产品演化发展科学模板能够描绘一件产品的现状与未来
Evolutionary Product Development Can Map Status Quo and Future of a Product

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Introduction
The concept of Evolutionary Product Design opens up the possibility of analysing the relationships between different fields of industrial design, such as ergonomics, marketing, construction and styling. A product’s styling can be analysed in relation to its functionality, its ergonomic qualities, its production technology and the marketing techniques that are used to sell the product. To demonstrate this, we propose six qualitative product phases: performance, optimization, itemization, segmentation, individualization, and awareness. Arranged chronologically, these phases reveal a more or less general pattern, enabling the exploration and prediction to some extent of a product’s future design (Eger, 2013).

When applying the evolutionary product design method to an existing type of product, it is essential to understand how the product developed over time. The historical development of a product can be mapped in a family tree that depicts the evolutionary relationships. To achieve a better understanding of this development, it is also necessary to investigate the situational context and visualize it in an ecosystem. By creating the future ecosystem, we obtain a sketch of future influences on the product to be designed, for example, by analyzing demographic shifts (such as population aging) or legislation changes (such as the banning of incandescent lamps). Together, the family tree and the ecosystem form the product evolution diagram (Ehhar, 2013).

Understanding how products came about, what influenced their development, and which elements will influence their development in the future is instrumental in evolutionary product design.

In his lecture at the Design Forum on Industry-University-Research Collaboration in the Big Data Age, professor Eger elaborated on product phases and on the product evolution diagram.
Case Study: Child Restraint Systems for Cars

A case study of the evolution in child restraint systems for cars illustrates that it is important to note the influence of external events, such as the development of cars and safety belts, legislation and events like the death of Dana Hutchinson (see Figure 1). These factors constitute the ecosystem and are crucial for the development of the product over time. Figure 1 shows the evolution of child restraint systems into different dominant designs. As the purpose of the diagram in Figure 1 is to explain the evolution of child restraint systems into a family of products; it is called a product evolution diagram. There was a rapidly increasing complexity and diversity in these child seats in the second half of the 1960s and the early 1970s. Several designs proved to be unsafe and, although they subsequently became extinct, they still influenced legislation. Other designs provided better protection and evolved into the dominant designs we know today.

The evolution of child restraint systems led to three different dominant designs catering to different market segments (based on age, weight or length). The first is the cradle type, in which babies and toddlers aged up to 1.5 years or weighing up to 12 kg lie rearward facing in a reclined position. The second is the seat type for small children aged up to 7 or weighing up to 24 kg. Both these types have their own belt harnesses for children whose bone structure, muscles and length are not yet mature enough to use the three-point-belt for adults provided in the car. The third is the booster type for children aged up to 12 years or weighing up to 36 kg who are still too small to position correctly under the three-point-belt without elevation. This type does not have a belt system of its own and uses the three-point-belt provided in the car. The evolution of child restraint systems reached the segmentation phase, as will be explained in the following.

Relationship between Product Development and Ecosystem

As discussed in the previous section, the interaction between the development of a product and its ecosystem shapes the development of both. Figure 2 depicts this mutual relationship. The central part shows the developmental relationships between different products. The top part summarizes the ecosystem that interacted with the child restraint systems as they developed over time. The bottom part shows the product phases that are described in the next section.

Research of over two hundred products has shown us that there is a strong and mutual influence on the development of products on the one hand and political, economical, social and technical factors on the other. Mapping the historical development of a product in a product family tree, together with visualizing the ecosystem
2. 与生态系统相关的产业发展的关系

产品发展与其生态系统之间的关系

正如前面所讨论的，一件产品的开发与其生态系统之间的互动关系对于产品的发展至关重要。图2所展示的就是这种相互关系。中间部分显示了不同产品之间的关系，而上方的区域则描述了生态系统如何影响产品的发展。下方则展示了产品与生态系统之间的关系。

