How to Develop a Digital Ecosystem: a Practical Framework

Omar Valdez-De-Leon

> *"Our philosophy is that we want to be an ecosystem. Our philosophy is to empower others to sell, empower others to service, making sure the other people are more powerful than us. With our technology, our innovation, our partners - 10 million small business sellers - they can compete with Microsoft and IBM."*
>
> Jack Ma, CEO of Alibaba

Throughout the modern industrial era, industries have generally been organized as linear value chains. This gave birth to the vertically integrated organization, which was organized in such a way in order to control the entire value chain and achieve economies of scale, which in turn would create a significant competitive advantage. As digital technologies continue gaining adoption, they start enabling new ways of organizing how value is created. This transition means moving from value chains to digital ecosystems.

This is giving way to new industry giants, which rely on the strength of their digital ecosystems to attain market dominance. However, there is still limited knowledge of digital ecosystems: how they are created, how they work and, importantly, how organizations beyond digital giants can approach digital ecosystems. Based on literature review and expert surveys and interviews, this piece puts forward a practical framework for both established organizations and entrepreneurs to better understand, plan and navigate the new paradigm of digital ecosystems.

Introduction

Throughout the modern industrial era, industries have been organized as linear value chains. This gave birth to vertically integrated organizations and giants such as Exxon Mobile and Royal Dutch Shell that were designed in such a way to control the entire value chain. The purpose of this was to achieve economies of scale that would create an important competitive advantage.

However, things are changing . As digital technologies continue developing and gaining adoption, they start enabling new ways of organizing how value is created. This means a transition from value chains to digital ecosystems. This in turn is giving way to a new type of enterprises, such as Apple and Alibaba, that rely on the strength of their digital ecosystems to attain market dominance.

And even though these are widely discussed cases, there is still limited research and knowledge of digital ecosystems, including how they are created and how they work.

This study and resulting framework is a response to the needs to better understand such ecosystems and to help organisations and practitioners going (or planning on going) though such transition. The aim is to shed some light on what these digital ecosystems are, how they are built in practice, and how practitioners can approach them. To this end, a framework has been developed that can provide reference to a practical approach, including key levers that can be used to create, develop and engage with a digital ecosystem. The framework, developed using literature review and an expert panel survey approach, is described in this article.

It is sometimes argued that 'not every organization can build its own ecosystem like Apple or Amazon'. And this is largely true, at least in terms of scale. However, if ecosystems are the new way of organizing value creation, then every organization and every

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entrepreneur should know how they work, at a minimum to be able to better participate in them. Moreover, the author believes that there is not such a thing as a single type of 'ecosystem'. Instead, there are different kinds of ecosystems. Some are small and others large. Some ecosystems are part of larger ones. Some overlap. Some are global; others local. Some operate in a niche, while others are market specific.

For example, there are global ecosystems like those of Apple or AirBnB. There are also industry-specific ones like those Verifone and Klöckner are developing. Likewise, also small, local or niche ecosystems like To Good To Go, whose app connects local businesses and consumers to make unsold food available at reduced prices to cut food waste. Too Good To Go is part of both the iOS and Android ecosystem. Yet it also has its own ecosystem of vendors and consumers, who in turn participate in other digital ecosystems. As such, from the results of this article it is fairly safe to say that every organization needs an ecosystem strategy.

The paper is structured as follows: First, I provide a basic definition for digital ecosystems. A short description of the role of digital ecosystems in industry value creation then follows. Following that, I outline the current need for a practical framework that helps companies tackle the transition to a digital ecosystem, then describe the methodology used to develop this framework. Finally, I describe the framework for building digital ecosystems and recommend the framework's use and further development in the conclusion.

What are Digital Ecosystems?

Defining Digital Ecosystems

Business ecosystems have been continually defined, re-defined and studied over the past 20 or more years. (Moore, 1996; Iansiti and Levien 2004; Muegge, 2013; Jacobides et.al., 2018). In their work, Iansiti and Levien attribute the business dominance of Walmart and Microsoft to the success of their respective business ecosystems. They define these ecosystems as "loose networks of suppliers, distributors, outsourcing companies, makers of related products and services, technology providers, and a host of other organisations that affect and are affected by the creation and delivery of a company's own offering" (2004).

More recently, Jacobides (2019) defines digital ecosystems as "interacting organisations that are digitally connected and enabled by modularity, and are not managed by a hierarchical authority".

For the purposes of this paper, I propose a definition of digital ecosystems as, "loose networks of interacting organisation that are digitally connected and enabled by modularity, and that affect and are affected by each other's offerings".

The Role of Digital Ecosystems

Iansiti and Levien (2004) suggest business ecosystems create value to the end consumer by leveraging a symbiotic relationship whereby platform owners (for example Microsoft) enable others (for example software developers) to create products on the (Windows) platform, that have the potential to strengthen the (Windows) ecosystem, thus giving everyone involved "a collective advantage over competing networks". This way, value is mutually created both to the end consumer, the platform owner and ecosystem participants. Every participant in the ecosystem benefits from interacting within the ecosystem and thus is incentivized to keep participating.

