BBL Seminar
Handout

December 7, 2011

"Standards, Platforms, and Public Policy"
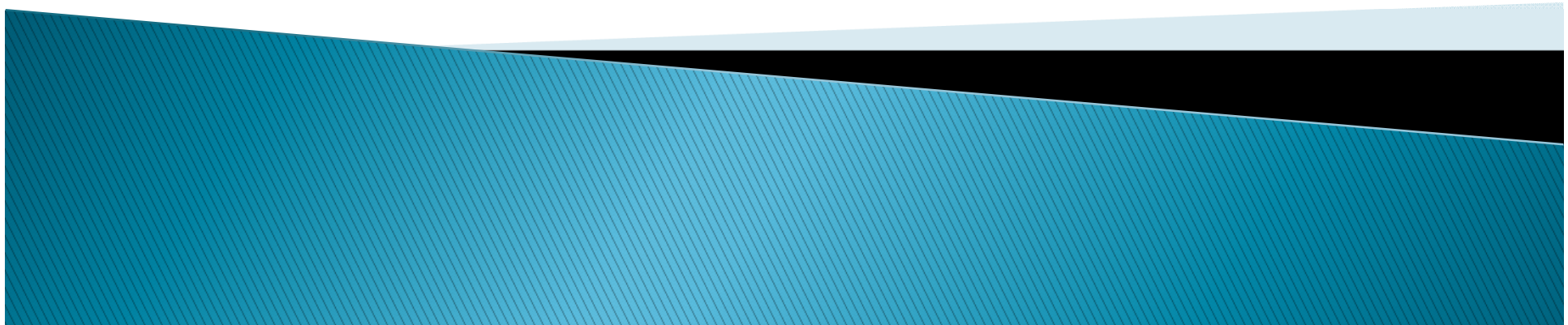
Shane Greenstein

http://www.rieti.go.jp/jp/index.html

Standards, Networks, and Policy
規格、ネットワーク、およびポリシー

Shane Greenstein
Kellogg School of Management
Northwestern University

Thank you　ありがとう

▸ Thank you for hosting me.
  ◦ Big thank you Dr. Reiko Aoki!

▸ Thank you for opportunity to talk with you.
  ◦ Interested to know what is useful.

▸ Please ask questions.
  ◦ I tend to talk quickly…
  ◦ Apologies in advance…just slow me down.

Outline

- **Introduction,はじめ**
- Illustrations,イラスト
- Key concepts,キーコンセプト
- Evolution of platforms,プラットフォームの進化
- Conclusions,結論

What is the question?
質問とは何ですか？

- *What does the (old and new) literature on standards suggest about government policy?*
  - When should policy makers intervene in markets where standards play a large role?
  - When is a government policy that favors compatibility between standards superior to a policy that favors competition between standards?
  - How well do non-market mechanisms perform in comparison to market mechanisms?
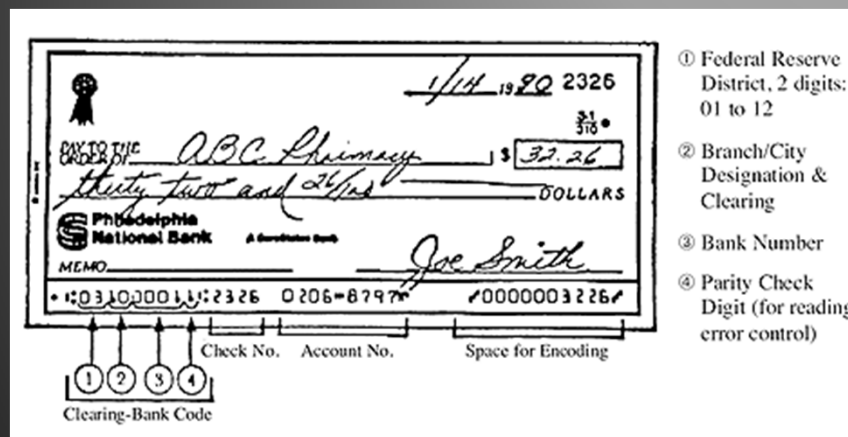- *What are the big open questions?*

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Why policy cares about standards?
ポリシーは、標準規格を気になぜ？

