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# **Digital Transformation Strategy: The LEGO Case**

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**Abstract**: The purpose of this paper is to shed light on the digital transformation of LEGO and to figure it out in innovation-oriented growth decisions. To this end, the study here examines the transformation process of the company from diversification to smart specialization strategy in more detail. Besides, where digital architecture for toys requires many innovations at the same time, authors discuss what LEGO does to add value. More importantly, the typologies of innovation strategy elucidate the changes and improvements that foster digital transformation.

**Keywords:** Digital transformation, smart toys, corporate strategy, innovation, LEGO.

## Introduction

The digital revolution keeps reshaping and transforming the whole industrial landscape tremendously. Organizations deal with a difficult struggle on how to ride the wave of digitalization to business success. Likewise, the toy industry also seeks to attain a successful digital business strategy to take advantage of the new age of innovations. Since connecting players over the internet, the video game industry has seriously threatened the toy industry (Grecu, 2013; Sawy et al., 2016). However, this situation never seems as if it will take forever. Internet of Toys (referring to the Internet of Things) has already started to close the distance between the toy industry and the gaming industry by creating a digital bridge between physical toys and online games (Holloway and Green, 2016; Manches et al., 2015). Technologies such as augmented reality, virtual reality, and voice recognition have completely changed the play experience and enabled interactive toys to be launched (Curtin, 2018; Tippenhauer et al., 2012). Despite the more common adoption of new video games, children still have some sort of attachment with their toys and are even proud of their toy collection (Manches et al., 2015). Therefore, the digital play has merged with traditional play instead of entirely replacing it (Marsh, 2017). On the one side, parents are more interested in such kinds of educational toys (Plowmann and Luckin, 2004). On the other side, learning by play is extremely expensive and hence it may take some time for smart educational toys to completely take over the traditional toy market until cheaper versions are available (Brito et al., 2018). But it is quite obvious that new generation toys that serve for both entertainment and education are merging into a seamless blend of games and electronic media (Goldstein, 2013). Despite some challenges and disruption threats traditional toy manufacturers have faced through time, there are only a few toy manufacturers available that held their ground

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firmly. Depending on the digital revolution, LEGO became one of the leading businesses that completely changed the nature of play (Robertson and Breen, 2013).

LEGO, catalyzer of the widespread use of plastics in toys, was founded in 1932 in Denmark. During such large corporate longevity, LEGO did face difficulties but never gave up the race, and even kept its position of the runner-up ranking in the worldwide marketplace (Statista, 2019). The company is also capable of successfully transforming digitally while keeping its traditional business intact. Hence, LEGO undoubtedly represents a good precedent of the digital business model with sustained innovation strategies. Successful digital transformation of LEGO does not only come from product innovation but rather ensue from its digital infrastructure such as Horizon and BICF (Business Intelligence Concept Foundation) initiatives. Beyond digitalization efforts, the victory of the firm depends on a complex yet efficient blend of different types of innovation. This study aims to unveil how digitalization initiatives shape innovation strategy over time. To this end, the authors refer to the digital transformation of the traditional toy industry by addressing the LEGO case. In sum, this paper contributes to ongoing work in understanding the link between digital strategy and innovation employing a case study. This paper answers a few critical questions that could contribute to better understanding in the field of strategy and innovation:

- How digitalization drives innovations in low-tech industries?
- When and to what extent digital innovations may have an impact on the business market?
- How business success can be accomplished with distinctive and harmonic bundle blocks of innovations in structural configuration, offerings, and customer experiences?
- What is smart specialization? How does it contribute to innovation and firm survival?

# The Evolution of Digital Transformation

Looking over the earlier applications of new technologies in production systems, it is noticeable that the time interval between technological inventions and their subsequent widespread use has been declining constantly (Charlesworth, 2009; Giedd, 2012; Makridakis, 2017). 200 years had passed from the first affordable car, as performed by steam power. 90 years after its discovery, electricity was first used in factories. On the other hand, the radio was in use only 38 years after breakthroughs in information and communication technology. In a shorter time, personal computers considered as the technical backbone of the internet, and digital platforms became apparent some 20 years later (Muhleisen, 2018). And in just a decade, technology was transmitted into mobile phones. Nowadays people have pocket computers dubbed as smartphones embedded with the internet, without which daily activities seem impossible. Along with the further developments in the internet and smartphones, digital technology then evolved into social media platforms and websites to cater social needs of the human being (Charlesworth, 2009). Smartphones together with the internet and other digital platforms have opened infinite doors to the online world. Today, people use the internet to do research for assignments (Google), to stay in touch with friends (Facebook/Instagram/WhatsApp), to apply for a new job (LinkedIn), to watch videos and movies (YouTube/Netflix), to find a way (Google Maps), to shop anything and everything (Amazon/AliExpress), to order a cab (Uber), to book accommodation for next holidays (booking.com), to read reviews about different products and services (TripAdvisor).

