THE FUTURE OF INTELLECTUAL PROPERTY

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The IP Group

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MANAGEMENT SUMMARY
The Future of Intellectual Property

Technology is driving the transformation of intellectual property in companies – from creation to exploitation to protection. By consistently developing your company in line with the growth of intellectual property, you can tap into the true potential of your business model.

This offers decisive advantages – for you or for your competitors!

Know-how will soon carry the success of companies. An omni-IP management system can cover the entire range of a company's intellectual property needs.

From protection to use: The mere protective function of IP management will take a backseat in favor of mechanisms for exploiting profit opportunities.
From use to sharing: Copyright holders will shift to granting cost-free access to their IPR.
From sharing to releasing: IPR will be used freely within cooperative networks while serving outwardly as a defense mechanism.

Customer needs are changing: The potential of IP is generated through its activation; however, its real value first appears during customer interaction.

Data is the substance of intellectual property. Continuous communication between companies and customers is a prerequisite here. For the customer, this interaction is the place where value is created for them. For companies, the interaction with customers is a source of new intellectual property.

The death of plagiarism: In a digitalized world, the interaction between companies and customers will reach new heights through the use of artificial intelligence in customer contact. As soon as the interaction between providers and customers has become the core for new knowledge – new intellectual property – reproduction by third parties is no longer possible. This intellectual property can no longer be imitated, stolen, or copied.

#1 In the future, the customer is the source of intellectual property. The customer is the *driver*, the interaction is the *prerequisite*, and the data is the *foundation* of the intellectual property of the future. Put the customer at the center of your development of products, services, and processes.

#2 Together with partners, create a blockchain-based alternative for conventional IPR that is quicker, more transparent, impossible to manipulate, and works without middlemen. Do not try to be an essential driver for the legislation here – you have other options.

#3 Shape the internal organizational structure of your company like a customer interface. Also, view potential staff members as your most important partners. Where they share their expertise with you is where your company's intellectual property will grow.

#4 If you shelve your intellectual property in the form of patents locked away in your filing cabinets, you will shelve your company's success as well. No matter the industry, your company's success depends on the proactive management of your intellectual property.

#5 The first to share will be the first to profit. Let go of the idea of exclusive usage in favor of rapid development. Purposefully share your intellectual property within partnership frameworks in order to boost your speed.

#6 For patent and trademark offices: Reality and regulation are drifting apart; traditional protective mechanisms now miss the mark. Become the advocate for the intellectual property of the future. Do not digitalize existing mechanisms – create digital processes for the protection of intellectual property.

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Foreword

Dear Reader,

Artists create opulent paintings, musicians compose one-of-a-kind symphonies, and inventors conceive valuable new solutions. However, as creative entities, companies and their staff members also generate intangible assets. With the growing digitalization of all areas of life, the intellectual property of the business and working environments of the future will require a new kind of interaction. Many of today's structures and approaches will not be able to meet tomorrow's needs.

The company of the future will be confronted with new realities due to sweeping changes in the management, creation, use, and protection of intellectual property: Rapid innovation cycles mean that companies will act at a much faster pace than patent offices, leading to a subsequent speed gap and the creation of new protective mechanisms. Company staff will become more important not only due to demographic change, but also as carriers of know-how. They will be intensely wooed by tomorrow's caring companies and fluid companies. Omni-IP management will become indispensable for every company's growing pool of knowledge. Intellectual property rights will remain an important element here; however, companies will use them in a more targeted way in the future. The need for individualization will make all standardized products irrelevant; the importance of brands will change. The growing amount of data will become the foundation of intellectual property, and interaction with the customer will be the place where new knowledge is generated. The result will be the death of plagiarism.

The following study has identified the most important drivers for the future within this radical new restructuring process. It explains what players are driving which trends, and for what reasons. Using the roadmaps, plans, and expectations of trendsetting stakeholders, it compiles a picture of the future of intellectual property through 2030.

However, none of this is set in stone or inevitable – it is after all the future. And it will be shaped by all of us.

Be skeptical of trend studies which forecast that the management of intellectual property will completely change overnight. This is pure nonsense. Most companies will be able to continue their current approach for many years – continue with steadily declining revenues, but continue nonetheless. The present study invites you start preparing for the future today. It provides you with specific strategic options and concrete steps towards continued success tomorrow. It offers you valuable support for the strategic orientation of your business.

Due to our cooperation with Dennemeyer Consulting GmbH, we are able to present this study to you free of charge. Please do not hesitate to contact us or our partners if you would like to use the results of this study to review your strategies. We would love to help.

We would like to thank our study partner for the kind and constructive help they offered us every step of the way. They enabled us scientists to undertake an independent and unbiased analysis of future trends. We wish our readers the same open-minded approach to the challenges of IP management, and to plan their futures with the awareness that we can only influence change by actively shaping it.

We wish you an inspiring read
... and a great future!

Michael Carl
Managing Director Research & Consulting
2b AHEAD ThinkTank

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Researcher
2b AHEAD ThinkTank

Greetings

Dear Reader,

It is with great pleasure that I present you Dennemeyer's study, "The Future of Intellectual Property." Strengthened by the expertise of the 2b AHEAD ThinkTank, the largest independent trend-research institute in German-speaking Europe, and complemented with Dennemeyer's thorough knowledge of Intellectual Property (IP), this study analyzes the opportunities and challenges of emerging trend developments and their impact on all facets of IP Management on an unprecedented level.

Combining an extensive review of the literature as well as exclusive interviews with a series of IP decision-makers from various industry sectors, the study not only sheds light on how innovation leaders think about the future of IP and adapt the strategic management of their IP assets, but also identifies the factors and trends behind such decisions.

As most of our readers may know, this publication emerges at the onset of the so-called 4th industrial revolution – a time of profound technologic, economical, and even social transformations. The practice of IP as we know it, needless to say, will not be spared. In this context, I believe it is crucial for companies to anticipate how those transformations will impact the management of IP and even IP rights themselves. This study digs deeper and builds further understanding of how the successful businesses of tomorrow must respond to such pressing challenges.
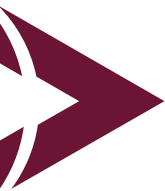
How will companies adapt their IP licensing models to customers that can print their products? The study tackles events like the growing accessibility of 3D printing but also other trends like the sharing society and the individualization of services and products. Moving on, the study also touches on topics like of personal data, called by some the new oil of the 21st century. The much awaited European General Data Protection Regulation is certainly a testament to the importance of this development. As European entities and even some non-European entities will soon need to brace themselves for higher legal accountability in this regard, the debate on whether governments should treat personal data as a proper intellectual property right is likely to intensify. In the telecoms arena, the establishment of technological standards has both lead to a convergence of innovation efforts but also caused intense competition between firms to gain first-mover advantage, leading to fast innovation cycles and accelerated obsolescence as a side effect. In this context, it is not uncommon to have patent granting times which are equal or greater than the market life expectancy of the underlying technology. Are we to expect changes in patent laws here, as we have seen in other areas, for instance pharmaceuticals?

A brief review of recent history reveals the astonishing speed at which we continuously transform the way we create, use, and maintain IP. While such fluctuations may at first cast doubts on the very value of IP, this new work shows us that trends can also be an unwavering source of opportunity for entrepreneurs and innovators on the lookout.

