Electronic Journal of Education, Social Economics and Technology
Vol. 4, No. 2, (2023), pp. 43-48
ISSN 2723-6250 (online)
DOI: https://doi.org/10.33122/ejeset.v4i2.18

SAINTIS publishing

Research Article

Mapping digital ecosystem for competitive advantage using technological advancements

Swapnil Morande[1]* & Veena Tewari[2]

[1] Department of Economics, Management and Institutions, University of Naples Federico II, Napoli, Italy
[2] Faculty of Business Management, Majan University College, Muscat, Sultanate of Oman
*Corresponding Author: swapnil.morande@unina.it | Phone Number: +39 3294423049

ABSTRACT

'Digital Ecosystem' is the interdependence of computer software, hardware, and digital services that play a significant role in fulfilling the organization's objectives. It is a convergence of recent broadband adoption and technological advancement that has pushed the state-of-the-art technologies, and industrial commerce into a flux, for greater market penetration. One of the most significant advantages of the Digital Ecosystem includes mapping of consumer interest (with product or services) to gain a competitive advantage in the market. The research presents various tangible and intangible benefits received by the organization with the help of the Digital Ecosystem. In the future, customers are likely to align their buying behavior based on 'Digital Ecosystems' they prefer. The variables involved in buying behavior are complex as well as difficult to measure; hence the qualitative approach has been followed to integrate various aspects of the proposed study. This research is significant because the 'Digital Ecosystem' can be a part of a business strategy that can gauge customer requirements, enhance customer experience, and retain customer loyalty.

Keywords: digital ecosystem; content management; user experience; cloud computing; service ecosystem

1. INTRODUCTION

The metaphor of 'Digital Ecosystem' implies the use of business processes and information systems to achieve customer satisfaction with greater market share. The research comments on the value addition that an organization can have while utilizing innovative business models arising from the Digital Ecosystem. The proposed research also takes into consideration the current technological advancements that propel the competitive advantage. Digital Ecosystem functions on the design of the hardware, software interface, and services to target customers. (Li et al., 2012) It can reduce the churn rate and can retain the customer for a longer duration. (Okano et al., 2018) Additionally, the Digital Ecosystem can create dependencies across products and services that lead to greater opportunities for businesses. Using an appropriate example and conceptual mapping research provides a different outlook on how technological advancements can push the capabilities of businesses to their limits.

Digital technology helps E-commerce based businesses achieve an unprecedented level of distribution performance using the Internet. In fact, technologies such as 'Cloud computing' further lowers the cost of delivering the products or services and makes it possible to have the flat-cost model featuring both reliability and scalability. Technological breakthrough, companies have developed innovative practices by recognizing that software needs to be coupled with hardware platforms. This gives rise to the concept of 'Digital Ecosystem' that represents connected digital devices and their limitless functioning. (Bajarin Ben, 2011) The Digital Ecosystem can combine Web Apps, Smartphones, and Desktop applications with E-Commerce Portals, where businesses can reflect their operational strategy and interact with potential customers. (Subramaniam, 2020) As technology continues to progress, such a sophisticated Cyberspace paradigm drives a new generation of digital businesses. (Daugherty Paul, 2015) That said, organizations have become flexible in identifying practices to develop 'Digital Ecosystems' from the ground up. (Johnson et al., 2018).

Researchers claim that 'Digital Ecosystem' can be called distributed adaptive open socio-technical systems, that are inspired by natural ecosystems and appears to be a novel approach for a new generation of business. (Briscoe & Marinos, 2009) It can help small and medium enterprises (SMEs) to create value networks and compete with global counterparts. Another study documents that organizations are working to create a platform through which an ecosystem of applications enables collaboration and workflow between stakeholders (Olavsrud, 2015). The study further notes as such digital transformation continues to support organizations to tap opportunities that had never been explored. As per one of the published articles, such as re-engineering of business processes, can help the organization capture valuable data and provide analytics-based services to attract more customers. (Desmet et al., 2017).

The potential of current businesses can further be enhanced by applying 'Network effects' and by leveraging the control of core technologies. (Farrell & Klemperer, 2011) 'Network effects' is nothing but an increase in the overall value of the

product or service when more people start using it. Network effects help scale a business by increasing customer base, market share, and the overall value proposition of the product/service or content. Digital Ecosystems fulfills scaling activities using the Network effects.

