organizational forms

# Niche

- Area in ecosystem identified by specialized skills

# Company interacts with at least six groups

## Groups in ecosystem with which company interacts



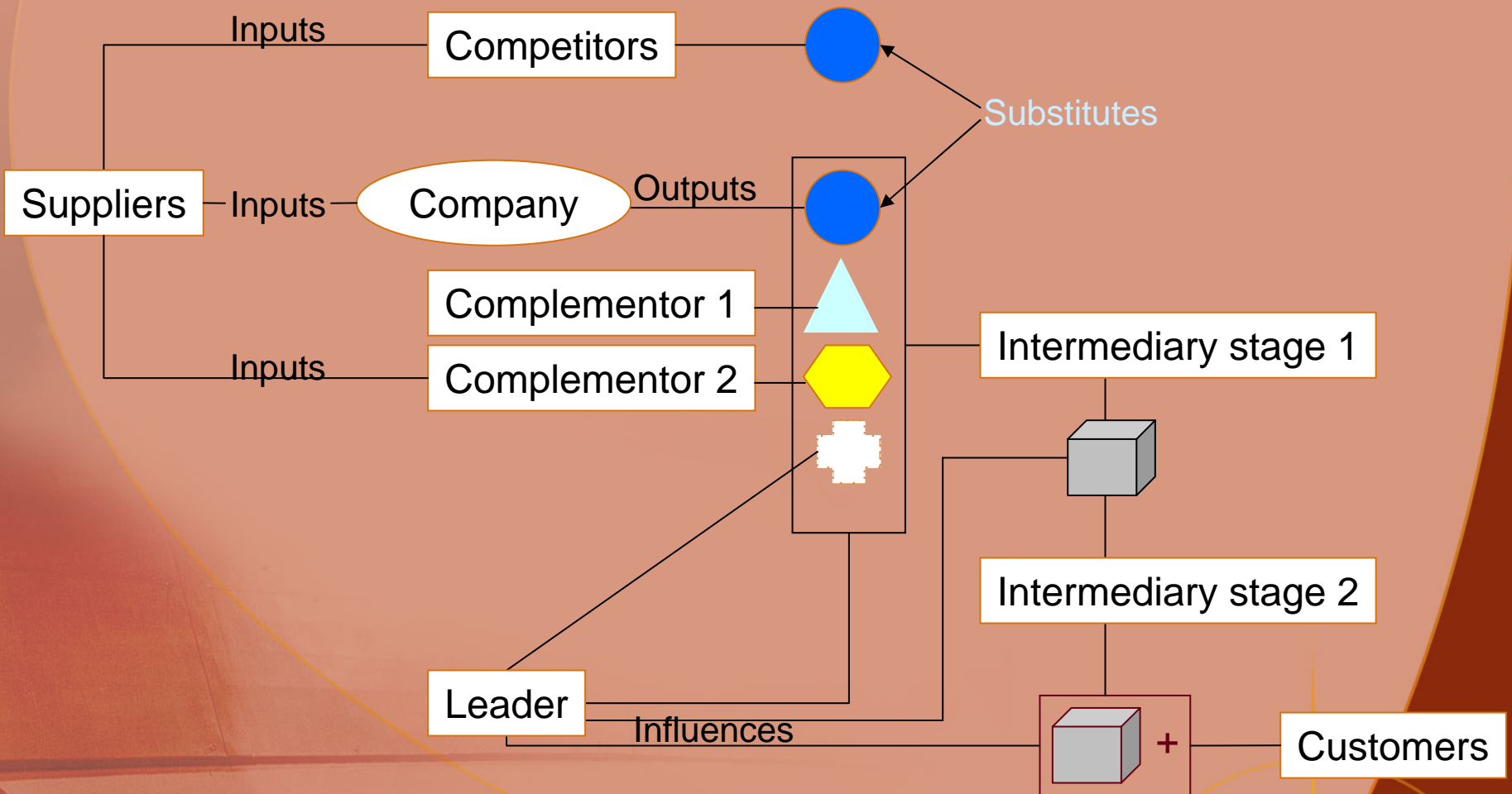
**Offers from companies acting alone**

**Offers from companies in other ecosystems**

Ecosystems are a dense network of interconnections where company's fate depends on ecosystem's fate