针对两百余种产品所展开的研究显示，对于一个产业的发展，存在着一种强大的相互影响。政治、经济、社会与技术因素也发挥着重要作用。在生态系统图中描绘出一件产品的历史发展，并将其与互动和共同演化的生态系统相关联，有助于理解产品的发展。任何产品的研发都必须在这一原则下进行。因此，以开发成功的新产品为目标，了解这些产品的起源、过去以及其影响因素，对于未来会产生影响，这些工作是至关重要的。

绘制产品的框架图需要考虑其发展历史。像专利之类的资料会提供有关其发展的重要信息。这种信息的详细描述，还包含了清晰的时间序列，并且涉及现有技术与早期相关发明之间的关系。在各种阶段的数据库中都有专利信息，发展至今，从互联网上也能快速查到相关信息。而围绕这些信息，是所有新产品的开发团队的必修课。就许多产品而言，立法使得追踪产品的开发成为可能，更重要的是借此未曾识别即得发生变化。就不同产品类型而言，书籍、图标或消费者指南，能进一步提供历史性的或最新的信息。收集到的信息可用于构建某种产品的框架图。分析点则是技术革新、产品架构，以及需要在前期分析中进行确认的主导性设计的标志。

建立一件产品的框架图是一个反复试验的过程，就如同所有的设计一样。在搭建框架图之前，需要收集信息的过程中，我们通常会假定产品在发展过程中会遇到的问题，其中之一是 PEST——“政治”、“经济”、“社会”和“技术”（Political, Economic, Social and Technological）的缩写，代表对这项研究有用的四种视角。

政治因素涵盖的事项包括产品立法。

经济因素涵盖的事项包括油价提升、高物价、经济危机等。

社会因素涵盖的事项包括人口结构变化，例如婴儿
海外趋向 International Scholars

产品发展阶段

产品发展阶段的概念与营销产品的生命周期息息相关，其中包含了五个阶段：

1. **产品开发阶段**
   - 新产品构思与开发
   - 市场需求分析

2. **介绍阶段**
   - 产品首次推向市场
   - 建立品牌形象

3. **成长阶段**
   - 销售量快速增长
   - 市场份额扩大

4. **成熟阶段**
   - 销售量达到高峰
   - 竞争激烈

5. **衰退阶段**
   - 销售量下降
   - 市场份额减少

这些阶段反映了产品生命周期的不同阶段，有助于企业制定相应的营销策略。
进入市场之后的某个时间段遭遇行业阶段的困难。这也预示了产品基本功能的改善是该阶段产品发展重要的一个方面。这样的“基本功能”指产品的技术性能。从技术角度上讲，新产品的性能是社会地位的象征，而其性能通常不如现有的同类产品，例如目前出现的汽车远不如当时的汽车可靠。不过，虽然那时候的汽车存在诸多问题，仍然有群体期待拥有它。

在这一阶段，产品性能可以归纳如下。

从技术层面讲，该产品是新的，是技术推动的结果。但产品的性能通常比较差，其发展的主要目的在于完善其性能。在产品有极的款式型，设计不重要，因此产品的美感也成为了次要的问题。产品在专利拥有者手中多少有发明并被广泛使用，这个竞争并不激烈，也导致产品的单位价格相当昂贵。产品通常由标准的机械装备生产，其零部件的数量往往大于其技术可行

性所需的数量，而且主要靠手工装配。产品通过展会进行推广，通过媒体、零售店的宣传等获得免费宣传。制造商在这一阶段尚未建立一个合适的售后服务组织，而顾客也不关注制造商的道德问题。

产品发展阶段 2：优化

在第二个阶段，产品发展的范围有了进一步拓展，涵盖了一机多能、性能等使用的可靠性与安全性方面的考虑。产品发展的“优化”阶段特性如下。

虽然从技术层面上看，产品仍然是新的，但该产品的消费者意识已经开始发展。产品的性能已经相当成熟，改进的焦点仍然是产品发展的主要目的。其他方面，诸如增加可信赖、人机工程学以及安全方面的完善，已经成为值得认真考虑的问题。竞争对手的数量开始增多，而单位价格依然相对较高，不过日益激烈的竞争引发了降价压力。

