Exploring and Preserving the Socio-Technical Underpinnings of the Success of the Unlicensed Revolution

Sometimes we study history to avoid making the same old mistakes; Sometimes we study history to learn how to repeat past success

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Wireless Spectrum Research and Development Workshop IV:
Promoting Economic Efficiency in Spectrum Use:
The Economic and Policy R&D Agenda

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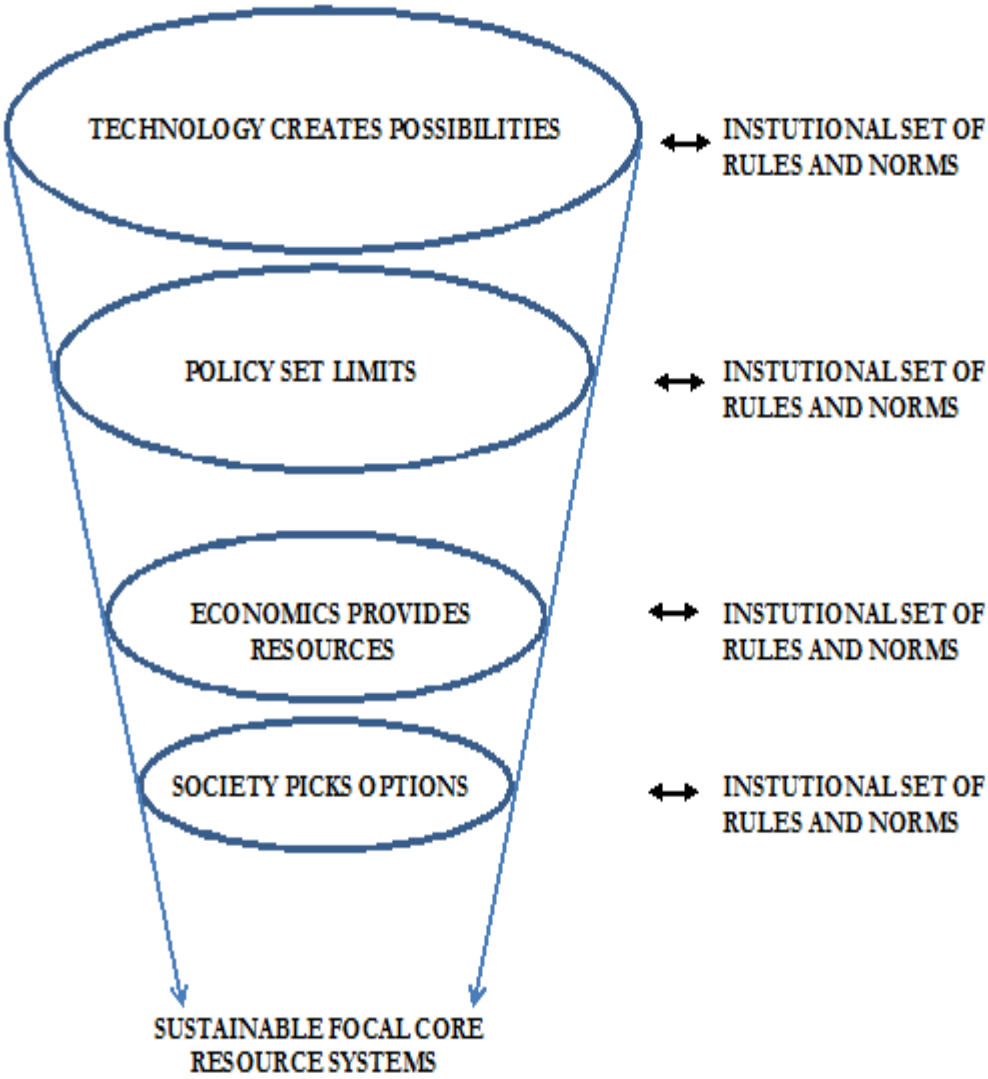
PART 1:

CONSUMERS WANT TO PRESERVE AND EXTEND THE DYNAMIC DIGITAL COMMUNICATION ECOLOGY

The Digital Model of Communications:

- Brutally Simple, Amazingly Efficient Communications Protocols
- Shared Space: Facilitates Entry, Stimulates Innovation and Fosters Entrepreneurship
- Public Policy Creates and Preserves the Open Space
- Voluntary, Private Action Governs the Resource

SOCIAL STRUCTURE AND SUSTAINABLE RESOURCE SYSTEMS



THE ECONOMIC BENEFIT OF UNLICENSED SPECTRUM IN A MIXED LICENSED/UNLICENSED WIRELESS SECTOR

Improves Economic Performance by Overcoming Traditional Market Imperfections

- Captures what would be externalities with respect to licensed approaches.