- Let me start with a personal story….
- Victor Stango & I edited a book, *Standards and Public Policy* (Cambridge Press, 2007).
- Why did we do this book?
  ◦ Michael Moskow, head of the Chicago Federal Reserve Bank at the time, asked for it (and paid for it!).
  ◦ Moskow was Victor Stango's boss.
- Why did Moskow want his research department to investigate standards?
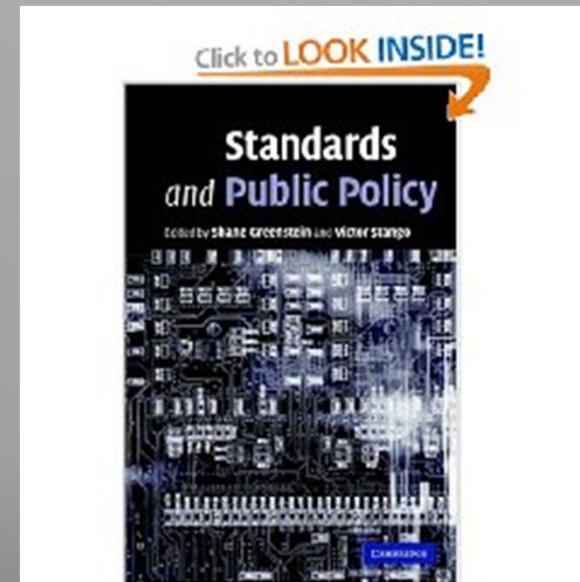
Moskow believed check clearing had gotten easier due to standards

同総裁は、チェックのクリアを基準に簡単に起因得ていたことを知っていた

① Federal Reserve District, 2 digits: 01 to 12
② Branch/City Designation & Clearing
③ Bank Number
④ Parity Check Digit (for reading error control)

Check No. Account No. Space for Encoding

Clearing-Bank Code

- The Fed had helped push through standards for checks clearing.
  - Improved efficiency in processing checks.
  - Helped the Fed while helping the industry.
  - Large gains for US economy.
- Did not happen until Fed did it. No individual bank could get others to agree. Fed endorses a design.
  - Moskow received many suggestions for additional things to endorse.
  - But he was very wary of making a big mistake….
- Moskow wanted to know: When to intervene and when not, and why?

Outline of main theme
メインテーマの概要

- *Old & new literature on standards differ in their analysis of the effects of standards on markets, so differ in framework for policy.*
  - Old literature focuses on the demand for compatibility & the creation of switching costs.
  - Focused on the number of ways in which standards limits the distortions from switching costs.
- *New literature focuses on competition between platforms which embed standards.*
  - Shifts focus to analysis of participation & adoption of platforms by users, developers, advertisers.
  - Investigates multiple ways to grow a platform, and the effects of intervention on platform growth.

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The purpose for the illustrations
イラストの目的

- *Motivate general approach to thinking about standards and platforms.*
  - How do standards help markets emerge out of an exploratory period?
  - What are the catalysts for growth of mass markets?
- *How do competitive events and governance interplay as platforms evolve?*
  - Does governance respond to competitive pressure?
  - Does competition act as check on poor choice of governance?
- *Where can policy make a difference?*

Illustration: Wi-fi
イラスト：無線LAN

- *Experiments throughout most of the 1990s.*
  - Early wireless LAN designs generated little sales
  - Interesting usage cases – campuses, warehousing, wireless cash registers.
  - Equipment firms the primary innovators.
- *IEEE committee 802 designed an interoperability standard. First released in 1997, again in 99.*
  - Helped commit firms, grow mkt size.
  - Used unlicensed spectrum so all could interoperate.
- *Market competition pushed it forward in 99.*
  - Apple commissioned first product from Lucent. Dell was next. Competitive rivalry took off after that.