Current research on Digital Ecosystem has primarily focused on how organizations can attract users to generate network effects and assumes that the phenomena in conjunction with Digital Ecosystem will reduce the consumer attrition(Briel & Davidsson, 2020) Digital Ecosystems can integrate multiple product and services to holistically address customers' needs, establishing a significant value proposition. Even without discounts, it can also help encourage sales in the form of bundled products and services. With Digital Ecosystems, organizations get to monitor their service networks and supply chain and improve business processes. (Desmet et al., 2017) Such an innovative form of digitalization brings in a different perspective towards the value chain and redefines the role of the consumer to be able to achieve a competitive advantage. Literature shows that modern organizations will no longer act as isolated entities but components of the Digital Ecosystem. Using Digital Ecosystems, businesses are likely to offer a broad range of facilities where customers using networked devices will have more choices and great user experience. (Morande & Tewari, 2016) Researchers also believe that the Digital Ecosystem can tackle the range of technological, strategic, and operational challenges that businesses might face as market demands change. (Gawer & Cusumano, 2014).

1.1 Research Question

Researchers believe that multifaceted factors originating from business processes and digital technologies affect value creation. (Häikiö & Koivumäki, 2016). Hence the research looks forward to reflecting on the functioning Digital Ecosystem of an enterprise. It holistically evaluates the ecosystem to address the following research questions -

1. To understand the role of 'Digital Ecosystem' in an organization.
2. To identify the extent of the influence of the 'Digital Ecosystem' on an organization.
3. To investigate business opportunities presented via 'Digital Ecosystem.'

1.2 Justification for the research

In modern times, it is not enough to be able to sell a product or services and expect customers to stay loyal without providing any value-added services. Presented research will showcase how an organization can leverage different components of a Digital Ecosystem and technologies to achieve market leadership. Various attempts have been made to explore business models and ecosystems as separate entities. But there exist few studies that have focused on their combined exploration. By studying the Amazon's (B2B & B2C) business models and ecosystem analysis, researchers have attempted to understand how business models relate to today's E-commerce industry.

2. RESEARCH METHOD

Researchers initially conducted a conceptual study of the Digital Ecosystem. This helped in developing a clear understanding of the concepts and translating observations to present the researcher's perspective. Researchers also studied the different applications and followed up with advancements in E-Commerce (B2B and B2C models). In the process, they also reviewed publications to identify and develop the initial and contemporary variables of the area of study. The primary research method of this study was qualitative, which is one of the best approaches for the understanding of complex social constructions, such as ecosystems. (Hammarberg et al., 2016) The qualitative study enhances the involvement of everyone related to the study. The researcher worked on the social parameters in addition to the quantitative measures involved in the study. Qualitative data was collected using non-interventionist techniques. (Green et al., 2015; Palinkas et al., 2015). Observation is fundamental to scientific inquiry that seeks to examine the natural course of events as they would occur without the presence of the observer as it was observed in a given study. (Adler & Adler, 1994) Hence this methodology was justified and supported the observations that were made through the course of the presented research. (Pathak et al., 2013) Observational analysis of this type helped researchers understand the role of the Digital Ecosystem, gain insights, and further to quantify the tangible and non-tangible benefits of a Digital Ecosystem. (Angrosino, 2007) The contextualized discussion has been presented in the next section.

3. RESULTS AND DISCUSSION

3.1 Insights

The research includes the observational study carried on Amazon Inc., where researchers have evaluated its E-commerce driven framework. Amazon has been considered for this research due to its business model and capabilities in cloud computing, competencies in content management (deAgonia Michael et al., 2013). Amazon is also one of the successful companies that have achieved strategic fulfillment via the Digital Ecosystem over the last decade. Amazon has been more than capable of enabling its e-commerce platform and working to strengthen its business strategy as an organization. The company has been investing in hardware and software components of Digital Ecosystems to differentiate itself and gain a competitive advantage. In this new era of truly personal computing, being led by devices like smartphones and now tablet PCs, Amazon has introduced its Fire Series products. It is to be noted that amazon made an attempt to bring in another hardware called 'Fire Phone' which eventually failed, but ended up giving insights to the company regarding hardware development. (Mangalindan JP, 2014) These insights are reflected in the development of 'Amazon Fire Television,' where it works with several manufactures to become a part of an open ecosystem. This fact helped the company receive greater

financial benefits leveraging its content delivery business arm. The mechanics of Amazon's Ecosystem revolves around 'Kindle' devices. It is a hardware that comes in various versions and bundles with multiple digital services. Amazon works around overall shopping experience and personalized content delivery leveraging its content-based platform. The E-commerce activities that run through its portal display a stronghold of Amazon, as shown in the given figure 1.

