The world is becoming increasingly complex while facing huge problems such as aging societies, energy scarcity and greater demand for healthcare. These challenges demand new systemic solutions based on a holistic, integrative and multi-dimensional approach. We are simultaneously moving towards a knowledge economy, which requires us to design in a different way, delivering meaningful experiences in ecosystems of interconnected products, services and solutions that will evolve over time. No company (or one part of it) can now understand all aspects of these ecosystems, let alone create meaningful experiences for end-users. In addition, it is evident that these experiences will be delivered by different players. We therefore need to work towards co-creation. Philips Design is currently changing its way of working to support this process. We believe that innovation is inherently driven by true collaboration (from the onset), that it should be based on learning and that design thinking will facilitate this process. In other words, we are innovating innovation by developing new ideas (the focus of a lot of current innovation literature) and by coming up with new ways of working along with new competences. These activities can be broadly divided into four areas: Empower, Position, Create and Enable. While we touch on all four here, the focus is on Create. We discuss in detail our Rapid Co-creation approach to a dynamic and focused way of progressing ideas into strong propositions and how to accelerate learning by prototyping and validating these propositions.

Keywords: Co-creation, innovation, prototyping, people driven

1 INTRODUCTION

Designing for Today: focusing innovation on existing offerings, and Designing for Tomorrow: focusing innovation on new solutions, are two different yet intertwined activities (Christensen & Rayor, 2003; Verganti, 2011, 2013). Designing for Tomorrow demands different methods and tools (Gardien et al., 2014), whereby it is particularly important to have a shared understanding of the future. To enable this we, adopt a paradigm framework to describe and understand how people’s concept of ‘value’ is changing (Brand & Rocchi, 2011).

1.1 CHANGING PARADIGMS
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Following the paradigm shift from the industrial and experience economy to the knowledge economy, we live in a world of constant and rapid change; one in which users expect evolving, personal experiences. This means that we have moved from delivering a single product to a specific user (industrial), to focusing on market segmentation with tailored solutions delivering targeted experiences to customers with particular lifestyles (experience), and the challenge of delivering meaningful experiences in ecosystems.

In the knowledge paradigm people are seeking evolving experiences that are uniquely their own, and which are capable of growing and changing with them. This, in turn, produces data and content that helps to shape their own experience. Discrete products and services are migrating into an ecosystem of offerings (products, services, portals, apps, advice, content, interventions, etc.) with multiple transactions. An example of such an evolving ecosystem is the Philips Hue. Starting from internet-enabled light bulbs that can be controlled via an app to create personalized atmospheres, this has evolved into a complete ecosystem involving, for example, third party apps, connection to other devices such as televisions, additional luminaries and switches, interactive storybooks and programmable interactions.
1.2 INNOVATION IN THE KNOWLEDGE PARADIGM

In the knowledge paradigm, companies need to design continuous engagements based on the user’s actions and data retrieved. As such they need to shift from being the creator to becoming the enabler of experiences. Within companies, both the propositions and the way of working are thus shifting from a linear to a circular structure. All stakeholders need to start thinking in terms of ecosystems, while at the same time harnessing the skills and capabilities acquired from both the industrial and the experience economy. A holistic, integrative and multi-dimensional approach is required which integrates people aspects as well as business, technology and socio-cultural developments.

2 CO-CREATING INNOVATION

2.1 NEW WAYS OF WORKING

At Philips – as with many other companies – bringing products or services to market is seen as a linear, sequential process. It is both difficult and time-consuming to get all necessary disciplines involved. To design for, and contribute to, successful ecosystems we need to be open and flexible. We can no longer follow a linear structure where we go from vision or strategy to proposition to new product development (Kyffin & Gardien, 2009).

Moreover, it is impossible to define the whole ecosystem upfront and top-down. Co-creation builds concepts from the bottom-up (Sanders & Stappers, 2008). True co-creation goes beyond collaboration (within and outside the company) so that different stakeholders take responsibility for their own role. The ‘concept’ of the ecosystem is no longer determined solely at the front-end of the innovation process; it builds up over time. Getting to grips with this complexity means that designers have a new role to play. Rather than providing creative direction at every touchpoint, they will have to champion and facilitate balance and synergy between projects within the different innovation horizons, shaping and framing a story of the ecosystem that will immediately make sense to end-users and to the other departments in the company.

