Control as a Strategy for the Development of Generativity in Business Models for Mobile Platforms

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Abstract—The objective of this paper is to put forward a discussion of how a better understanding of the issues surrounding control can be an important element in the development of generativity strategies in business models for mobile platforms, such as Apple’s iPhone. Generativity refers to “a technology’s overall capacity to produce unprompted change driven by large, varied, and uncoordinated audiences” [29]. In this paper generativity is defined as the ability of a self-contained system to create, generate, or produce new content, structure, or behaviour without additional help or input from the original creators [23]. Although generativity is at the core of Apple’s expansion model, the company has to keep a tight control on the innovation platforms in order to protect their revenue sources, whilst at the same time ensuring that this does not stifle third party development and the innovation of compelling services. This is part achieved by the controlling access to the platform through the App Store for all actors of the platform ecosystem. It is possible to analyse the relationships between Apple and the other actors of the Apple Mobile Platform and identify through a longitudinal analysis of control the formation of strategies that balance or shift the control between actors, which gives further insight on possible sources of revenue based on the value network defined for such control points.

Keywords—control, generativity; mobile platforms; Apple; strategies, business models

I. INTRODUCTION

For the purposes of this paper, the relationships between Apple, application developers and other participants are what Tiwana [24] refers to as a digital ecosystem where multiple actors liaise and interact. Additionally a digital ecosystem includes a platform that serves as a core on which others can build modules that are designed to extend the service possibilities of the platform. It also includes various social actors who build the platform and various modules and a regulatory regime including standards that bind these heterogeneous actors together. In this context, control is a major component when trying to understand the interactions between the many actors concerned [24].

The approach to the analysis is illustrated by the case of Apple as a mobile platform and its open versus closed relationship over time to the application developers and their tools for iPhone and iPad services. The data used is a batch of empirically collected data concerning interactions between those two groups. The data is sourced from blogs reporting events in the mobile industry, which were examined to identify the many interactions between platform owners (e.g. Apple as a platform and other external actors). The method of analysis was based on structural narrative analysis, which enabled us to find common ways that platform owners deal with the tension between control and generativity.

As part of the analysis, this paper presents research that aims to discuss how a combination of control and generativity defines the choice of a particular type of longitudinal strategy to deal with conflict between members of an ecosystem. An explanation of the choice is based on the work by Poole and Van de Ven [20]. They proposed a framework of organizational and managerial paradox and suggested that a paradox perspective can serve as the foundation for developing management theory and promote four approaches to resolving organizational paradoxes, to be used individually and in combination [20] of which three were studied: Apple and its relation to digital content publishers, and a further two concerning Apple and Adobe Flash users and Adobe Developer Tools.

Over time, the relationship between Apple and iPhone and iPad application developers has changed, either by controlling the requirements to access the Apple App Store or by defining the type of tools developers are able to use within the Apple ecosystem. In the case of the publishers, the relation did not change for a long period of time, allowing Apple to generate a competitive advantage in this market. The paper has 6 sections, the first being this introduction, section 2 an introduction to mobile platforms and the paradox of control and generativity, section 3 and section 4 describe data collection, focusing on the narratives and discourses in balancing control and generativity as part of
some kind of organizational strategy, section 5 is a brief discussion on the main findings of this analysis, concluding with section 6 which a summarises this research.

II. MOBILE PLATFORMS: THE PARADOX OF CONTROL AND GENERATIVITY

Digital ecosystems represent a dynamic and exciting field of innovation in our contemporary economy. Companies like Apple (and others such as Amazon and Google Android) are pursuing various forms of innovation strategies in order to maximize the value from the business models that they take part in, mostly by engaging external developers and maximizing the technology’s generative potential. At the same time, these firms must balance their acts by dealing with the inherent paradox of control and generativity in digital ecosystems [28].

A digital ecosystem includes a platform that serves as a core on which others can build modules that are designed to extend the service possibilities of the platform. It also includes various social actors who build the platform and various modules and a regulatory regime including standards that bind these heterogeneous actors together. In this context, control is a major component when trying to understand the actions of interaction between the many actors concerned [24].