Offers produced inside ecosystem compete with offers produced outside

# Example of how groups relate to each other



# Distinctive responsibilities of each group

Complementors	Sell other products and services which increase attractiveness of company's offer
Intermediaries	Integrators and distributors that must adopt company's offer before it reaches customers
Leaders	<ul style="list-style-type: none"><li>• Sell key products and services of customer solution</li><li>• Strong influence over (i) foundation platform; (ii) network of producers and users of technology and customer solutions; (iii) customer solution along various stages of the value chain</li></ul>
Competitors	Sell substitutes of company's offer
Suppliers	Give, sell or make available inputs to company
Customers	<ul style="list-style-type: none"><li>• Pay for solutions</li><li>• Provide feedback on value of solutions</li></ul>

# Leadership is materially different

Who leads	Example
Gorilla and add-ons	Microsoft + developers
Supplier alliance	Scope Alliance, Mountain View Alliance
Strategic members	Eclipse
Small companies	Moodle
Customers	Enterprise Ecosystem
University consortia	Sakai
Economic and talent development agency	Digital Business Ecosystem
Talented developers	Linux

# Business ecosystems are different from clusters, networks, associations and alliances

- Leadership to attain shared vision of the future is strong and process to identify leaders is transparent
- Organizations become responsible for ecosystem health and advancing foundation platform
- Large number of diverse members distributed globally that concurrently cooperate and compete



# Ecosystem collaboration is not outsourcing

<b>Collaborate to</b>	<b>Outsource to</b>
Grow revenue	Reduce costs
Create new thing that delivers value	Produce existing product at lower cost
Access skills dispersed globally, share risks	Procure commodity assets
Build capabilities to differentiate offers for which customers pay	Avoid investing in capabilities for which customers will not pay

# Agenda

- Key problems a technology company faces
- Fundamentals of business ecosystems
- Ecosystem approach to commercialization

15 minute break

- Discussion about:
  - Lead projects that use ecosystem approach
  - Attractive niches in healthy ecosystems
  - Topics for TIM theses and projects

# Ecosystem approach requires company to

- Act on economic community's shared vision of the future
- Launch offers using ecosystem's foundation platform
- Compete for leadership positions at space, niche and governance levels
- Draw on talent around the world
- Develop capability to collaborate

# Core of approach requires company to incorporate ecosystem realities into:

- Managing product interdependencies
- Accelerating adoption of company's products
- Creating and appropriating value

# Benefits to company of incorporating ecosystem approach

## Increases:

- Likelihood that company's offers are ready at the same time as complementors' offers
- Capacity to transform company offers and offers from multiple companies into significant customer value propositions
- Capacity to incorporate advances in various knowledge domains into product designs
- Alignment with companies in leadership positions
- Number of options to grow company's market
- Information sharing and environmental awareness
- Quality resources and relationships company can access
- Capacity to react to significant changes

# Benefits to company (continued)

## Decreases:

- Time to cash
- Technical complexity and cost of R&D
- Time to select, engage, and manage partners in complementor, intermediary and leadership roles
- Likelihood of extending capability to meet customer needs
- Cost to provide customized offers
- Investment to enter new markets, adopt technology, and carry out research
- Risk of advancing technology and entering into new markets
- Cost of cooperation and collective action
- Cost of hiring talented personnel with right skills

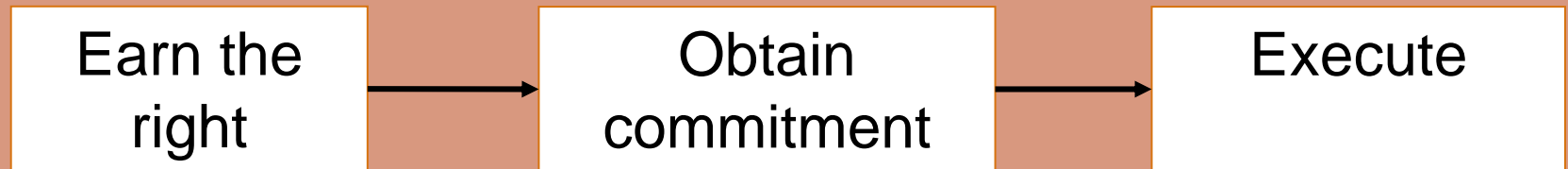
# Benefits to company (continued)

Greater value created and appropriated

- Better definition of customers', intermediaries and complementors' problems and their contexts
- Better definition of what company can do, when, and how
- Stronger relationships with customers
- Buffers relationships with partners against external shocks
- Support for company's offers at every step along value chain