This implies a move away from creating value through only one firm's integrated value chain, towards creating value by many firms enabled and orchestrated by a platform. This has been described as an 'inverted firm' (Van Alstyne et.al., 2016; Van Alstyne, 2019), which in turn helps to increase the total value created.

One contributing factor that facilitates this inversion is the effect that digital technologies can have on reducing transaction costs between independent parties, making 'buying' more desirable than 'making'. Here I borrow Ronald Coase's concepts related to the nature of the firm. Indeed, digital technologies can help reduce a company's transaction costs (through modularity, for example. See also, Iansiti and Lakhani, 2017, regarding how blockchain could contribute to this too). This means that the cost of sourcing products or services through third parties can be lowered, making it more practical and cost-efficient to work with external partners instead of trying to do everything in-house. It can be not only more practical, but also a more strategic decision, in order to keep pace with the degree of innovation enabled by digital technologies and the rapid change of entire industries (Gawer, 2009b; Gawer and Cusumano, 2014; Van Alstyne, et.al., 2016). Indeed, research by McKinsey estimates that companies with an ecosystem approach have higher earnings than those without (Bughin, et.al., 2019). These findings suggest that the emergence of digital ecosystems signifies the declining importance of value chains, and at the same time the increasing importance of digital ecosystems (see Figure 1).

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Importantly though, an ecosystem is more than a set of partnerships. Since it is a network of loose contributors who interact closely to create mutual value, there is necessarily an atmosphere of interdependency among partners in the ecosystem. This means that all partners share the same interest and that individual partners will only be successful if the ecosystem succeeds (Iansiti and Levien, 2004). As such, business and operating models need to be adapted to the new paradigm.

The Risk of Not Taking Part in the Digital Ecosystems Paradigm

The main risk for a company of not taking part in digital ecosystems or not even having an ecosystems strategy is getting left behind. As ecosystems become more entrenched and capture more of the available markets, those businesses outside may find it hard to compete (Gawer, 2009a).

Also, ecosystems tend to expand beyond their initial sphere. This means that new market entry may not happen through individual innovators, but rather through an entire ecosystem that leverages its existing market power, technology and reputation to move into an adjacent market (Gawer and Cusumano, 2008). Take for example, the case of Nokia losing its dominant position to new entrants that took an ecosystem approach. Also, more recently, Apple has entered the music streaming market and is gaining market share from Spotify by leveraging its market power in mobile devices, operating systems and distributing applications (Apple Store).

As the trend toward ecosystem thinking continues, organizations are almost bound to at least in some way become part of an ecosystem. This ultimately makes ecosystems into a kind of competitive unit, wherein competition for market share takes place between ecosystems, rather than between individual companies. Also, there will not be a single, but many interlinked ecosystems, or an "ecosystem of ecosystems" (Valdez-de-Leon, 2017). This means that every business organisation and entrepreneur needs to gain a better understanding of how to approach digital ecosystems.

Towards a Practical Framework for Developing Digital Ecosystems

The Need for a Framework for Developing Digital Ecosystems

Moving to an ecosystem model, however, can be difficult, especially for incumbent players with well-established operations. Such a model involves a different approach and, more concretely, a new set of strategies, processes, competences and technology assets. In a recent interview, the SVP of IoT at Sprint, a major Telecom operator in the US, explained how telecom operators are struggling to transition from serving the single-service consumer market to the myriad of new applications that form part of the Internet-of-Things (IoT) ecosystem. This involves having to develop a new technology platform that will attract and maintain relationships with developers that can help Sprint develop its ecosystem (Rook, 2019).