产品发展阶段 3：全面发展

当制造商对产品的完善达到了产品能够基本满足功能与可靠性的标准时，竞争的焦点便转向了便利性。市场被分为由易于使用的产

品，尤其在企业对企业的市场中，以及面对容易接受的实体时，对于批量生产的产品，个人销售几乎是不可能的。在市场增长率低于 5% 的时候，竞争对的数量不断增长，当产品类别的扩展的时候，价格会降低，而推广的成本会上升。传播媒介也发生变化，从个人销售策略转向直销，以及（付费的）印刷媒介、电视与广播。产品发展旨在改善其性能、可靠性、人机工程学、安全方面，并尝试开发额外的功能与配件，包括针对不同贸易渠道与目标群体而推出其特别版本，设计变得更为重要，使得产品的美观成为关注的要点。竞

How Qualitative Product Phases can map the Status Quo of a Product

The use of product phases makes it possible to analyse the relationships between the different fields of industrial design engineering, ergonomics, marketing, construction and styling. The styling of a product can be assessed in relation to its primary and secondary functionality, its ergonomic qualities, its production technology and the marketing techniques that are used to sell the product. To demonstrate this, we propose six qualitative product phases – performance, optimization, itemization, segmentation, individualization and awareness – complementary to the (essentially quantitative) phases of the product life cycle (Figures 3 and 4).

When we arrange these phases in chronological order, a more or less general pattern reveals itself, which makes it possible to explain a product’s development to some extent. Each product phase can be described in terms of eight product characteristics of which four apply to the product itself, and the others to its market, production, technology, the services that accompany the product and the ethical aspects of the product in question. The eight product characteristics that we propose are newness, functionality, product development, styling, pricing, production, service and ethics.

Product Phase Characteristics

All product phases display typical patterns of product characteristics. In this section, we will make these product characteristics explicit for each product phase.

Product Phase 1: Performance

New products – that is, products based on new technologies – normally suffer teething troubles for some time after market introduction. By implication, improvement of primary functionality – that is, the technical performance of the product – is the most important aspect of product development in this phase. Technically new products often start as status symbols, and usually perform worse than the existing alternatives. The first cars, for example, were much less reliable than the contemporary horse-drawn carriages, but despite these shortcomings, early adopters still wanted to own one.

The product characteristics of the initial product phase “performance” can be summarized as follows.

The product is technically speaking new and results from a technology push. The performance of the product is often poor. Product development is primarily aimed at improving the performance. Design in the limited sense of overall styling is unimportant and therefore, product aesthetics are of minor concern. The product is launched by a monopolist or a small number of heterogeneous oligopolists, so competition is low. As a consequence, the price per unit can be relatively low.

The product is frequently produced by standard machinery equipment; it often has more parts than is considered technically feasible and assembly is mostly manual. The product is promoted through fairs, free publicity via public...
争夺者的数量仍然在增长，不过均匀的多头垄断的完美竞争市场尚未形成。产品部件数量减少，机械加工或自动装配变得更重要。如果有必要，会出现特别设立的组织完成的服务机构以支持该产品。

产品发展阶段 4：市场细分

以上三个产品发展阶段（展示、优化工、全面推广），焦点是建立在经过完善的功能、可靠性和人机工程学与安全性基础之上的。将某款产品与其他类竞争者相互区分而添加额外功能与配件，这样就可以出现在产品发展的第三个阶段。然而，这一类型的发展有结束的时候，即完成了所提供产品功能超越了所要求的产品性能。家具与装饰品之类的产品的简单产品，仅仅微小的添加功能与配件的可能性。此外，在产品发展的后期阶段，无论对于创新者还是早期使用者，该产品都将变得不再特别有吸引力。市场表明证明产品已被接受，拥有该产品的不再是与众不同的，也不再是身份的象征。于是，就可以开始往产品中添加额外功能。