Enjoy reading!

Dr. Sevim SÜZEROĞLU-MELCHIORS
Global Head of Consulting Dennemeyer
Consulting GmbH

THE STUDY

Trend-cycle analysis – Not megatrends

This is not a study on megatrends. Those who work with megatrends do so on the assumption that there are a limited number of drivers that affect all business areas equally. This is wrong. Trends exist only because industry developments are driven forward or blocked by those individuals who have the resources or authority to do so and to lead others in doing so.

Human behavior – and thus also investment decisions – always follows specific interests, desires and compulsions. These vary by industry and by industry sector. We trend researchers are able to observe this behavior on the part of decision makers; we can try to understand it, we can analyze driving and blocking factors, and we are able to generate forecasts regarding where this behavior on the part of industry players will lead. In the sciences, we call this "qualitative research." The following study is based on this approach. In contrast to other industry studies, you will find no lists of percentages in the following pages. Futurists know that the future can neither be measured nor quantified – because it has not happened yet. For the most dead-on forecast possible regarding what will happen in your industry in the years leading up to 2030, no representative survey of customers or so-called experts will help, no matter how large-scale it may be, because no matter how many you might interview, they will also

be unable to reliably describe a future that has not yet occurred. The only possible way to come close to a reality that is still in development is to speak with trendsetting companies and industry players who are driving the technologies and trends that we will all meet in the future by the decisions they are making today, because you can talk to these players. Furthermore, you can try to understand their motives and compulsions. You can find out about their expectations and roadmaps for the years to come. Where these players intersect, we can see those trends that are being pushed – or blocked – most forcefully. This provides the basis for the most realistic picture of the future of your industry that researchers could possibly offer you. You will find this picture on the following pages.

The trend research institute the 2b AHEAD ThinkTank specializes in the identification of driving and blocking factors, the analysis of opportunities and risks, and the development and implementation of business models for the future – all individually tailored to the trend cycle of specific companies.

This last feature is important because the players who have a decisive influence on the business of their organizations vary from company to company.

Thus the trend drivers and blocking factors, as well as the opportunities and risks, also differ between companies – even within the same industry.

Those who handle their future responsibly will not run after the one-size-fits-all megatrends of supposed trend gurus, but will base their strategies on the goals and roadmaps of the leading attackers and defenders in their markets. This is our mission. We would be thrilled to hear that this study has helped you succeed there, too.

THE BIG PICTURE

How will living and working environments change by 2030?

The living environments of customers in 2030 will be influenced by numerous factors. The average life expectancy in Germany will exceed 85 years and tend towards 90. In many families, celebrating the 100th birthday of a grandparent will be a normal occurrence. Even where this is not the case, the question will arise: What will people want to do between the ages of 65 and 85? Vacation? Work? Most are sure to experience a sort of new beginning as they enter the third active segment of their lives between 50 and 60. The phrase "new beginning" is meant literally here: a new job, a new home, a new life partner... active living will continue at that point. The arrival of retirement age with its reduced mobility and activity will be pushed back even further. People will half WANT this in order to spend those 30 years in a meaningful way, and they will half be FORCED into doing so in order to avoid the very real threat of old-age poverty.

People will experience their personal health as the greatest luxury of the future. Thanks to all varieties of body enhancement, health will increasingly become a purchasable consumer good: Medical food will eliminate most illness in society; brainfood will offer the custom-tailored optimization of mental performance, and production of human organs as replacement parts will lead to further increases in life expectancy, initially in the luxury segment. The next stage will be genetic optimization, which has among its chief goals slowing – and finally stopping – the aging process.

The world economy will be increasingly dominated by Chinese market players, not only in production work, but also in the areas of innovation and conception. Asia will gradually emerge from its role as a region of discount labor and in turn seek to meet its own extended staffing needs in Africa, first in Northern and Southern Africa, and years later in Central Africa as well. In this way, Asia and Africa will continue to grow as markets – with increasing prosperity.

In Germany as well as internationally, people are streaming from provincial areas into major cities. Rental costs are rising in the booming metropolises while rural areas are slowly being abandoned. We will then live in an era of full employment. Every halfway qualified candidate will have a job. And there is more: Headhunters will begin to show up at the door every day thanks to the approximately 3-4 million unoccupied positions in, as a concrete example, German companies. The companies themselves will see this as a catastrophe. Not so the employees: They will have the upper hand in the employment game for the first time in decades, and thus can freely choose the job they want.

This trend will push salaries upward, but will also be cause for the fact that roughly 40% of the working population will change projects – and companies – every 2-3 years as so-called "project workers." The short supply of personnel will also compel companies to develop and communicate their attractiveness as employers in new ways. Against this background, some of the fundamental values of our society will be redefined: Security in life will remain important, but will become linked to new factors in the face of constantly available new jobs. Trust will remain important, but will not simply be handed to brands during this era of maximum transparency. Instead, it will constantly be tested. Expertise will be available round the clock in a world where countless experts – both genuine and self-styled – will strive for recognition; communication will be the factor that decides who will find an audience.

New human / machine organisms

At the same time, new, user-friendly usability concepts and new human / machine interfaces will appear. The technological hurdles for an automated and individualized customer approach will be largely eliminated. Companies will have to prepare themselves for the time when electronic devices will not only recognize individual customers, but also their current state of emotions, sensitivities, and vital functions. Consumers will grow accustomed to communicating with their devices in a "human way": through language, facial expressions, gestures, and later even thoughts. They will also get used to the fact that technology will be capable of assessing their present situation and reacting to it successfully – within fractions of a second. Electronic devices will thus become "more human" than their human counterparts, because they will know much more about the customer than the average stranger would! This presents a great risk for human experts and sales representatives, but also a great opportunity for those who know how to use the technology competently.

Devices are better than sales personnel – They remember you

Indeed, the additional benefits of connected devices in the future will not arise from data as we understand it today: those statistical heaps of data lying in databanks. Our contemporary concept of data will change. The intelligent compilation and evaluation of information on users' dynamic data will also be part of our future understanding of what data is. Object recognition, image recognition, and observation-capable interfaces will guarantee that, in the future, everyday objects will observe the behavior of their users, combine this real-world data with stationary information stored via the cloud, and produce unique and situation-appropriate prognoses regarding the current needs of the user through automated algorithms or business intelligence systems – always accurate down to the second. It remains to be seen to what extent these devices will require an intelligence of their own or will function as part of a "smart grid" through which they are controlled situationally, yet also in a centralized manner. The question of "data" in 2030 will have little to do with the definitions we are familiar with today. It will mainly be a question of the recognition of the user's needs ... and the intelligent prediction of their desires.

Smartphones as intelligent assistants

In spite of the rapid expansion of smartphone use and the resulting opportunity for consumers to use all new apps available, one basic truth of technology- and media use cannot be ignored: Only a small percentage of us are highly active users who proactively seek out, try, and use new applications. The vast majority of the world's population remain couch-potato consumers. This leads to problems when today's apps require active intervention and input by the user. The result is this: Even when the great mass of users own devices with apps installed, this in no way means that these apps are being used.

