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Digital ecosystems as transformation tools: A theoretical study

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Abstract
Designing a new business is not an exact science and there is no one template or approach that will work for business or digital ecosystem modeling. However, there are best practices and guidance that you may want to consider. Overtime you will need to adapt the approach you take so that it is best suited to your organization but for now if you do follow these guidelines you will be on the way to modeling your business ecosystem. It takes a collaborative and iterative approach to define and design a business model and digital ecosystem. Start with the information that you know; focus on the key stakeholders and start to identify their customer segments, partners, the drivers and the value propositions. The present study accounts for the theoretical framework of the Digital Ecosystems in the business context.

Keywords: stakeholders, validation, curator

Introduction

With more and more media channels, social platforms, and content being published every day, brands need to adopt a customer-centric approach to cut through the clutter and compete for the attention of their potential customers. While many companies claim of adopting a customer-centric approach, few are actually going beyond the customer-facing departments of the company. A customer-centric personalized approach is not limited to customer service and marketing; it is a holistic approach across every department and even the products the business sell.

A digital ecosystem is an integral part of digital transformation and creating the culture that embraces change and new technologies to grow and progress your company. At the end of the day, the successful brands of tomorrow will be those that are best prepared to capitalize on changes and trends in consumer behavior. Technological advances in the last decade have empowered the consumer, and with the rollout of 5G approaching, being able to meet the demands of consumers and deliver a robust Omni channel experience is crucial.

Review of Literature

Aldridge feels that tectonic shifts in the higher education landscape – from changing student demographics and expectations, to escalating market competition, transformative technologies and the need for lifelong learning – are rapidly realigning the attitudes and principles, norms and practices that have traditionally powered the academic enterprise. Consequently, postsecondary institutions of all sizes and types are struggling to keep pace with these shifts, exploring innovative academic approaches and sustainable business models that will empower them to successfully navigate this rocky terrain in the years to come.

Zuccalà and Verga (2017) contends that in order to build real smart cities, heterogeneous data from different sources has to be properly collected, integrated and shared. In this paper, a real district scale example of urban sharing ecosystem based on coopetition is presented. This digital ecosystem enables data sharing that can be synergically applied to different sectors relevant to the urban context, e.g., energy and transportation, in order to create innovative solutions for energy monitoring, citizen engagement, and evaluation and monitoring at district and city level.

Kritsupath Sarnok (2019) [4]. prpound that at present, technological advances and transformations of knowledge on the digital world are endless. Schools and institutions, as well as teachers, need to develop themselves to take themselves into a new world of learning. Adjusting teaching process, technique and teaching media as well as the attitudes, knowledge and understanding of the changing behavior of the learners have resulted in the teacher adjusting and thinking about new teaching methods. Apply modern technology as a medium or tool to create and stimulate learning for new generation of learners. Learning in the new century is a very challenging one for teachers and educational institutions. Therefore, the design of teaching activities and the creation of a new learning society do not focus on educating the learner by the teacher or teacher alone but it is designed to teach and create a learning environment system that focuses on learning and doing activity in anytime through digital technology and tools.

Chang (2007) propagate that the Digital Ecosystem, as a neoteric terminology, has emerged along with the appearance of Business Ecosystem which is a form of naturally existing business network of small and medium enterprises. However, few researches have been found in the field of defining digital ecosystem. In this paper, by means of ontology technology as our research methodology, we propose to develop a conceptual model for digital ecosystem. By introducing an innovative ontological notation system, we create the hierarchical framework of digital ecosystem form up to down, based on the related theories form Digital Ecosystem and Business Intelligence Institute. Averian (2018) [2].