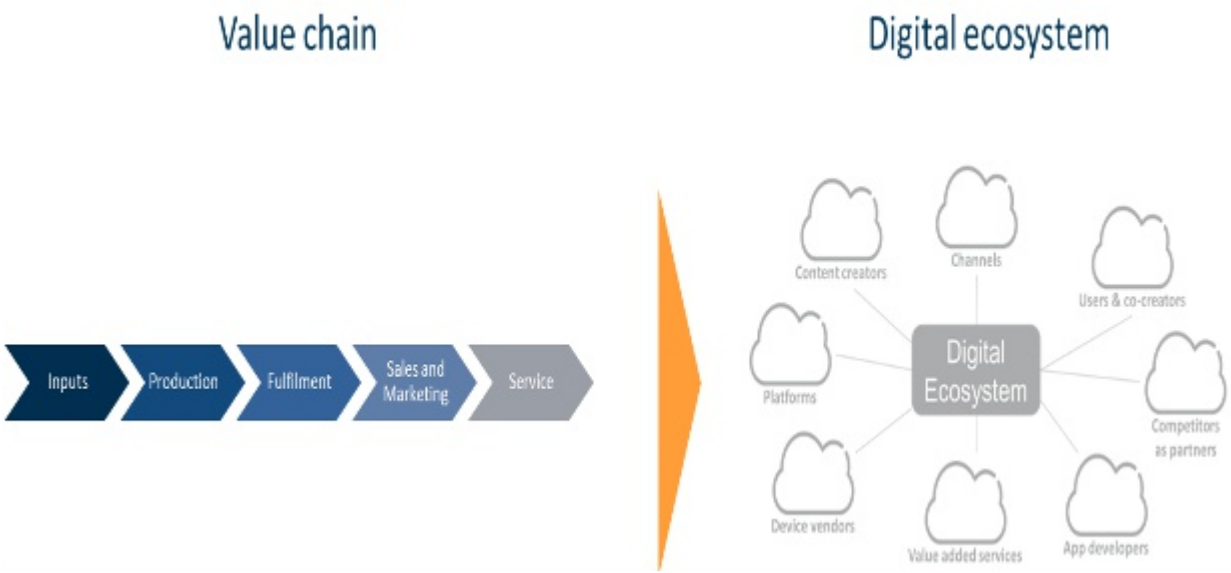

Figure 1. The transition from value chains to value ecosystems

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Gaps in the Literature

The literature in the subject of digital ecosystems is sparse, with varied areas of focus. Indeed, in recent research Senyo, et. al (2019) map out the research landscape within the topic of digital business ecosystems. They identify a gap in frameworks and other artefacts for such ecosystems. They do identify some efforts in this area with focus on themes such as the interoperability in ecosystems, their integration, enterprise agility, self-organisation, the effect of ecosystems on financial inclusion and overall technical platform development. Other efforts towards framework development include Gawer's (2014) focus on integrating economic and technological views, and Jacobides et. al. (2018) on the various structures of ecosystems that are created based on different types of organisational complementarities.

However, there is a general lack of blueprints or frameworks that can, in a practical manner, help practitioners navigate the digital ecosystems paradigm. A practical framework to develop digital ecosystems and digital ecosystem strategies that fills this gap is thus necessary. The framework put forward herein intends to fill this vacuum.

The next subsection will describe the methodology used to construct the framework, before giving way to the final section that describes the framework's structure and components, and how the framework can be used in practice.

Developing the Framework

Methodology

In developing the proposed framework, a three-part approach was used:

1. An initial characterization of the framework
2. A review and refinement of the framework by an expert panel
3. Final definition of the framework

Initial Characterization of the Framework

The initial characterization of the framework involved a comprehensive review of the relevant literature, case studies and discussions with experts and practitioners in the field. This then formed the basis for a set of three key elements of digital ecosystems as well as six enablers (or levers to shape the three key elements) as depicted in figure 2.

The idea behind this structure was not just to establish the key elements that constitute digital ecosystems (the 'what'), but to focus primarily on the practical enablers that affect and shape these elements (the 'how').

Reviewing, Refining and Validating the Framework

Next, a panel of experts in the field was formed and an initial characterisation of the framework put forward to the panel. They were then asked to review and help refine the components of the framework and also to elaborate on their own practical experience with digital ecosystems.

This process was carried out in three steps (see Figure 3). First, a structured questionnaire was administered to the expert panel to gather their insights, critiques and recommendations. This part produced wide-ranging input into the framework, particularly in the detailed characterisation of the six enablers. Following this, in-depth interviews were carried out with four experts from the panel to gather further insights on practical uses of the framework, which led to a final version.

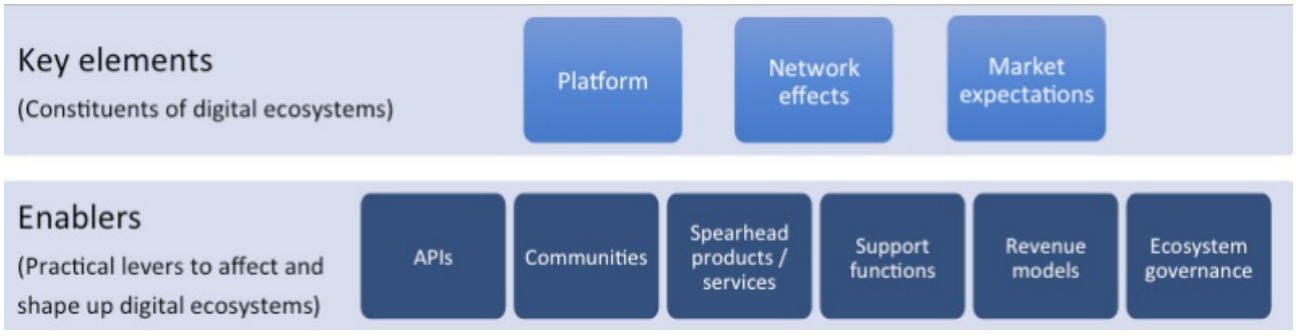

Figure 2. The initial, high level characterization of digital ecosystems

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The Framework

Following assessment and validation by the panel of experts, the framework for developing digital ecosystems is presented below.