An essential future market will thus be intelligent systems that function independently of active user control. Such systems observe their owners while they go about their daily activities, analyze the data gathered, use it to create needs profiles, and take these profiles as a foundation for constantly filtering the environment of their owners. These systems acquire their "intelligence" through automated data exchange with other nearby devices. In that way, they project suitable (albeit entirely unsolicited) recommendations into the view of the user when the user finds themselves in an everyday situation that requires making a decision.

Software producers do not describe these assistants as "programs," but as conglomerates of many individual programs. Most of the necessary data will be gathered from the mobility profiles of the user, which will consider not only their physical location, but also, for example, their personal internet habits. We will soon have intelligent technological assistants that owe their intelligence to the data gathered from users' everyday lives.

At the same time, we will experience a paradigm shift in the realm of data protection. Naturally, all of the predictions mentioned so far will only take place if people release their personal and user data for this kind of analysis and forecasting. This is highly probable. Because: Even today we experience the same patterns and strategies when we move in the computerized world of the internet. Even there, the security of our data is undergoing a major paradigm shift. The assumption that private citizens do not want to release their data is 1980s thinking.

Today's population does not want to keep its data secret. Data protection will become more important in the future, but also different. The data protection of the future means that the consumer can view, change, and delete the data saved about them with a single click. There will be a system in place that ensures this. Companies that have the trust of their customers as "trust centers" will have the best chances strategically.

No company really wants to annoy its customers with mass advertising that scares off 90% of recipients and is only useful for the remaining 10%.

However, in order to filter out this 10%, companies will have to evaluate consumer data. And for that, they need the trust of their customers. For their part, the customers will understand this, because life is much more comfortable when you only receive genuinely helpful information. In 2030, people will live in a "traffic light society". They will have grown used to having an electronic assistant on their smart phones for every area of life that gives suitable recommendations, product evaluations, and tips for every possible situation. Customers, however, will not want to receive all this virtual information as rows of digits or mountains of text. They want to be told: Is this the right product or service for me or not? In most cases, your customer in the year 2030 will trust their smartphone more than human representatives. This is a good thing, because the smartphone will give them better answers!

Loss of significance for salespeople … The devaluation of the expertocracy

Let's not beat around the bush: Digitalization holds not only great opportunities, but also major risks for today's companies. When we look back from 2030, there will not only be big winners in the digital world, but also large numbers of losers as well. For what can sales staff do when customers know better via barcode scanners and Amazon if a particular product is right for them, how other customers have rated it, and if they can get it cheaper around the corner? Today's expert, tomorrow's cashier!

And this will not only affect salespeople. What can teachers do when their students' knowledge well exceeds state requirements thanks to eLearning? Today's expert, tomorrow's reciter! What can craftsmen do when customers no longer seek advice on heating their homes, but hire skilled laborers merely

to install heating system X (which the internet says is the best)? Today's expert, tomorrow's handyman! What can tour guides do when there is always someone in the group who has more to say about the history of local landmarks – thanks to their smartphone – than the guide could ever memorize? Today's expert, tomorrow's chaperon!

What will real estate agents do when their clients receive an offer for their dream apartment automatically in their smart glasses as they cross the street? Today's expert, tomorrow's doorman!

In the next few years, we will experience a devaluation – a loss of significance – of the expertocracy that will radically change large segments of our economy and open the way for new markets. Because: Today's experts will have to assume that at least a good share of their expertise will be offered faster and better custom-tailored by software in the future. Salespeople who do their work simply in terms of gathering, compiling, and passing on data … will lose their share in the market to electronic assistants.

But this is no reason to stick our heads in the sand. On the contrary: Those who actively make use of this trend in their work will be among the winners of tomorrow's business.

The real winners will be those who know how to use the capabilities of digital devices for themselves as electronic assistants and, at the same time, are able to offer their customers services that digital devices cannot. We can already see these effects with doctors and lawyers – teachers, salespeople, and other experts will soon have to find a way to adapt as well.

Cutting out the middleman: Blockchain will revolutionize all industries

Another change will be even more drastic. Blockchain technology is a relatively recent achievement in IT history. Traditionally only used to enable and ensure transactions with cryptocurrencies such as Bitcoin, this technology can potentially eliminate the middleman in every electronic transaction. Data on previous transactions are recorded in "blocks" of the same name, saved in a code, and copied to each device that uses this technology. IT experts across industries agree that – starting with the banking and insurance sectors – blockchain technology will disrupt existing business models and institutions.

INTRODUCTION
The future of intellectual property

"Intellectual property (IP) refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce." [1]

The focus is shifting: The management of intellectual property has traditionally targeted the roles of protection and defense, whereas use, reproduction, and individualization will become key over the next few years. This development will significantly boost the potential of intellectual property in companies.

Contemporary legal systems offer a variety of property rights for the protection of intellectual property. These are divided into non-registered and registered property rights. Non-registered property rights include copyright and trade secrets. Registered property rights are, on the one hand, technical protection rights such as utility models and patents, and on the other hand non-technical protection rights such as trademark and design rights.

For companies, intellectual property ranks among the intangible company assets. In the last few years, intangible assets have gained significance at the expense of tangible company assets.

A study by the intellectual property merchant bank Ocean Tomo shows that the market valuation of Standard & Poor's 500 consists of 87% intangible assets and 13% tangible assets. In the last 20 years, the proportion of intangible assets has increased from 68% to 87%. This represents a decisive share of company assets.

The increasing importance of intangible assets for companies represents a good reason to analyze the development of intellectual property through 2030. For that reason, the present trend study assesses the effects of key social, technological, and economic developments concerning the future of intellectual property and intellectual property rights (IPR/IPRs). Six key trend areas have been identified which reveal fundamental changes in the significance, handling, and use of intellectual property.

The first trend area describes changed corporate needs concerning intellectual property rights and regulators, as well as the companies' reaction to these new needs. Trend Area 2 shows how changes in working environments will transform the management of intellectual property within companies.

[1] http://www.wipo.int/about-ip/en/

Companies will continue to use IPR in the future, but how will they do so? Trend Area 3 will answer these questions. How will new customer needs change the importance of brands and trademarks? This is the core question of Trend Area 4. In a connected world, data is becoming increasingly important: Trend Area 5 therefore analyzes the corresponding future consequences for the understanding of intellectual property within companies. Trend Area 6 shows the influence of changing product landscapes on intellectual property. The epilogue provides an outlook of things to come after 2030.
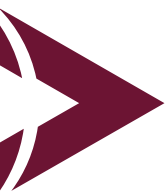
THE PROTECTION OF INTELLECTUAL PROPERTY

The Transformation of IPR Systems

A variety of technological developments will transform the environment for the creation, use, and protection of intellectual property. Innovation cycles are becoming increasingly shorter, the speed of development is growing, and markets are gaining new momentum thanks even to digitalization alone through the fusion of previously distinct sectors. Customers' expectations regarding the immediate and highly individualized satisfaction of their needs will result from this development and fuel it at the same time. This is increasing the pressure on patent and trademark offices to similarly pick up speed and agility and to allow for new connectability. The use of technology and automation are changing the system for intellectual property rights. Companies are driving transnational systems for intellectual property rights.