Digital ecosystems are a new type of application based on a "universal digital environment" populated by digital entities that form communities that evolve and interact with

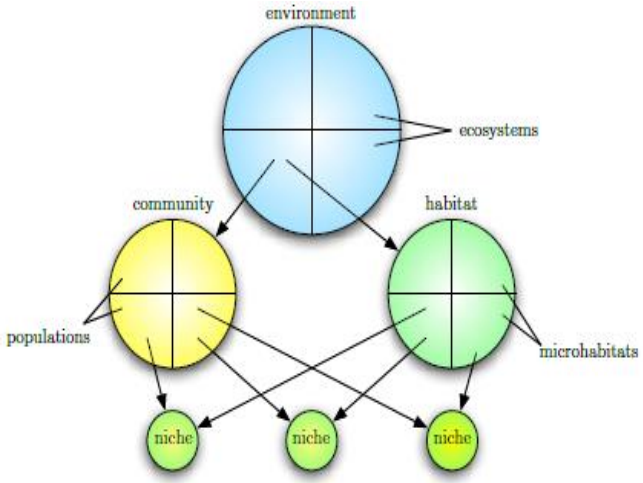
information exchange and who trade digital objects that are produced through the system. Entities that participate and form the ecosystem can be applications running not only on simple devices: wearable, sensors, actuators, but also on complex services executed on smartphones, tablets, personal computers, company servers, etc. A reference, architecture for digital ecosystems is a step toward standardization, as it defines a set of guidelines in designing and implementing a digital ecosystem. Often such architectures are very abstract, difficult to understand and implement.

Biology of Digital Ecosystems

Natural science is the study of the universe via the rules or laws of natural order, and the term is also used to differentiate those fields using scientific method in the study of nature, in contrast with the social sciences which apply the scientific method to culture and human behaviour: economics, psychology, political economy, anthropology, etc [1]. The fields of natural science are diverse, ranging from particle physics to astronomy [2], and while not all these fields of study will provide paradigms for Digital Ecosystems, the further one wishes to take the analogy of the word ecosystem, the more one has to consider the relevance of the fields of natural science, particularly the biological sciences.

A primary motivation for our research in Digital Ecosystems is the desire to exploit the self-organising properties of biological ecosystems. However, the biological processes that contribute to these properties have not been made explicit in Digital Ecosystems research. Here, we discuss how biological properties contribute to the self-organising features of biological ecosystems, including population dynamics, evolution, a complex dynamic environment, and spatial distributions for generating local interactions [3]. The potential for exploiting these properties in artificial systems is then considered. We suggest that several key features of biological ecosystems have not been fully explored in existing digital ecosystems, and discuss how mimicking these features may assist in developing robust, scalable self-organising architectures [4, 5].

Evolutionary computing uses natural selection to evolve solutions [6]; it starts with a set of possible solutions chosen arbitrarily, then selection, replication, recombination, and mutation are applied iteratively. Selection is based on conforming to a fitness function which is determined by a specific problem of interest, and so over time better solutions to the problem can thus evolve [7]. As Digital Ecosystems will likely solve problems by evolving solutions, they will probably incorporate some form of evolutionary computing. Notably, a fundamental difference between biological and digital ecosystems lies in the motivation and approach of their respective researchers. Biological ecosystems are ubiquitous natural phenomena whose maintenance is crucial to our survival [8], developing through the process of ecological succession [9]. In contrast, Digital Ecosystems will be defined here as a technology engineered to serve specific human purposes, developed to solve dynamic problems in parallel with high efficiency.



***Source*:** Digital Ecosystems: Ecosystem-Oriented Architectures by Gerard Briscoe, Suzanne Sadedin and Philippe De Wilde

Fig 1

Preparing for the Future

To prepare for the future, companies need to develop new capabilities in two areas. The first area is learning more about their customers:

Use Digital Capabilities to Obtain Information about Customers' Goals and Life Events

Many companies have customer data stored in separate departments, systems and geographies, ut not often enough can they bring it together to act at the "moment of truth" (the moment the customer remembers and talks about) on the customer's mobile device, during a phone call or at a physical outlet.

Amplify the Customer Voice inside the Company

Every company we saw that put a premium on better customer knowledge found a way to amplify the customer's voice inside the company. Amplifying the customer's voice typically involves compelling the widespread use of some kind of customer satisfaction metric, accessing customers' unvarnished sentiments via social media and using big-data techniques to test and learn.