There are three main elements for building a successful ecosystem. These are: a platform, network effects and market expectation (as shown in Figure 4).

Three Key Elements

The Platform

This is the key building block of the ecosystem; the enabler upon which ecosystem partners can build their products or services. As one of the experts suggests, "It all starts with a platform. If you do not have a platform you cannot have an ecosystem." Crucial aspects here include openness, modularity and quality as perceived by the ecosystem. Openness means that the platform allows access to platform resources (via APIs, for example) enabling ecosystem participants to develop their own use cases. Modularity is a key driver to developing digital ecosystems as it enables different organizations to build complementary products or services. Quality means features that enable high availability, reliability, and security, which can be highly valued by ecosystem participants. This in turn will help attract other participants to the ecosystem.

The platform in turn supports the other two elements below.

Network Effects

The second element concerns the self-perpetuating cycle of ecosystem participation and user enrolment. More participants and products or services on the platform lead to more end-users attracted to it. At the same time, more end-users on the platform attract more participants with their products and services (Iansiti and Levien, 2004; Gawer and Cusumano, 2008; 2014. Valdez-de-Leon, 2015, 2017, 2018; Van Alstyne et.al., 2016; Van Alstyne, 2019).

Ecosystem leaders need to be able to create the right incentives (financial and other kinds), as well as systems to support participants. They must define how theirs, and not competing ecosystems, will create more value for users and ecosystem participants (Valdez-de-Leon, 2015). Here the emphasis is on creating and sharing value across the ecosystem. This is a challenging task for many organizations that are not accustomed to a

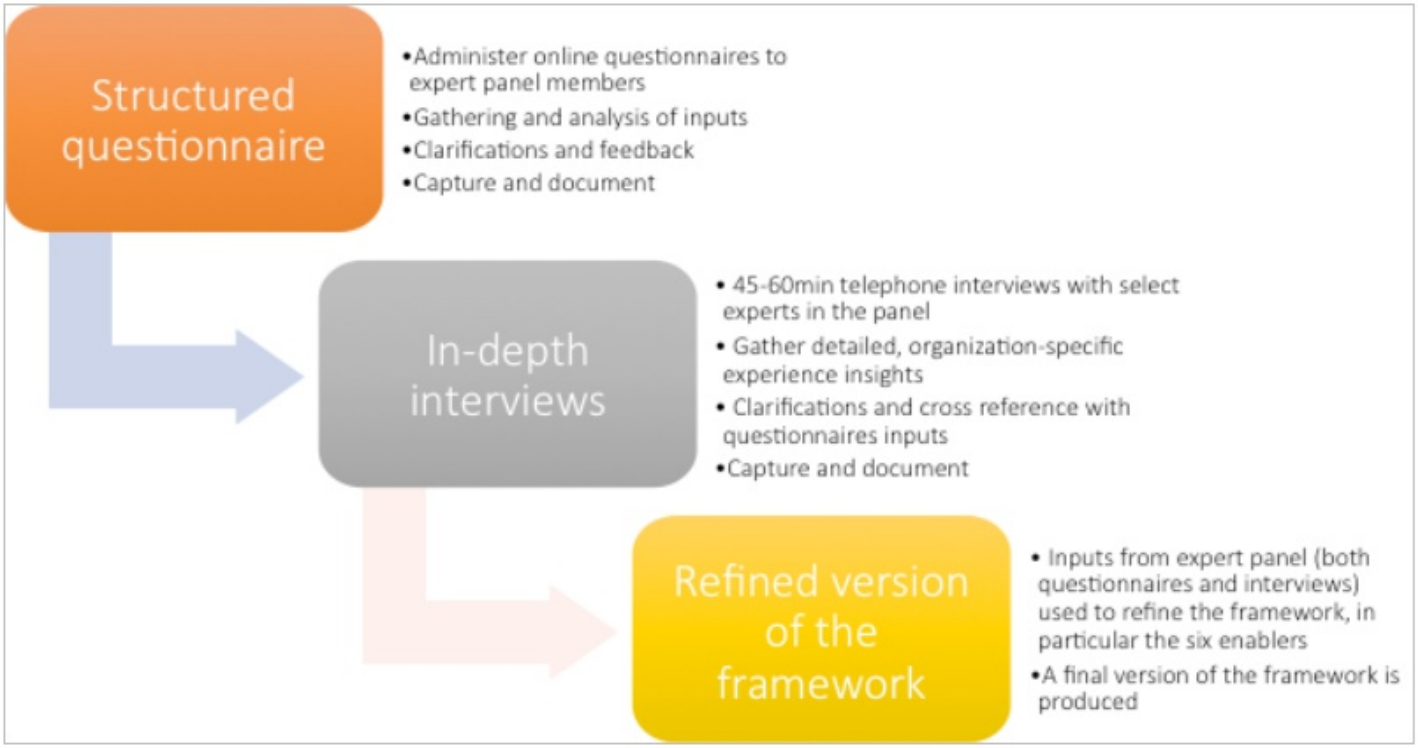

Figure 3. Approach to reviewing, refining and validating the framework

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dynamic where users' value is created and shared across partners in the ecosystem, rather than just within one company.

