




Advocating for Harnessing the Power of Ecosystems in Healthcare: The Case of an Ecosystem in the Realm of Parkinson's Disease - A Position Paper

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Abstract: In the contemporary healthcare landscape, organizations largely operate on their own, potentially limiting comprehensive care for complex diseases. This position paper underscores the potential of utilizing the power of an ecosystem as a structure for value creation within the realm of Parkinson's disease. We analyze the potential values that arise from utilizing an ecosystem for three entities, the organizations, the healthcare system and the patients. In so doing, we propose a first set of benefits, i.e., values, that arise subdivided into financial and non-financial values.


1 INTRODUCTION


In the healthcare sector, organizations such as pharma companies, doctors, or medical equipment manufacturers predominantly act independently to provide products and services to patients. Especially regarding diseases that demand complex care offerings and where the potential benefits of identification, cure, or management by combining specific incremental services of different actors lie, new ways of providing a joint service offering might be promising.


Today's healthcare systems might be seen in a status where a reboot is needed. Exemplarily, in the healthcare system in Switzerland, the costs are rising significantly, which is currently reflected in increasing health insurance premiums (Bundesamt für Gesundheit (BAG), 2023). The majority of the direct costs of the healthcare system are attributable to non-communicable diseases (NCDs), e.g., cardiac diseases, musculoskeletal, and cancer (Bundesamt für Gesundheit (BAG), 2022), making them a significant lever.

Looking at organizations in various sectors, it becomes evident that they work jointly with other organizations to provide complex service offerings to their customers. A specific form of such a networked environment for value creation is denoted as ecosystem (Adner, 2017; Jacobides et al., 2018; Moore, 1993; Vetterling & Baumöl, 2023a). Ecosystems form a third organizational form for value creation besides markets and hierarchies (Jacobides et al., 2018). In ecosystems, the organizations as actors provide their individual capabilities in the form of increments for letting an as complete service offering as possible arise for the customers. Providing customer value is considered the ecosystem's main goal (Moore, 1993). We propose that in the case of ecosystems in the healthcare sector, the provision of value by an as complete service offering as possible for (potential) patients is the north star for such settings which might be beneficial for providing value for complex patient journeys.

The realm of analyzing ecosystems, in general, is dominated by large technology organizations such as Apple, Google, or Amazon that harness the power of many to let an overall complex service offering arise.

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Imagine, for example, the large number of applications offered in the Apple app store provided by millions of organizations. Building on the large number of incremental building blocks, i.e., applications, based on one platform, i.e., iOS as software, and the iPhone as a physical link, the provision of a nearly completely individualizable service for each user of an iPhone is possible. Chances are high that not two iPhones show the exact combinations of applications and, hence, the possible combination of increments used shows a high degree of possible individualization.

In this position paper, we now advocate for harnessing the power of ecosystems, to create an as complete service offering as possible in the realm of one NCD, namely Parkinson's disease (PD). We do so by offering an overview of potential benefits for different entities that could be seen as stakeholders of such an ecosystem.

PD is a progressive neurodegenerative condition that starts slowly and deteriorates with time (Alves et al., 2005). Regrettably, there is currently no cure, which means patients must manage it throughout their lives for an extended duration. It causes various constraints for patients, such as unintended and uncontrollable movements, like tremors, muscle rigidity, and difficulty in balance and coordination, which highly impact patients' quality of life. Further, among others, depression and anxiety, sleep disturbance, and sudden freezes in movements are possible effects.

In Switzerland, approximately 15,000 people are affected by the disease (Parkinson Schweiz, n.d.). The primary cause of PD is the gradual loss of dopamine-producing neurons in the brain, particularly in an area called the substantia nigra. Dopamine is a neurotransmitter that is crucial in regulating movement and mood. The exact cause of this neuronal loss is still not fully understood, although genetic and environmental factors are believed to contribute (Pang et al., 2019).