2.2 A FRAMEWORK

To help Philips move forward together, we have created a framework known as Co-Creating Innovation which is geared towards the knowledge paradigm. As mentioned, the ecosystems will develop over time and consist of different ‘propositions’. These value propositions, or verticals as they are sometimes called, need to be part of a consistent user experience, both on a conceptual level and on the physical interaction level (interactions, designs, graphic elements, etc.).

The concept or story that drives the ecosystem will also develop over time; this is the position part of the framework. For example, research findings and in-market experiments, coupled with knowledge of current products and services, are at the base of this positioning. Through these, we aim to describe a number of experience drivers that are crucial if the verticals are to be adopted in the market and the ecosystem is to grow. The verticals themselves are referred to as create. Having a hypothesis on a position is one thing, but what is really relevant to people, technically feasible and makes viable business sense is another matter. We can only truly discover this through experimentation and fast iterations; we use our Rapid Co-Creation (RCC) approach for this. This creation can only be carried out in an efficient way if it builds on the infrastructure of the ecosystem, for instance IT systems, hardware and software
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building blocks or even privacy policies; this is the **enable** aspect. All three of these elements - which run simultaneously – are framed in the co-creation philosophy described above. In addition to these three elements, we strive to **empower** employees throughout the company to apply design thinking.

We aim to drive change by delivering a range of new initiatives and tools that will **empower** the company, create a **position** on ecosystems – or experience domains as we call them in Philips - and **enable** us all to **create** the next meaningful solutions. This paper briefly introduces the Empower, Enable and Position elements of the framework before discussing the Create element in more detail.

To facilitate co-creation within Philips, we use elements of design thinking. However we believe that this way of working is too important to be left to designers alone. To spread the philosophy and knowledge on design thinking, we have developed a co-creation training course intended to **empower everyone** in our company, including those outside the design community. The training teaches participants about design thinking, equipping them with the tools and methods they need. The co-creation training course is built on learning by doing and addresses real issues and business challenges, but is structured on the key principles of design thinking. The training is part of a Philips-wide initiative known as the Philips University.
2.2.2 Position

To successfully deliver meaningful experiences in an ecosystem, a company must understand what drives end-users and their experiences in this ecosystem. We have therefore recently started to organize ourselves into so-called experience domains (Gardien et al., 2014). An experience domain is a thematic, strategic area of human activity in which design, research and business activities are organized and initiated. Together, we describe the main drivers that the ecosystem needs to address to be relevant and applicable in society, enabling uptake and growth. An experience domain revolves around a specific user group or experience. It is a platform for collaboration, integration and building on each other’s skills. Based on the thinking of the knowledge paradigm, we take a dynamic approach: experience domains develop over time and provide direction and opportunities.

2.2.3 Enable

Experiments and projects can be completed efficiently only if the right enablers are in place. These enablers can be very diverse, ranging from IT infrastructure, prototyping facilities, and building blocks (such as standard technologies or design templates) to privacy agreements and contracts as well as the methods and tools used in collaboration. In addition, our design locations themselves play an important role in effectively developing propositions. For example, we are setting up creative hubs in key office locations where different groups of people can come together to build knowledge, share creativity and test propositions in a multidisciplinary setting.

3 CREATE

3.1 NATURE OF PROBLEMS IN THE KNOWLEDGE PARADIGM

As described, an ecosystem will evolve and cannot be designed from the outset. In this respect, problems can be classified as ill-defined or wicked problems (Rittel & Webber, 1973). In the case of wicked problems, neither the solution nor the problem has been agreed upon. By working on the solution, stakeholders also enhance their understanding of the problem (Rittel & Webber, 1973, Hengeveld et al. 2014). As there is no clear definition of the problem, wicked problems cannot be tackled using traditional approaches. Roberts (2000) identifies three strategies to deal with wicked problems which are discussed in relation to our own experience below.