Two key dimensions to foster network effects: business and operational. The former is related to how value is generated and shared amongst partners. Clearly ecosystem leaders, together with ecosystem participants, need to create value for end-users, and in turn generate revenue for everyone involved. An ecosystem strategy needs to have a well-defined view of how this revenue will be shared. Incentives for the ecosystem to develop also need to be made clear from the start. In addition to fair revenue splitting, these incentives can include elements such as gaining access to market channels, as well as sharing marketing resources and technical support. On the operational side, company leaders need to develop specific capabilities to support the rapid expansion of their digital ecosystem.

Market Expectation

Market expectation is related to how prospective users perceive an ecosystem in terms of its potential to become widespread in the long term. Indeed, participation in an ecosystem is "based not on the network's current scale, but rather on the number of users with whom they expect to be able to interact in the future" (Eisenmann, et.al., 2007). A new platform must satisfy user concerns by building credible expectations for its future success (Edelman, 2015). In a way, building credible market expectations is the first push to get the flywheel rolling towards a network effect.

This is arguably one of the reasons why the Windows phone, as a mobile operating system, failed. Nokia and Microsoft could not create sufficient market expectation among both users and app developers to launch their ecosystem. As a result, they ended up losing to Apple iOS and Goggle Android.

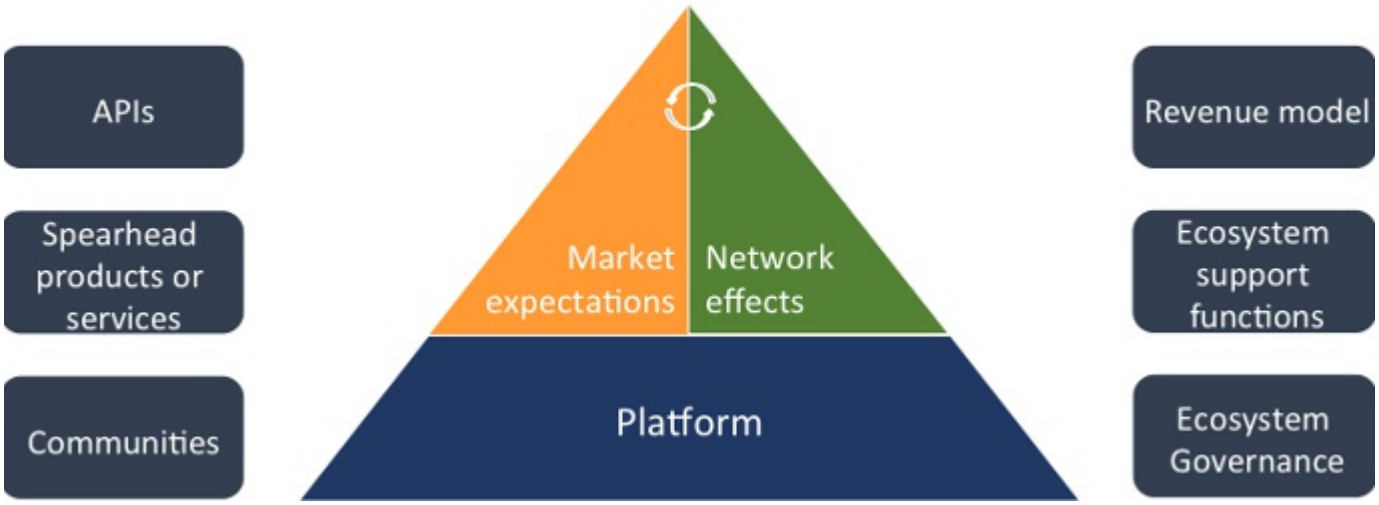
To shape up market expectations, organizations developing a digital ecosystem have several options. First, they can signal commitment by setting up digital units and investing in platforms. They can launch specific (spearhead) products or services to reinforce commitment and to kick-start their ecosystems. Setting up an initial set of partnerships in support of the ecosystem is essential to further grow market expectation (Valdez-de-Leon, 2015).

However, the key question is how to build and activate these three elements. For this, a specific set of enablers can be utilized to develop these elements, which I briefly describe below.