Diagnosing PD is a complex process that demands both the time and expertise of a plethora of experts and organizations providing their services. Initial symptoms may indicate other medical conditions, necessitating extensive efforts, often involving a team of specialists and time-consuming consultations. This leads to significant expenses for the healthcare system and a high degree of inconvenience for patients. Once having identified the disease, various treatments are available to help manage its symptoms, including medication, physical therapy, or, in some cases, deep brain stimulation surgery. These treatments aim to improve the quality of life for individuals with PD by

addressing their motor and non-motor symptoms. Unfortunately, today, these treatments are not offered as a complete service to the patients but oftentimes in a siloed way. Hence, exemplarily, the patient might have to deal with various experts, different appointments, and a broad field of fragmented information provided to him.

PD is a progressive condition, and its management often requires ongoing care and adjustments to treatment plans as the disease advances. Hence, this disease represents a complex condition where the joint endeavors of many organizations, each offering specific increments, i.e., modular aspects of an overall service, might benefit the creation of an auspicious offering for the patients.

For establishing a new organizational setting, such as an ecosystem, knowledge of the possible benefits that might arise is necessary. Thus, we ask the following question:

What are the benefits for organizations, healthcare system, and patients that an ecosystem focusing on Parkinson's disease might offer?

To answer this question, we consider the perspective of an ecosystem as a structure of organizations that aim for a focal value proposition to arise (Adner, 2017). We hereby consider the ecosystem not only a passive construct surrounding an organization but an actively shapable construct for value creation. Further, we consider the perspective of organizations, their *raison d'être*, and the perspective of patients. In addition, we propose a higher-level systems perspective to be considered. To fuel our argumentation, we turn to analyzing the approach of establishing an ecosystem within the realm of PD by a global healthcare manufacturing company.

2 BACKGROUND ON ECOSYSTEMS

In general, two extrema exist for exchanging information, creating value by the interaction of different entities: markets and hierarchies. Both structures arise, building on various organizations that work together. A new structure of different organizations as entities that create value that arranges between these extremes is often seen in practice. This new form is called an ecosystem and positions itself as incorporating aspects of markets and hierarchies, enabling the creation of a service offering no single organization would be able to

create on its own (cf. Adner, 2006; Autio & Thomas, 2022; Dattée et al., 2018; Jacobides et al., 2018; Talmar et al., 2020). On the one hand, the actors within the ecosystem obtain a certain degree of autonomy since they are still offering their products, i.e., increments, as parts of an overall service. These increments stand in a complementary relationship to one another, and hence, the actors, more precisely, their increments, are not fully controllable by one single entity (Jacobides et al., 2018). On the other hand, a necessary condition of ecosystems is that all actors within an ecosystem are aligned toward a shared goal by an entity called the orchestrator (Lingens et al., 2023), undermining the need for a certain degree of leadership.

The main goal of an ecosystem as a value-creation structure consisting of different organizations (cf. Adner, 2017) is the creation of an as complete as possible service offering for customers, i.e., patients (Adner, 2006). For patients, a complex to create solution can arise through the interplay of different actors that no single actor could have offered alone.

Ecosystems as value-creation structures of different organizations, or “organization[s] of organizations” (Kretschmer et al., 2022, p. 407), position themselves as parts of higher-level systems. In our case, this higher-level system is the healthcare system. Figure 1 presents the conceptual framework we propose for considering ecosystems as part of the healthcare system.

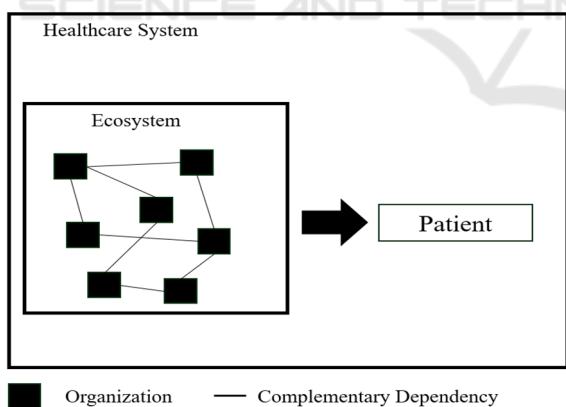


Figure 1: Conceptual Representation of the Ecosystem as Value Creation Construct in Healthcare.