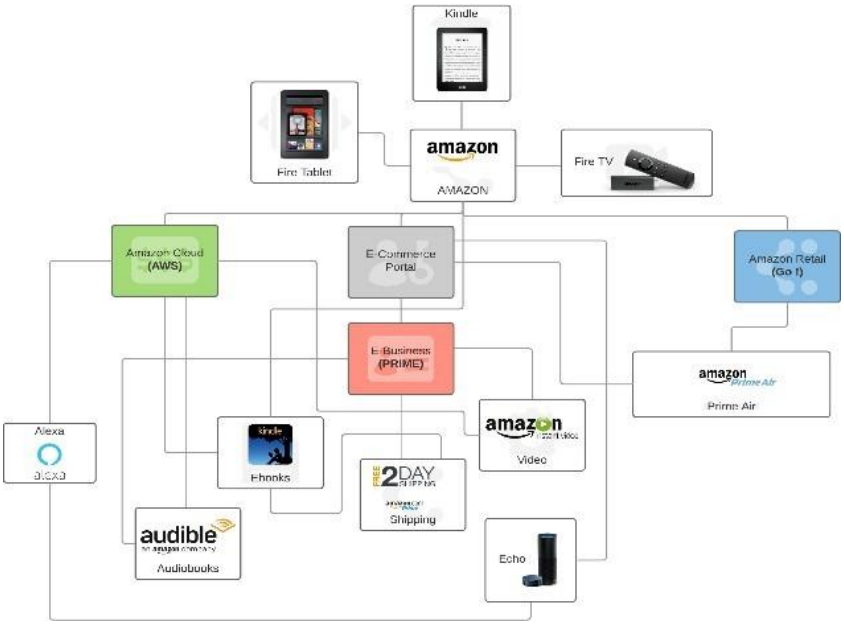

Figure. 1. Digital Ecosystem of Amazon Inc.

From the above block diagram (Figure 1), one can identify essential elements, such as Kindle, Fire TV, coupled with E-commerce services. It also aligns with the Amazon Web services (AWS) as well as a popular virtual assistant called 'Alexa.' **Figure 1** is a representation of the Digital Ecosystem that was developed over a long period. It can be associated with services provided using the Internet and products making use of the Internet. These products and services are a representation of customer requirements *(secured through Feedback),* User Experience *(enhanced through Recommendation System)*, and Loyalty (pushed through Trials/Discount and Offers). The Business model built over the Digital Ecosystem of Amazon Inc. is focused on the cost-effectiveness and value addition. The same is experienced by a customer where an individual can access products and services as a one-stop-shop. Over the period, customers with investments on the platform contains them within Amazon's Ecosystem without switching to its competitors. With interconnected products and services, the customer's experience keeps on getting better. At the same time, as a business-Amazon Inc. can plan on introducing a new product or services with the promise that the company will have many early adopters.

3.2 Discussions

Further analysis of the Digital Ecosystem in **Figure 1** presents a deeper layer of its capabilities and translating those into Service Tangibility, as demonstrated in **Figure 2**.

The Amazon Web Services (also known an AWS) helps Amazon facilitate online videos as well as music services along with audiobooks and e-books in digital form. The cloud-based service called 'Alexa' houses different variations branded as 'Echo devices'. This hardware that interfaces with Amazon's software framework to drive Digital capabilities.(Major et al., 2019) It also fulfills various operations that involve getting groceries, checking the weather, booking flights, calling radio cabs, getting a burger, and making online purchases using E-Commerce. For every query placed by the user through Alexa, Amazon gets benefitted in a direct or indirect manner. (Orr & Sanchez, 2018; Simonite Tom, 2017) This has been possible due to Amazon's unique business processes that gave access to third parties to leverage their Cloud-based service (AWS) and Alexa driven (Echo) services. Undoubtedly this has resulted in an open ecosystem where consumers can use Alexa for several different purposes. In the near future, using the Digital Ecosystem, Amazon may monetize the content available on Alexa. There's also a possibility that Amazon might allow advertisements on Alexa 's Echo branded devices as well.