Mobile platforms are defined as part of a mobile digital infrastructure formed by ecology of devices and services aiming to provide a seamless experience to the network users [27]. In these platforms there are social factors, economic and business factors, network and technical factors contributing to this purpose [11]. There is a growing body of literature that investigates the relationship between control and innovation in mobile ecosystems and value networks [1, 7]. However, there are few, if any, studies that investigate this relationship by analysing the interactions between platform owners and other external actors. It is proposed that insight into these complex interactions will contribute to a better understanding of the dynamics of services on mobile platforms. This is a justifiable contribution, as it concerns the interstices of a number of emerging Information Systems and related domains that are still poorly understood, and whose practical manifestations are contributing to our daily lives both at home and at work.

The tension between control and generativity lies at the heart of digital ecosystem innovation. It is a fundamental component of any service innovation within many mobile digital ecosystems. The issue of managing digital ecosystem innovation can be seen as the continuous process of developers as protagonists seeking to engage in generative acts, further expanding the platform functionality, and an opposing platform owner as antagonist serving the role of moderator and regulator [6] accepting or rejecting generative attempts through the application of control points. The core challenge of innovation in a digital ecosystem is continuously to engage in balancing control and generativity. The tension that results can be observed in the negotiation, made up of complex interactions that occur between the two sides.

A company that creates a platform for a digital ecosystem, a platform owner, must exercise certain types of control – economic, social and technological – in order to appropriate economic rent from the ecosystem [24]. Control is traditionally a key concern in the study of the application of information systems [5, 16, and 26].

Control exists because of generativity, as defined by Zittrain [29]. All actors may participate in the development of a platform as a digital ecosystem by suggesting new modules and standards for its improvement or expansion in order to either improve or expand the performance of the original platform. External actors can, for example, seek to engage with the platform owner by adding their contents or applications, thereby making these available to the customers. These external actors may also wish to have the confidence that certain standards will be supported by the platform, or that the general practical arrangements are organized in a certain manner, in order to accommodate their own interests. These are effectivley attempts to influence and render the goods and services available, as well as the general standards used when developing the platform in a generative way. Further, this can be viewed from the point of view of the platform controller as attempts to render the platform more generative.

Within a digital ecosystem platform, one or more stakeholders may have the power to make critical decisions regarding the direct and indirect innovation of digital services. Direct control drives decisions concerning acceptable content and applications through the processes of quality assurance and general terms and conditions for other stakeholders. Indirect control over the innovation of services concerns decisions affecting enablers, or platform generativity, for the innovation of services such as middleware standards. Thus, simply put, this control amounts to the ability to say ‘no’ to other stakeholders when they seek to introduce new modules in other layers [14, 15].

It is typically the platform owner, who is an obvious candidate for this role as antagonist. The platform owner directly or indirectly shapes the generativity of the ecosystem with the platform at its centre through a continuous process of accepting or rejecting attempts made by other stakeholders. Simultaneously, the platform owner itself can seek to enrol additional stakeholders to expand the capabilities of the platform. In the role of protagonist, the platform owner may seek to influence an antagonist, by either accepting or refusing requests to access to the platform – such as a regulator, an intellectual property owner, or another platform owner – to enable the expansion of a platform’s generativity.

III. DATA COLLECTION – APPLE STORE CASES

The data reviewed for this research aims at understanding the underlying structural dynamics of the interactions of actors involved in the innovation of mobile information services in a digital ecosystem. This is addressed first by explaining how sequences of seemingly complex interactions emerge from a simpler repertoire of actions, and second, by identifying underlying mechanisms that can explain these sequences of interactions.
The specific interactions studied concern the attempts by platform owners to control the generative acts of actors on their platform. Although the paper has a qualitative research approach [18, 22] where data was collected on sequences of interactions relevant to this phenomenon, the means by which these interactions were analyzed and then the steps taken to interpret the results and extract meaningful insight [4].

The unit of analysis concerns manifest actions taken by platform owners and external participants to regulate control and generativity in order to affect digital innovation and the aim of our data collection is to build a corpus of qualitative data [4] concerning these actions. Data was collected from publicly available sources in the form of web logs, generally known as blogs.

