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Interoperability in IoT: Open Standards vs Silos

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1. Platform-based models for analysing innovation
2. What would happen if...?
3. Dimensions of comparison to evaluate the “quality” of innovation:
 - price
 - speed
 - transparency/social accountability
 - competition
4. Conclusion



1. Platform-based models for analysing innovation



4 ideal types of platform-based organisational models



	<i>Internal platform</i>	<i>Silos</i>	<i>SSOs</i>	<i>OSS</i>
Agents	Firm + sub-units or Assembler + Suppliers	Leader + complementors	Innovators + Implementers	(Supporting org) + developers
Core value	Hierarchy	Leadership	Negotiation	Collaboration
Coordination mechanism	Command & control / Contractual	Orchestration of the leader	Consensus	Decentralization
Advantages vs disadvantages of coordination mechanism	Efficiency vs limiting incentives to innovation	Speed vs lock-in	Technical quality and stability vs lengthy process	Free modification and distribution vs instability
Interoperability	Vertical	Vertical	Horizontal	Might or might not be assured
Competition issues	Traditional	Winner takes all dynamics	SEPs and FRAND agreements	None



2. What would happen if...?



A mental experiment

- ❖ **What would happen if *PageRank* was developed by a Standard Setting Organisation?**
 - Today the essential technology behind PageRank is maintained as a trade secret. While there is a Google patent for PageRank (no. 6,285,999), there many aspects of this search technology that are not addressed by the patent (i.e. the number of parameters used to weight the webpages)
- ❖ **What would happen if the *5G* was a proprietary development of a GAFAM-like company?**
 - Today 5G is the fifth generation of cellular network technology developed in the collective context of the industry association 3GPP and implemented by a plurality of companies



3. Dimensions of comparison



Price - SSOs



- ❖ In the context of the cooperative process of standard-setting, a core problem is deciding the “right” distribution of rewards among innovators, and between innovators and implementers
- ❖ The large majority of SSOs have chosen to adopt some form of FRAND licensing, asking members to commit to license any patent essential for the realization of the standard on **fair, reasonable, and non-discriminatory terms**
- ❖ SSOs are coping with a crucial problem of “contractual incompleteness”: their pricing policy omits to govern “the future” and involve substantial ambiguities
- ❖ The frequency of litigations shows that the effectiveness of SSOs “pricing through FRAND” at present is unsatisfactory



Price - Silos

- ❖ Silos are typically “multi-sided markets”: levels and structure of prices are set to optimize output by fully harvesting the network effects that are available on both sides
- ❖ In terms of rewards to innovation, the core-periphery organization of Silos tends to concentrate the profit at the core, leaving the remuneration of innovation at the periphery quite uncertain
- ❖ Taking as an example the search market, the pricing structure developed around online advertising is uniquely complex and opaque. This might lead to higher prices for advertisers, as well as loss of innovation since the surplus that could have accrued to contents’ creators is captured by Google



- ❖ **Lengthy** innovation **processes** are an historical and critical feature of **SSOs**. Innovation is slow and is achieved through laborious processes of consensus-building and therefore, advances by discrete steps
- ❖ As an example, 3GPP is articulated into 4 broad technical areas and 17 working groups: in a typical working group working on the technical specifications of a new feature, member orgs submit technical documents called contributions which are reviewed and discussed amongst all the members in the working group meetings before approval/rejection (LTE Rel 13 had some 730,00 technical contributions and 1261 technical specifications)



Speed - Silos

- ❖ Innovation processes in **Silos** are **continuous** and **fluid**: in the app markets, innovation is produced on top of platforms' core resources and the platform owner is able to influence the innovation process by managing the openness of its resources (such as APIs, SDKs, code libraries, templates)
- ❖ The platform owner does not know which developers will succeed in the market and therefore which assets to promote or acquire, but it can wait and profit from external developers' success before, and eventually acquiring some of them, without assuming any specific risk



Transparency/Social Accountability - SSOs



- ❖ The complex rules governing participation and decisions in SSOs are oriented at preserving **transparency** of standard-setting processes as a key feature of SSOs
- ❖ Standards have enjoyed a public character for much of their history
- ❖ In recent decades, given the market-wide benefits perceived to flow from broad interoperability, agencies around the world have begun to view private standard setting as an inherent public function enhancing the request for accountability



Transparency/Social Accountability - Silos



- ❖ A substantial part of silos' success rests on trade secrets
- ❖ The growing use of algorithms in social and economic life has raised more than one concern as they may “inadvertently” discriminate against certain groups. The controversies surrounding ‘fake news’ in Facebook and the accusations that Google’s search algorithm is racially, politically (and economically) biased are examples of these worries
- ❖ The public request is for more transparent business practices in digital markets leading to more accountability but this is not easy to achieve for silos, as is shown by the controversies surrounding the role of major social media in political elections



