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Is Inner Source the Next Stage in the Agile Revolution?

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Abstract. Modern business leaders know it is important to be able to work fast, adapt to change, and build on existing solutions. This is especially true of digital business, where the high rate of change creates a continuous stream of new problems and new opportunities. Many have called for business leaders to adopt more ‘agile’ structures and processes that embrace change, transparency, and employee empowerment. Now a new complementary approach called ‘inner source’ is emerging to help address this. Inner source does not only embrace speed and change; it also lays out techniques for globally distributed agile teams to systematically store and reuse solutions in a shared, organization-wide repository. This paper explores this new management concept – where it came from, what it means – and illustrates its value in large organizations. Building on a number of illustrative cases, we explain how certain business leaders have brought the principles and practices of inner source to their respective organizations.

Keywords: Inner Source, agile, adoption

1 Introduction

The last 20 years or more has seen the emergence of a number of agile systems development (ASD) methods, such as XP [1] and Scrum [2] for example. Use of these methods is highly prevalent across the community and have helped businesses work fast and adapt to change. Yet the emphasis on ‘good enough’ improvements and ongoing discovery has hindered agile approaches’ capacity to build on existing solutions. Indeed, it may have actually been a step backwards. Conboy and Morgan (2011) argued that an agile environment needs to incorporate open innovation principles that enables a culture of collaboration and knowledge-sharing with other teams and business units [3]. To address this, business leaders are now implementing Inner Source, which is defined as the adoption of open source best practices and tools by professionals interacting inside an organization [4, 5]. Just like agile, inner source began as a set of systems development methods. Yet just like agile, inner source is spreading to other forms of business leadership. While the initial focus of Inner Source was on sharing code, this approach also features a high degree of open innovation, a phenomenon that focuses on tearing down and collaborating across silo boundaries [6, 7]. Moreover, Inner Source

involves changing the philosophy of working, creating communities of empowered developers spread across different countries to work transparently on co-creation activities, resulting in improved productivity and innovation [8, 9, 10]. The overall objective of this research is to explore how and why the adoption of inner source practices and principles benefit large organizations. In the case descriptions that follow, we present a juxtaposition of Inner Source with agile across different adoption points in time.

2 Research Design

This research is part of an ongoing 12-year study on inner source and hence our research model is longitudinal in nature. For this paper, we adopted a comparative case study approach and focused on five organizations that adopted inner source (see Table 1) as they have contrasting histories and business models. For example, some emerged in the digital era (Zalando, Paypal) rather than moving from older established industries (Philips Healthcare, Bosch, Ericsson), some focus primarily on physical goods (Zalando, Philips Healthcare) rather than digital offerings (Paypal, Ericsson), and some have a more global focus (Philips Healthcare, Paypal) rather than targeting a specific region (Zalando). Philips Healthcare were one of the first companies to implement inner source and a well-known champion of this approach. In 2011 we performed an immersive study of the company, which included eight interviews with senior project managers and software developers. From 2016 to 2021, we further collected data through a number of interviews with project managers, software team leaders and software developers involved in inner source implementations in Bosch, Paypal, Ericsson and Zalando. Given that one of the authors has been working with these organizations on a number of inner source research projects over the past 12 years and is a member of the Inner Source Commons, a community comprising 1500 inner source practitioners from 500 companies, we also drew heavily on ethnographic methods such as participant observations in Ericsson and Zalando to better understand how and why the adoption of Inner Source values and technologies helped these businesses build on existing solutions. In line with the longitudinal nature of our study, we analyzed data periodically over the period 2011 to 2021. For our coding we focused on identifying and analyzing distinct stages of inner source adoption, as well as the benefits and challenges associated with the approach.