1. Authoritative; by reducing the number of stakeholders the problem complexity is reduced.
   In industry we see this in the creation of closed systems, of which both the Apple as Sonos ecosystems are examples. Because of the diversity of solutions that Philips offers and the value of our partnerships we have not so far followed this strategy.

2. Competitive; developing a number of (opposing) solutions focused on individual ideas or value propositions allows the best solution to be sought.
   The venture capital approach can be seen as an example of this strategy. The hit and miss character of this stagey has made it difficult for large companies. Developing substantial revenue in a foreseeable timeframe requires a platform for innovation (provided by our experience domains).
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3. Collaborative: engaging all stakeholders to find the best possible solution.
Since health and wellbeing issues are by nature multi-stakeholder (patient, caregiver, medical staff, insurance, hospital), Philips Design has adopted a collaborative strategy and developed it within the Rapid Co-Creation methodology. As well as involving all our external stakeholders, we ensure that our internal business (and marketing) and technology (including research) partners are all part of the Rapid Co-creation projects. This ensures that we make use of all the capabilities, assets and positions (CAPs) available in our company.

3.2 THE ROLE OF THE USERS AND STAKEHOLDERS

Although user engagement is a crucial part of shaping the experience paradigm, it will play a different role in the knowledge paradigm. In the experience paradigm, designers approach users from a third-person perspective through, for example, observation and interviews. In the knowledge paradigm, however, we cannot research all relevant user knowledge from the start so designers need to adopt a first-person perspective: they need to collaborate intensively with potential users - functioning not only as objective observers conducting user studies or as mere facilitators of co-design sessions, but also as subjective participants in which they themselves are part of the solution space (Hummels & Frens, 2011). In their discussion of wicked problems, Rittel and Webber (1973) also propose reconsidering the traditional division between experts and stakeholders, using the term “symmetry of ignorance” to denote that all stakeholders are equally expert or equally ignorant.

3.3 INNOVATION IS LEARNING

Learning, along with a shared view of the future and collaboration, is an essential part of the innovation process. Inherently in breakthrough innovation, you do not know what the outcome will be (Deckers et al. 2012, Walters, 2013). Breakthrough innovation means learning our way into a new reality. Hence, the question becomes: “how do we accelerate learning?”

In the 1980s, a renewed model for learning emerged called reflective practice, based upon works by Dewey (1933) and Piaget (1964). It describes how in complex, real-life learning situations, theoretical frameworks and formalized knowledge do not suffice (Schön, 1983). Practitioners complement their theoretical knowledge by reflecting upon practical experiences (reflection-in-action & reflection-on-action), resulting in a wealth of non-formalized, and practice-based knowledge. The team masters new realities (innovation) by ‘doing’: the team frames the idea, prototypes the idea, and then reflects on the experiment. Through this reflection, the team is able to consider whether it (1) already understands how to create the new reality, (2) needs to fundamentally adjust the idea or (3) should stop the project. All three results apply in our RCC approach. It is through an iterative process of such experiments that knowledge develops (Hengeveld et al. 2014).

Furthermore, we draw upon the learning cycle of Kolb (1984), explaining that learning is a cycle that perpetuates more learning and that reflection is the engine that moves the learning cycle along. Fry and Kolb (1975) argue that the learning cycle can begin at any one of the four points - and that it should really be approached as a continuous spiral. More recent thinking suggests the process starting point is open, but also propounds that the order of activities may well vary too (Hummels & Frens 2008, 2009).

3.4 FRAME (AND RE-FRAME)
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The RCC process starts with a clear and specific hypothesis or proposition, but with the understanding that there is a good chance of this hypothesis being false. The framing exercise helps a multi-disciplinary team to set a clear starting point for their learning curve. It (re)sets all the ideas about elements of the total solution to the same level. The framing canvas describes the critical elements of the idea that need to be in balance to develop a strong proposition: business validity (how do we earn money from it?), technical feasibility (how do we make it work?), and relevance (how can we make it relevant for people?) (Kelly, 2014). In addition, we include a clear statement of what is actually proposed to the main stakeholders. Identifying a (relevant and meaningful) user need is one thing, but embedding the proposition in the wider experience context of all stakeholders is important in propelling growth (Ries, 2011).