Emphasize Evidence-Based Decision Making

Effectively using more and better knowledge about the customer also requires a change in the decision-making

[1] Hollis M (1994) The Philosophy of Social Science: An Introduction. Cambridge University Press, Cambridge
[2] Salmon M (1999) Introduction to the Philosophy of Science. Hackett Publishing, Indianapolis
[3] Tilman D, Kareiva P (1997) Spatial Ecology: The Role of Space in Population Dynamics and Interspeci_c
Interactions. Princeton University Press, Princeton
[4] Briscoe G, Sadedin S, Paperin G (2007) Biology of applied digital ecosystems. In: IEEE Digital Ecosystems
and Technologies Conference, pp 458{463
[5] Briscoe G, Sadedin S (2007) Natural science paradigms. In: Digital Business Ecosystems, European Commission,
pp 48
[6] Goldberg D (1989) Genetic algorithms in search, optimization, and machine learning. Addison-Wesley,
Readin
[7] Ibid.
[8] Balmford A, Bruner A, Cooper P, Costanza R, Farber S, Green R, Jenkins M, Je_eriss P, Jessamy V,
Madden J, Munro K, Myers N, Naeem S, Paavola J, Rayment M, Rosendo S, Roughgarden J, Trumper K,
Turner R (2002) Economic reasons for conserving wild nature. Science 297:950{953
[9] Begon M, Harper J, Townsend C (1996) Ecology: Individuals, Populations and Communities. Blackwell
Publishing, London

culture. Many companies have relied on gut instinct and management experience for making their key decisions about customer needs. However, in the era of big data, real-time dashboards and many other sources of hard evidence, companies need to create much more of an evidence- based culture. Experience and gut feel still matter for the intangibles, but decisions must be driven by the evidence, not by title or position.

Develop an Integrated, Multiproduct Channel Customer Experience

Making actual customer needs and goals central to the business model means that companies stop selling products and instead meet the customer's needs in the context of life events. This change requires companies to become multiproduct and multichannel simultaneously. That is no easy feat and often requires significant organizational surgery, as we saw with USAA. The second area is to become more of an ecosystem. For companies that have learned how to manage value chains, redesigning the business requires a difficult transformation. Here's what is required:

Become the First Choice in Your Space

Being successful requires being the first choice in your space for a significant number of customers. Amazon is the first choice for many customers for retail. Aetna would like to be the first choice for your health care needs. Fidelity would like to be the first choice for your wealth management. We believe that as business designs become more open, with more competition, industries will consolidate. There will be fewer profitable players that are ecosystem drivers and modular producers. Being first choice requires a combination of having a great brand, delivering on the brand's promise, receiving great customer recommendations and delivering world-class execution in meeting customer needs.

Become Great At Building Partnerships

Ecosystem drivers have to find ways to partner with providers of complementary products and services (and probably competitors, too) and then integrate other things customers want, such as payments and delivery. At Fidelity's website, for example, customers can use the company's portfolio analysis tools to identify gaps in their portfolios and then purchase a wide array of mutual funds from competitors (including Vanguard, PIMCO and hundreds of other fund companies).

Create Service-Enabled Interfaces That Others Can Use

Success requires taking what makes you great — your core business transactions — and making them easily and securely available throughout your business — and also to your partners. Achieving this is dependent on two things. First, you need to standardize and make your business rules available (for instance, Aetna would describe how it assesses a claim). Second, you need to make the business transactions available as services. For example, both Aetna and BBVA provide the application programming interfaces to their core transactions to both insiders and outsiders to help drive innovation. For Aetna, each API bundle includes additional health content, data and services that can be included in any new product or service offering and speed time to market. For BBVA, learning how to make these business services available to other parts of its global bank further informs how to offer the services outside the company.

Treat Efficiency and Compliance as a Competence

Success also requires increased digitization of your company's operations, recognizing the inherent potential efficiencies, responsibilities and threats. These include dealing with data privacy issues, cyber threats, potential service disruption and the need for increasing levels of compliance with governments and other regulators worldwide. Companies that can do all this will make compliance a competence, not a chore, and will strive to be the best in class.

Digital Transformation

Digital Transformation is the application of digital technologies and capabilities to improve the business and operating models of an organization. Organizations that engage in digital transformation typically create new products and services, expand markets, improve efficiency and operations, enhance customer value and experience, engage employees and partners, optimize assets, manage risk, and uncover new monetization opportunities.