Innovation cycles in companies are becoming shorter while development speed is increasing

The innovative activity of companies is growing across industries. Expenses for research and development (R&D) in German companies have grown by 9.5% (to €62.4 billion) in 2015 compared to the previous year[2]. A success with various drivers: "Investment in research and development has never been as high in Germany as in 2015. This is a great joint effort between state and industry. It is particularly encouraging that, after years of stagnation, small and medium-sized companies are investing more in internal research again," says Federal Research Minister Johanna Wanka[3]. There is a similar trend internationally. Between 2010 and 2015, expenses for R&D have risen by 34%[4] : Investments are being made in innovation.

The drivers of this development include the growing competitive pressure from the markets to shorten innovation cycles through new innovative strategies and the technologically enhanced possibilities of prototyping. At the same time, there is an increasing expectation by the customers that their own needs will find immediate and individualized fulfillment. This is causing companies to accelerate development speed and keep innovation cycles as short as possible.

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[2] https://www.stifterverband.org/pressemitteilungen/2016_12_12_forschung_und_entwicklung
[3] https://www.stifterverband.org/pressemitteilungen/2016_12_12_forschung_und_entwicklung
[4] http://www.strategy-business.com/feature/Software-as-a-Catalyst?gko=7a1a

Another driver for accelerated development speed: The foundation for both the new and continuing development of products is noticeably improving. With the Internet of Things, and in the long run the Internet of Everything, virtually all everyday objects, devices, and products will receive a digital interface. They will then become places where data can be created, gathered, and collected. More and more of this data will be available for companies in the future. The possibilities for the useful evaluation of data will grow even more in parallel with the level of connection between these devices. The melding of living and working environments will grow further and faster in the next few years due to the enormous increase in the performance power of intelligent computer systems and algorithms.

By collecting more customer data, analyzing it, and using it in combination with intelligent algorithms, companies can gain increasingly precise insights into their customers' individual needs. The ability to integrate this continuously growing knowledge will be the foundation for the faster development of better products. What remains merely a possibility in many cases today will quickly become a simple necessity for companies tomorrow. In the case of digital products in particular, companies are forced to provide fast incremental improvements. Customer loyalty is shrinking in numerous markets – this is a facet of changing customer needs which will be described in more detail in Trend Area 4 of this study. The easy availability of non-physical, software-based products plays its part, too. When a better product enters the market, customers can often switch with a single click. This phenomenon is less pronounced with physical products; however, providers who offer subsequent optimizations have an advantage as well. This means that merging the digital and analog worlds offers a means of optimizing physical products. Tesla, for example, sells a given vehicle, but while the physical product does not change, the software within is updated regularly. The result is this: Not only are innovation cycles becoming shorter, but products long in use by customers can have a stake in the market as well.

Thus the seemingly provisional nature of an "always beta" product is becoming a development advantage on the market. With this strategic approach to always beta or perpetual beta, projects will never be fully complete.

Instead, it is possible to make changes to the program or product at any point. Feedback, suggestions, and proposals for improvement from customers can be implemented much more quickly. This means that the level of quality possible with a longer development phase has not yet been reached at launch. Always-beta products are more flexible and can be better tailored to customer needs. Due to the close cooperation with customers, manufacturers know that they will precisely meet their customers' needs. Always beta allows for more speed and, most of all, for the development of a better product for the customer thanks to continuous development efforts throughout the entire product life cycle.

Shorter innovation cycles mean shorter product life cycles as well. Software engineers Shalaka Kadam and Dinesh Apte conclude: "The life cycle of products is becoming shorter and shorter due to increased competition in-market, shorter product development time, and increased product diversity." This is especially true for non-physical products. As soon as a new insurance coverage, new software, or a new telecom rate enters the market, it replaces its predecessors. However, this is also true for hybrid products that include both physical and non-physical components. Primarily hybrid products stay relevant with the help of software updates. But in the future, the pressure on physical products to remain up-to-date will increase, too. Customers used to buy a new TV every ten years; now it is every four to six years. The pace is even faster for computers and smartphones. This effect will have the least impact on purely physical products. However, the volume of that product category will decline further over the coming years.

It can be seen across industries: Shorter innovation cycles drive shorter product life cycles and vice versa. This development is still in its infancy, but will significantly gather momentum by 2030 due to increasingly powerful technology, the rising number of data points in the Internet of Everything, and the growing ability of providers to evaluate customer needs in real time – and later predictively as well – and to fulfill these with specifically tailored offers.

How will this speed affect the traditional institutions of intellectual property? How can patent offices and other organizations meet the new demand for speed?

The speed gap

In Germany, a patent granting procedure takes an average of 24 to 30 months to be completed, provided that the request for examination has been submitted four months after the application and the examination fee has been paid[5]. The term for a European patent granting procedure is three to five years from the date of submission[6]. In contrast, the registration procedure for trademarks and utility models can already be completed after approximately three to four months[78]. The imbalance is immediately noticeable with patents: Increasingly faster-acting companies face comparatively slow patent and trademark offices.

"Patent procedures and periods in patent offices originate from the days before the internet. Patent applications, for example, are published 18 months after filing. With an IT-supported environment, the processes in patent offices could be accelerated and information could be made available more quickly. This would be important for companies that have to know where their competitors have filed patents in order to avoid infringement. Patent offices have to become much faster."

Dr. Franz Wittwer, Biotronik

Furthermore, the order volume is growing for patent offices in industrial countries. According to the WIPO, the number of patent applications grew by 44%, from two million to almost 2.9 million, between 2005 and 2015. Most applications are from China, where the number of patent applications has risen by 181% between 2010 and 2015[9]. This growth is promoted by the international expansion of IPR systems. Almost equally as important is the changed focus in patenting itself.

Hybrid products no longer only consist of mechanical components, but also of sensor technology and software. The more components a product contains, the more complex it becomes and the larger the amount of elements that need to be protected. This promotes the fragmentation of patents and therefore increases their number. A result: The protection of a product will no longer be ensured by a single patent, but by a group of patents. Another driver of this development is the increasing granting of patents for detailed solutions or incremental improvements. As soon as a company is able to measure customer behavior with the help of data collection, it will know which incremental improvements are particularly effective. If the competition is kept from using these, the company will have secured a solid advantage. In addition, the number of patents is also growing due to increased cooperation between companies, as a given product is now interesting (and protected) in the perspectives of different industries, components, or value creation stages. This enhances the quality of patents, but also increases their fragmentation at the same time.

"In the next 10 years, patents will continue to be submitted extensively. At the same time, the expenses for freedom to operate will grow even further. However, the pain caused by the handling of this quantity alone will increase exponentially."

Prof. Dr. Martin Bader, BGW AG Management Advisory Group St. Gallen - Wien

The time gap between patent filings and the completion the patent granting process is widening. Shorter innovation cycles, faster development speeds, the expansion of patent systems, and a fragmented patent environment further boost the number of patent applications.

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[5] https://www.dpma.de/patent/faqs/index.html#a9
[6] http://www.epo.org/service-support/faq/own-file_de.html#faq-274
[7] https://www.dpma.de/marke/faqs/index.html
[8] https://www.dpma.de/gebrauchsmuster/faqs/index.html
[9] https://www3.wipo.int/ipstats/index.htm?tab=patent

This is why prior art searches are becoming increasingly complex. This rise in complexity requires more resources – in terms of personnel and therefore also financially – on the part of the companies and state institutions.