The aim of the analysis applied was to identify repertoires of actions concerning the innovation of mobile information services on digital platforms from within the textual data that was collected. To make sense of this data it was necessary to recognize sequences of actions taken by respective actors within the context of specific platform service innovations over time. By untangling complex interactions in this way, the researchers were able to then undertake further analysis in order to explain the mechanisms that cause them.

For this propose the approach to the data analysis is a structural narrative analysis [19]. The structuralist approach of narrative analysis [2, 3] is a means of explaining relationships between seemingly complex sets of events in narrative data. The approach identifies surface phenomenon within textual data. The surface phenomenon is then interpreted in order to produce a deep structure of generic underlying events, as fabula. The mechanisms that link these underlying generic events within the fabula can be used as an explanation for what is seen in the surface phenomenon. Pentland [19] adapts this method in order to understand the deep structure in organizational processes and he has subsequently gone on to apply it in the context of innovation [10, 25]. Pentland [19] identifies three analytic steps to uncover the deep structure within narrative: (a) identify the narrative structures of a story [19] including patterns of sequential events, the focal actors within the story and contextual factors such as social relationships, cultural values and assumptions made; (b) develop the fabula or a generic set of events, focal actors and contextual factors that are common between stories; and (c) generate mechanisms or "underlying structures that enable or constrain the fabula" [19]. This analytical process moves from an emic description, which is locally meaningful, to an epic description, which can be applied in other settings.

In Figure 1 a summary of the three cases used to apply the Pentland [19] analysis are described. On the left side of the table the antagonist and protagonist of each case is presented. On the right side of the table, a brief summary of what the case is about and a number of sample actions taken out from the blogs described as part of the methodology are given.

<table>
<thead>
<tr>
<th>Case</th>
<th>Description and actions</th>
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| Adobe vs. Adobe (users) vs. Apple | The early introduction of digital books in the Apple ecosystem for iPhone and later iPad devices, creates a tussle between Apple and traditional content publishers (later other media will join the tussles e.g. magazines, radio, etc.) regarding the increasing power of Apple in the distribution of e-books.  
Action 1: Between 2008 and 2010 Apple (and other platforms such as Amazon) start selling iBooks thought their online store (Apple App Store and iTunes).  
Action 2: Publishers ignored the increasing demand for e-books until they lost the control on their negotiation rights.  
Action 3: Concerns Apple's ban on the use of Adobe Flash on the iPhone and the resulting tussle between Apple and Adobe. |
| Adobe (iOS developers) vs. Apple | Concerns the impact on Adobe of the policy restriction that Apple placed on the choice of developer tools used by third parties to create iPhone applications.  
Action 1: Adobe has frequently expressed its interest in enabling Flash on the iPhone  
Action 2: Apple continues to disallow Flash citing security and battery consumption issues.  
Action 3: Applications are released (e.g. by less well known developers), which enable the viewing of Flash content on the iPhone, without Flash actually being present on the handset. |
| Concerns Apple's ban on the use of Adobe Flash on the iPhone and the resulting tussle between Apple and Adobe. |

The analysis that follows is how to determine the fabula or plots linked to the stories of these. Below are two examples of these structures. It is apparent from the diagram that the plots grow in complexity and encompass more sequences of actions. The figure also shows how the plots escalate, such that each plot is subsumed by the next.

Since the plots collapse into each other, it becomes possible to identify the underlying fabula, deep structure, or order of potential actions carried out in the observed stories, which underpins all of the stories. The result of this analysis is a state transition diagram which represents the totality of potential sequences of generative and controlling actions that the actors were observed to follow. The logic that informs how these decisions are made is described by Pentland’s last analytical step of identifying mechanisms or “underlying structures that enable or constrain the fabula” [19].

In figure 2, two of the cases are illustrated applying the method described above; relationships can be clearly established between antagonist and protagonist for both cases. Further analysis using semiotic analytical tools [10] allows us to understand the relationship between a protagonist and the generative acts leading to innovation with the platform owner in the antagonist role, exercising controlling acts over the innovation in the mobile platform.
Since the data collected is longitudinal, this type of analysis allows for the study of sequences of generative and controlling acts. Hence, it is possible to recognize patterns of sequences of actions to be identified in the complex interactions that make up the innovation of information services on digital platforms. These narratives are seen in the public domain, as their unfolding is reported in both traditional and digital media [10].