The four aspects of digital transformation, as shown in Figure 1. First is the transformation of the business model. New business models extend/improve existing products and services as well as create completely new ones. Examples are:

- **Connected Products / Services / Assets**

Use connected information for product improvement, predictive maintenance, and to provide users with feedback and recommendations. Examples are remote health devices such as Medtronic's Continuous Glucose Monitoring system and Caterpillar's CatConnect product line.

- **Platform Business Model**

A platform business model facilitates exchanges between two or more interdependent groups, usually consumers and producers. Platforms create value by harnessing and creating scalable networks of users and resources that can be accessed on demand. Examples are Amazon and Facebook.

- **Asset-Lite And The Sharing Economy**

Built on top of the platform model, asset-lite, uses the platform to connect owners of assets to those desiring to use the assets. Prime examples are Uber and Airbnb.

- **Customer Engagement**

Provides personalized and targeted interaction with customers that makes them feel "understood, special, part of something" in a way that provides value to the customer and the organization. Examples are Under Armour's Connected Fitness program and Macy's On Call mobile shopping assistant.

- **Information Monetization**

Collect information from multiple sources, analyze and aggregate it, anonymize it, and sell the results. Examples are Oracle's Unified Customer Data and IBM's Weather Channel Weather Data Packages.

While changes to the business model, and especially to customer interaction are the 'sexy' stuff that makes the headlines, changes to the operating model may actually offer more opportunities for organizations to improve their bottom line. Operating models focus on improving internal or partnered operations, efficiencies, and processes. Examples are:

- Digital supply chain
- Intelligent fulfillment
- Decision augmentation
- Robotic process automation
- Digital twin synthesizing

Of course, all of these advances to both the business and operating model are enable by data, and the transformation of that data into insight and knowledge through the use of cognitive technologies (e.g. analytic, AI, ML). And, everything is enabled by the new technologies.

Yet so much has changed in the past 2 or 3 years that it's hard to know what that should look like anymore. The environment is now part of a larger business ecosystem. Scale, speed, and scope are greatly expanded. Business architecture is different. Information and data architecture are different. Application architecture is different. Technology architecture is different. Security architecture is different. Performance architecture is new. And, how they all fit together to create a "digital business platform" is different too.

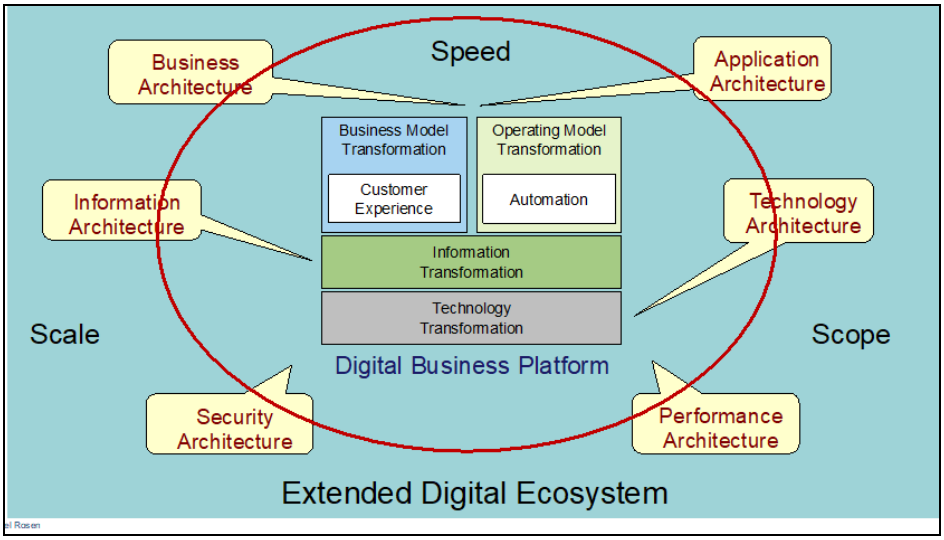


Fig 1: Architecting the Digital Business Platform

Digital Business Platform

The digital business platform is the new conceptual framework for the architecture that addresses the needs for business model, operating model, information, and technology transformation. Fundamentally, it:

- Supports interaction and communication internally and across the ecosystem
- Has subsystems for collection and storage of large amounts of a wide variety of data in real time
- Provides cognitive capabilities for AI, machine and deep learning, analysis, modeling, visualization
- Enables predictive and prescriptive actions including augmentation, automation, reporting
- Integrates with existing enterprise systems
- Is secure
- Is scalable, flexible, manageable

Figure 2 provides a high-level overview of the key aspects of the digital business platform.