The Enablers of Digital Ecosystems

Application Programming Interfaces (APIs)
APIs are the basic building blocks of a digital ecosystem; the key elements that enable modularity and openness. A robust API strategy is thus required. This strategy should be based on a deep understanding of the markets that the ecosystem intends to serve. Designing APIs for all purposes is impractical, which means that a focused approach is likely to be more appropriate. The ecosystem leaders should also develop an API roadmap that is in line with their overall ecosystem strategy, while the API pricing and support model must be

Figure 4. The key elements and enablers for developing digital ecosystems



aligned with the ecosystem revenue model.

APIs can be used to foster network effects. If using the APIs is too onerous or does not create sufficient value, ecosystem participants will be reluctant to invest time or effort. It is therefore vital that APIs are designed with participants' needs in mind. As one panel expert with a community of more than 70,000 developers puts it, "developer experience is currently the number one consideration. There are so many platforms. If you don't make it easy for your users it will not be adopted". Furthermore, according to the panel, things to consider when developing APIs include transparency and communication with the developer community, good quality documentation, ease of use, steadiness and dependability (not constantly changing), use of standards and long-term support.

A good example of this is the approach taken by Stripe, a US-based company whose platform enables payments over the internet. Their approach from the start was to build their platform with developers in mind, whereby their APIs would be simple, well-documented and steady, so that "developers who integrated the Stripe API would not need to touch it for years", and that it be done by just a couple of developers (Armstrong, 2018). According to Armstrong, the company counts the likes of Facebook, Lyft, Asos and Salesforce among its ecosystem partners. It is valued at USD20bn with around 80% of US internet users having passed through the Stripe ecosystem in 2018. The company has used APIs to propel its network effects by focusing not only on building its credibility (market expectation) among the developer community, but by providing all necessary support (see support functions below) to drive developer adoption and advocacy.

Communities

For ecosystems to work properly, communities of participants need to exist. These participants should be able to develop products and services based on platform resources (via APIs). Experts in the panel observed some key considerations in developing an ecosystem community, which include the need, 1) to establish a fair and clear intellectual property model whereby third party developers can fairly monetize their developments, 2) to open up the platform to a sufficient degree to allow and encourage innovation, 3) to 'create community' in the sense of enabling the exchange of ideas and fostering collaboration, and, 4) to provide an open door for feedback from the community about the position and direction of the ecosystem in the market.

The community benefits can be significant as in the case of Stripe. By enabling people to invest and create new products and services on the platform, the ecosystem can provide a richer set of options to end-users. Moreover, the faster an ecosystem develops a positive reputation among developers and thus more join the platform, the more difficult and onerous it becomes for others to replicate such a deed. This reflects market expectations driving network effects. As more developers are attracted to the ecosystem, more users are drawn to new products and better services offered.

Spearhead Products or Services

The launch of 'spearhead' products or services is another essential driver of ecosystem development. These are products or services that ecosystem leaders develop either themselves or through third parties, on top of their platform, in order to target a particular segment of the market. This approach helps develop market expectations by signalling commitment. It shows that the ecosystem leader is committed and ready to "put money where their mouth is". However, the real power of spearhead products or services is that they create a customer base that can help kick-start the ecosystem (Valdez-de-Leon, 2018). One way to visualize this is to look at how the video games industry relies on one or more key spearhead games (think Call of Duty or the Mario Bros series) to drive early user adoption to consoles, which helps attract developers to the platform and in turn brings in even more users (network effects).

Here the key challenge for an ecosystem leader is to define the right product or service that can become a 'killer app', as well as how to build it when the needed resources and skills to develop it might not be available internally. Here is where the developer community becomes a key resource. For example, Apple is reportedly commissioning new original content (TV shows, movies, podcasts) as a competitive tool to expand its customer base and in turn attract new content creators in those new categories to its ecosystem (Shaw and Gurman, 2019). This is essentially another lever to drive the tandem of market expectation and network effects.

Another consideration raised by the panel in regards to spearhead products is to be careful in their selection, as ecosystem leaders can risk alienating ecosystem

partners by launching products that directly or indirectly compete with theirs.

Support Functions

Ecosystems need to be continually supported, after first being created over a period of time. This is obvious yet often underestimated (Valdez-de-Leon, 2018). Support functions are essentially the internal organization and related functions that provide support to ecosystem participants. This capability goes beyond arms-length partnership agreements. Experts in our panel concurred that dedicated teams are invariably required to support an ecosystem. This support includes technical (for example, how to use an API like Stripe does), marketing (for example, how to sell your apps on our marketplace) and operational support (for example, "fulfilled by Amazon" logistics support services). Experts in the panel suggested their organisations have been offering developers things like a dedicated developer portal with SDKs (Software Development Kits), documentation and other forms of online help. Self-service and peer support through online forums add additional value. Marketplaces like Verifone's also offer app certification services, app design guidelines and a channel-to-market for developers through its app marketplace.