The Internet of Things- IoS (Manches et al., 2015) appears to have further extended the presence and usage of digital technology. Examples of IoT based applications include shared bicycles which can be unlocked through mobile apps, smartwatches enabling us to receive and make calls and messages in addition to their main function, connected cars, smart homes, and like many others (Meola, 2019). Artificial Intelligence-AL is the latest development of digital technology holding enormous potential which has made humans worried whether they

will be replaced by robots in near future. Unlike the previous digital technology, AL does not only perform tasks based on programming it is encoded with, rather it shows learning capabilities through the process of "deep learning" (Makridakis, 2017). Self-driving cars as one of its most important applications are expected to launch soon (Frontline PBS, 2019).

Evidently, the digital and mobile revolution has been picking up the speed at which new businesses and internet-connected new products/services are introduced to the market. For instance, Google -the champion of the search was incorporated in 1998 and initially funded by the founder of Amazon (Statista, 2019). Facebook, a social networking site was launched in 2004. Facebook was not an entirely new idea; rather it took inspiration from earlier social networking sites such as Friendster, Myspace but surpassed them soon. By 2010, the age of mobile internet had already been started. In the year 2007, Apple was leading a new market with products such as iPod, iPhone/IOS. Only one year later, Google entered the smartphone market with its Android technology. In those years, Microsoft was left behind in offering an operating system to the smartphone industry, and even when it did in 2013 for Nokia, it failed. Facebook has emerged as the most popular social networking site, and up to date holds that position with around 2.5 billion users. Amazon which initially dealt with books continued adding other categories to the business portfolio. By 2007 it has been a controller of around 80% of the e-book sales along with the introduction of its kindle e-reader (Holder and Hern, 2018). By 2019, Amazon has been the World's Biggest Retailer (Debter, 2019). In a near future, Amazon might even become a threat to Google and Facebook in digital advertising (Barwise and Watkins, 2018; Moore and Tambini, 2018; Statista, 2019). These six leading companies at the forefront of the new economy are continuously listed among the most valuable brands of the world by valuation companies such as Interbrand, Brand Finance, and WPP (Barwise and Watkins, 2018).

Consequently, the rise of digitalization in carrying out commercial activities has entirely transformed business solutions and permanently reshaped competitive dynamics in many industries (Giedd, 2012; Charlesworth, 2009). Nowadays entire living patterns revolve around digital technology. Hence, its sphere of influence extends beyond to include the low-tech industries such as entertainment, education, finance, shopping, government affairs, and others. Previous research denotes those businesses without a digital advantage are no longer to survive. Therefore, organizations face the inevitable necessity of integrating digitalization efforts with business strategy (Sawy et al., 2016).

#### **Disrupting the Entertainment Industry: From Traditional to Smart Toys**

The kids of the 18th century had usually enjoyed wooden toys such as dolls, stick horses, wooden snakes (Brightonmuseums, 2012). However, the 19th century's industrial revolution marked a new era of manufacturing across all sectors and there was no exemption specifically for the toys industry. In addition to the mass production of traditional toys, advancements in cotton, paper, and printing industries fueled by the steam power triggered the diffusion of other toys such as jigsaw puzzles, playing cards, and stuffed toys. The technological innovations of the 20th century further contributed to the diversity of toys and the growth of the toy industry. As the use of trains and cars became more common, the production of toy trains and cars also came into existence (Toy Retailers Association, 2020). In 1901, the founder of Lionel Trains sold his first electric train to a store owner. Hornby also introduced the first electric trains to its product catalog in 1925 (Hornby, 2020). A series of those events shows that the toy industry got its share of influence from the advancements in electricity.

Along with the technological innovations the toy industry has been impacted by the changing social scenarios of the century including new consumption culture and the social changes it brought (Greenfield, 1991). Consumption influence on children got stronger at the end of WW2 (Edwards, 2013). During this period children started to be recognized as an important market segment (Edwards, 2013). Although the great depression affected the sales of the toy

industry, it somehow resulted in the birth of toy libraries; the need for children to have access to toys and games was understood. Over the years, not only did the toy libraries grow as independent organizations, but also as part of public libraries and schools (Nicholson, 2013). The American Toy Institute was established in 1948, and then in 1975 International Council of Toy Industries was built to further ensure safety standards and regulations in the industry. The importance of toys in education were also highlighted. The toys fairs began to serve as a platform not only to showcase products but also to integrate them in educational programs (Toy Retailers Association, 2020).