Unfortunately, ecosystems are risky for organizations to engage with since most such endeavors fail (Pidun et al., 2020). One of the main reasons seems to be the choice of the wrong governance structure (Pidun et al., 2020). Another risk could be seen in the need to open up as an organization to work in the interconnection with other

organizations and competitors to exchange data and partner relations, both basic resources within ecosystems (Vetterling & Baumöl, 2023b).

In addition, a certain risk could be seen from a higher, macro-level perspective. Since ecosystems incorporate elements from markets and hierarchies and position themselves just between both constructs, it might be up to debate if, for society, such a new construct offers more benefits than these other extrema or might bring its risks. A first step towards a possible evaluation might be identifying benefits that might arise for entities affected.

Contrasting analyses in markets and hierarchies, that as constructs have been affected by the notion of value-based management, and hence consider a wider spectrum of values, in ecosystems, the financial perspective is still dominant (cf. Priem, 2007; Ritala et al., 2013; Schreieck et al., 2021).

3 CONSIDERING VALUES IN ECOSYSTEMS

We propose three elements to be analyzed to gain a picture of possible values to be obtained: actors, the healthcare system, and patients.

First, **actors, i.e., organizations**, form the essential ecosystem elements that jointly aim to let a specific value proposition arise. Even though the organizations might be more distinguished explicitly by the capabilities they bring to the ecosystem, which might ascribe them to particular roles, such as orchestrator and partner, we here consider one class of organizations as entities that bring increments to the joint value creation setting. Organizations build the focus of our analysis of benefits, i.e., values. This is because we consider the ecosystem the structure for value creation (Adner, 2017).

Second, we propose considering a higher-level systems perspective, the **healthcare system**, for analysis. The structure of a group of organizations necessary for a value proposition to arise is supposed to form the ecosystem (Adner, 2017). Hence, a systems perspective is implicitly assumed already. For analyzing the benefits of an ecosystem in the healthcare sector, we propose considering a different, higher-level perspective on the benefits of utilizing an ecosystem to create value for a higher-level system—the healthcare system.

Third, the perspective of the **patients** needs to be considered. In our case, the patients in the realm of PD might be seen to be the gravitation point of value creation by the ecosystems’ organizations aiming to

provide an as complete service offering as possible for identification and care. Further, considering the patients' perspective brings a certain time dimension to our analysis. Dealing with PD as a specific disease, we believe a patient's journey to be distinguishable in pre- and post-identification of the disease. Early and subtle symptoms start in the pre-identification period and may be mistaken for another condition or as typical signs of aging. Often, patients experience frustration as they try to understand the cause of their symptoms. To diagnose PD, various medical evaluations such as physical examinations, blood tests, neuroimaging, or sometimes genetic tests are conducted. Once the diagnosis becomes more apparent and symptoms progress, the patient is often referred to a neurologist or movement specialist specialized in diagnosing diseases like PD. In the post-identification phase, the patient receives treatment, and ongoing disease management is required to maintain the health status and slow disease progress. The treatment of the disease includes the intake of medication, close monitoring of symptoms evolving, and adjusting treatment plans accordingly. Further, patients receive education about the disease to increase health literacy and a person’s capability of dealing with disease-specific challenges. Early diagnosis and appropriate management are crucial in helping maintain a higher quality of life.