Further, it can be noted that content delivery is greatly enhanced for activities such as reading a book. This is where Amazon has the biggest store of e-books and paperback editions. With its Cloud-based synchronization service (also known as 'Whisper sync'), it lets reader sync progress (or a bookmark) across devices and encourages reading while on the move. Amazon can also play the media (Music and Radio streams)-via 'Alexa'-where the store makes use of Amazon Music to fulfill the content consumption and deliver music to devices. As a matter of fact, Amazon is the undisputed king of online shopping, where it sells a plethora of products. With its development of hardware and software, Amazon has certainly made its services platform-independent, at the same time, its Digital Ecosystem pushing customers across various amazon-based services. One of the prominent examples of this is 'Amazon Prime,' where its two-day shipping service provides value to all the Kindle E-book device owners by delivering free eBooks as well as content in the form of online Music and Movies. (Milliot, 2012). So far, the company has managed to maintain better integration across all its components, as it can be seen in the Digital

Ecosystem. In the present age of consumerism, Amazon has developed itself as one of the most proactive service providers, but it does not stop there, as Amazon has redefined a retail experience-using 'Just Walk Out' technology-to fulfill the contactless shopping via Amazon Go. (Ives et al., 2019) Based on the discussions, the proposed model in Figure 2 below is an attempt to integrate the benefits of using the technologies in the service sector by any contemporary service provider. The model not only takes care of core service delivery but also covers the importance of facilitation of payment options. The model can act as a driver to enhance the customer's overall joy of owning any service/product. This can be followed and practiced by any service provider to deliver superior customer experience by supporting service quality parameters, as shown in Figure 2.

In the process of developing the above schematic (Figure 2), researchers have referred the Amazon's model, as a base to develop the proposed framework because it is one of the pioneer brands that play to exploit the capabilities.These capabilities are used in terms of its an acquired resource - not only to refine the competencies of its human resources but also the process-oriented competencies. This relates to the underlying assumption of service marketing of having three extended P's, i.e., People, Process, and Physical evidence for managing any service/product. It indicates that today's service provider will be able to manage its vast portfolio of software, hardware, and services by realigning its resources using the model shown above for any type of content delivery, as shown in **Figure 2**.

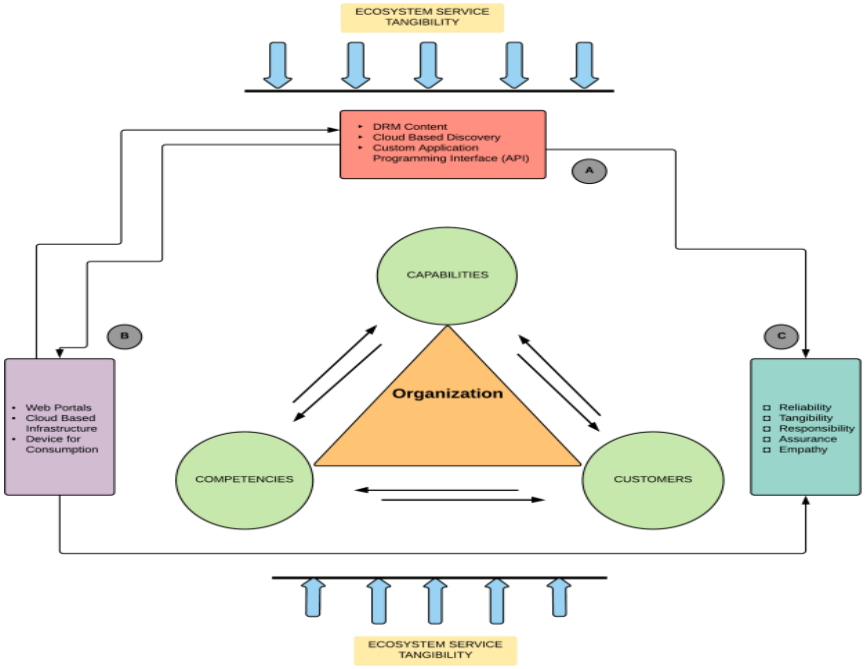

Figure. 2. Digital Ecosystem and Service Tangibility

As demonstrated through discussion, 'Digital Ecosystem' achieves brand loyalty, market penetration, customer relationship, aggregated data, and improved processes. It also helps new customers to get inducted by the business. Further, the 'Network externalities' seen in Figure 2 increase bump Tie-in Purchases and 'Network effects' additional results into Impulse Purchases made by customers. Such mapping of the Digital Ecosystem helps existing customers by holistically addressing their needs and, at the same time, support businesses reduces friction with the competition with a steady customer base. Characteristically, the Digital Ecosystem also puts greater switching costs on customers and offer market monopoly by the business. The same is evident from Amazon Inc.'s success, as it has become a trillion-dollar company. (Lee, 2018)