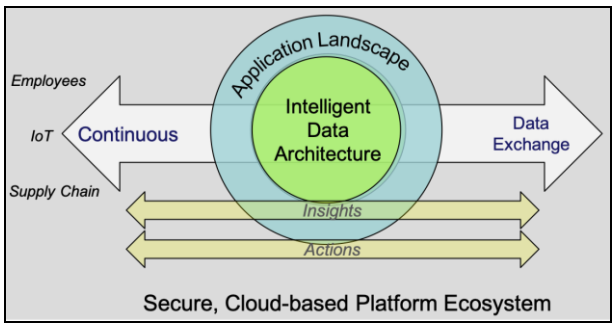


Fig 2: Digital Business Platform

At the heart of the platform is the continuous exchange of data into, out of, and between all aspect of the platform and its environment. Data is collected (in real-time) from customers, partners, connected products, employees and internal processes, IoT devices, supply chains, etc. The intelligent data architecture applies cognitive computing to provide awareness and insights of the ecosystem and translate them in automation, augmented decisions, controls, recommendations and other actions. The application landscape integrates existing enterprise applications with new, micro services based architectures to provide the interfaces, logic, and processes that implement the business and operating models.

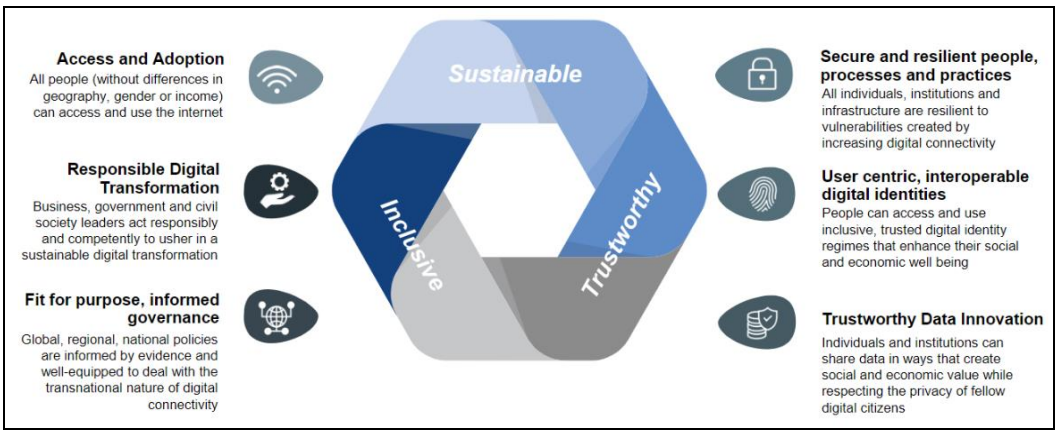
Shaping the Future of Digital Economy and New Value Creation

The Fourth Industrial Revolution is rapidly driving transformational disruption across every sector. By 2022, over 60% of global GDP will be digitized. An estimated 70% of new value created in the economy over the next decade will be based on digitally enabled platforms. Currently, about 50% of the world's population does not currently participate in the digital economy at all – and growth in internet adoption is slowing. The G20's Global Infrastructure Hub estimates a global funding shortfall of nearly $1 trillion for information and communications technology infrastructure by 2040.

Industry structures and business models are being disrupted by innovation in new products and services, changing cost structures, lower barriers to entry and shifting value pools. Companies need to re-imagine how to create, distribute and

capture value in this new environment. Navigation requires holistic and sustained insight & intelligence.

Our Platform works with over 1,000 executives, experts, policy-makers, civil society leaders and academics to create new frameworks for disrupting traditional business, investment and innovation models, and to create sustainable value for an inclusive economy.