These patterns of longitudinal interaction can then transpose to a further set of analysis using some ideas from organizational change, these are explained in the following section.

IV. STRATEGIES FOR DEVELOPMENT OF A PLATFORM

Poole and Van de Ven [20] propose a set of four strategies to understand organizational change. In this paper the analysis completed looks to these strategies from the point of view of the platform owner as antagonist. We have transposed those strategies to the context of mobile platforms and they are defined as listed below, taking into account the role of the protagonist and the controlling strategy taken:

<table>
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<tr>
<th>Paradox</th>
<th>Definition/Patterns</th>
<th>Strategy</th>
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<tr>
<td>Acceptance</td>
<td>Antagonist does not attempt to resolve the control/generativity paradox. Accept that the paradox exists, and cannot be managed. Learn to live- and deal with the implications of the tensions that result, as they arise.</td>
<td>Entirely open by default (e.g. Apple vs. publishers)</td>
</tr>
<tr>
<td>Spatial Separation</td>
<td>Antagonist resolves the paradox through spatial separation. The validity of the control/generativity paradox falls in favor of control being appropriate for certain classes of innovation, and of a generative approach being valid for other classes of innovation.</td>
<td>Selectively open and close platform by class of innovation</td>
</tr>
<tr>
<td>Temporal Separation</td>
<td>Antagonist resolves the paradox by situating control at different temporal locations. The validity of the control/generativity paradox falls in favor of control being appropriate at certain times, and of a generative approach being valid at other times.</td>
<td>Selectively open and close platform over time for all classes of innovation</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Antagonist or Protagonist resolves the paradox through synthesis. Change the basis upon which the current paradox of control and generativity is defined, thus temporarily transcending it.</td>
<td>Recognizing that the paradox is more complex than can be solved by a simple strategy and instead selectively differentiate in control strategy by reducing the negative impact of blocking (e.g. Adobe vs. Apple)</td>
</tr>
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The four broad patterns of interactions represent four different strategies that a platform owner can take in dealing with the inevitable paradox between control and generativity in digital ecosystem innovation. If a platform owner as antagonist has no refinement in their controlling strategy such that their platform is open by default (acceptance), an external actor as protagonist can pursue generative strategy while continuing to struggle with the existing opposition by the antagonist. On the other hand, should a platform owner have some sophistication in their controlling strategy, they can either block new categories of innovation entirely (spatial separation), or alternate between admitting and blocking in cycles over time (temporal separation). However, the risk for a platform owner as antagonist is that by refusing to admit sufficient innovation, it is then bypassed by external actors to the extent that it loses relevance vis-à-vis competing platforms. The most sophisticated controlling strategy begins with the protagonist attempting to bypass the antagonist through a synthesis strategy (synthesis). The antagonist platform owner, recognizing that the paradox is too complex to be solved by a simple strategy, instead selectively differentiates in control strategy by reducing the negative impact of blocking. This can, for example, imply selectively, and possibly unpredictably, alternating between opening and closing at more granular levels to guard against the unwanted side effects of blocking.

Although there are four possible strategies according to Van de Poole, the cases presented in this paper focus on two
extremes: acceptance and synthesis. In the case of Apple vs.
Publishers, the publishers are the antagonists, and they took
a long time (over 2 or 3 years) to realize that Apple was
exercising a strong control on what was published, how it
was distributed and the formats for such activities. For all
practical terms, the publishers were by their own slow
response to the innovations Apple provided to the
publishing work, relinquishing control of their own core
business, as they were unable to determine the pricing,
distribution strategy of ebooks through the Apple app store.
The case for synthesis is slightly more complex and requires
a more detailed analysis of what is controlled and when.
In the case of Adobe Flash (users) vs. Apple, at the debut of
the Apple App Store, Apple was quite relaxed about the use
of Adobe Flash, and many developers created applications
for the iPhone and later iPad using Adobe Flash. Apple then
banned the use of Adobe Flash giving a set of technical
reasons for denying access to the platform. Adobe adopted a
changing strategy that tried to use multiple actions and
interactions with Apple to create pressure and demand from
users and developers for Adobe. When this strategy is not
successful, Adobe looked for strategic partners, and
supported other standards. After a period of dealing with
very negative press and a lot of discussions and exchanges,
Apple and Adobe arrived at an agreement. It is still to be
seen if the changes Adobe made to its core code will keep
them competitive in the long term as new standards such as
HTML5 develop stronger core base use.