Wi-fi continued
無線LANは続けた

- *Firms formed an alliance shortly thereafter*
  - For conformance testing
  - For branding. Name "Wi-fi" chosen.
- *The unexpected emergence of the "hot spot".*
  - Experimentation by access providers.
  - This was the most valuable use. Variety of models.
- *Unexpected design of Centrino in 2003*
  - Intel designed Wi-fi into motherboard.
    - Intel also designed the chip set to be a commodity.
    - Further cost declines. Fostered ubiquitous use.
- *IEEE committee continued to upgrade speeds....*
  - Each redesign has become more contentious.
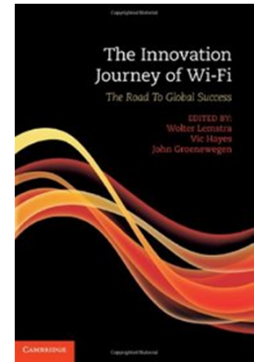
Observations about Wi-fi
Wi - Fiに関する観測

▶ *Experimentation continued for some time*
  ◦ Throughout most of the 1990s wireless LANS were not a profitable market! But many believe in the usage case, which propelled experimentation by equipment firms.
▶ *Breakthrough with an unexpected use.*
  ◦ Leapfrog functionality for the mass market required making equipment at a low cost price point.
  ◦ IEEE-endorsed standards contributed to growth because antenna and receivers had to interoperate.
  ◦ Growth in ubiquity encouraged more follow-on complementary uses.
▶ *Sponsors attempted to profit.*
  ◦ By selling equipment.
  ◦ By taking a slice of access revenue.
  ◦ Policy enabled considerable experimentation.

Illustration: Android's evolution
イラスト：Androidの進化

- *Experiments early by leading firms & entrepreneurs.*
  - Smart phone designs from Microsoft and many others.
  - Limited adoption in US, more outside US.
- *Unexpected emergence of the iPhone in 2007.*
  - One touch movement: a leapfrog in functionality.
  - Bringing the iPod installed base + phone + pictures.
  - Apple has a core of fanatical and loyal buyers → sales.
- *Ecosystem develops for mass market iPhone.*
  - Apple adopts strict rules for developers. Resentment.
  - Tries to dictate standards (e.g., Flash). Anger.
  - Apple profits in App store.

Android continued
Androidは続けた

- *Google looks for competitive response to Apple.*
  - Strategic issue: deter proprietary standards.
  - Buys Android OS, redeploys it with open APIs to invite partnerships. Allows variance in implementation.
  - App store → ecosystem, Android profits in app store.
- *Growth due to less restriction and lower price*
  - Not as profitable as iPhone. Growth through variety.
- *Change in competitive landscape?*
  - MS almost gone, Symbian declines, Blackberry in trouble.
  - Tablet competition? Amazon, Apple, B&N, Sony.
  - Many other firms involved (Nokia, MS, HP, Samsung, etc.)

Observations about Android
Androidについての観察

- *Experimentation propelled by software firms.*
  - Through most of the 2000s Microsoft did not have a profitable mobile segment. Usage case presumed strong interplay with PC. Presumed pieces came from many players, organized by Microsoft.
- *Breakthrough with an unexpected use.*
  - Music + phone + pictures + finger navigation = leapfrog functionality for the mass market
  - Required making equipment at a low cost price point.
  - Proprietary standards contributed to the virtual cycle because copyright holders wanted IP for music.
- *Android a competitive response*
  - Strategic benefits towards openness pay off for Google.
  - Revenue in app store too.
  - Many others want open, such as Amazon, and most entrepreneurs and their VCs....

Summary of lessons
レッスンのまとめ

- *Experimentation can continue for some time*
  - ◦ Variety of strategic choices over time.
  - ◦ Usage case propels activity, search for value.
  - ◦ Often unprofitable for extended periods.
  - ◦ Standard/platforms vary with experimentation.
- *Breakthrough often unexpected.*
  - ◦ Leapfrog functionality or other catalyst, such as a new design with wide appeal.
  - ◦ Important: Applications develop → ecosystem.
    - Especially developer behavior → choose among platforms.
- *Sponsors attempt to profit.*
  - ◦ Sell equipment, gain revenue within given platform.
  - ◦ Designers, sponsors, close allies typically benefit more.