Regulation and technology in the sphere of patent and trademark offices

Patent and trademark offices can react to this development with the use of regulation and technology. This way, they can counteract the increase in the number of patent applications by raising the requirements for patents in general. This will increase the quality of patents; however, in the long run it will not solve the demand for speed on part of the companies.

"Even today, proving that an infringement has occurred can be very challenging with some markets and technologies. In addition, the enforcement of rights can sometimes be difficult. With intellectual property rights for greater numbers of detailed solutions and incremental improvements, the difficulty of substantiating infringements will intensify even more. A corresponding intensification of the requirements for patentability could possibly counteract the emerging flood of applications for smaller inventions. On the other hand, companies could avoid filing patents for "smaller" inventions in the long run should the difficulty of substantiation procedures and implementation further intensify."

Lukas Roesgen, SLM Solutions

A second – much more promising – path here is the use of technology. And this does not mean the automated translation of patents, which will be a given at the beginning of the next decade at the latest.

Online patent submission: In the future, however, these interfaces will go far beyond the quick and efficient submission of patents – the real emphasis will be on faster processing. Moreover, the growing number of patent applications will be the largest driver for the use of artificial intelligence for IPR. By 2030, intelligent algorithms will be used as a support tool to determine the inventive level of a patent application, compare it to patent databases, and finally ensure the granting of the patent itself – all at the touch of a button.

"As soon as an automated translation of patents is possible, there will be a global database of patents. Based on that, intelligent software and machine learning will help to analyze patents. In the future, artificial intelligence will support decisions on which patent is granted and which is not. As the human subjectivity is removed from the process of granting patents by using artificial intelligence, this will increase the quality of patents."

Christian Bunke, Aalbun

Use Cases

Averbis offers companies and patent offices a software solution for the most effective search processes, content structuring, and targeted data analysis. The program focuses on the analysis of patents, but also on unstructured social media data. The aim is to thereby exploit and analyze both internal company knowledge sources as well as external ones in order to gain an overview of new technologies and patents. In addition to text recognition, Averbis uses technologies to automate information processes and the classification of documents. In this way Averbis supports, for example, the work processes of the European Patent Office in The Hague.

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Dr. Malte Köllner, Dennemeyer & Associates S.A.

Companies will take the initiative as well

In the coming years, companies will also begin using technology for the management of their intellectual property as an increasingly natural part of their business. This ranges from the automatic generation of patent applications to the use of artificial intelligence in IP management. With regard to the optimization of IP management, the use of AI offers the same opportunities for companies as it does for patent and trademark offices.

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Dr. Jörg Thomaier, Bayer Intellectual Property GmbH

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Dr. Stephan Wolke, ThyssenKrupp Intellectual Property GmbH

The obvious initial use of artificial intelligence will give companies the opportunity to keep an overview of the patent landscape and to determine the value of new patents. Intelligent software for the automated reading and analysis of patents will become a common tool in IP management. This starts with the establishment of the prior art. Prior art or the state of the art comprises everything made available to the public by any means before the date of filing a patent application or the date of priority (Art. 54 II EPC, § 3 I 2). The research is primarily based on the review of the published patents and utility models pooled in digital databases. The aim of this research is to avoid infringement of third party patents while simultaneously ensuring the freedom to operate. In the future, automated prior art searches, which are already possible today, will be further optimized by the use of artificial intelligence. By 2030 at the latest, this research will be automated by means of intelligent algorithms. It will be faster, more precise, and more reliable. In the future, the freedom to operate will be used much more often than today by purchasing licenses or participating in cooperation networks – see Trend Area 3. And there is more: With the use of self-learning systems in IP management, there will be completely new options for using, utilizing, and actively developing the IP of the future. In the end, various artificial intelligences will interact with each other and thus increase the value of intellectual property for providers and users. This perspective will be discussed in Trend Area 6.

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Dr. Franz Wittwer, Biotronik

The speed gap between the development of intellectual property on the one hand, and the possibilities of traditional institutions for its protection on the other,

will increasingly lead to the creation of alternative strategies and processes for handling IP in the next few years. If patent and trademark offices do not meet the growing demand for speed, companies will develop their own mechanisms for the protection of their intellectual property. In cooperation with other companies, they will increasingly turn to creating new parallel systems with different operating principles. Their goal will not be the digitalization of analog patents, but the establishment of a new system which will better satisfy the needs of the digital world, while at the same time offsetting the inherent weaknesses of patents.

"Due to the rapid spread of information and availability, as well as the increasingly fast pace of developed technology, practical speed advantage is sometimes more important for companies than IPR. For many actually good inventions, securing formal IPRs is not always commercially worthwhile."

Lukas Roesgen, SLM Solutions

A first possibility is the use of blockchain technology as a new protective mechanism for intellectual property. Blockchain technology offers companies the option to forgo the protective promise of traditional intellectual property rights, but at the same time still provides security for both sides by using an independent third party – the blockchain. Currently blockchain technology is often massively underestimated. The arguably best-known blockchain applications are cryptocurrencies such as Bitcoin that enable worldwide transactions within milliseconds and cannot be manipulated due to their decentralized character. Cut out the middleman: Bitcoin ensures P2P transactions without a bank – and without any loss of trust. The data on effected transactions is logged in blocks (hence the name), saved in the blockchain, and copied on every device that uses the technology.

The security promise of blockchain technology is set up systemically. This can easily be seen in the example of a money transfer. The transfer from person A to person B is digitally mapped as a block, transmitted to every device in the network, and then verified by each.

Next, the block is stacked to the already existing blockchain – i.e., other transactions. The decentralized storage and connection of blocks with existing and future transactions increases security, as the information is effectively impossible to change – the manipulation would have to be carried out on each and every device in the network. Another advantage is that both contract partners A and B can prove that the money has changed hands at any time. Each transaction is digitally signed by a public and private key for each partner with which both parties can properly be identified.

These transactions must not necessarily be of a financial nature. In principal, the technology can be used for any kind of information exchange. It serves as a trust provider in various fields of application. Blockchain technology, or more precisely the principle of blockchain technology, will increasingly become known across industries as a trusted third party over the next few years. One essential driver is the speed gab between innovation and traditional documentation.

By 2030, blockchain technology and associated applications like smart contracts will be more common in various segments. The platform Ethereum, and organizations such as The DAO that use its technology, are now working on making applications easy to use for the IT-savvy end user – without any prior expertise. Companies like Backfeed are working to make the use of blockchain technology as easy as browsing the internet by the end of the decade – blockchain for everyone. By this time at the latest, blockchain technology will have the potential to completely restructure the principles of intellectual property – its protection as well as its use.

Use Cases

The Berlin-based startup Ascribe issues licenses for digital artwork via blockchain technology and returns the power over their works back to the artists. Artists who are registered on Ascribe digitally sign their pieces and can transfer user rights to buyers with a cryptographic, …

forgery-proof certificate of authenticity which allows for easy retracing of the ownership history. The collector, in turn, is then free to sell the art along with the digital certificate. This solution is currently geared towards artists, photographers, and designers.