# Stages of business ecosystem approach to commercialization



# Earn the right to participate in ecosystem

1. Set high standards for continuous innovation and collaboration
2. Identify bull's eye target customer for whole solution and foundation platform
3. Select a niche for company's offers and establish a position within it that adds value to customers, leaders, complementors and intermediaries
4. Define scope of company's core contributions in selected niche and specialize to deliver them
5. Define company in terms of its ability to continuously contribute innovations within the niche it occupies in the ecosystem, not its existing products, services and operational efficiency

# Obtain commitment

1. Select partners in complementors, intermediaries and potential customer roles
2. Obtain partners' commitment to company's (i) offer road map and (ii) business model
3. Invest in people and processes required to support global collaboration with customers, leaders, complementors, and intermediaries
4. Define architecture for company's offer using ecosystem's foundation platform
5. Decide how to protect intellectual property and what information and assets to share

# Execute

1. Empower internal organizations to:
  - Ensure company's and complementors' offers are ready at the same time
  - Reduce total adoption cycle
  - Create and appropriate value
2. Invest in ecosystem's health

# Ensure company's and complementors' offers are ready at the same time

- Change partners who may be late
- Provide partners with economic incentives to be ready at the same time
- Company produces complements on its own
- Company delays product development to let complementors catch up

# Reduce adoption cycle

- Concurrently design offer and sales strategy with complementors, intermediaries and customers upfront
- Increase degree to which leaders, complementors, intermediaries and customers perceive offer as being better than others
  - Make company's offer consistent with the existing values, shared view of the future, and needs of leaders, complementors, intermediaries and customers
  - Place intermediaries and end customers at the centre of company offers, processes used to produce offer, and innovation trajectories of offers
  - Provide visible evidence that benefits of adopting offer exceeds costs for each intermediary along the value chain
  - Make offer transparent and act quickly on feedback about offer

# Reduce adoption cycle (continued)

- Provide incentives for quick adoption of offer
  - Price offer as % of realized savings
  - Pay for changeover costs
  - Pay for trials
  - Make offer simple to use and buy
- Provide ample opportunities to experiment with offer
  - Enable customers to combine any and all services and explore any and all uses
  - Enable intermediaries and customers to innovate for themselves
- Use government to overcome intermediaries' and customers' inertia



# Create value

- Help increase the number of solutions, products and services available to customers
- Invite others to expand existing and new markets
- Increase customers' willingness to pay for solutions, products and service (i.e., better quality, improved functionality, greater number of applications and platforms supported)
- Decrease coordination, development and sales costs of providing solutions, products and services

# Appropriate value

- Increase customers' willingness to pay for company's offers
  - Provide differentiated offers
  - Provide migration programs for competitors' products
- Decrease customers' willingness to pay for competitors' products
  - Provide free distribution of assets and information
- Decrease costs to interact with company
  - Make it easy for customers, intermediaries, complementors, leaders and suppliers to engage company

# Appropriate value (continued)

- Increase costs to interact with competitors
- Constrain value others can add
  - Become the most important contributor to creating new customer value
  - Align development efforts of others with company goals
  - Increase power position within ecosystem
  - Release commodity assets that make proprietary assets more attractive

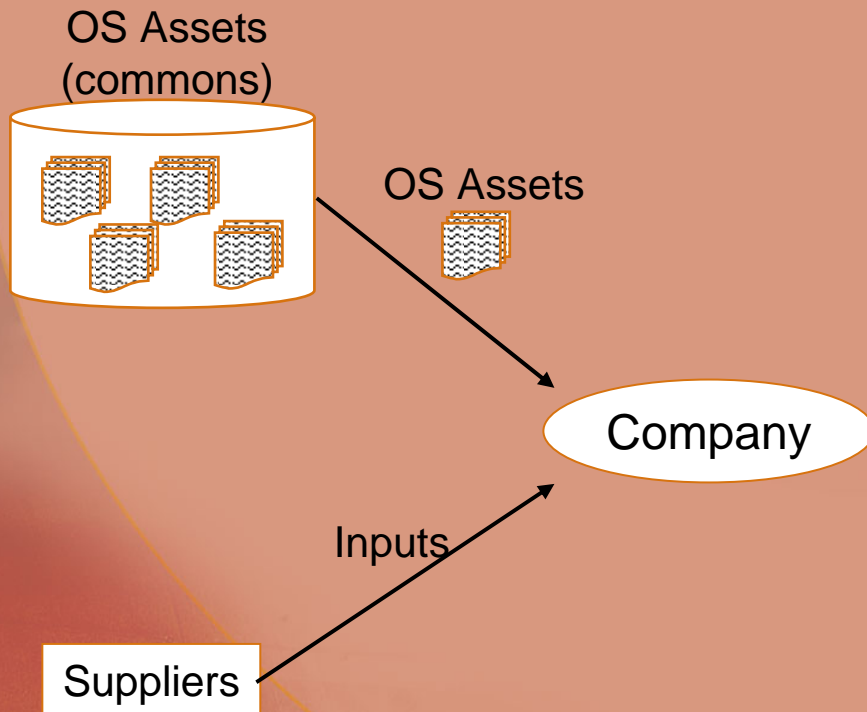
# Maximum value a company can appropriate