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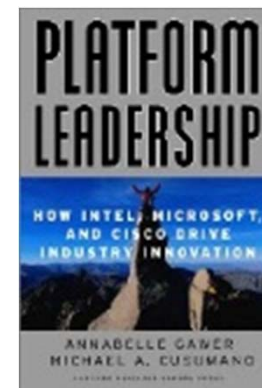▸ Conclusions,結論

What role do standards play?
基準は、どのような役割を果たすのですか？

- *Facilitate inter-networking.*
  - Data in one location shared w/many other locations.
  - Contribute to low costs for Internet applications.
  - Many standards facilitate routinized procedure for sharing data.
- *Facilitate network effect.*
  - Value of a standard rises w/participation.
  - Standards facilitate interoperability, services build on top of that interoperability, and these services display network effects.
- *Platforms reduce transactions costs*
  - Between complements components that work together…
  - Between users and application developers.

Multi-sided platforms play a role
マルチサイドプラットフォームの役割を果たす

‣ *A platform: Reconfigurable base of compatible components on which participants build applications.*
  ◦ Multisided: Many distinct group of participants
    • Users, advertisers, content providers, app developers, etc.
  ◦ Platform accommodates each group.
  ◦ Often subsidy/cost for one group & revenue from another.
    • Ex: Newspaper, Google search, Apple iPhone.
‣ *Platform serves economic function, as intermediary between groups with different interests.*
  ◦ Which supports mix&match.
    • Among antennae and receivers in Wi-fi.
    • Among apps, handsets, and users in Android.

PLATFORM LEADERSHIP

HOW INTEL, MICROSOFT, AND CISCO DRIVE INDUSTRY INNOVATION

ANNABELLE GAWER
MICHAEL A. CUSUMANO

Platform leadership plays a role
プラットフォームのリーダーシップは、役割を果たしている

▸ *Leadership affiliated w/designing computer hardware and/or software that mediates activities among participants.*
  ◦ Many firms aspire to leadership role.
    • MS, IBM, Oracle, Google, Apple, Amazon, etc.
    • Windows, web services, search, mobile devices.

▸ *What role entails*
  ◦ Design standards. Alter them. Inform others about alteration. Roadmaps & targets. Provide assistance.
    • Lower the transactions costs for partners.
  ◦ Timing mismatch of costs/revenues: Expend costs in design/operations. Gain revenue later.

Variety of platform leadership
プラットフォームリーダーシップの様々な

- *Both profit or not for profit forms*
  - NFP: Industry consortia, SSOs, Open source org.
- *Important aspects: Restrictions/limitations on participation and release of information.*
  - Open: make all info available. No limits on use.
  - Differ on interconnection. Open has no limit.
  - Pricing at zero? Maybe in open source, but not necessarily.
    - Confusion about free/libre.
- *Platform governance shapes several margins of potential platform value.*
  - Not only price. Many strategic choices, often taken at moments when payoffs quite uncertain.
  - Particularly important decision: what technical information developers know about present and future plans for the platform.

Summary of key observations
キーの観測の概要

- *Analysis of standards needs to frame issues in terms of platforms.*
  - Platforms are an organizational form for market oriented users & firms, designed to diffuse standards in manner that serves platform sponsor.
  - Literature stresses private strategic purposes.
- *Analysis should focus on participation in and adoption of platforms.*
  - By users, developers, advertisers.
  - Shift in emphasis. Places less emphasis on engineering function, more on economic decision making and economic contribution of platform.
- *Important policy question: regulatory and legal rules for how platform leader treats participants.*

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Policy analysis & platform evolution
政策分析とプラットフォームの進化

- *Standards and platforms are rarely static.*
  - Most are embedded in products that continually upgraded, etc. Standards change.
  - Platforms add value over time.
- *Platforms shapes firm competition.*
  - One ecosystem may compete with another.
  - Competition evolves as both platforms evolve.
- *Policies shape the evolution of competition*
  - By shaping firm incentives, and rules for platform.
  - By shaping the margins on which firms compete

Coordination and Learning
協調と学習

- *Participants gain from involvement w/platform.*
  - In comparison to unilateral action.
  - Potential bargaining issues or misalignment of cost/benefit.
    - Ex: Bar code scanner useful if all cooperated. Bar code almost collapsed b/c little profitability in first decade.
- *Platforms become focal for learning and experimentation.*
  - A societal trade-off: Concentrate learning with fewer platforms, but more platforms nurtures variety & competition.