This is precisely where blockchain-based platforms come into play, thus launching the development of a supplementary system. There are already blockchain solutions for non-registered intellectual property rights such as copyrights. These allow for an encrypted upload of copyrightable content, provide a time stamp, and attach it to the existing blocks of other works of art. In case of doubt it is possible to clearly identify at which time and by which logged-in entity the registration was first carried out. All this is achieved independently of national borders and is significantly faster than classic methods as a large part of the process is carried out automatically and the system needs no operator. The documentation in the blockchain is obviously no substitute for a court ruling. However, it facilitates the substantiation process and thus can replace analog systems for trademark and patent applications as proof of the ownership of the innovation. This clearly identifiable allocation means more security for copyright holders. On this basis they can offer new possible uses for their intellectual property. The use of IPRs will drive the application of blockchain technology as a protective mechanism in the years ahead.

Use Cases

Decent is an open source platform for the blockchain-based protection of intellectual property. The provider trustingly and securely saves items without any physical infrastructure or agent – and in addition lets users exchange and publish their works. The providers Proofofexistence and Blockai offer similar platforms. Users register in the system for a small fee; the blocks document the content of their work without saving copies of it in order to ensure that no piece of work is published without prior approval. Here it is even possible to save ideas anonymously.

In addition to non-registered IPRs, blockchain technology can also be used for registered IPRs. Utility models already have the characteristics of a blockchain solution. The utility model is a technical IPR which can be filed for a technological invention that demonstrates inventive step and thus stands out from the prior art. In contrast to patents, utility models are pure registration IPRs, as the institution for utility models does not check if the requirements for protection have been fulfilled. Only in the event of a dispute will a court determine whether the utility model is valid.

"The blockchain has a time stamp in each block that can't be modified afterwards; this can be used at any time to prove that a document existed in a certain form. And if you also have the specific private key – i.e., the key of the user that has submitted the document, you can also prove that this particular user has used this document. And this alone means that you don't have to go to the patent office: You essentially don't have to do anything else to prove that a certain document existed at a certain time and has been used."

Christoph Jentzsch, Slock.it

A digital utility model based on blockchain technology even makes it possible to record both inventor and time of entry with absolute certainty. Here, too, only a court will determine if this is valid. A result for everyone involved in the current system: The costs and therefore fees for the registration of utility models will thus drop rapidly. Private inventors, smaller companies, startups, and specialized think tanks would especially benefit from this development. The Bureau of National Affairs confirms: "Ownership of intellectual property ('IP') could be similarly recorded on a decentralized ledger. Tokens that represent individual sticks from the bundle of property or IP rights could be individually transferred. For example, the right to perform a copyrighted work could be sold as a token on a blockchain without the need to affect other exclusive rights or renegotiate upstream licensing agreements. [...] The use of blockchain technology in the context of IP would require a further doctrinal and legislative shift."

The drivers reaction speed and costs alone will lead to the fact that companies will use a parallel system for protective mechanisms based on blockchain technology within the next few years. The increasing usability of applications – and eventually the growing circle of users – will further boost this development, as well as the option to test these protective mechanisms in parallel to conventional IPR solutions before traditional property mechanisms can be gradually disintegrated.

As soon as existing mechanism such as patents lose significance and companies develop their own solutions for the protection of their intellectual property, the business model of non-practicing entities and trolls will also be attacked – they will lose the foundation of their business.

Over the next few years, we will see how this will change the roles and drivers for this development:

» The consequence for the courts is: They will have to remove any loopholes in the legislation.

» The consequence for lawmakers is: If they do not include blockchain technology as a protective mechanism for intellectual property, the framework for public regulation will be left behind by actual developments. The significance of blockchain technology will not be lessened if blockchain options are not be included in the legislation – lawmakers will simply cut themselves off from development.

» Companies do not have to put in the effort to be the essential driver for legislation – they have other options.

» Ironically, this will put the executive organs of IPR (i.e. state offices and authorities) in the position of drivers for the development of the legislation. And this – objectively speaking – has not proven a core competency of theirs to date.

Harmonization of legal parameters at the European level

Companies are putting pressure on patent and trademark offices not only because of the accelerated speed of development, but also due to the globalization of markets. Digital companies sell their products globally on technological platforms. Neither digital platforms such as Alibaba or Amazon, nor the companies themselves, are constrained by national borders.

"A harmonization of the – by now mostly global – competition between companies will see even more demand, thus further increasing the need for harmonization."
Lukas Roesgen, SLM Solutions

Companies are in an increasingly international competition with each other – even with small, foreign, and somewhat unknown businesses. The territorial principle of IPRs such as utility models or patents is opposed to the interests of the progressively internationally acting companies. The information for the publication of a given patent is globally accessible; however, the protective mechanism is limited to those countries in which the patent has been filed and granted. This requires more resources – in terms of staff and finances – on part of the companies if international property rights are to be implemented. One result: Companies have an increasing need for harmonized legal parameters for intellectual property. The need for international legal certainty is growing, particularly in economic and values-based unions.

" I hope that all of these process improvements will continue at the European level. Any further segmentation would be unfavorable for the patent system with regards to development costs and legal certainty of IP."
Dr. Stephan Wolke, ThyssenKrupp Intellectual Property GmbH

European patent and trademark offices have already reacted to this by institutionalizing EU trademarks and registered designs as IPRs on the level of European secondary law. Also, with the European Patent, we are seeing initial developments towards a European legal certainty as well. The European Patent is a so-called regional batch patent which will is granted by the EPO and can be valid in up to 38 European states. Following up on this, the Unitary Patent – the European patent with unitary effect and centralized enforcement – is the next important step to the harmonization of European IPRs. It "[...] is a European patent, granted by the EPO under the rules and procedures of the European Patent Convention, to which, upon request of the patent proprietor, unitary effect is given for the territory of the 25 Member States participating in the unitary patent scheme."[10] For companies, this means both a reduction of costs and an increase in efficiency.

"We are still miles away from a global patent which will be granted with unitary effect and will then have unitary effect in various states, because the granting of an intellectual property right has so far been an exercise of national sovereignty, and the recognition of a "foreign" intellectual property right is perceived as a relinquishment of the decision-making power which should be the steering instrument within the state itself."

Prof. Dr. Paul Schrader, Universität Augsburg

This is why a global harmonization of patent law will not happen by 2030, even if the Patent Prosecution Highway (PPH) and the Global Patent Prosecution Highway (GPPH) are a step in this direction. The PPH allows for a quicker processing of patent applications through the sharing and joint use of work results between patent offices in the participating jurisdictions. The prerequisite of an application for an accelerated examination within the framework of the PPH is having submitted a corresponding patent application at a PPH partner office in another jurisdiction that has, at the very least, deemed the application to be patentable with regards to a patent claim. In this case, the two

offices share their work- and research results and can mutually use these without being bound to them. Thus the patent examination procedure will become more efficient and examination quality will improve. Nonetheless, the international systems are still very different; this is why a harmonization will not have been achieved by 2030.

"Patent concepts and many patent laws are already very similar, but each country enforces patents according to its own legal system. Forcing a country to alter its own legal system for patent enforcement is a violation of that country's independence."