产品发展阶段 5：个性化

市场细分的外推，可以理解为逐渐按小的目标人群而展开的不连续的强调，这最终导因针对特定个体的产品。近来在信息与产品技术方面的发展，更加促进了这种个性化。这些发展暗示了产品特性在产品发展的“个性化”阶段所经历的众多变化。为了让来自竞争对手的产品易于辨认，也就是通过某种程度上“私有化”产品设计，产品发展仍然针对额外的功能与配件，其中仍然包括针对不同贸易渠道和目标群体而推出的不同版本。设计进入了融合产品所有零部件以形成一个完全单一且可辨识的形式的阶段。其重心从展厅风格转向了添加富有表现力的元素，旨在提升产品之中的情感认同。市场的状态则讲究完全的自由竞争。由于价格接近平均成本，价格下降停滞。在这个阶段，推广与广告集中于各类大众媒体，通常是密集而昂贵的。

产品发展周期：个性化

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Product Phase 2: Optimization

In the second phase, product development is broadened to include ergonomic aspects and issues of reliability in use and safety. The product phase “optimization” is characterized as follows.

Although the product is technically speaking still new, consumer awareness of the product is starting to develop. The product performs reasonably well, but product development is still aimed at improving performance. Other aspects, like increased reliability, improvement of aspects of ergonomics and safety are becoming serious considerations. The number of competitors is starting to grow. The price per unit is still relatively high, but the increasing competition creates a pressure toward lower prices.

Product Phase 3: Imitation

When manufacturers have improved a product to the point that it satisfies generally accepted standards of functionality and reliability, the edge of competition shifts to convenience. Buyers will prefer those products that are the most convenient to use and – especially in the business-to-business market – sellers that are convenient to deal with. With mass-produced products, personal selling becomes impossible. Market growth is less than 5% and the number of competitors continues to increase. As the product range grows, prices fall and promotion costs increase. Communication channels change from personal selling strategies to direct marketing, and (paid) print, TV and radio advertising. Product development is aimed at improving performance, reliability, ergonomics, human interfaces and safety. An endeavor emerges to develop extra features and accessories, including special editions of the product that are developed for different trade channels and target groups. Design becomes more important, and product aesthetics become a major concern. The number of competitors is still growing, but the market has usually not yet developed into a perfectly competitive market (homogeneous oligopoly).

The number of product parts decreases, and mechanical and/or automated assembly becomes more important. If needed, well-organized service organizations are set up to support the product.

Product Phase 4: Segmentation

The focus in the first three product phases (performance, optimization and itemization) was on improved functionality, reliability, ergonomics and safety. An endeavor to add extra features and accessories in order to differentiate the product from its competitors sets in somewhere in the third stage. However, there is an end to this type of development. There comes a time when the offered product actually exceeds the required performance. Relatively uncomplicated products, such as furniture and tableware, have only limited possibilities for adding features or accessories. Moreover, products become less attractive for innovators and early adopters in the
可能，而客户也开始注重制造商的道德。

这个产品发展阶段的问题在于个性化并不可能适用于每一产品。像汽车之类复杂的产品已经在某种程度上实现了可定制化。不过到目前为止，个性化的选择仍然是有限的，客户通过选择制造商的某些汽车，来实现对于个性化产品的需求。这对于生产者而言，个性化产品的可能性有限，而客户可以订购印有他们姓名的这些产品。

产品发展阶段•社会意识

1997年是荷兰展开了一项市场研究，调查所谓的“企业责任”。结果显示客户愿意通过改变自己的消费模式为一个更好的环境做出贡献，并帮助企业解决社会问题。前提是不用担心太多的精力，而且不会导致客户满意度的下降或增加经济负担。从这一角度来看，这项研究展示了客户确实希望企业能在解决共同的社会问题时扮演一个更加积极的角色。一家企业能够通过为客户提供在伦理方面做出的可能性的产品，即为客户提供包括为社会环境有益的产品而成功地吸引消费者，及其带来那些对环保有利的群体。这就导致了产品发展阶段的最后一个重要环节—社会意识阶段。