Key questions for policy analysis
政策分析のためのキーの質問

▶ *If platforms add value w/o limit...*
- Existing platforms grow, but there are inherent limits on numbers of platforms.
- Backward compatibility tends to limit growth of any specific platform (eventually).

▶ *Platforms competition incents platform differentiation.*
- Nurture survival of multiple platforms in market.
- On what margins do platforms compete?
  - Generally, not on all margins.

More key concepts
より多くの主要な概念

▸ *Multi-homing: users and/or firms maintain viable economic relationships w/multiple platforms.*
  ◦ More MH can help sustain more platforms competition.
  ◦ Absence of MH can contribute to monopoly of platform.
  ◦ Many examples of where it matters: Bar codes, Battle of the Bund, Internet BB, Smartphones

▸ *Converter: Technical bridge b/w platforms*
  ◦ Can change size of market, alter evolution of platforms.
  ◦ Examples: US email systems in 1987; Resolution of 56K modem fight.

▸ *Multiple pathways to platform development.*
  ◦ Many ways for market to evolve and achieve economies of scale.

Symptoms of experimentation?
実験の症状？

▶ *Early stage quandary: what design/operation most valuable?*

- ◦ Many usage cases for early adopters do not imply usage case for mass market adopters.
- ◦ Public actors can facilitate experimentation.
  - · At early moments, pursuit of variety of approaches.

▶ *Quandary: Is market working? Look for symptoms of health.*

- ◦ Economic experiments, entrepreneurial entrants, vigorous standards competition, absence of unilateral bargaining.

Symptoms of virtuous cycles?
好循環の症状？

- *Quandary: Are platforms growing? Hints of virtuous cycles.*
  - One participant's action raises value of participation in another type of participant. E.g., more users → more apps→ more ads.
  - E.g., IBM PCs in early 80s, Apple iPhone in '07.
- *Developers are focal for analysis.*
  - As symptom of success/failure of virtuous cycle.
  - Difficult management challenge for many platform sponsors.

Summary
まとめ

- A complete analysis requires analysis of change over time, (often) at level of platform & (sometimes) at level of firm.
- Multiple pathways for platform evolution to take. Firms usually have preferences about which path the market takes, but policy may not have strong preferences.
- There are a variety of intuitive concepts to analyze evolution as it occurs.

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- **Conclusions,結論**

Policy when standards are not static
標準は静的ではない政策

- *Private orderings can (& do) resolve issues.*
  - If the conditions are right.
    - Often a few large lead organizers w/incentives to lead.
    - Many producers of complementary goods.
  - If "joining" a coalition is voluntary, hard to design standards that makes everyone happy.
    - Bargaining and negotiation inevitable.
- *Standard more than just endorsement of a design.*
  - Changing w/technological possibilities, firm needs.
  - Institutions to support, upgrade, test.
    - Firm interest change over time.
- *Even after a breakthrough, there will be many changes in a design.*
  - This usually creates more value for all participants.
  - Implies policy cannot be static.

Policy for information disclosure?
情報開示のための政策？

- *Disclosure raises many issues.*
  - Disclosure rules in standards committees shapes whether firms participate.
    - Sometimes *interoperability is why* firms participate – they want assurances that all the complementary equipment works together.
  - Firms pay close attention the disclosure rules.
    - Big difference between open and proprietary platforms when IP is at stake.
    - Open platforms will elicit disclosure from private firms, but only if rules are tightly written.
- *Who is favored by disclosure rules?*
  - Important open question for policy.

Summary of broad policy lessons
広範な政策上の教訓のまとめ

- *Generally when to consider intervening.*
  - When one platform better than none. When intervention can avert bargaining failure.
  - When public actor hold statutory authority over key input into platform components.
  - When intervention facilitates entry and/or experiments.
- *Generally when not to intervene.*
  - When private orderings can manage platform development.
  - When platform competition shows symptoms of vigor.
  - When use case remains uncertain, but private initiatives continue to experiment and compete.
- *Government mandates for designs only rarely will work better than market processes.*
  - Due to leadership failures or statutory requirements.

Thanks for your attention

▸ ご清聴ありがとうございました
▸ ご質問は？