Figure 5. Left: Innovation is learning, the Rapid Co-Creation process. Right: Impression of the framing canvas.

3.5 PROTOTYPING AND TESTING NEW REALITIES

When an organization is innovating, it creates new realities. Prototypes and demonstrators enable these new realities to be mocked up and tested at an early stage and at low cost, and help the team make its ideas tangible and concrete. They also help the team to develop their reasoning and understanding of the issue at hand (Hengeveld et al. 2014), get out and confront stakeholders with their idea and take their exploration out of the confines of the lab and into the field (Koskinen et al. 2011).

When designing ecosystems, the traditional design skills (from the industrial and experience paradigm) fall short, as these are focused only on physical product features and so fail to address the temporal and expressive aspects of interactive behavior (Frens et al., 2003; Kyffin et al., 2005). In the knowledge paradigm, designers need to understand complex systems that not only involve products and services, but also several stakeholders, the context of use, and the interaction between all of these elements over time – while knowing that all of these elements can or will change over time. Prototyping and testing these complex systems (new realities) enables them to design expressive interaction behaviors and to capture such behavior in experience prototypes. Here, experience prototypes do not focus on evaluating technology, but on the resulting full experience of the proposition for the end-user. As such, the designer’s toolbox needs to support the rapid development of interactive prototypes to explore product behavior before committing to building experience prototypes, e.g. body storming, Wizard of Oz or props (Gardien et al. 2014). Rapid prototyping tools, application development tools and electronic prototyping toolkits accelerate the expression of every aspect of the idea.

One very important aspect of the toolkit is to confront users and test the experience as quickly as possible, although this means ‘faking’ part of the solution. This is often counterintuitive to the project’s technology partners who want to make the product or service work. The prototype is not the full
proposition per se, it is meant to explore critical aspects of it. In the exploration phase, polished prototypes are often not desirable as they elicit detailed feedback on design aspects, while an explorative dialogue on a possible reality would be preferable.

Figure 6. An example of a rough prototype in an actual hospital setting.

3.6 REFLECTION

As explained, reflection is an important step in our process. To enable balanced reflection on the full proposition, all the elements that we describe as part of the framing canvas should be progressed. Information on user relevance and experience, business validity and technical feasibility should all reach the same level of maturity. Moreover, reflection is a true team effort. It is crucial that all participants, stakeholders and roles fully engage in an open and honest dialogue. Open-mindedness is crucial: each team member should be able and willing to see unexpected opportunities and be open to changing their personal hypothesis.

3.7 STARTING POINTS AND PROCESS

We started with Rapid Co-Creation (RCC) in 2009, initially aiming to provide a structured innovation process for Philips Incubators (internal Philips start-ups). Following the characteristics of a start-up, the RCC process consisted of a very limited set of starting points and activities:

- Make sure a business owner is part of the team
- Set a very limited budget and time frame
- Start by having team members exchange knowledge with each other
- Have people researchers conduct extensive people research beforehand
- Quickly create and test an experience demonstrator with users.

In 2011, when Philips introduced the Accelerate! organizational improvement program, these starting points became relevant for other Philips innovation programs as well. We took the original RCC starting points, incorporated the lessons learned from previous RCC projects as well as research and methodologies on innovation and design, and formalized our approach into Rapid Co-Creation. The rapid co-creation approach has been applied in the early stages of innovations such as the Smart Air Purifier, the HomeCooker Next and the grandBaristo Avanti coffee maker that were recently introduced at the IFA Berlin.
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An RCC learning curve could have several loops. Each loop might take several days (five days minimum), several weeks or several months (three months maximum). It brings participants from different disciplines together in a highly facilitated track. By working side-by-side on different materializations of an idea, alternative business models and technical feasibility, the team develops trust in reciprocal expertise and understanding of each other’s language and priorities (Deckers et al. 2012). The experimental setting of an RCC or a hackathon (five-day RCC loop) helps business stakeholders to progressively embrace innovative ideas they may have not considered as viable at the beginning. This way of working increases the business participant’s sense of ownership and commitment.

Figure 6. Impression of the RCC process on the HomeCooker Next.