额外的功能与配件的添加，包括针对不同群体和目标主题而推出的特别版本，这些行为并没有终止，只不过通过市场更有效地实现。发展到这一阶段，设计的重点在于提升产品与社会的关联性，旨在增强产品价值。不过当这些利益开始涉及到社会问题时，则有可能突然转向朴素的设计。市场联系的增多会产生，共同创造与批量生产使得实现更高的价值成为可能。产品对社会问题的诉求进一步强化了这种趋势。制造商在促销活动中开始明确地表现在传递公司的道德规范，而这样的道德行为也确实会在某种程度上对消费者的影响力。

案例研究：耐克篮球鞋（设计师：马修·米歇尔）

在荷兰乌得勒支大学学生发展课程中，学生马修·米歇尔为耐克设计了一款篮球鞋（米歇尔，2014）。其特点是与著名的NBA球星合作的所谓“签名鞋”。
篮球鞋一般由三部分组成：上部、中底和外底。上部座于鞋子并提供了稳定性，中底为脚提供支撑，对缓冲作用于脚的力起到至关重要的作用，外底与中底相互连接，并对其提供保护，外底还提供与运动场地面之间必要的摩擦力。

篮球鞋：展示阶段

1981 年，詹姆斯·乔丹斯为了在冬季给学生寻找一种室内的运动而发明了篮球。这项运动迅速普及，到了 1990 年，已经有足够的篮球鞋可以参与到竞争中。1996 年，篮球成为奥运会的竞技项目，参与第一场比赛的球员所穿的鞋是标准的运动鞋。然而，许多的篮球运动员很快被破而穿着网球鞋，可能是因为网球鞋可以提供更大的抓地力与支撑。广告上宣称的第一款篮球鞋是 1904 年的斯伯丁“专家”。1907 年，该企业推出了带有橡胶外底的，更加灵活的网布鞋。研发第一款篮球鞋的主要驱动力是塑胶工业的发展（编写 PEST 中的 T 所代表的“技术因素”）。伴随着 1860 年古德伊尔发明了硫化橡胶，制造合成的橡胶鞋底已经成为可能，匡威就是其中受益的一家企业。1917 年它推出了全明星系列，而且在此后的数十年中都是畅销产品。从某种程度上来说，正是因为在 1933 年的贸易保护法（编写 PEST 中的 P 所代表的“政治因素”）全明星系列球鞋的垄断才会持续到 20 世纪 60 年代。因为匡威全明星系列产品的主导地位，篮球鞋的发展几乎一直持续到 20 世纪 70 年代耐克进入市场之后才发生了改变。

篮球鞋：优势阶段

1966 年，基于 1933 年贸易保护法的美国进口鞋关税降低。德国企业阿迪达斯和阿迪达斯继续将自己有创意的设计推向美国市场，并引发了鞋子设计的变动。这也为耐克——当时日本跑鞋的经销商——提供了打入市场的机会。以“蓝带体育用品公司”为名的耐克创建于 1964 年，1972 年，耐克推出了自己的篮球鞋以及著名的耐克标志。有别于美国的篮球鞋制造者，耐克并没有依赖于橡胶工业，它同时也使用其他的材料，如阿迪达斯一样，耐克在鞋子的上部使用皮革和绒面革来增强支撑力与舒适度。鞋底设计了人字形花纹，能够提供更多的抓地力和支撑力。这一设计沿用至今。

篮球鞋：全面发展

20 世纪 80 年代是耐克的重要转折点。1982 年，它推出了以其总统专机命名的耐克“空军一号”，这是第一款加入耐克气垫技术的篮球鞋。该技术是自 1979 年开始针对跑鞋而开发的，给耐克很大的优势，但并不是

on them.