Leigh Outten, adidas Group

The alternative – Regulation becomes severed from reality

This perspective will become more obvious if we reverse the question: What will happen if a harmonization of the general legal conditions is blocked in spite of all drivers within Europe as well, and there will be no international legally based protective system for intellectual property?

Continuing national regulations will still be attractive even until 2030, especially for small and medium-sized companies that primarily act locally. International protective rights are too expensive for these companies and are therefore irrelevant to them. The continuation of national protective systems is also important for companies that only trust the new protective rights and mechanisms once legal certainty has been established. It will take some time before this feeling of legal certainty has been created – this will be achieved by the jurisdiction of courts. The law alone will not be enough.

"There will be a paradigm shift. Smaller companies that act nationally and not in the European Union will prefer to use the national IPRs. If you serve the national market, you only need a national trademark, not an EU trademark. …

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[10] http://www.epo.org/service-support/faq/procedure-law/faq_de.html#faq-630

That would simply be too expensive. This means national IPRs will still be needed. Of course the big global players will use IPRs with a broader coverage or follow a dual-track protective system.''

Prof. Dr. Paul Schrader, Universität Augsburg

The gap that is created by a lack of international harmonization will essentially affect multinational companies. This is an additional obstacle given the currently growing protectionist tendencies. . In a future market, this will become a driver for change.

Creative Commons, for example, was founded in a similar situation as a non-profit organization to meet the need for authors to, through a new type of license agreement, grant third parties different kinds of user rights for their works. The following part of this study will highlight what the protective systems of the future will look like and what they will aim for. Here one thing is already clear: The lack of reliable international harmonization will be a dynamic driver for companies to promote their own solutions.

THE TRANSFORMATION OF IP MANAGEMENT

How companies will manage their intellectual property

The essential part of any company's intellectual property is stored in the heads of its employees. Their know-how will promote the organization's success. Project work and high staff turnover are driving digital solutions that can select the necessary know-how in the companies better and faster, eventually even storing it reliably as well. Omni-IP management systems will compile the comprehensive intellectual property of a company. These allow companies to store, link, use, and eventually further develop, knowledge. This way, the management of IP will contribute to expanding a company's IP in the long run.

2.1 Staff members as carriers of IP

One of the fundamental – and often underestimated – consequences of digitalization is the radical transformation of knowledge. Ideas, correlations, estimations, experiences, and data of all kinds are becoming increasingly available digitally and accessible all over the world. From a corporate perspective, this is a double-edged sword: The easier it becomes to generate knowledge through one's own business model

and processes – to continually improve and evolve them – the harder it will become to differentiate oneself from the competition by accumulating and processing knowledge. The long-standing core belief of HR, that the staff is the actual capital of a business, will then reach a new, much stronger dimension: Employees will become a differentiating competitive factor by sharing their know-how with companies. This capital, however, will be under pressure.

"Intellectual property (IP) in particular – e.g., knowledge, know-how, and inventions – is a major part of a company's value. I think the contribution of IP to the company value has really grown in the last few years. In our industry, we can clearly see that the most valuable things are the ideas, the know-how, and the inventions – and that we have to protect this IP."

Dr. Franz Wittwer, Biotronik

According to the logic of today, the decision for specific know-how is still the decision for a specific worker. The members of staff apply their knowledge to projects and thus drive their implementation.

This means that the successful implementation of a project always depends to a degree on the level of available know-how .

In this context, know-how stands for practical knowledge about a certain subject area or experience with a certain product, market, or a certain technology.[11] This knowledge forms the basis for driving inventions, developments, and innovations in a company. Registered IPRs and non-registered IPRs are then merely tools for acquiring the product of the know-how – the results of activities in the field of innovation. This means know-how will be the foundation of a company's IP and an important part of IP management in the future.

In the next 10 years, the future of the working environment will be dominated by one demographic phenomenon: The generation of baby boomers will reach the statutory retirement age, and millions of people will leave a job market fed only by those born in years with low birth rates. These candidates can only partially fill the resulting gap. The consequence will be full employment in almost all sectors and at all hierarchical levels and degrees of qualification. And what's more: The shortage of skilled workers will soon become a general labor shortage. The balance of power between companies and employees will be reversed within the next 10 years. The employees themselves will define the terms of employment in the future, and the companies will accept them. The alternative would be an exodus of irreplaceable workers.

2.2 Employees and their know-how will be scarce and fleeting

For decades, employees have striven for unlimited permanent employment. This promised security – a promise that will not be delivered when every halfway qualified staff member receives numerous unsolicited new job offers every month.

With the decreasing appeal of a permanent position, the amount of permanent staff is sinking as well. In the midst of the coming decade, only a maximum of 40% of employees will have an open-ended contract of employment. At the same time, the proportion of self-employed workers will double to 20%. However, the greatest change in the working environment will be caused by those employed on temporary contracts in 2030 (because they want to be)! This will likely account for up to 40% of the working population.

In 2030, 40% of employees will be project workers

Project workers change their projects, employers, and thus their place of residence, every two to three years and belong to that "creative class" that the politicians, business promoters, and trend analysts have been hunting for since Richard Florida's book "The Rise of the Creative Class." But it is not their creativity that characterizes this newly developing group of project workers, but rather their mode of working and their view of work as a malleable element for self-realization in their patchwork biographies. Not only life partners, children, and residences will become mosaic stones in the individual patchwork biography, but also especially jobs, activities, and projects. The next project promises development, enrichment, and challenge while also offering meaning.

Caring companies

For the companies, this means developing new, extensive, and cost-intensive strategies and measures in order to meet employees' requirements. There will be two contrasting strategies for HR management over the long term: caring companies and fluid companies.

Caring companies meet the market dynamics by attempting to tie employees more closely to them. Their company culture is aimed at offering their employees particular forms of individual development which make permanent affiliation with the company attractive.

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[11] http://www.onpulson.de/lexikon/know-how/

"Corporate life" is the key phrase governing this company structure. The central element consists in connecting clear standards of performance and goals with the employee's own long-term plans for professional development and support. These support plans go far beyond classical ideas of professional development. They include attractive offers for housing, family planning, leisure activities, health, and retirement, and also include the social surroundings of staff members when structuring their long-term plans. The boundaries between work and leisure will increasingly become blurred. At the same time, the companies will take on greater responsibility for the social well-being of their employees. A good relationship between employees and the company will become more and more important for company success in the coming years.

Fluid companies

In the year 2030, caring companies will be counterbalanced by their opposite number: fluid companies. These companies will no longer have fixed boundaries with clear staff assignments, but will rather base their work structures on the collaboration of project workers. These companies will acquire a high proficiency in attracting and releasing job nomads and project workers.

In this fluid structure, companies and project workers are mutually dependent. Project workers will have to think twice before breaking a contract, exiting prematurely from a project, or delivering poor service levels: Contractual penalties or severance fees can be applied. The companies themselves will face the same dynamic: They will be evaluated by project workers with regard to payment, fairness, and work atmosphere. Numerous internet portals will immediately disseminate all available reviews – poor conduct by project employees as well as any unsatisfactory working environments in companies will immediately be flagged in social media.

Thanks to these dynamics a new working culture will arise, characterized by a high degree of transparency and reliability.