4 ON VALUES IN ECOSYSTEMS

In general, financial and non-financial returns might arise for actors when bringing their capabilities in for value creation (cf. Chesbrough et al., 2018)—which might also account for engaging in ecosystems. We here postulate to further refine this perspective by considering the following:

First, the basic elements of the *raison d’être* of organizations should be considered to analyze the possible benefits for organizations that engage in ecosystems. Organizations generally follow the goal of benefitting their stakeholders (Madden, 2020). To do so, they must follow their basic determination and create capital to sustain (Watson, 2021). Hence, organizations benefit from all resources and capabilities they can obtain by engaging in an ecosystem that help them create capital. The stakeholders benefit in the form of economic returns in general. Hence, organizations should separate the two types of possible benefits. On the one hand, direct economic resources or capabilities, i.e., higher returns or lower costs, are considered financial benefits—these then can be utilized directly by the

organizations to benefit stakeholders since benefitting stakeholders is oftentimes considered by increasing the value of a company in financial terms, see shareholder-value theory (cf. Ittner & Larcker, 2001; Malmi & Ikäheimo, 2003; Rappaport, 1981, 1998). On the other hand, indirectly benefitting resources or capabilities enable better fulfillment of the organization's *raison d’être*, such as gaining more profound insights into the patients or enabling a cultural change within the workforce.

Second, considering a system’s perspective, anything that either lowers the costs of the existing system or benefits by allowing for innovation might be seen as beneficial. Benefits might arise from providing the ecosystem’s output to the healthcare system. These benefits might be denominated in financial terms, e.g., increasing efficiency. But we here aim to broaden the scope and further consider the possibility of a more stable system or increasing the potential of innovation, which might increase the system's efficiency as additional aspects—such aspects we propose to denominate as non-financial.

Third, for patients, benefits arise in either lower overall system costs or a better treatment enabled by a better-aligned service offering. A better treatment might come in many different ways. Exemplarily, it might be seen in an increased convenience during necessary steps within the patient journey or by a more complete treatment offering the potential for better results. Hence, also for the patients, financial values, e.g., lower costs, and non-financial, e.g., a higher convenience or a more complete treatment, might be observable.

Figure 2 refers to a representation of the elements according to the value types to be analyzed.

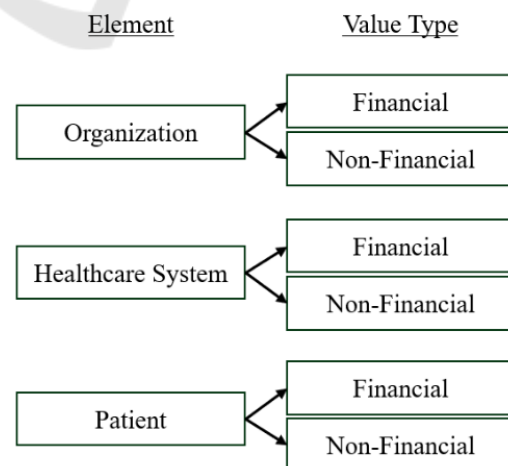


Figure 2: Elements and Value Types.

5 TURNING TO ONE SPECIFIC ECOSYSTEM FOR PROPOSING DIFFERENT VALUES

A rather clustered market of different organizations providing stand-alone solutions can be observed within the healthcare sector in general. A “complete” offering with different patient journey aspects is hardly identifiable. The first attempts are shown in endeavors like Well in Switzerland, where a consortium of organizations set up a platform for utilizing an ecosystem to bring healthcare closer to the patients by combining the offers of various other organizations, such as start-ups or health insurance providers (Maicher et al., 2023; Well Gesundheit AG, 2023). Another example could be seen in the National Health Service (NHS) in England, where entities of different sectors, such as general practitioners, mental health care, district nursing, and more, jointly build a network of entities that benefit the patient (NHS England, 2022). Nevertheless, we currently miss focused attempts to create a more complete service offering for patients by combining the increments of different organizations for a combined service offering in regard to highly relevant diseases such as PD.

Consequently, we describe one imaginable attempt led by a global healthcare manufacturing company that aims to establish an ecosystem focusing on identification and cure, i.e., offering support to manage a life with PD. For that, it aims to connect the potential of several digital technologies and physical ports developed by third-party companies, i.e., start-ups, other organizations, or itself.