***Source*:** https://www.weforum.org/platforms/shaping-the-future-of-digital-economy-and-New-value-creation

Fig 3: Six Shared Global Outcomes to Achieve a Sustainable, Inclusive and Trustworthy Digital World

Recommendations

Member States are invited to consider the findings and recommendations of this discussion paper to improve national ecosystems of data, algorithms and insights and to request UN Environment to continue the SPB Forum Working Group on Data, Analytics and AI. The next focus of this working group should be developing an implementation strategy to ensure that a digital ecosystem of data, algorithms and insights is built for the environmental dimensions of sustainable development. Such a strategy would include:

1. **Envisioning a digital ecosystem for the environment partnership by:** considering the scope and structure of the ecosystem; identifying where data, algorithms and insights can be hosted depending on the type of information contained; mapping linkages with other relevant digital ecosystems; providing a framework for quality assurance and transparency; establishing a mechanism for protecting individual privacy; continuously identifying data, and data gaps; providing insight related to the most pressing and emerging environmental issues; matching the vision for the ecosystem together with a financing model; and avoiding data and technology monopolies in the environmental sector.
2. **Collaboration and integration of other global best practices:** many initiatives related to sharing data, including geospatial data, or to stimulate the development of analytical products already exist. UN Environment will work across the UN System and with other partners to leverage existing initiatives, for example the Environment Situation Room powered by MapX, the UN Global Platform on Big Data for Official Statistics, the UN Data Innovation Group, the UN Global Pulse projects on data science, Group on Earth Observation System of Systems (GEOSS), IOCUNESCO's Global Ocean Observing System, etc. (United Nations [UN] 2015; United Nations Global Pulse [Global Pulse] 2018; United Nations Environment Programme [UNEP] 2019; United Nations Statistics Division [UNSD] 2019).
3. **Using the science-policy-business interface to identify the demand for actionable, policy relevant insights, and public good applications:** convene countries, companies, academics, civil society and international actors to match the data available with technological capabilities for generating insights in real time about the state of the environment at any scale. This will also help identify data gaps and democratise access to information for supporting government policies, academic research, financial investments, citizen action and sustainable consumption. In particular, public good applications required to monitor key environmental risks and opportunities should be identified even when these applications do not generate stand-alone private sector investments. These would include monitoring global environmental security risks, developing open source software, promoting consumer awareness and nudging towards sustainable consumption, and catalysing citizen science opportunities.
4. **Developing a strategy for operationalising and financing an ecosystem for data, algorithms and insights:** a strategy should be developed with key stakeholders related to data generation and collection, technological solutions and algorithms, insight analysis and business models. This strategy should be geared toward operationalising a global ecosystem through a step-by-step approach which identifies short term wins and long term modalities for the ecosystem.
5. **Fostering engagement and rolling out the ecosystem:** engagement with Governments, private sector partners, academics and citizens underpins the success of a global ecosystem. UN Environment could identify key partners that could stimulate national engagement, such as academia, UN Country teams and members of the Citizen Science Community, which would be both information users and contributors (Citizen Science

Association [CSA] 2019). UN Environment would take into account the specific needs of developing countries and to ensure that digital technical solutions to environmental issues do not create additional inequality, but promote technology transfer and build capacity for uptake.

Conclusion

Digital Ecosystem is not always about capturing more leads and producing relevant content. It is also about how you direct those qualified leads to move further along the marketing and sales funnel. Keep in mind that your marketing and sales team need to work together in this case and rather than using traditional method, they should use more digitalized tactics to entice today's prospects.

References

1. Aldridge S. a. (n.d.). Virtually Transforming Higher Education, 1-25.
2. Averian A. A Reference Architecture for Digital Ecosystems. Additional information is available at the end of the chapter, 2018, 106-212.
3. Chang HD. Exploring the Conceptual Model of Digital Ecosystem. Second International Conference on Digital Telecommunications, 2007, 1-8.
4. Kritsupath Sarnok PW. Digital Learning Ecosystem by Using Digital Storytelling for Teacher Profession Students. International Journal of Information and Education Technology, 2019, 21-29.
5. Verga ZM. Enabling energy smart cities through urban sharing ecosystems. Energy procedia, 2017; 111:826-35.