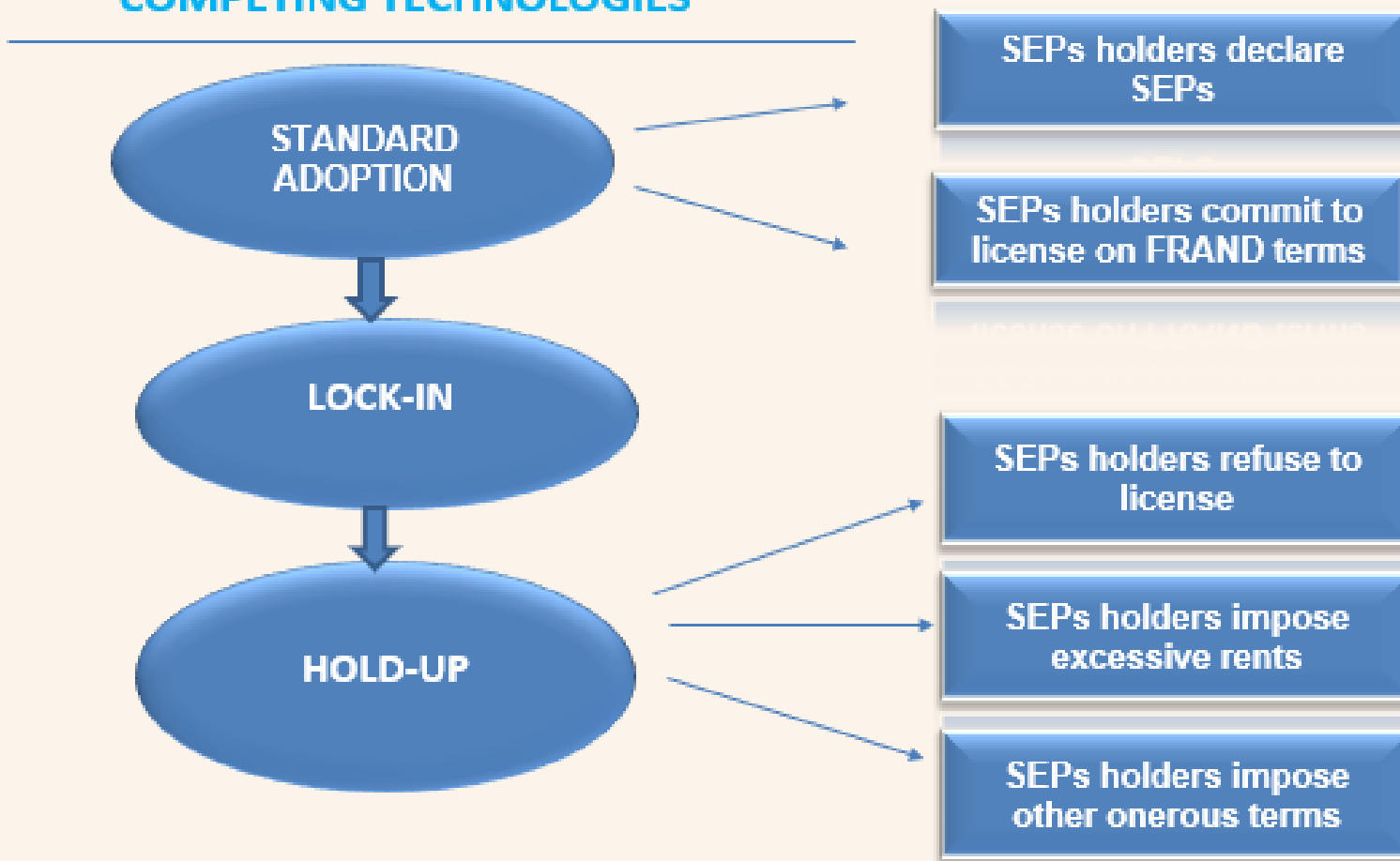
- ❖ Standardization transforms **pre-standard competition** among alternative technologies into **post-standard competition** among different interoperable implementations of the standard
- ❖ Before the selection of a standard is made, competitors can choose among alternative technologies. Once the standard has been selected flexibility is forgone
- ❖ If an industry has committed itself and investments have been sunk into implementation of the standard **firms become *de facto* locked-in into both the standard and the relevant SEPs, with the risk of conferring significant market power to SEPs' holders**
- ❖ **The SEP may become an essential facility**



Competition - SSOs



COMPETING TECHNOLOGIES





- ❖ **Direct and indirect network effects** represent the key characteristic of two- and multi-sided markets
- ❖ When such effects are positive and strong, platforms tend to enjoy **increasing returns to scale**: users pay more for accessing a bigger network and margins improve as the users' base grows
- ❖ In turn, this may lead to very high concentration or even to a monopoly especially when multi-homing is not attractive, costly or not possible
- ❖ Fostered by the promise of increasing returns, platforms orchestrators can use higher margins as a leverage to invest more in R&D or even to lower prices, **driving or keeping rivals out of the market**



Competition - silos

- ❖ As a consequence, two- (or multi-) sided industries tend to be dominated by a few large platforms. In extreme situations, a single dominant company emerges as the winner, taking (or almost all) the market, giving rise to ‘tippy’ outcomes
- ❖ This is what Schumpeter described as **competition ‘for’ the market** as opposed to competition ‘in’ the market
- ❖ However, technology may produce unexpected results and make such a position extremely temporary. Platform markets can evolve through **sequential winner-take-all battles**, with superior new platforms replacing old ones (e.g. the console’s war Sony’s Playstation vs Nintendo’s SNES)



Conclusion



- ❖ SSOs and Silos are two different models of organising innovation. The affirmation of either model in different areas of the digital economy is still not well understood
- ❖ There are several dimensions to compare SSOs with Silos in terms of ‘quality of innovation’ and we have briefly explored some of them
- ❖ Focusing on competition, for SSOs, worries related to Art. 101 TFEU seem to be vanishing, while worries related to Art. 102 TFEU for SEPs and FRANDs pricing are still heavily debated
- ❖ Regarding Silos, the public policy pendulum is challenging the winner-take-all characteristics and the lack of transparency of algorithms but not directly the innovation issue except for killer mergers...



Many thanks for your attention!!!!