The imaginable PD ecosystem operates as a collaborative network dedicated to enhancing the management of PD. In doing so, it plays a pivotal role in improving the overall quality of care for individuals affected by PD. The stakeholders within this ecosystem encompass healthcare providers, researchers, pharmaceutical companies, patient advocacy groups, and patients themselves.

The primary objective of the PD ecosystem is to facilitate holistic care, support, and research focused on PD. It aims to provide comprehensive solutions that address the diverse needs of patients and their families, from the early stages of symptom recognition to the post-identification phases.

For Pre-Identification: The ecosystem offers educational resources, awareness campaigns, and

early symptom detection tools to empower individuals and healthcare professionals in recognizing the early signs of PD. This phase emphasizes early intervention and timely diagnosis that is enabled by combining the increments of a group of actors that each are specialized in their fields. Exemplarily, educational material could be provided by organizations that already deal with the topic of improving the health literacy of patients for NCDs. Further new attempts to identify the disease already in the early stages by applying technology, such as tracking the movement with personal-health-trackers could be a perceivable solution.

For Post-Identification: The ecosystem provides access to a range of specialized care services, treatment options, support networks, and ongoing research initiatives. These components are designed to improve the quality of life for those living with PD and advance the understanding and management of the disease. Here, exemplarily options to conveniently track the development of the disease with technology such as movement trackers or measuring the brain activity for precisely adjusting the medication doses are one option to be mentioned. Further, related to more psychological factors, establishing patient forums or standardized checklists for special situations could be possible increments contributing to the overall service.

In both phases, pre- and post-identification, the benefit of the ecosystem offering an as complete as possible service offering for patients is built by the contribution of autonomous actors contributing to the overall service offering and not by one single organization. By that, more aspects of the patient journey are coverable without needing one organization to build up specialized capabilities. Hence, the creation of a service offering that no single actor alone would be able to create is possible (Adner, 2017).

Following this overview of the ecosystem proposed, the following section will provide an overview of the benefits of establishing such a new ecosystem. The analysis will be guided by the three elements for analysis: organizations, the healthcare system, and patients. Further, a time dimension, shown in pre- and post-identification of PD will be considered.

6 ANALYSIS OF THE BENEFITS OF BUILDING AN ECOSYSTEM FOR MANAGING PARKINSON’S DISEASE

Benefits for organizations might be seen in anything that supports them to create capital, enabling the organization to fulfill its *raison d’être* of benefiting its stakeholders. For the healthcare system, we see possible gains in light of efficiency and exemplarily enabling innovation. For patients, financial and non-financial benefits are to be imagined as well. Analyzing the ecosystem mentioned above, we propose the following non-exhaustive benefits to be considered as values, as shown in Table 1.

Table 1: List of exemplary Values for Entities.

Entity	Value Class	Pre-Identification	Post-Identification
Organization	Financial	Higher revenue ...	
	Non-Financial	Data Value Creation Increasing Relevance More Stable Network ...	
Healthcare System	Financial	Lower Costs ...	
	Non-Financial	More stable system Innovation ...	
Patient	Financial	Lower Costs ...	
	Non-Financial	More Convenience Earlier Identification ...	More Convenience Better Manageability ...

Organization: For the organization itself, we see potential benefits that span both phases, the pre-and post-identification. Potential benefits that might help the organization create capital and, thus, fulfill its *raison d’être*, are of a financial and non-financial nature. As financial aspects creating a higher revenue by providing increments within the ecosystem to audiences that were not reached before entering the ecosystem and being part of a service offering that spans a longer customer journey is to be mentioned. Non-financial aspects that help the organization create classes of capital ultimately leading to economic benefits for the stakeholders are manifold. First, for the healthcare manufacturer or other organizations engaging in the ecosystem, we see the possibility of either gaining new data points,

increasing the data quality, or finding new ways of excavating data for better knowing the patients utilizing not their own but the capabilities of other organizations within the network. Second, we see the possibility of increasing the relevance of each organization by either increasing the brand value or creating innovative increments that benefit the overall ecosystem. A third aspect we want to mention here is the possibility of amplifying partner relationships, which are already a basic resource for ecosystems, whether with customers or other organizations. This might be beneficial in creating more stability or even accelerating the creation of new increments.