3.8 LESSONS LEARNED

From our experience of implementing the approach over recent years we can draw the following relevant lessons:

1. The difference between an involved and a committed business owner

A lot of innovation projects are seen as creating options for the future; however we have learned that the commitment to follow up on these options is crucial for success. Consequently, we do not start if the business owner does not commit capacity and budget to the project.

2. The need for multidisciplinary teams.

RCC facilitates team learning and understanding of how to accelerate a specific interesting idea into a strong and balanced proposition. In our experience it is crucial that all relevant disciplines participate from the start. We start the project only if every role is represented.

3. The need for strong and experienced facilitation

We experienced that such teams need a facilitator (not a project manager). The facilitator helps the team to act as a team, perform as a team and reflect on their own actions and lessons learned. The facilitator ensures the team doesn’t miss opportunities, and doesn’t get stuck in a certain direction. Although designers quite naturally combine the two roles, in the content role the designer is expected to express a clear opinion on the quality of the work done by all the disciplines. This is hard to combine with the facilitator role; therefore we assign a neutral facilitator (also from Philips Design) as the RCC lead.
4. Conduct in-depth research in parallel with the RCC process.

We found that people research before the start of the process is a delaying factor. Yet there is already so much knowledge in the company that implementing this knowledge is generally sufficient. So we focus on conducting targeted research as parallel activity. This research looks in-depth at specific topics such as sleep, lifestyle change, etc. (as part of the enabler activity). This helps to guide the team in answering questions and coming to a better understanding.

5. The required prototyping fidelity level.

Creating the best level of ‘visualization’ to present to users and stakeholders remains an ongoing debate. There needs to be a balance between what is needed to get the right feedback at a particular stage in the process, and how comfortable stakeholders feel making decisions. We invested in the process of validation and people research as well as in prototyping skills.

6. RCC projects need to be embedded in the bigger picture.

One pitfall is to focus on single solutions. As discussed, such solutions are no longer sufficient since: (1) users expect and need ecosystems, but also (2) single value propositions do not bring sufficient business opportunities and are therefore not top priority, (3) the chance of selecting the right idea as the starting point to be developed into a larger opportunity is not so great, and (4) if we do not venture into a new paradigm, the results become significantly less. Therefore we make sure that the projects either come from a strategy planning exercise or we roll out strategy projects after the first iteration to create the bigger picture. This of course relates to the experience domain positioning as discussed above.

7. We deliver different 'sizes' of RCC projects.

In line with the different learning cycles we go through, we have made the Rapid Co-creation projects scalable. We have started to deliver RCC projects in different ‘sizes’: an initial two-day workshop, a next iteration of three to five days (which we often call an RCC Hackathon), or a few weeks through to three months (this was the maximum). This builds on the Bell-Mason method (Bell & Mason, 1991), introduced in Philips a few years ago, in which all the aspects (technology, proposition, team, capital, etc.) of a venture are developed to the same ‘level’ to ensure balanced development and avoid over-investment in one aspect.

4 DISCUSSION

If design is to deliver on the promises enabled by design thinking, designers and design researchers need to take the next step forward. We need to redirect our creative skills away from looking at all the touch points around a proposition to developing and maintaining a position focused on the user experience in a domain that includes the different innovation horizons. However, to do this effectively, not only do we need to expand our competences; we also need to adopt new ways of working that coincide with the challenges inherent in the knowledge economy. To design for connected experiences in ecosystems and
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experience domains, we at Philips Design are piloting approaches that integrate a strong position in a domain combined with fast experimentation and iteration, built on solid enablers and embedded in a collaborative, co-creative way of working. This dynamic and iterative approach will enable us to deliver meaningful experiences to our end-users in a rapidly changing, interconnected world.

We have shared our journey because we believe that no one company, organization, NGO or government is able to deliver these experiences. True co-creation is needed and to achieve this, we as organizations need a shared vocabulary, methods and tools. We believe that design as a discipline, through facilitation and people focus, can play a leading role in this. We hope that this paper will encourage you to join us on this journey and to create a shared understanding and attitude towards co-creation.

5 REFERENCES


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