Max value a company  
can appropriate =

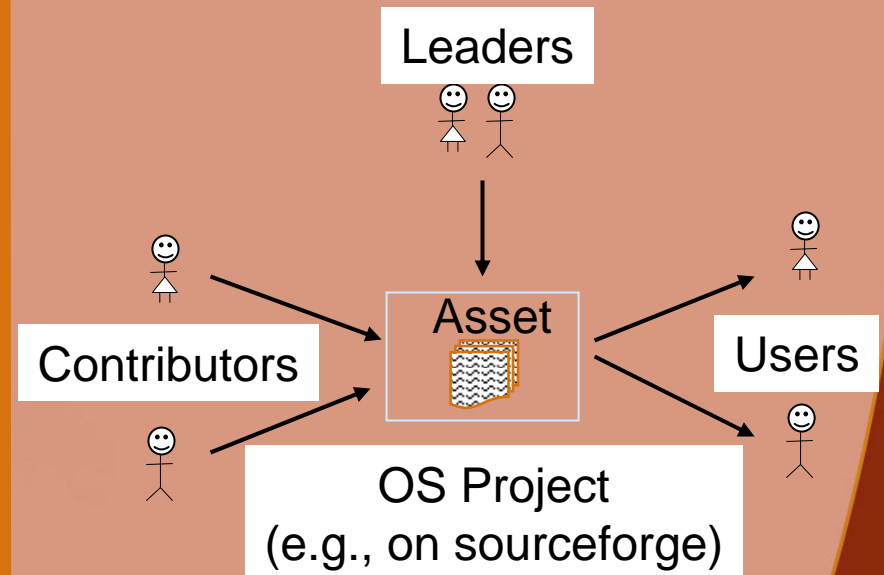
Value created with company  
participation

- Value created without company  
participation

# When company's business model depends on open source assets



Company is a stakeholder in the success and direction of the OS assets

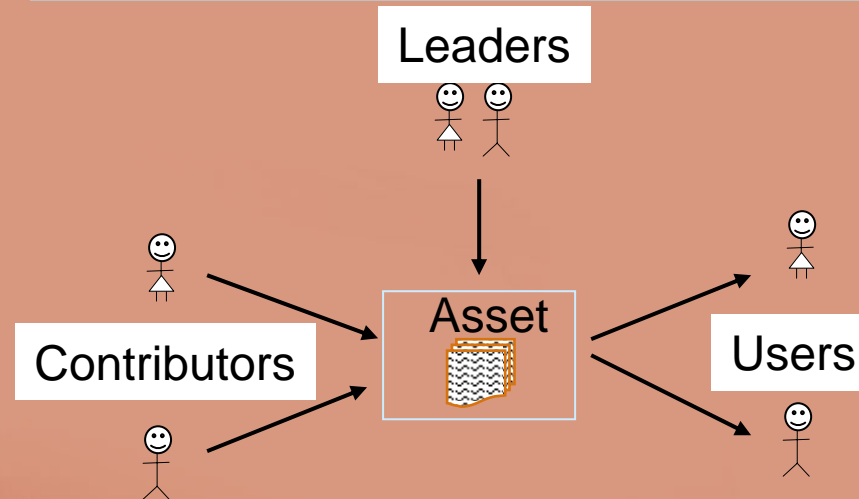


Company participates in the OS project:

- Contributes: bug reporting, documentation, code
- Uses: visibility as a customer and advocate
- Leads: talent to direct technology & project

# Company's checklist of open source related activities

- Increase number and diversity of talented contributors
- Provide opportunities to contributors based on merit
- Keep barriers to contributing low
- Maintain transparent processes and decisions
- Enlist non-discriminatory rules
- Advocate strong and appropriate leadership
- Compete for leadership positions