Product Phase 6: Awareness

A market study carried out in the Netherlands in 1997 investigated aspects of so-called responsible entrepreneurship. The results suggest that consumers are willing to contribute to a better environment and help solve societal problems by changing their consumption patterns, but only if this can be done without much effort, and only if it does not lead to a decrease in consumer satisfaction and an increase in financial burden. On the other hand, this research also shows that people do expect companies to play an active role in solving common societal problems. A company can successfully tempt consumers – especially those who are committed to purchasing luxury products – by offering them the possibility to show ethical involvement by acquiring products that claim to be more environmentally or socially beneficial. This leads to slight changes in the characteristics of the last product phase, “awareness”. The addition of extra features and accessories, including special editions of the product for different customer bases and target groups, has not stopped, but becomes more of secondary concern. Design is focused on the enhancement of expressive features, aimed at increasing emotional benefits, but when these benefits start to include ethical concerns, this can lead to a sudden leap into sober forms. The market approaches a heterogeneous polyphony. Co-creation and mass customization offer possibilities for realizing higher prices. This tendency is reinforced even more by product claims on societal and environmental issues. The manufacturer explicitly communicates company ethics in its promotional campaigns. The ethical behaviour of the manufacturer does influence consumers’ choices to some extent.

In the original study, based on five retrospective case studies and a classification by experts, we proposed that the product phases follow one another. After additional studies, we conclude that the last three phases often co-exist. Sometimes, one or two of these phases do not apply because they are not suitable for the product or product group. The Nike example in the next section illustrates this.

Case Study: Nike Basketball Shoes (Designer: Maarten Michel)

In the course Evolutionary Product Development at the University of Twente in the Netherlands, student Maarten Michel designed a new basketball shoe for Nike (Michel, 2014). The focus was on so-called signature shoes, which are developed in collaboration with famous NBA players. The NBA is North America’s National Basketball Association and contains the world’s top male professional basketball players. A basketball shoe consists of three components: the upper, the midsole and the outsole. The upper encloses the shoe and provides stability. The midsole provides support for the foot and is essential for cushioning the forces that act on the foot. The midsole is connected to and protected
唯一的创新。鞋子的上部包含了一个网状材料的组合，相对现有同类产品而言，这一结构提供了更强大的透气性功能。另一项创新在于鞋的外底，带有隐形的图案可以改善球员往后的动作。还有一个空心的“号”使得足弓的弯曲变得更加容易。直到 20 世纪 90 年代，这项设计都是耐克的标准。1988 年，耐克推出了空中飞人乔丹一号——第一双所谓的“签名鞋”。

这种鞋是为著名的篮球运动员而创作的，或与知名的运动员合作创作。20 世纪 80 年代，耐克开始专注于市场细分：面向男性的高帮产品，为无法满足跑鞋（签名鞋）的客户而准备的他们负担得起的产品，以及女性篮球鞋，还有一些限量版产品，例如为奥运会设计的鞋。

**篮球鞋：个性化阶段**

1999 年，随着耐克 iD 的推出，耐克进入了个性化阶段。耐克 iD 是一项在线服务，使得客户能够在“自由定制”的情况下实现鞋的个性化。虽然这并不是真正的意义上的共创创作，因为这些鞋并不是实质意义上的定制，但这些鞋确实满足了客户对于外观和款式的需求。对于球星或者爱好者来说，个性化已经成为常态，新款的签名鞋正是通过与运动员和设计师合作而设计的，例如勒布朗·詹姆斯（“国王詹姆斯”）、科比·布莱恩特（“黑曼巴”）、凯文·杜兰特（“KD”）。

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by the outside. The outside also provides the necessary traction with the floor of the playing field. **Basketball Shoes: Performance Phase**

Basketball was invented in 1891 by James Naismith, who was searching for an indoor sport for his students during the winter season. The sport quickly gained popularity, and around 1900, there were enough basketball teams to start a competition. It became an Olympic sport in 1936. The first matches were played on standard soft leather sports shoes. However, many basketball players soon switched to tennis shoes, probably because they provided more grip and support. The first shoe that was advertised as a basketball shoe was the Spalding “Expert”, from 1904. In 1907, the same company introduced a more flexible, canvas shoe with a rubber sole. The main driver behind the development of the first basketball shoes was the development of the rubber industry (the T in the PEST acronym, the Technology influence). With the invention of vulcanized rubber by Goodyear in 1860, it became possible to manufacture stable rubber soles. One of the companies to profit from this was Converse, who introduced its All-Stars in 1917. It became the bestselling product for the coming decades. Partly due to a protectionist law from 1935 (the P in the PEST, the political influence), the hegemony of the All-Star would last until the 1960s. Because of the dominance of the All-Star, the performance phase lasted until the 1970s, when Nike entered the market.