Television is another technological invention that reformed the toy industry with the potential to a great extent. Apart from serving as a focus of family entertainment, and an efficient advertisement platform for increasing demand and awareness about the "must-have" toys among kids, it also gave birth to numerous characters such as the world-renowned Mickey Mouse (Toy Retailers Association, 2020). Soon after, TV connected children with video games. Pioneer of successful arcade games such as Atari defined this new gaming industry, and later developments from companies such as Nintendo further revolutionized the gaming industry (Atari, 2020). In the same period dawned the sun of digitalization which, much like the industrial revolution impacted all spheres of life, all existing industries and further found the basis of many new industries. The toy industry, like all the previous innovational waves, had to respond to this new age wave in order to stay attractive (Figure 1).





(Source: prepared by the authors)

Ever since the traditional toy industry has been disturbed by the video gaming industry, leading toy manufacturers such as Mattel, Hasbro, and LEGO (Statista, 2018) started adding technology to the play offerings in order to keep themselves alive and attractive. Although toy companies are not the pioneers of the video gaming marketplace, they have entered the market as secondary players (D'Hooge and Goldstein, 2001). The continual efforts of improving traditional play with technology along with the advancements in IoS stimulated the idea of producing smart toys. Smart toys can connect to electronic devices or the internet and hence creates opportunities for connected toys with a play experience (Marsh, 2017). One of the earliest smart toys is "Speak and Spell" from Texas Instruments (Tedium, 2018). Coming forward with interchangeable game cartridges, this educational tool developed in the 1970s aimed at helping children learn and spell some 200 words. Then it has been acquired

by toy company Basic Fun. Another, probably more famous interactive toy was Teddy Ruxpin, produced by an American Toy Company, World of Wonders in 1985. Teddy was a storyteller and thus was able to develop a friendly relationship with the children. It was an instant hit both financially and culturally and became the best-selling toy of the year. Its founder is called "the father of animatronic toys" and is also credited for sowing the seeds of innovation in the industry (Jones and Meurer, 2016). However, despite all the success, the company could not have a bright future. Just after a year of setting a record as one of the fastest-growing companies, the company filed for bankruptcy protection in 1987 (Pollack, 1987).

The late 1990s carried out the boom of smart toys. Furby- an American electronic robot toy was first released in 1998 and 40 million units of which were sold within the first three years. The later versions of Furby were updated with the technologies such as voice recognition containing "respond to commands" and with mobile apps (Jones and Meurer, 2016; Marsh, 2017). In 1998 a remarkable network innovation was actualized between Mattel, the toy leader, and Intel, the technology leader (D'Hooge and Goldstein, 2001). These companies combined their forces to launch the Intel Play brand and introduced new toys with the characteristics of educational and fun to the market. The early products of this collaboration were revealed at the New York toy fair in 1999. The first one was the Computer Microscope enabling users to view magnified images on their computer screen and, the other was "Me2Cam" with a special feature of which transports moving images of a child to the game. Both of these products have received very positive feedback. Interestingly, LEGO's first successful digital move came in 1998 with the launch of MINDSTORMS (Robertson and Breen, 2013). The robots of MINDSTORMS consist of traditional LEGO components augmented with sensors, motors, intelligent bricks. They can be connected to the software and programmed to perform complex tasks. Overall, smart toys support educational purposes and help children learn coding, programming, 3D printing, etc. (Holloway and Green, 2016). Hence, the new generation devotes keen interest to buy them (Brito, et al., 2018). As a result, the smart toy industry is expected to grow at a compound annual rate of 15.5% from 2017 to 2025 (Business Insider, 2019).

## Linking Strategy to Innovation: The LEGO Case

This case study focuses on the concepts of sustainable growth and digital transformation to understand the link between innovation and strategy. To have a deep understanding of innovation-driven growth, here we intend to shed light on the selective specialization strategy of LEGO. The selected case study illustrates that strategic shift from diversification to smart specialization is the strongest driver of recovering business success. To unveil the underlying reasons for strategic change, we conduct a strategic analysis on decisions made and actions taken by the managerial team of LEGO throughout the lifecycle phases. In nearly 90 years of business life, we analyzed its corporate strategies related to products, markets, and business areas. Finally, we elucidated its innovations that support the decision on specialization. To this end, data from secondary sources were collected, carefully synthesized, and linked to the context of innovation-corporate strategy.