Table 1. Data Sources

Company	Industry	Data Sources
Philips Healthcare	Health	8 interviews (International Partnership Project Manager, Director of Software Services, Software Team Leaders)

Bosch	Technology & Services	4 interviews (Software Team Leaders, Software Engineers) Participant observations
Paypal	Financial Services	3 interviews (Head of Open Source, Technology Leader)
Ericsson	Telecommunications	3 interviews (Program Manager, Software Engineering Manager) Participant Observation
Zalando	Fashion	2 interviews (Inner Source Manager) Participant observations

3 Case Studies

3.1 Pre-agile and 'big bang' adoption of inner source at Philips Healthcare

Philips Healthcare are one of the best-known early adopters of Inner Source, which they introduced in 2007 - five years before beginning their agile transformation in 2012. The inner source initiative at Philips Healthcare started with a component suite built around the DICOM (Digital Imaging and Communication in Medicine) standard, a popular medical-imaging system. Philips Healthcare traditionally relied on top-down development approach, in which a central platform development group developed components and separate product groups integrated them into different solutions. This ensured the firm could build on existing solutions. However, the top-down reuse of software components also created bottlenecks and jarred with the growing need for fast, responsive, client-facing innovation. The initial focus of the inner source initiative at Philips Healthcare was on software, encouraging open collaboration, distributed ownership of the source code, and frequent release and integration of software components. The company deployed CollabNet Enterprise Edition as the enabling infrastructure for this transformation. Yet leadership quickly realized these new practices could act as a

broader catalyst to change how the company was managed. Their focus therefore shifted to facilitating the sharing of knowledge and expertise across functionally and geographically distributed teams, providing easy access to all the information of the product line, improving communication and cooperation among teams, and creating a sense of shared ownership and control of the product line. This inner source approach gave teams the freedom to work closely with individual clients and develop/adapt new solutions quickly, while simultaneously reducing re-work and increasing transparency, cooperation, and peer learning across the organization. Executives felt an increase in both horizontal and vertical transparency and cooperation, as newfound visibility allowed individuals and teams to build a profile that rewarded their day-to-day efforts. Philips Healthcare credit the introduction of inner source as not only enabling new product launches and substantially reducing the time to market, but for changing the culture of the organization towards cumulative learning and innovation.

3.2 Pre-agile and incremental adoption of inner source at Bosch

Bosch were also early adopters of inner source, introducing it before they made the move to agile. However, the manner in which Bosch moved to inner source was different. It began as an 'experiment' in 2009 for a small number of teams and several years passed before inner source spread across the company. As with Philips Healthcare, the initial focus of introducing inner source at Bosch was the quality and efficiency of software development. Specifically, Bosch wanted to address the narrowing of relationships that occurred because of their distributed organization of business units across locations and time zones. Yet as with Philips Healthcare, management recognized this change had more profound implications. The early success of inner source created an appetite for new norms in Bosch, which leaders used to drive cultural change and a move towards openness, transparency, self-organization, self-determination and meritocracy. It also laid foundations for the organization-wide agile transformation in 2015. Gains in productivity, reduced lead times, and improved collaboration have coincided with higher reports of employee happiness and personal growth, which has also boosted employee retention. Bosch established an infrastructure by migrating to a single collaboration platform called Bitbucket for employees to collaborate across boundaries. Use of inner source has spread across functions and roles in the organization and the number of users on the inner source platform at the time of writing has increased to 10,000 from countries all over the world. Use of this platform has led to many success stories within Bosch, including the recent Bosch AI-powered Virtual Visor which won the CES 2020 Innovation Award in Las Vegas. This visor replaces traditional sun visors in cars with a transparent liquid crystal display that adapts to areas of sun glare without limiting visibility. The combination of agile and inner source approaches allowed Bosch to build increasingly sophisticated technological components, without compromising the focus on observed user experience and feedback.

3.3 Parallel incremental adoption of agile and inner source at Ericsson

Unlike the previous companies, Ericsson performed the inner source and agile transformation in parallel. The rapid growth and evolution of new technologies and standards (3G, 4G and 5G) for mobile networks since the 1990s had strained Ericsson's organizational and communications structures. Management felt this strain was likely to increase due to future technologies such as the Internet of Things. They began developing a cloud-based platform and related set of services with the intention of supporting agile feature-specific development teams. In 2013, Ericsson realized that inner source approaches would complement their new agile philosophy by encouraging collaboration and learning across teams, rather than only within them. As with Philips Healthcare and Bosch, while much of the initial inner source discussion at Ericsson was about introducing new tools to support systems development. However, the broader effects were once again felt across the organization. Specifically, management credit the adoption of inner source with stimulating a change towards a more 'open' culture that reduces territoriality and encourages individuals to extend and improve upon each other's work. Building on the establishment of a flexible community portal, Ericsson introduced new governance structures. They also introduced new core teams tasked with building internal and external communities around key extensible components. Documented benefits included an increase in cross-unit collaboration, the production of higher quality robust components, and faster and more effective customer support.