- The unlicensed model removes the spectrum barrier to entry, which is the primary obstacle by allowing anyone to transmit signals for any purpose.

- This removes the threat of hold up, in which the firm that controls the bottleneck throttles innovation by either refusing to allow uses that are not in its interest, or appropriating the rents associated with innovation.

- It lowers the hurdle of raising capital, by eliminating the need for a network and focusing on devices.

- It fosters an end-user focus that makes innovation more responsive to consumer demand AND allows direct end-user innovation.

- It de-concentrates the supply of services compared to the exclusive licensed model, especially for high bandwidth services which tends to result in a very small number of suppliers, particularly in lower density markets.

THE ECONOMIC BENEFIT OF UNLICENSED SPECTRUM IN A MIXED WIRELESS SECTOR

Lowers Transaction Costs.

- Well-written rules allow many people to transmit for many purposes, while avoiding interference.
- In the FCC's approach
  - The use rules were simple and established an easy set of conditions with which devices had to comply.
  - They did not require intensive, continuous monitoring and coordination.
  - There were no membership rules. Anyone could enter and use the shared resource.

Creates a Much More Diverse Sector.

- Diversity has come to be recognized as a uniquely important characteristic of economies and economic systems
- Diversity creates value, enhances innovativeness and builds resilience, as well as promoting other social values like pluralism.
- Diversity is created by three systemic characteristics – variety (the number of firms), balance (market shares of firms) and disparity (the differences between the firms).
- The diversity that a different ownership model introduces into the communications ecology provides the uniquely significant benefit of introducing a different perspective that is ideal for enhancing diversity.

PART 2:

MEETING THE MATURATION CHALLENGES OF THE DIGITAL REVOLUTION BY ADAPTING TO THE UNINTENDED CONSEQUENCES OF SUCCESS:

- Exaflood of data, Influx of diverse interest
- The challenge of change in the face of success > adaptation, not reform

The research questions:

- Which rules and roles can we change and how much can we change them without undermining the core functioning of the resource system?

Sources of Organizational Advantage

Focal point of Activity	Resource Exploited	Process	Benefit
Supply-side			
Internet/Unlicensed Spectrum	Networks	Open Entry/Standard Decentralized investment	Ease of entry, Innovation at the Edge
Mesh Networks	Spectrum	Embedded Coordination in algorithms	Dynamic Occupation of spectrum
Open Source	Software Code	Embedded Knowledge in software	Exploit rich information
Peer-to-Peer (music, video)	Content, Storage, Bandwidth	Torrenting, Viral Communications	Cost Reduction Expansion of throughput Broad Exchange Collaboration
Party/campaign	Engagement	Texting, shared lists	Resources, Time
Transaction Cost Reduction			
All	Local knowledge	Consumer as producer	Fit Between consumer needs and output
Demand Side Value Creation	Network	Self-organizing	Increased option value

ANALYTIC FRAME FOR UNDERSTANDING THE SUCCESS OF FOCAL CORE COMMUNICATIONS RESOURCE SYSTEMS

RULES, FUNCTIONS & INFLUENCES	DESIGN PRINCIPLES	PAST	FUTURE
Structure and Units			
Boundary Rules	Clarity of Membership		
Position Rules	Clarity of Resource		
	Congruence between membership & resource		
Control			
Appropriation Rules	Fair, orderly, efficient		
Provision Rules	Incentive to contribute		
	Reflect local conditions and be congruent		
Users and Uses			
Collective Choice	Participation		
	Power to act		
Payoff	Cost/Benefit		
Governance			
Monitoring	Present		
Enforcement	Graduated response		
	Accountability		
Information	Local Knowledge		
	Flow for monitoring		
Socio-ecological Setting			
External Drivers	Government		
	Recognition of rights to organize		
	Economic		
	Nested Enterprise		

Potential Principles for Successful Adaptation

- Pursuing new goals with minimal infringement on “old” rules

- Capture the benefit of functional specialization without incurring the cost of fragmentation
  - Identifiable uses that demonstrate they “require” preferred access
  - Utilize all previously dedicated spectrum resources first
  - Impose smallest possible restriction on access to shared resources

- Open access within categories

- Transparency between categories

- Presumption/Burden of Proof