**Basketball Shoes: Optimization Phase**

The American import duty for foreign shoes based on 1933 legislation was lowered in 1966. This caused a turnaround in shoe design, as the German companies Adidas and Puma subsequently entered the market with innovative designs. It also offered Nike – then distributor of Japanese running shoes – an opportunity to enter the market. Nike, founded in 1964 as Blue Ribbon Sports, introduced its own basketball shoes and the Nike brand with its famous swoosh logo in 1972. Unlike the American basketball shoe manufacturers, Nike was not rooted in the rubber industry and therefore used other materials as well. Like Adidas, Nike used padded leather and suede for the upper to improve support and comfort. The outside consisted of a herringbone pattern that provided more grip and is still used today.
Basketball: Society and History

Nike introduced the Air Jordan 1, the first so-called signature shoe, a shoe created for or in close cooperation with a famous basketball player. During the 1980s, Nike became the biggest brand in basketball shoes. In 1985, it had founded the Nike Sport Research Lab, where new materials and production methods were developed and tested.

Basketball Shoes: Segmentation Phase

The innovations in basketball shoes really took off in the 1990s. The basketball shoe portfolio of Nike grew from thirteen different shoes in 1990 to well over fifty different types around 2000. Nike started to focus on segments: high-end shoes for males, affordable shoes for consumers that could not afford the expensive (signature) shoes, and women’s basketball shoes. There were also limited editions of existing shoes, for instance for the Olympics.

Basketball Shoes: Individualization Phase

With the introduction of Nike iD in 1999, Nike entered the individualization phase. Nike iD is an online service that gives consumers the ability to personalize their shoes (mass customization).

It also started reducing the use of toxic or harmful adhesives and materials. Since then, Nike has received several awards for its sustainability policy, including the first place in the “Climate Counts” scorecard for sustainability seven years in a row up to and including 2013.

Basketball Shoes: Conclusions of the Research

Nike’s basketball shoe has gone through all product phases and is now in all of the last three phases: segmentation, individualization (i.e., awareness). Additional research, for example with the aid of Kapferer’s identity prism – which is outside the scope of this research project – has produced three core values for Nike: Ambition, Innovation and Being [the Best].

A difficulty with Nike basketball shoes is that they are already very successful, and all product phases have been reached. Consequently, there is not a lot of room for improving the functionality or increase segmentation and individualization.

To find out whether there are niches in the current portfolio, a closer look was taken at the
目前为止，有三位球员拥有签名鞋，而这类产品每年都会发布一个新款。这是一种现实的选择，但对马修·米歇尔而言，这并不是一个真正的挑战。

2. 再引入一种女式签名鞋。自1996年斯沃斯莫尔大学推出以来，没有再现过同类产品。女子篮球的产品市场规模相对较小，使其获利的可能性也因此降低，而目前的WNBA（女子NBA）缺乏真正的超级巨星。

3. 为大牌球员设计一款签名鞋。自从推出凯文·加内特的签名鞋以来，尚未出现为中锋与前锋运动员设计的签名鞋。马修·米歇尔认为某一设计，是因为他在看来这是最有意义，也是可行的方案。

凯文·勒夫、拉马库斯·阿尔德里奇与安东尼·戴维斯这几位担任中锋与前锋的几位年轻球员具有明星的潜质。前克已经将一些现有的限量版球鞋与安东尼·戴维斯签约，但尚未与其合作创作签名鞋。因此马修·米歇尔设想的战略就是，“为NBA球星安东尼·戴维斯设计一双签名鞋。”