3.2 Contribution

The competition among businesses has been evolving into maintaining the consumers by leveraging online services along with hardware and software. The research contributes to the possible alignment of these three components through the development of a model. This research offers organizations with a bird's eye view on the concept as well as components of the Digital Ecosystem. In the process, it explains how a Digital Ecosystem makes use of existing technologies with the objective of creating net value and building a competitive infrastructure. It must be noted that Amazons' business processes vary from country to country. Hence the design of the Digital Ecosystem should follow context-specific evolution. (Lenkenhoff et al., 2018) In future studies, researchers plan to develop a systematic approach towards Digital Ecosystem for verifying it applicability.

4. CONCLUSION

Business strategies have come a long way where value-added services were limited. Business scenario has changed entirely in modern times, and more efforts from the service provider are expected to retain a customer. The existing competition among companies is increasingly moving to the combination of hardware, software, and services. This effectively gives rise

to the realm of the Digital Ecosystem where an organization can make use of evolving technologies aligned with the Digital Ecosystem for the betterment of customer experience. Digital ecosystems come in many variations and can be customized as per the product and services offered by it. Digital Ecosystem is as good as the strategy, design, and engineering that goes into developing it. It enables businesses to solve a multitude of problems for a diverse customer base. In today's E-commerce driven environment, a given framework can be exploited, and technology can be used both as a mediator and final service product for the contemporary service industry.

ACKNOWLEDGEMENTS

The research received no external funding. The online portal called 'Lucidchart' was used for model development.

AUTHOR'S CONTRIBUTIONS

All authors discussed the results and contributed to from the start to final manuscript.

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

REFERENCES

Adler, P. A., & Adler, P. (1994). Observational techniques. In *Handbook of qualitative research*. (pp. 377–392). Sage Publications, Inc.

Angrosino, M. (2007). Recontextualizing observation. *The Sage Handbook of Qualitative Research*, 161–184.

Bajarin Ben. (2011, December 16). *Why It's All About the Digital Ecosystem* . Tech.Pinions. https://techpinions.com/why-its-all-about-the-ecosystem/4567

Briel, F., & Davidsson, P. (2020). Digital platforms and network effects: Using digital nudges for growth hacking. *40th International Conference on Information Systems, ICIS 2019*, *December*.

Briscoe, G., & Marinos, A. (2009). Digital ecosystems in the clouds: Towards community cloud computing. *2009 3rd IEEE International Conference on Digital Ecosystems and Technologies*, 103–108. https://doi.org/10.1109/DEST.2009.5276725

Daugherty Paul. (2015, March 9). *The Rise Of Digital Ecosystems In The "We Economy."* Forbes. https://www.forbes.com/sites/ciocentral/2015/03/09/the-rise-of-digital-ecosystems-in-the-we-economy/#736677d5514f

deAgonia Michael, Gralla Preston, & Raphael JR. (2013, August 2). *Battle of the Media Ecosystems: Amazon, Apple, Google and Microsoft | CIO*. Computerworld . https://www.cio.com/article/2383616/battle-of-the-media-ecosystems--amazon--apple--google-and-microsoft.html

Desmet, D., Maerkedahl, N., & Shi, P. (2017). *Adopting an ecosystem view of business technology*. McKinsey & Company. https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/adopting-an-ecosystem-view-of-business-technology#

Farrell, J., & Klemperer, P. (2011). Coordination and Lock-In: Competition with Switching Costs and Network Effects. *SSRN Electronic Journal*, *May*, 1–129. https://doi.org/10.2139/ssrn.917785

Gawer, A., & Cusumano, M. A. (2014). Industry platforms and ecosystem innovation. *Journal of Product Innovation Management*, *31*(3), 417–433. https://doi.org/10.1111/jpim.12105

Green, C. A., Duan, N., Gibbons, R. D., Hoagwood, K. E., Palinkas, L. A., & Wisdom, J. P. (2015). Approaches to Mixed Methods Dissemination and Implementation Research: Methods, Strengths, Caveats, and Opportunities HHS Public Access. *Adm Policy Ment Health*, *42*(5), 508–523. https://doi.org/10.1007/s10488-014-0552-6.Approaches

Häikiö, J., & Koivumäki, T. (2016). Exploring Digital Service Innovation Process Through Value Creation. *Journal of Innovation Management*, *4*, 96–124.