#### The 88 Years of Business (1932-2020)

LEGO was founded by a master carpenter- Ole Kirk Christiansen in 1932. The company was producing wooden toys during its foundation years (The LEGO Group, 2019, 2020; Robertson and Breen 2013). Kirk's passion to experiment with new ideas resulted in the use of plastic materials in toys. Back in 1946, LEGO was the first toy manufacturer who gets a plastic injection molding machine and produces plastic toys in Denmark. Therefore, the company faced heavy criticism that plastic would never be able to replace the preferred wooden toys. But it was not at a standstill. LEGO made subsequent improvements in plastic components that eventuated in the perfect clutch power design of standard bricks, and then

patented this platform-based innovation. A six 8-stud LEGO brick can be combined in approximately 915 million different ways. Besides, all LEGO elements manufactured since 1958 are fully compatible with each other regardless of when or where they were made (The LEGO Group, 2011). Different sets can be combined for creating more interesting play scenarios. Here is one of the most important reasons why the LEGO brick is known universally and well-liked by children, teens, and adults.

Until the end of the 1980s, the company's sales had steadily increased. Everything was looking good at first glance. But in the 1990s, the digital revolution began to change the dynamics of competition. This new wave of change in technology and economy made play offerings of traditional toys outdated for children. To maintain its competitive position, LEGO had to take the plunge into the digital world. This situation pushed LEGO to diversify its product range (Lauwaert, 2018). The company launched a new initiative with Darwin (1994), a product that stemmed from the idea of converting LEGO bricks into digital bits. This important strategic move could not enable company involvement in digital and software technology. The first attempt was entirely a failure because LEGO was trying to do too much too soon (Robertson and Breen, 2013). Hence it was ended up in 1999. Despite the frustration it brings, the Darwin project provided a considerable experience for future products such as LEGO Island- a computer game launched in 1997, and the very successful LEGO MINDSTORMS launched in 1998. MINDSTORMS was probably the company's first successful digital move. Once again LEGO encountered a great loss of 48 million \$ in 1998. However, this time, digitization was not responsible (Company Man, 2018). The company was on the brink of bankruptcy in 2004, with a threat of being acquired by Mattel. And all though, LEGO was still the toy of the century.

If so, what went wrong at LEGO? The company was implementing a growth strategy to develop new markets (Bloomberg Markets and Finance, 2017; Robertson and Breen, 2013). Beyond opening new stores, the company launched into new businesses such as video games, clothing lines, stores, and theme parks (Figure 2). It sailed vertically into the blue oceans with products such as movie maker sets, Legoland resorts, and education learning centers. All of them were outside the realm of LEGO's core assets and capabilities. Unfortunately, none of these diversification initiatives around non-core business efforts proved successful for LEGO, and sooner or later most of these projects were shut down. It seems that the core business function was miscomprehended and thus the company underestimated its own capabilities. Building with bricks was the major attraction for LEGO fans, but the aforementioned products were lack of these main characteristics or functions.

Over-diversification not only harm the main customer segment but also harmed the component suppliers due to the increased costs. Fortunately, it was not too late to turn back and reshape the corporate strategy around core business (Ashcroft, 2014; Monaghan, 2017). At the end of 2003, the company completely restored its corporate strategy to achieve the position it has today. LEGO ensured the act in the children's best interest by mixing digital and physical play in a much-admired way but staying at the core. LEGO now focuses on a narrow range of products within the core business and globally expands along with optimal leveraging of digitalization (Aljazeera English, 2016). It is certain that the successful digital transformation of LEGO did not happen overnight, rather LEGO learned its lessons through constant experimentation and failures. As of now, LEGO enhances its offerings by adding intelligence, creativity, behavioral and educational aspects to its system of play.

Figure 2. Corporate-level strategy of LEGO: From diversification to smart specialization strategy



(Source: prepared by the authors)

#### **Growth Strategy of LEGO**

Growth strategy is strongly associated with the decisions a company takes on regarding the set of businesses that it would operate in (Furrer, 2016). Due to the limited resource endowments, small companies broadly follow a single-segment strategy and penetrate the current market with a single product available. On the other side, bigger ones can operate by offering the same product to different markets (product specialization) or different products to the same market (market specialization). Some of them are even diversified over a wide array of product-market combinations with full coverage. But ultimately these growth strategies are all about concentration on a single business. Unlike such concentrated strategies, others operate in different business areas. Accordingly, diversification is not a yes/no decision (Furrer, 2016) and regards with substantial changes in business definition along the three generic dimensions of customer groups, customer functions (/needs), and (product) technologies (Abell, 1980). In this situation, a single business firm with multimarket or multiproduct activities is more concentrated but still said to be diversified. In the broadest sense, diversification contains the composition of a company's portfolio of business units (Bartlett and Ghoshal, 1993; Goold and Luchs, 1996; Puranam and Vanneste, 2016).