Revenue Model

The revenue model constitutes a key feature of a successful digital ecosystems development undertaking. Ecosystem leaders looking to attract ecosystem participants need to define the right revenue generation and allocation model, one that incentivizes participants to join the ecosystem at an early adoption stage, whilst reducing their risks to innovate (Valdez-de-Leon, 2015; Van Alstyne, 2019). Also, several revenue and partnership models will be needed that in turn will require new decision-making and management systems (Valdez-de-Leon, 2015, 2017; Van Alstyne et.al., 2016).

Some partners will be attracted to a revenue-sharing model, while others will instead prefer a licensing or fixed royalty-based model. Models like 'freemium' can be good to encourage experimentation and early adoption in ecosystem communities.

Another consideration here is the need to establish a revenue model that is aligned with the realities of current markets, and that is also fair to all partners involved. Likewise, to have an openness to a common drive to 'change in response to changes in the market' as put by one of the experts in our panel. This can be illustrated by the cases of Spotify, Netflix and Match Group, which have been objecting to the high commissions that Apple and Google capture as ecosystem leaders through their respective app stores.

Governance

Lastly, for an ecosystem to work well and grow, a clear set of rules is required. This means that a transparently established ecosystem governance model is needed (Cusumano and Gawer, 2002; Valdez-de-Leon, 2018; Van Alstyne et.al., 2016; Van Alstyne, 2019). An ecosystem governance model establishes very clearly the rules of engagement among ecosystem partners. It also sets out processes to deal with disputes, as well as how value will be distributed based on the agreed revenue model, as described earlier. In the end, just like all other enablers described here, the governance model needs to be defined in a way that supports the development of the ecosystem and helps create value for all stakeholders.

Use of the Framework

Practitioners may adopt the framework as a guiding tool when developing their digital ecosystem strategies, be it as an ecosystem leader, or as a participant in an existing ecosystem. The framework was structured in a way that explains the key components, yet with its primary focus being on practical application of the six enablers in forming viable platform-based companies. These six enablers can be used in different ways, depending on the context, the maturity of the ecosystem, and the strategy being pursued. The framework is not stringently prescriptive in its application, and allows for flexibility in the usage intensity of each of its enablers.

The two cases briefly described in the appendix help illustrate how the various elements in the framework, although always present, can be used in differing ways. For example, in both cases presented below, EVRYTHNG and The Things Network (TTN), a robust, modular platform was essential to the development of the ecosystems. The former began establishing market expectations by partnering with Avery, and by jointly launching a spearhead product, thus kick-starting its network effects. The latter used a pilot project in Amsterdam, and a very successful kickstarter campaign as a spearhead to a similar result. Furthermore, a comprehensive set of APIs, developer support services and robust governance models have been designed, tested, iterated and deployed, in both cases to foster developer communities, and in turn continue to

provide momentum to their ecosystem's network effects flywheel.

Other Potential Uses of the Framework

The framework is also expected to be useful as a form of checklist. When developing a digital ecosystem strategy and relevant tactical initiatives, the framework can be used as a reference to check for blind spots. Moreover, it could also be used as a reference for bench-marking ecosystems in general, whether to evaluate an ecosystem's long-term viability (how are the enablers being used?), to assess if it is worth joining an ecosystem, or as a way to compare two or more ecosystems options to participate in.

Further Research

As the framework is adopted to each ecosystem use case, it should also be further developed. The research used to construct the framework as described herein, provides an initial attempt with its own limitations in terms of magnitude and scope. The research could be expanded, both in scope and magnitude, as well as taking into account the application of other methodologies that may add a new dimension into our understanding of the various elements and enablers contained in an ecosystem.

Another clear area for further research and development of the framework relates to its applicability for the long-term development of ecosystems, including attention to the relevance of each of the framework's elements as ecosystems mature over time.

Conclusions

Much talk focuses on large digital ecosystems like those of Apple or Amazon. Yet still very little is clearly understood about their inner workings. More importantly, however, many new smaller companies emerging in current markets are interested in how organisations beyond these giants, can play with the ecosystem paradigm. The motivation behind the creation of the framework presented herein and the research behind it is to contribute to a better understanding of the concept of digital ecosystems. If ecosystems are a helpful new way of organising and enabling value creation in various markets, then it is essential that, the sooner the better, early adopting organisations and entrepreneurs understand how these ecosystems work.

The research carried out to develop this framework has been a result of ample literature review, and many years of combined experience within our expert panel members in working with digital ecosystems. We are therefore pleased to offer this framework as a comprehensive and practical guide for organisations and practitioners to deal with the transition towards digital ecosystems.

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About the Author

Omar Valdez-de-Leon is a digital transformation practitioner and advisor, based in Copenhagen, Denmark. Over the years Omar has worked across IT, telecom, consulting and industry in companies such as Ericsson, CGI, Honeywell and Vodafone, with a focus on new business initiatives grounded in emerging technologies. His experience in digitalisation ranges from advising utility companies on smart grid strategies to devising IoT plans for large telecom operators and smaller start-ups. He has also built, launched and managed IoT solution portfolios in utilities, transportation and FMCG. Additionally, he is member of Council, a think-tank for the internet-of-things and provides independent advisory services and lectures on digital transformation. He has written widely about digitalisation independently and for corporations, including digital ecosystems, organising for digital and more. He also developed the Digital Maturity Model as a framework to help develop digitalisation roadmaps in the telecom sector. Omar holds an MSc in Technology & Innovation Management from the University of Sussex in the UK, and an MBA from Manchester Business School.