Healthcare System: The overall healthcare system benefits from lower costs, enabled by a better service offering. Exemplarily, applying technology provided by start-ups for diagnosis might lower the need for involving several experts in detecting the disease. Further, building a data pool might enable the discovery of patterns and hence benefit the right identification of PD.

Further, we see non-financial benefits built by higher stability of the overall system that the complementary interrelation of the increments would create. This would benefit the healthcare system since higher stability would decrease the risk for necessary adjustments when, e.g., organizations or procedures change. In addition, the combination of organizations might amplify innovative endeavors, e.g., by combining research institutions with practitioners and patients, benefiting the chances of innovation.

Patient: For the patients, we see the possible financial benefit instantiated in lower costs. These costs might be direct costs that could be lowered by efficiency gains created within the ecosystem. Furthermore, costs for searching for practitioners or time spent identifying management could be lowered. This is enabled by the service offering of the ecosystem that not only increases convenience but also lowers costs. In the direction of non-financial benefits, we further see the benefit of an earlier identification in the pre-identification phase that might be enabled by the combination of increments provided within the ecosystem. In the post-identification phase, the combination of increments might allow for better manageability of the disease. Lastly, connecting the organizations within the ecosystem might lead to benefitting innovation, and hence, the potential for emerging new solutions that benefit the patients, increasing their quality of life, or even finding a solution for a cure might be amplified.

7 CONCLUSION

We aimed at positioning the construct of ecosystems within the healthcare sector. More specifically, we aimed to propose a first set of different benefits such a construct might offer in PD. We understand that the list here might not be exhaustive, but it is a first exemplary approach. Nevertheless, we are convinced about the benefits ecosystems might offer the healthcare sector, as exemplified by our suggested analysis of one imaginable ecosystem focusing on identifying PD and enriching the treatment path by providing one joint solution.

Since ecosystems force organizations to transform and might be considered a risky endeavor as most of them fail (Pidun et al., 2020), knowledge about the possible benefits to be achieved is an important pillar to allow for informed decisions when considering a respective transformation. Future research should deepen the understanding of the possible benefits and further provide insights into the respective accumulation. Our list of exemplary benefits already allows for seeing ecosystems' potential—for the organizations, the healthcare system, and the patients.

Hopefully, we were able to plant the first seed for growing an ecosystem regarding PD with our position paper. Future research needs to validate our thoughts provided here further. Research on values for organizations in other ecosystems that already function in providing a joint service offering might form a good basis to be transferred and adjusted for the healthcare sector.

Further, following development paths of ecosystems represented in life-cycle models as proposed, e.g., by Moore (1993), development frameworks as proposed, e.g., by Nerbel and Kreutzer (2023)), or stage-models exemplarily presented by an early-, growth-, and late-stage, would benefit the analysis.

Initially, we highlight the challenges regarding PD connected to identification and management. Establishing ecosystems by utilizing the power to connect different organizations for one combined offering offers the potential to help—patients and the healthcare system. In addition, it offers financial and non-financial benefits for each organization engaged.

Opening up for collaboration by each organization to create the highest benefit for the patients is what is necessary to establish ecosystems. Hence, we call for organizations to focus on the patient and elaborate on new ways of a joint value proposition.

Limitations: This position paper is subject to some limitations. First, it is a conceptual paper; hence, the developed ideas need to be proven for feasibility and practicability. We aimed to provide real-life examples to support our arguments, but we still would need empirical research to support our ideas further.

Second, we postulate the ecosystem as a possible solution for solving a complex problem, i.e., creating a joint service offering in the realm of PD, but we do not investigate if, or to what extent, the ecosystem would be better than a market-based or hierarchical approach to value creation. Such an investigation of the “real value” of the value-creation setting would further support the arguments provided.

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