As of the latest status, LEGO seems to be more concentrated on its core business (i.e., toy industry). This is a prominent result of a collaborative initiative that promotes efficient sourcing, and collective action. LEGO transferred the whole or exclusive part of ownership rights associated with the non-core businesses. Thereby, the company aimed to earn money by charging for the use of its licensed asset (Figure 3). The new shared vision included

selling Legoland theme parks to Merlin Entertainment, halting all unprofitable products, restricting manufacturing budgets, introducing rules for a minimum return on sales, and thus reviving the core business (Smout and Gronholt-Pedersen, 2019). After the corporate decision taken on "innovate inside the box", the year 2005 marked a slight recovery from the LEGO loss, and afterward the LEGO revenue curves constantly grew upward till 2017. Following the restructuring process, LEGO has more concentrated on the toy business but diversified its main products into the three product categories including themes, advanced, and education.





(Source: prepared by the authors)

A new series of brick blocks, LEGO DUPLO, was launched for pre-school children in 1969 (Figure 4). These products of the Themes Category were compatible with the classic LEGO bricks. DUPLO series, also used in educational institutes, is one of the most famous product categories (Robertson and Breen, 2013). LEGO had been a male dominant consumer base until the launch of LEGO FRIENDS. It enabled the company to reach out to the little girls as well. "LEGO FRIENDS" offers a more buildable experience for girls who enjoyed constructing. LEGO went on to expand its customer segment by introducing LEGO TECHNIC in 1977, targeting older children. This new line of the advanced product category achieved great success in a short time and some elements of which were also used in the later blockbuster lines of LEGO such as MINDSTORMS.

Figure 4. Product portfolio of the LEGO toys



#### (Source: The LEGO Group, 2018)

Another appealing product line of the advanced category is architecture themed products. LEGO ARCHITECTURE was launched in 2008. The sets designed by famous architects are sold at premium prices. The product line is not only successful financially, but also denotes a new market for LEGO as 15% of their enthusiasts had never bought any LEGO kit before. Like LEGO Architecture and LEGO Creator Expert, LEGO MINECRAFT has attracted enthusiasts by combining physical play experience with the virtual games (Stuart, 2012). LEGO has further enhanced each product category by adding digital extensions. For instance, LEGO added the digital experience "Create and Connect" in the DUPLO series as well by striking a partnership with Amazon's Alexa in 2018. The target of DUPLO STORIES was to develop the programming skills of kids from a young age. Similarly, some sets of the secondary level education line consist of newer technologies such as LEGO MINDSTORMS EV3. Furthermore, LEGO MINDSTORMS equipped with new robotics, and LEGO UNIVERSE of massively multiplayer online gaming are the latest products that create new markets for LEGO. The new versions of MINDSTORMS are not only attracted teens and adults but also become a part of STEM education in some countries. Overall, it is possible to find many differentiated products and product lines embedded in the product range of LEGO. Each of them targets different market segments (Figure 5). LEGO's product portfolio clearly shows the diversity and the digital trends it follows, but at the same time, we can see that they

all are centered around the core of LEGO: Bricks and the building experience. Most of the theme sets come with instructions or ideas, but they are for building what is on the box. Children can use their own creativity and make whatever they want.





(Source: prepared by the authors)

## **Innovation Strategy of LEGO**

How to diagnose innovation strategy(/ies) in business? Diagnosing innovation strategy needs assessment for change an innovation creates in technology and the market. These two dominant parameters of innovation may stand somewhere along radical (/discontinuous)- and incremental (/continuous) - change in the spectrum (Gurcaylilar-Yenidogan and Aksoy, 2018). Drawing upon the general acceptance of defining innovation strategies and appraising innovation capacity (innovativeness) of an organization, Norman and Vergani (2004) identify four types of innovation strategy (market-pull innovation, technology-push innovation, meaning-driven innovation, and technology epiphanies). According to this classification, the technological aspect that drives innovation regards the magnitude of technological change and indicates the novelty degree (newness) of technology compared to the existing products. On the other hand, the market driver of innovation refers to the meaning change in how people interact with a product. The innovation capacity of an organization (/innovativeness) expands with significant changes in both innovation parameters.

Technology epiphanies happen when consumption attitudes drastically change with fundamental product differentiation that serves as a catalyst in purchasing behavior and hence reshape the rules of the competition (Verganti, 2011). This kind of innovation emerges in a radical change in customer benefit package and a different or wider meaning behind it (Kortelainen et al., 2010). Technology-push innovation occurs when a radical change in technology does not bring significant changes in the meaning of a product in use. Meaning-driven innovation is driven by radical changes in socio-cultural structure that leads to new meanings of consumption. On the contrary, market-pull innovation endures with existing sociocultural regimes but helps us gain a better understanding of how people interact with existing products. Consistently, the case study here, an endeavor to implement the appropriate coupling of LEGO products and innovation strategy in new product development, adopts the technology and meaning change typology developed by Norman and Vergani (2004). We use this typology because the newness or novelty of the production technology of toys is closely related to the lifestyle and societal changes. The three major structural changes in the social system are as follows (Klemenovic, 2014; Mao et al., 2019);