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Appendix – Excerpts from two expert panel interviews

EVRYTHNG (EVRYTHNG)

Excerpt from an interview with Dominique Guinard, Founder and CTO of EVRYTHNG

Dominique Guinard: EVRYTHNG is a Smart Products Platform connecting consumer products to the Web and managing real-time data to drive applications. The platform enables billions of intelligent online identities in the cloud for physical products, delivers real-time interactive experiences and provides support services to consumers, connecting their digital lives in the ecosystem with other applications and products. More information on EVRYTHNG can be found on https://evrythng.com/

What has EVRYTHNG's approach been to developing their ecosystem?

Dominique Guinard: The case of EVRYTHG is an interesting one in that the company has utilised the concept of 'spearhead product' in a reverse manner, that is, as a key element to kick-starting its apparel industry ecosystem. Instead of launching a product with its own brand, it partnered with a packaging and labelling supplier of brands. As an example, Avery's Janela Connected Products platform is provided by EVRYTHNG and provides billions of products with a digital identity. More importantly, this initiative cultivates a unique ecosystem among Avery's customers, bringing brands such as Rebecca Minkoff to digitalise products such as handbags, which were not hitherto 'connected'.

Another key enabler for the EVRYTHNG ecosystem is the robust set of developer tools that focus on bringing together all kinds of technologies, standards and ecosystems in a common way. The tools include SDKs for all major device platforms and IoT protocols, connectors to virtually any cloud service, and support for any programming environment. This provides a streamlined route for developers to leverage EVRYTHNG's ecosystem. For example, it offers device manufacturers and software developers a quicker route to a NEST certification by using its own integration with the NEST cloud and making this available to its community. By saving time and providing resources for developers, this attracts developers to the platform's communities, and thus drives market expectations and network effects.

What have the results been so far?

Dominique Guinard: As of January 2018, EVRYTHNG manages about 1 Billion unique digital identities for brands such as Coca Cola, Avery, Rebecca Minkoff, Unilever, Mondelez or Diageo. Close to 10,000 developers have subscribed to the EVRYTHNG free

developer tier. EVRYTHNG has several key partnerships with packaging and labelling manufacturers such as Avery, Crown and Westrock. This accounts for billions of Consumer Packaged Goods (CPGs) and apparel products being made with digital capabilities.

The Things Network
(https://www.thethingsnetwork.org/)

Excerpt from an interview with Wienke Giezeman, Founder of The Things Network

Wienke Giezeman: The Things Network (TTN) is a distributed, user-defined IoT data network, based on LoRaWAN wireless networking technology. It aims to create an open, user-built data infrastructure for the IoT. It has more than 70,000 users globally and network nodes in 138 countries. Like the internet a few decades ago, supporters of the TTN initiative expect the IoT to grow organically, and to become decentralised in a way that enables the open exchange of data around the world.

What has The Things Network's approach been to developing their ecosystem?

Wienke Giezeman: The Things Network is a LoRaWAN platform with a reference architecture that enables users anywhere in the world to co-create the network itself. To develop such a self-organising ecosystem, TTN has relied heavily on a well-documented digital architecture, including how to build and set up the nodes as well as how to integrate the platform to user applications via its APIs.

It all started with a pilot project in Amsterdam that brought together several businesses to create a city-side network in a matter of weeks. This was followed by a very successful Kickstarter campaign to build the base equipment for TTN. These two things in turn helped attract global attention and credibility to the project.

TTN is also heavily dependent on community-building for its success. All along, users have been and are still required to install the nodes themselves in order to connect to the platform. There is no cost to join or run applications. The only contribution requirement is that nodes can be used by anyone in the community.

The community itself also provides support. A core TTN team enables community by providing communication and support channels such as github, wiki, Slack and online forums, where members rely on each other to provide support. For cases where the user might not be so technically-savvy, TTN also partners with professional services companies to provide specialised support. Finally, TTN organises events to help bring the community together and to spread the benefits of its open-source approach.

Overall, it is clear that a strong focus on community building, paired with well-documented APIs, support mechanisms and a clear governance model have been key to the rapid growth of TTN.

What have the results been so far?

Wienke Giezeman: At this moment, we have more than 70,000 members. The global network has 7,511 gateways up and running in 138 countries. Additionally, there are more than 23k applications deployed. To compare, three years ago when we presented the initiative at SXSW16 our presence was much smaller (in 100 cities with a mere 1,000 members). We have grown exponentially over the last couple of years.