Hammarberg, K., Kirkman, M., & de Lacey, S. (2016). Qualitative research methods: when to use them and how to judge them. *Human Reproduction*, *31*(3), 498–501. https://doi.org/10.1093/humrep/dev334

Ives, B., Cossick, K., & Adams, D. (2019). Amazon Go: Disrupting retail? *Journal of Information Technology Teaching Cases*, *9*(1), 2–12. https://doi.org/10.1177/2043886918819092

Johnson, R., Moore, S., Petriwsky, K., Rice, C., John, C., & Sand, D. (2018). Digital McKinsey: Insights of Winning in Digital Ecosystems. *0718 Hospitality Technologies*, *3*(1), 5–25.

Lee, A. (2018). Bussiness: Amazon Breaches the Trillion-Dollar Club: The company's market value crosses the $1 trillion threshold. But it's not Apple who should fear the e-commerce company and budding ad giant. *WWD*, 8. https://search.proquest.com/docview/2222477900?accountid=12669

Lenkenhoff, K., Wilkens, U., Zheng, M., Süße, T., Kuhlenkötter, B., & Ming, X. (2018). Key challenges of digital business ecosystem development and how to cope with them. *Procedia CIRP*, *73*, 167–172. https://doi.org/10.1016/j.procir.2018.04.082

Li, W., Badr, Y., & Biennier, F. (2012). Digital ecosystems: Challenges and prospects. *Proceedings of the International Conference on Management of Emergent Digital EcoSystems, MEDES 2012*, *October 2015*, 117–122.

https://doi.org/10.1145/2457276.2457297

Major, D. J., Huang, D. Y., Chetty, M., & Feamster, N. (2019). Alexa, Who Am I Speaking To? Understanding Users' Ability to Identify Third-Party Apps on Amazon Alexa. In *arXiv.org*. Cornell University Library, arXiv.org. https://search.proquest.com/docview/2311134852?accountid=12669

Mangalindan JP. (2014, September 29). *Why Amazon's Fire phone failed* . Fortune. https://fortune.com/2014/09/29/why-amazons-fire-phone-failed/

Milliot, J. (2012). Amazon's Prime Advantage. *Publishers Weekly*, *259*(36), 3.
https://search.proquest.com/docview/1038133476?accountid=12669

Morande, S., & Tewari, V. (2016). Impact of Digital Ecosystem on Business Environment. In *Communication and Power Engineering* (pp. 233–241). De Gruyter. https://doi.org/https://doi.org/10.1515/9783110469608-023

Okano, M. T., Antunes, S., de Oliveira, G. F., & ... (2018). Digital Ecosystem and how it can benefit the business: A narrative review. *… on Management and …*, *September*.
https://www.researchgate.net/profile/Marcelo_Okano/publication/327546114_Digital_Ecosystem_and_how_it_can_benefit_the_business_A_narrative_review/links/5b9558eba6fdccfd5432c37a/Digital-Ecosystem-and-how-it-can-benefit-the-business-A-narrative-review.pdf

Olavsrud, T. (2015). *How digital ecosystems are creating the "we economy."* CIO. https://www.cio.com/article/2878419/how-digital-ecosystems-are-creating-the-we-economy.html

Orr, D., & Sanchez, L. (2018). Alexa , did you get that? Determining the evidentiary value of data stored by the Amazon® Echo. *Digital Investigation*, *24*. https://doi.org/10.1016/j.diin.2017.12.002

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful Sampling for qualitative data collection. *Adm Policy Ment Health*, *44*(12), 73. https://doi.org/10.1007/s10488-013-0528-y.Purposeful

Pathak, V., Jena, B., & Kalra, S. (2013). Qualitative research. *Perspectives in Clinical Research*, *4*(3), 192. https://doi.org/10.4103/2229-3485.115389

Simonite Tom. (2017, January 18). *Alexa Gives Amazon a Powerful Data Advantage-MIT Technology Review*. MIT Technology Review. https://www.technologyreview.com/2017/01/18/106693/alexa-gives-amazon-a-powerful-data-advantage/

Subramaniam, M. (2020). Digital ecosystems and their implications for competitive strategy. *Journal of Organization Design*, *9*(1). https://doi.org/10.1186/s41469-020-00073-0