*High-performing working parents:* Families and especially mothers today spend more time in performing their professional career and work-life and less of it doing leisure and communication with their children. Therefore, toys gifted by adults are often seen as a compensation remedy for the neglected children. Due to the obstacles of playing with family, the meaning of toys has expanded to include technical devices that allow children to interact with them. Under these circumstances, parents also had to rely upon the skill-development aspect of toys such as stimulating imagination, problem solving and developing creativity in children. And in end, the meaning of "play for fun" has changed and expanded to play toys for "interaction/communication and skill-development". It cannot be said that LEGO acted early in this attempt. LEGO Duplo Stories can be given as an example of voice/image recognition toys. This product combines storytelling with LEGO's Duplo sets and aims to develop the interactive skills of children.

*Play in education:* In the 1990s, the knowledge-driver economy has reconfigured social systems significantly. The world has entered a period of rapid and profound change. Innovation, creative thinking, and transformation have become key performance indicators for sustainable growth and organizational survival in all systems. Similarly, traditional methods have changed in the education system. Alternative education promotes a play-based approach for active learning instead of traditional schooling. Hence, plays with creative toys have a prominent role in the education of children. In addition, out of school learning is gaining ever more importance in the life of human beings. It means that toys serve for education not only limited to formal schooling but also to a lifelong pursuit.

As a result of this second restructuring process, toys started to make sense of being educational devices that develop physical, cognitive, and artistic skills of children and adults. In response to this new market expectation, the LEGO Group, with the motto of being more than a toy, established a department (now dubbed as LEGO Education) to develop educational material in 1980 (the LEGO Group, 2020). The task of LEGO Education was to collaborate with educational institutes and design products suitable for learning through integrating digital and physical forms of play.

*Highly connected people and digital society:* Nowadays, the vast majority of teenagers devote huge amounts of time to playing computer games, the internet, and online social networks rather than participate in outdoor activities. While digital technologies made many analog technologies obsolete, social systems began to be restructured by creative destruction in technology. This is the era when a toy as a smart machine which consists of miniature electric motors and chips. The use of toys for entertainment, education, skill development, and special interest is not unprecedented for the existing market. However, integrating physical toys with digital dimensions for educational intelligence continues to be disrupted the existing market.

LEGO teamed up with MIT, for introducing intelligence and behavior; digital technology such as programming languages in the play. MINDSTORMS was one of the results of this collaboration. MINDSTORMS, released in 1998, was the first robotic coding adventure of LEGO (Robertson and Breen, 2013). The toy series of MINDSTORMS involved radical technology and opened a new market with 70% of MINDSTORMS buyers from the adult age range. This type of LEGO series is also used for STEM (science, technology, engineering, or math) education in curricula. An additional contribution of MINDSTORMS was to engage customers in product development. When the software got hacked through reverse engineering posing a challenge, LEGO opened its doors to the fans and encouraged them to submit new product ideas, support existing ones, and share their reviews on social media. At the same time, LEGO launched LEGO Digital Designer which would allow fans to make customized sets using 3D Bricks. It provided an essential foundation for LEGO Factory, later renamed LEGO Design by Me. The ultimate activities of the fan community are executed

under the initiative of LEGO Ideas. LEGO also launched the first-ever community platform for children under 13, named LEGO Life, available as a digital app. All these initiatives for customer engagement point out the effective content of crowdsourcing (Schlagwein and Bjorn-Andersen, 2014).

In a nutshell, the meaning of toys in society has expanded from fun (/entertainment) to include skill development and education at all ages (Figure 6). While the way of communicating with toys changes over time, analog toys have largely been supported by digital technologies. For this reason, today toys that entertain while serving for skill-development and education throughout life can speak, move, tell stories, interact, or be encoded.

Figure 6. Innovation strategies of LEGO

	Incremental Change Radical Change	Toys to life: transport physical toys into digital dimension	TECHNOLO PUSH INNOV	GY- ATION			Lego Dime	nsions	TE E	CHNOLOGY PIPHANIES
NGE		App-enabled mechanical toys: STEM (science, technology, engineering or math) educational toys			Lego Boost		Lego Mindstorms		Mindstorms Education EV3	
У СН∕		Screenless toys: <i>basics of coding and computational thinking</i>						Mochi Ro	bot	
OLOG		Voice/image recognition toys: combine storytelling with the brick toys	MARKET- P INNOVATI	'ULL ON		Lego Duplo Stories			MEAN IN	NING- DRIVEN NOVATION
TECHN		Brick block toys Conventional toys	Lego Duplo	Lego C Lego C	lassic reator					Education Steam Park
		Play for	Fun	Imagination and creativity		Interaction Communics	n/ Problem cation solving/ Intellege		ıce	Education (Schooling- Lifelong)
				Skill Develo			pment			
			Incremental Change Radical Change					ige		