3.4 Parallel incremental adoption of agile and inner source at Paypal

Paypal also introduced inner source and agile in parallel, though their path to implementing it was different. The company underwent a major agile transformation in 2013, launched as a 'big bang' change across over 300 cross-functional delivery teams. Management were satisfied this change had improved the speed of development and the ability to respond to user needs. However, they felt it had done little to address silos of knowledge and collaboration in the organization. These silos were often fueled by historic tensions between backend and frontend developers, as well as between competing specialists who were convinced they needed to maintain sole ownership of components to ensure quality. Contrasting with their 'big bang' move to agile, Paypal decided to introduce inner source in 2015 over multiple stages. They first identified key services and set up shared repositories. They then allocated specific individuals working on those services the role of 'Trusted Committer'. These individuals would oversee shared resources to ensure common standards were maintained. Further, this Trusted Committer role changed hands every two weeks. Management noted sharp quantifiable gains in efficiency among participating teams after six months. These quantifiable gains fed into a growing appetite to expand and improve on shared resources. Individuals and teams became more likely to mentor others, as they knew everyone's contributions would become a common asset. Collaboration also improved between frontend and backend teams, as each learned more about interdependencies in their work and established new trust relationships and overall better individual performance.

3.5 Post-agile adoption of inner source at Zalando

Zalando was founded in 2008 but has grown rapidly since then (at the time of writing the company has more than 2,000 employees from 77 nations, spread out across over 200 delivery teams across Europe). Zalando were an agile company from their inception, which had allowed them to expand into new areas and work closely with customers to discover new solutions. However, the rapid growth had created organizational partitions that senior management felt were harming both the culture and practical cohesion of the company. Zalando therefore felt they could use inner source as a catalyst for building a more collaborative and united culture. Key to this was to align development activities in a way that encouraged conversation across teams, built around a shared customer-orientation – a challenge they addressed by introducing new inner source tools and governance structures. The company started using Github Enterprise, a collaboration platform that brought all developers together on a single platform, enabling them to build and share software easily and effectively, helping to eliminate dependencies and ensure teams were not waiting on each other to complete critical pieces of work. This platform also provides teams with the opportunity to talk about their work and accept feedback from those outside the team. Furthermore, a core team was put in place to oversee the inner source initiative, providing various tools and guidelines around inner source practices that teams could adopt. The company also has an API Portal that provides a central repository of approximately 600 APIs and one where API specifications of all deployed services can be found. Management at Zalando credit the adoption of inner source with a reduction in re-work and siloing, an increase in product awareness, and a reduction in time to market. The benefits are not limited to cumulative outputs. Zalando also credit inner source with improvements in employee mobility and onboarding, as individuals on one team are more willing and able to contribute to components developed by other teams, due to added familiarity in both the components themselves and how those teams manage the development process.

5 Conclusion

This research presents some findings from a range of companies to show why and how inner source was adopted. As is evident, inner source helps establish an open source culture, providing companies with many benefits including improved job satisfaction and overall performance, increased productivity and innovation and reduced time to market. Providing the infrastructure and tools necessary as well as introducing new roles or core teams to build communities are some of the key requisites for adoption (something also described in more detail by Stol et al. (2014)). Overall, we believe that inner source is a complimentary value add to agile, providing companies with the capability to build on existing solutions whilst not conflicting with their ability to work fast and adapt to change. Nonetheless, while we have seen a significant interest from practitioners over the past number of years, research on Inner Source in the Information Systems domain is relatively sparse. Hence, further studies are needed.

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