马修·米歇尔研究了这些球星的特点。首先，他关注的是打球的风格。“安东尼·戴维斯以多变的打球风格著称——他从后卫转变为前锋。这意味着他既能运球又能传球（作为后卫），同时还能抢篮板，是NBA最优秀的盖帽手之一。他体格非常强壮，具有极强的力量和速度，但他的双脚依然非常灵活，因此，他所穿的鞋必须既稳定又轻便，且有足够弹性以便快速移动。”（米歇尔，2014，第80-20页）其次，米歇尔研究了安东尼·戴维斯的西部特征。他有一个特点就是一字跳非常明显，并给他带来了“眉毛”的绰号。他具有盖帽的高度，在赛场上奋力拼搏，不仅在场内，还在场外，都保持着理性与冷静。（图6）然后，米歇尔就安东尼·戴维斯所喜欢的鞋子展开了研究。他最重要的发现是：安东尼·戴维斯在赛场上喜欢2013 Hyperdunkies这款产品，因为这款鞋能够给脚部带来很好的支撑。

product family tree and at the portfolio of the main competitor, Adidas. When we examine the product family tree (simplified for this purpose; see Figure 5), we can identify three viable options. An added challenge within this assignment was that the new design had to be launched onto the market within a year’s time. The teachers decided to make sure that the students would aim for an evolutionary step in the product development, not for a revolutionary leap.

The assignment contained the following three options.

1. Design the next shoe for an existing line of shoes.

   Currently there are three players with signature shoes. They all release a new shoe every year. This is a realistic option, but — according to Maarten Michiel — not a real challenge.

2. Reintroduce a women’s signature shoe. Since the Air Swoppies Zoom of 1996, there has nothing been a new introduction of such a shoe. However, women’s basketball is relatively small, making the possible profitability also small, and the WNBA (Women’s NBA) lacks a real superstar at the moment.

3. Design a signature shoe for a big player. Since the signature shoe for Kevin Garnett, there has not been a signature shoe for the centre and power forward positions. Maarten Michiel chose this strategy because he considered it the most interesting and viable option.

Several young players in these positions (centre forward and power forward) have star potential. Kevin Love, LaMarcus Aldridge and Anthony Davis, Nike already has a contract with Anthony Davis, for some limited editions of existing shoes. However, no signature shoe, co-created with him, is available yet. Therefore, the selected strategy for this project became: "Design a signature Nike shoe for NBA-star Anthony Davis."

Maarten Michiel studied the characteristics of the selected player. First, he looked at the playing style. "Anthony Davis’ style of play is characterized by its versatility (...) He changed from a guard to a power forward. This means he can both dribble and pass (guard), but is also able to rebound and is one of the best shot blockers in the NBA. He is very athletic with a great vertical jump ability, but is still very nimble on his feet. He therefore needs a shoe that is stable but light and bouncy enough to move quickly." (Michiel, 2014, p.8-20). Secondly, Michiel studied his features. One feature — his unibrow — stands out and has brought him his nickname The Brow. He has a blue-collar attitude, working hard during the game, but with a sensible, calm presence both on and off the court (see also Figure 6). Thirdly, Michiel researched the shoes that Anthony Davis prefers. The most important finding was that during matches, he prefers the 2013 Hyperdunkies, stating that he likes the ankle support they offer. Based on this research, Michiel created a list of requirements. He designed a logo — which is customary with signature shoes — that is inspired on the eyebrows of Anthony Davis (Figure 7). The logo also spells out the name Davis (Figure 8). About the design, Michiel wrote: “For the design of...”
of the shoe, I have taken all previous conclusions in consideration, and have tried to match all of those aspects into a coherent design that resembles both Nike and Anthony Davis” (Michel 2014, p. 26) (Figure 9, 10 and 11).

**Concluding Remarks**

On the basis of several studies (Eger, 2013), we conclude that the product phases, the product family tree and the ecosystem together form a useful tool for describing the historical development of a product. With regard to both the education of design students and the design practice of product designers, we also conclude that the three models are a useful tool when developing a new product, especially when this is a next logical step. This is important as most products – if not all – are very rare – if ever – completely new, since they are often the successors of existing products and have minimal differences from their predecessors.

Figure 12 gives an overview of the aspects that influenced the design of the new basketball shoe. Note that technology is mentioned in the ecosystem. This played an important part in the design process of Maarten Michel, but is outside the scope of this paper.

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