**MEANING CHANGE** 

## (Source: prepared by the authors)

In an alternative vein, Kalbach (2012) assesses the impact of technological change in the marketplace and thus identifies four zones of innovation such as incremental, breakthrough, disruptive, and game-changer. A company in the pursuit of game-changer innovation produces really new products by making radical changes in technology and disrupting the existing markets. When modest changes in existing products sustain the current market, it results in incremental innovation. If radical technological changes breed new ideas in business offerings without disrupting an existing market, breakthrough innovations happen. On the other side, disruptive innovation with incremental change in product technology generates new revenue streams by either providing solutions to a new set of customer needs or significant improvements in product performance. Consistent with the typology of Kalbach (2012), the change and diversity in the innovation strategy of LEGO can be traced in Figure 7.



Figure 7. The change and diversity in the innovation strategy of LEGO

(Source: prepared by the authors)

#### **Distinctive Innovations of LEGO**

In this section, the prominent innovations of LEGO are categorized according to the innovation types of Keeley et al. (2013) (Table 1). The company has initially differentiated in the product system. After a retailer's recommendation to create a system of play in which different toys are interrelated and compatible with each other in 1954, this new idea has gained great attention due to its potential to increase repeat sales (Robertson and Breen 2013). Thereupon LEGO acts immediately to build its own system of play around the bricks. Based on the key characteristics of creativity, simplicity, affordability, infinity of opportunities, etc., the interconnected system of LEGO is established in 1955. Due to the interconnected toy bricks with a perfect clutch power, LEGO considerably differentiates from its peers in offerings (i.e., product system and product performance). The company also supports its offering with communication elements and a business system. This kind of innovation regards breakthroughs in experiences. For example, platforms such as LEGO Ideas and LEGO Life further enhance customer participation and customer experience. In turn, results in forming a strong "LEGO FAN" identity and gives an opportunity for having customized sets. In addition, this also creates an additional communication and sales channel. LEGO is the capable of using many channels in an integrated way. These include physical stores, online channels, social media, educational institutions, and movies.

Table 1. Distinctive innovations of LEGO

Innovation	What kind of innovation?	How to differentiate?				
Platform based product design:	Product System	Interconnected toy bricks with a				
LEGO SYSTEM OF PLAY		perfect clutch power				
Play for fun with skill- development and education	Product Performance	Multifunctional toys				
Funs of LEGO ✓Lego design by me (for adults) ✓Lego Life (for children under 13)	Customer Engagement	A sense of belonging to a community and involvement in product development				
Legoland amusement parks Lego House	Brand	Brand extension				
Character design	Network: Cooperation with Lucasfilm Brand: Creating connections between brands	TV series featuring Star Wars characters in LEGO form				
Smart bricks	Network: Cooperation with MIT Product Performance Product System	Intelligent development and education Digital architecture				
Channel diversification	Channel Innovation	Multichannel for distribution and communication: Physical stores Official website Smartphone apps AFOL Forums LEGO Ideas LEGO Life Educational Institutes Cinemas (LEGO MOVIE) TV Series (LEGO Nexo Knight) Toy Fairs/Exhibitions Social Media Accounts				

#### (Source: prepared by the authors)

LEGO has introduced new services like LegoLand and LegoHouse by extending its wellknown brand among the new target markets (e.g., families). On the other hand, successful character designs in TV series and cinemas have opened new channels by expanding the boundaries of the existing market to those who were previously non-users. In this endeavor, the company often benefits from network innovations. Cooperation with Lucasfilm can be given as an example to create connections between different brands. Another network innovation made with MIT serves to realize the company's new business "smart toys project".

#### Discussion

Today's companies confront the challenges of digital disruption more than ever before. In the era of the digital economy, innovation and digitalization have become inseparable concepts. Therefore, in the struggle to stay competitive in the marketplace, companies need to make innovations that support digital transformation and an entirely new business model. In other words, digital transformation is what a firm needs today (Mithas and Lucas, 2010; Lichtenthaler, 2018; Peter et al., 2020). Especially, in the current circumstances where the whole world order is disrupted due to a deadly virus COVID-19, more and more firms would resort to digitally transform their business models.