- Communicate the benefits of using open source asset

- Ensure compliance with interfaces: tests as contracts
- Ensure that IP of contributions and distributions are clean
- Make knowledge required to advance open source asset widely available
- Make production of open source assets and market offers that rely on these assets efficient

# Agenda

- Key problems a technology company faces
- Fundamentals of business ecosystems
- Ecosystem approach to commercialization

15 minute break

- Discussion about:
  - Lead projects that use ecosystem approach
  - Attractive niches in healthy ecosystems
  - Topics for TIM theses and projects



# Talent First Network and CEA3N were designed to exploit ecosystem approach

- Use TFN funding to build ecosystems anchored around open source stacks
  - Call for proposals for POP
- CEA3N is going ahead
  - Founders: Nortel, IBM, Carleton U.
  - Plan in two weeks
- TFN's second round of funding

# Talent First Networks' initiatives

Lead projects	Business ecosystem	Knowledge production	Knowledge dissemination
<p>DE and archiving</p> <p>Consumer electronics</p> <p>Geospatial</p> <p>Publishing businesses</p> <p>OER</p> <p>Simulation, modelling and animation</p> <p>Social innovation</p> <p>Business intelligence</p> <p>Requirements management</p> <p>Home grown projects - faculty driven</p>	<p>55 companies</p> <p>4 university spin outs</p> <p>Talentforge.org</p> <p>CEA3N</p>	<p>TIM theses and projects in</p> <p>Joint research programs with industry and open source foundations</p> <p>Curriculum</p> <p>OER production</p>	<p>OSBR.ca</p> <p>OSBC</p> <p>Lecture series</p> <p>TFN Showcases</p> <p>Gate reviews</p> <p>Seminars</p> <p>Camps</p>

# Attractive niches

- Communications enabled applications
- Communications enabled consumer electronics
- Geospatial
- Open educational resources
- Business intelligence
- ???

# New ecosystem related topics for TIM theses

- How do specific company tactics affect collective actions in an ecosystem (e.g., release proprietary code as open source)?
- How do ecosystems compete (e.g., Eclipse, Microsoft Visual Studio, Suns' Java Beans in the IDE space)?
- How do ecosystem leaders gain and abuse power?
- Compare effectiveness of various approaches to commercialization: ecosystem vs connect and develop vs technology transfer vs other
- Best practices managing company's interdependencies and accelerating adoption in an ecosystem context?
- How to build ecosystems anchored around customer driven innovation?
- What are material differences between supplier- and buyer- led ecosystems?
- How to build an ecosystem to support open standard adoption?
- Other topics?

# TIM theses in progress

Operationalizing ecosystem health constructs (Andrew Pullin)	<ul style="list-style-type: none"><li>• Way to assess ecosystem health using open source tools and data freely available on Internet</li><li>• Prototype</li><li>• Guidelines on how to develop tools to measure ecosystem health</li></ul>
Ecosystem approach to FOSS/COTS integration: Case of SCOPE Alliance (Jeevitahn Muttulingam)	<ul style="list-style-type: none"><li>• Factors that drive ecosystem approach to platform development in telecommunications</li><li>• Key internal changes that must be implemented</li><li>• Relationship between platform developed externally and market opportunities and radical innovation</li></ul>
How companies make money from open source hardware projects (Edy Ferreira)	<ul style="list-style-type: none"><li>• Ways to make money using open source hardware</li><li>• Similarities and differences between open source hardware and software development and commercialization processes</li></ul>
Governance of open source foundations (Xie Zhensheng)	<ul style="list-style-type: none"><li>• Types of governance structures used by open source foundations</li><li>• Practices of Boards of open source foundations</li><li>• Ways companies are engaged in governance of open source foundations</li></ul>

# TIM theses in progress (continued)

Company interactions with open source projects to deliver value to customers (Stephen Lombardi)	<ul style="list-style-type: none"><li>• Ways companies interact with open source projects and customers to create and appropriate value</li></ul>
Motives that drive companies to establish open source projects (Glen McInnis)	<ul style="list-style-type: none"><li>• Empirically identified motives for companies establishing open source projects</li></ul>
Developing a platform for communications enabled consumer electronics ecosystem using a test-driven development framework (Nadia Saad Noori)	<ul style="list-style-type: none"><li>• Describe ecosystem for webcasting / conferencing platform development</li><li>• Platform prototype</li><li>• Characterize TDD utilization as part of ecosystem approach to product development</li><li>• Metrics to measure product quality and link between product quality and ecosystems</li></ul>
Rules to design effective ecosystems: case of open source appliances (Mahoor Ahmadi)	<ul style="list-style-type: none"><li>• Design rules for effective ecosystems</li><li>• Observations on how two ecosystems were built</li></ul>