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V. DISCUSSION

These strategies reflect the complexity of modelling
digital infrastructures and platforms developing that lay at
their core. Other models for understanding the relationships
between the different actors of the ecosystem [1, 9, 17] take
a more static view of the actors, and the underlying
assumption is that the relationships between those actors will
be stable for a longer period of time. However the nature of
technological development on digital platforms has
accelerated such processes, and the cycles of interaction
between actors has been shortened.

One platform actor can take for example the
“acceptance” paradox and, for a long period of time exercise
very little control on its assets, but when sufficiently
challenged might end up bridging to a “synthesis” paradox in
order to assure the survival of its core business. In the case of
e-publishing there has been pushback against the domination
of Apple by the publishers, who have lobbied regulators to
open up the distribution of digital content. Traditional
publishers have also actively encouraged open standards and
multiple platforms (e.g. Amazon Kindle, Nook, etc.) for the
distribution of ebooks with considerable success. Hence
publishers have moved away from an acceptance strategy to
a more active in strategy which balances the control aspects
of their business in order to make themselves profitable.

Our method shows that there are strong indicators that
actors in a mobile platform might switch not only between
the different stages of one paradox, but might over time
switch between strategies as the requirements and demands
for digital services changes. Understanding where control
points lie and how value networks are formed around them is
of importance to platform owners who wish to nurture an
ecosystem.

VI. CONCLUSIONS

Control points combined with longitudinal analysis of the
relationships between actors of a mobile platform ecosystem
are powerful tools. They help us to understand the technical
aspects that contribute to the success of platforms. They also
give further insight into the socio-technical aspects, not
normally taken into account when analysing value networks
and added value coming from the use and expansion of such
platforms.

This paper represents research in progress and there are
three obvious areas for improvement. First, it would be
advantageous to obtain primary data, possibly obtained from
interviews, to supplement the secondary data, which is
obtained from blogs. Whilst this would strengthen the
foundations of the stories, it is difficult to gain access to the
companies involved in this research. Second, additional
stories are currently being identified and analysed. These
include complex and well documented stories such as
attempts to hack or "jailbreak" Apple's iPhone, efforts to
constrain generative enablers such as developer tools
provided by Adobe and other third parties, and the use of
"Kill Switches" to disable and remove malicious
applications that were initially allowed onto a mobile
platform. The third area concerns the application of the final
part of Pentland's approach to narrative analysis [19], which
is to identify and explain mechanisms, which constrain the
fabula, which lead to the actors taking the actions that they
do. This final area will help explain how platform owners
manage the paradox of control and generativity.

The use of the strategies by Poole and Van De Ven [20] is of
value to both academics and practitioners as it allows a
generic analysis of dynamic innovation processes, in a
setting of rich interactions between actors of a platform
ecosystem. This explanation is an important contribution to
understanding where possible business models might be developed, or nurtured by a platform ecosystem. When strategies are identified, a number of possible policies and recommendations for the enterprise can be sketched out. This provides a final contribution to the growing body of literature on research into platform strategies.

Prior studies focus on the processes of enrolling third-party developers [21], and governing these through boundary resources [8, 12 and 13]. Others have focused on the more conventional aspects of understanding platforms as physical infrastructures with digital components [30]. This paper contributes to the understanding of digital ecosystem innovation by showing a paradoxical and ambivalent relationship between control and generativity. It would appear that, sometimes, more control can be conducive for innovation, while at other times, less control supports platform generativity.

The authors of this paper are continuing their research on Apple and Android mobile platforms and their app stores and markets. The researchers are continuing data collection, analysis and validation of both existing and additional cases for these two platforms.

VII. ACKNOWLEDGEMENT

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VIII. REFERENCES


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