In order to accomplish a transformation from traditional to digital, companies should initially determine the extent to which digitalization proceeds in the sector. Integrating digital strategy into the business strategy might be enough for some firms. However, others must completely transform the business to digital (Cordon et al., 2016). The first solution entails a strategy where digitalization is integrated into the entire corporation but does not replace the core business (Cordon et al., 2016). That does not mean that digitalizing the play offer was never on LEGO's agenda. The digitalization at LEGO indeed revolves around products along with marketing and enterprise (Sawy et al., 2016). However, LEGO never replaced its core entirely i.e., physical plastic brick and the joy of buildable toys, rather it also focused on ways of merging physical and digital (Cordon et al., 2016; Rpark, 2018)

Undoubtedly, companies make numerous choices and take various risks in the process. They might even end up disrupting their own traditional core, or in the pursuit of diversifying digitally might even face serious losses. This research has presented a positive case, where despite the initially failed experimentations, LEGO was able to successfully transform digitally while also keeping its traditional business intact. LEGO can be looked upon as an example, and significant lessons could be learned from its business models and strategies. Almeida et al. (2019) identified the building blocks required to develop a business model integrated with IoT practices. According to their findings, the most frequently building blocks for manufacturing business are equity, customers, value propositions, data, digital architecture, stakeholders, and smart objects. All these building blocks can be spotted in the business cannot produce a great impact just by innovating the products they are offering, rather a complex and sophisticated mix of different types of innovation is required for boosting the overall performance of the firm (Keeley et al., 2013). LEGO well knows what should be done to achieve the marbling of innovations.

Finally, sustainability initiatives indeed add to the firm reputation and competitive advantage (Cavaleri and Shabana, 2018), and LEGO wins once again. LEGO has clear sets of principles directed towards Ethics, Children, People, and Environment. LEGO has remarkable initiatives of producing LEGO elements using sustainable materials and has a target of reaching zero waste in operations by 2030 (The LEGO Group, 2020). LEGO ranked first in a 2019 Global Corporate Responsibility study, and it was remarked that "The core strength in corporate responsibility translates into 57 percent of consumers saying they would definitely buy The LEGO Group's products" (Global RepTrak, 2020). Nevertheless, the future of smart toys often suffers from some serious concerns such as privacy issues, health dangers, data invasion, addiction of internet, electrical smog, etc. (Brito et al., 2018; Grecu, 2013). Apart from catching up with the technological trends, smart toy manufacturers need to come up with sustainable solutions to address these issues.

#### **Implications for Theory and Practice**

This case study provides some important implications for diagnosing the link of digital innovations to corporate strategy. First, this study illustrates how digitalization in low-tech industries can be used to improve main product technology, enriching the meaning of change. Besides, digitalization enables offering different value propositions for different customer segments via different communication, sales, and distribution channels. The LEGO case is an example of the renewed business model created by adding digitalization to product and marketing programs together. It does not regard the strategy development all over again but enlarging the source of innovation to achieve the business strategy. In the toy industry, this means adding intelligence to entertainment, development, and education. In a related vein, digitalization is one of the most important sources of innovation and its integration into business strategies is vital today. Second, this case study is a story of a strategy change in direction from differentiation to specialization by exploiting digital technologies for product/market extensions. Digital integration certainly functioned to restore painful failures arising from divergence away from core business. Smart specialization, therefore, seems like a good option for successful growth. Third and the last, this study demonstrates that digitization alone is not about technological breakthroughs. As well, this concept lies behind the sense we attributed to it. The LEGO case teaches us that digitalization not only augments the function of business but also provides social and emotional connected value.

#### Conclusion

LEGO is often called the Apple of toys when it comes to innovation, but LEGO has a longer history than Apple and has been enduring all the challenges efficiently. In a world, where every kid has a smartphone in the hand, staying attractive as a toy company indeed is a huge achievement. There are many lessons that we can learn from the case of LEGO:

 $\checkmark$  Companies should be very careful when they are looking to diversify their businesses and expand the existing customer segments. If diversification needs different resources and capabilities than the core business comprises, the performance results are not more likely to be favorable.

 $\checkmark$  Companies with empowered teams and dynamic research can explore the potential of their own core, and hence come up with concentric diversification tactics.

 $\checkmark$  Crowdsourcing can open a world of opportunities, not only will it bring the company closer to its customers, but significantly improve existing products as well as marketing campaigns. The praise of customers has more value than the praise company does for itself.

 $\checkmark$  Successful digital transformation is not only about product innovation, but also comes from enterprise-wide digitization efforts. Therefore, digital infrastructure should be encouraged as such in the Horizon and BICF initiatives of LEGO.

 $\checkmark$  Partnerships are becoming more and more important to expand towards new markets. Building strong partnerships with suitable agents (e.g., LEGO and MIT) helps diversify investments beyond the core business.

 $\checkmark$  A complex yet efficient blend of different types of innovation is required for the success of the firm. Most of the highly innovative firms have different types of innovations in their models, so does LEGO.

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