# TIM theses in progress (continued)

Methods to ensure clean intellectual property used in software companies (Kamal Hassin)	<ul style="list-style-type: none"><li>• Existing processes to attain clean IP</li><li>• Layered definition of clean IP based on Clean Room abstraction</li></ul>
Commonalities and differences between open educational resources and open source software (Monica Mora)	<ul style="list-style-type: none"><li>• Comparison between open educational resources (OER) and open source software</li><li>• Characteristics of the relationship between governance structure and OER production</li><li>• Ways OER projects harness innovation distributed worldwide</li></ul>
User perspective of releasing proprietary code as open source (Mekki MacAulay)	<ul style="list-style-type: none"><li>• Results of testing hypotheses examining user perceptions associated with a company's release of code as open source</li><li>• Observations useful to managers considering releasing code as open source</li></ul>
Venture capital and open source startups (Howard Ye)	<ul style="list-style-type: none"><li>• Motivations for venture capital (VC) firms to open source startups</li><li>• How VC funded open source start ups make money</li></ul>



# TIM theses completed

Open source software projects, market offers, and competitive advantages (Richard Alam)	<ul style="list-style-type: none"><li>• Types of market offers of companies that use software produced by the open source projects they established</li><li>• Ways open source is integrated into market offers</li><li>• Observations on the use of open source as a complementary asset</li><li>• Benefits and risks of establishing open source projects</li><li>• Differences between open source, strategic alliances, standards and freeware</li></ul>
Sales generated using open source projects (Jihong Yang)	<ul style="list-style-type: none"><li>• Structure open source companies use to generate sales</li><li>• Risks companies face when they rely on open source projects</li><li>• Motives for software companies setting up open source projects</li><li>• Motives for software companies to contribute to open source projects</li></ul>
Examining open source investment aggressiveness of large computer and telecommunications firms (Lenny Li)	<ul style="list-style-type: none"><li>• Profiles of companies that invest in open source software projects</li><li>• Factors that affect investment aggressiveness of large companies</li><li>• Model of large company investment in open source</li></ul>
Assessing the release of proprietary code as open source: large company case (Xiaoling Liu)	<ul style="list-style-type: none"><li>• Changes to the ecosystem and business models introduced when a company releases code as open source</li><li>• Ways companies that release code create and appropriate value</li></ul>

# TIM theses completed (continued)

Company interactions with open platforms: Case of Carrier Grade Linux (Tammy Yuan)	<ul style="list-style-type: none"><li>• Motivations for companies to incorporate CGL specifications into their market offers</li><li>• Ways companies that incorporate CGL into their specifications create and appropriate value</li><li>• Roles companies play in the business ecosystem anchored around the CGL Working Group initiative</li></ul>
Open source companies in telecommunications (Peter Liu)	<ul style="list-style-type: none"><li>• Type of innovations open source telecommunications companies represent</li><li>• Types of relationships between market offers and open source assets</li><li>• Types of relationships between open source telecommunications companies and the open source projects upon which they depend</li><li>• Ways open source telecommunications companies use open source to make money</li><li>• Benefits and risks of telecommunications companies that rely on open source to make money</li></ul>
Using theoretical perspectives to predict the size of addressable markets for mobile payment systems (Veronica Giggey)	<ul style="list-style-type: none"><li>• Method to include parameters derived from theoretical perspectives into sales forecasting models</li><li>• Sales estimates using method</li></ul>

# ..and many more TIM theses and projects

- For a complete list of completed TIM theses and projects, please go to:

[www.carleton.ca/tim](http://www.carleton.ca/tim)

- To apply to TIM program, go to:

<http://www.carleton.ca/tim/sub/apply.html>

# TIM faculty

- Tony Bailetti (Bailetti@sce.carleton.ca)
- John Callahan (John\_Callahan@carleton.ca)
- Douglas King (King@sce.carleton.ca)
- Thomas Kunz (TKunz@sce.carleton.ca)
- Steve Muegge (SMuegge@sce.carleton.ca)
- Stoyan Tanev (Tanev@sce.carleton.ca)
- Michael Weiss (Weiss@sce.carleton.ca)