This especially means greater external transparency – i.e., towards potential future project workers. Both sides will face the constant challenge of following the rules of the game. Therefore both project workers and companies must be exceptionally flexible and responsible.

We may by no means assume that project workers and permanent employees will form fixed groups. Transition is entirely possible. For example, it would be quite sensible for project workers to settle with a company when they intend to start a family. Then, after a few years, they can leave the company again and resume project work.

Choosing the right know-how

The greater the pressure on companies to attract and keep sufficient staff, the greater the necessity of identifying the desirable carriers of know-how: skilled, capable, and willing to learn as well as culturally adaptive. The growing speed of development on the market, along with faster processes and agile methods, will pressure companies to quickly find the right employees. Both lengthy application processes and poor staffing decisions can throw an entire project off course. In the worst case, the company's market position itself can be endangered. The traditional HR framework cannot fulfill this demand for speed and precision.

CVs will be worthless to companies in 2030

CVs, cover letters, job interviews, and assessment tests allow for selection according to fixed standards. However, standardized processes create standardized results. Targeted acquisition measures will only net the mediocre; high professionals even today do not respond well to these selection processes, and will do so increasingly less in the future.

Companies need a completely new strategy for ensuring a quick and precise selection of candidates with the right know-how. A first step is to look for employees in the immediate corporate surroundings.

For caring companies, this means looking among their own ranks. They will want to use existing know-how or further develop their employees in a specific field. In the future, the company IP management will grant project teams an overview of the existing know-how in the company. It will have thorough knowledge of the skills, knowledge, and experience of the staff.

Fluid companies, however, will in the future look for suitable project workers within their own networks

"Knowhow is a form of intellectual property that many companies do not sufficiently recognize, nor protect. In technology transfer agreements, knowhow is the most valuable factor and may have an indefinite enforceable lifetime."

Brian Hinman, Philips

even more than today. In contrast to caring companies, they rely on acquiring specific know-how faster and more often. This is a key driver for the future success of platforms such as Jobaline or Colony. These platforms will not only create the possibility to look at a project worker's skills, but also provide an overview and evaluation of their previous performance – in much more detail than CVs and references can offer. This will allow companies to look for specific skills on these platforms.

Use Cases

Colony is a collaboration platform. It is based on blockchain technology and connects project workers and projects. Colony makes it easy for people all over the world to set up and work on projects together online. Project workers can contribute to projects and then add them to their profile. To this end, Colony implements artificial intelligence in order to ensure that the right tasks are completed by the right person at the right time. The result is that project workers are no longer dependent on their CVs. They no longer need to apply for a job, but can simply complete it without a middleman.

Human HR will no longer be enough

Due to the highly complex, specific, and versatile development processes in companies, HR departments are no longer able to select staff members with the right know-how. Specialist departments are better suited to assessing the know-how of current and potential staff. However, even their expertise will be quickly overtaken by the capabilities of artificial intelligence over the next few years.

Arya and similar solutions are the first platforms that are already using artificial intelligence to select staff members. This is a first step; however, artificial intelligences will come to make recruiting decisions without any assistance by the middle of the next decade at the latest. In the same way that human beings will soon be considered the greatest risk factor in cars, HR processes will largely be automated ... in order to increase quality and avoid expensive bad decisions! Algorithms are able to better assess candidates than humans will ever be. This means that the AI will be purposefully expanding the company's know-how: It will thus increase and develop the IP of the company.

After-sales HR marketing

At the same time, the old hands in the HR departments of the future will receive a new task. They will need to maintain and develop contacts well beyond the term of employment. This will not only be an important foundation for any subsequent cooperation: Permanently maintained mutual between the company and staff members will be an increasingly important element in the protection and management of IP within companies.

2.3 From IP protection to omni-IP management

The more flexible staff – the carriers of know-how in the company – become within and between companies, the greater the challenge of protecting this intellectual property. The need for this protection will increase even more as soon as intangible company assets overtake tangible assets and know-how gains increased significance. Obviously: Even 10 years from now, companies will require staff to sign non-disclosure agreements. However, these obvious instruments will become blunter. Monitoring and restrictive control will not develop into sufficient protective mechanisms here either. When companies take project workers on board, they explicitly want to use their experience and expertise – i.e., their know-how. If you are recruiting to expand the know-how and intellectual property in your company, then you cannot at the same time expect the intellectual property that has been developed in your own company to remain there permanently. Which options will companies then use in the next 10 years to protect or even manage the intellectual property stored in the heads of their staff?

Sensitization, participation, and integration as protective mechanisms for intellectual property

The cultural option is obvious: In the future, it will not only be important that staff members are required and able to protect a company's intellectual property, but want to as well.

"Someone that leaves a company filled with bitterness will be more willing to take things from the company or share things than someone that sees this career move as a development, but keeps a positive image of their former employer and feels a moral obligation to them."

Patrick Clerens, Clerens CONSULTING

The key protective mechanisms of the future will be value-driven. Belonging, morale, and trust will become the protection of a company's IP. Targeted appreciation is only the basis here. The staff will be actively included in the decision-making and development process. This specifically applies to project workers that leave the company after two or three years. They will become owners of a project or an idea, and thus have the highest sense of responsibility themselves. However, despite the importance of the company culture, it remains obvious: This protective effect is limited in case of conflict.

Know-how retention in companies

Fluid companies will face the danger of a loss of knowledge following the implementation and completion of every project. If companies purposefully attract and release project workers, the challenge for a sustainably available documentation of know-how will increase. Since caring companies are looking for long-term cooperation, the knowledge stays in the company at first. However, opportunities for retaining and eventually harnessing know-how in the company after project completion are relevant for them as well. This way, it will become easier to connect knowledge, achieve synergies, and drive innovation; companies can thus fulfill the growing demands of networked operations.

The retention of know-how is linked to one condition: the consent of the project worker. Not only the companies know the importance of know-how, but also the carriers. The project workers of the future will not only decide if their know-how will be transferred to the company, but also which part(s) of it and how.

The analog push principle

In one analog approach, new structures and processes are created which make it possible to transfer knowledge to other heads – essentially using a scatter principle.

Today these essentially interpersonal processes are digitally supported in general. Although knowledge is spread, there is often no specific addressee. The effect of this push principle is often a sobering one; no protective element is clear.

Artificial intelligence will lead to a digital push process

For the long-term retention of know-how – beyond the project period – other methods will be necessary. In a digitalized world, companies need digital solutions that are supported by analog systems. Only technology will be able to record the growing heaps of data and knowledge. In the future, companies will develop intelligent knowledge platforms. They will begin using artificial intelligence for the retention of know-how.

In an embryonic form, artificial intelligence will support project team members and compile the resulting knowledge. This knowledge will then be allocated to certain clusters – at first by human staff. Through the principle of reinforcement learning, the artificial intelligence will make decisions by itself and is monitored by staff, thus learning from this over time. In the next stage, the artificial intelligence can evaluate and utilize this new knowledge. With the use of predictive analytics, the system will know what type of knowledge is needed in which part of the company. It can then run a targeted matching process and provide the corresponding knowledge to the project teams. This is not a matter of spreading knowledge in an uncontrolled way, but of specifically providing it to the departments that need it – intelligently and predictively. The analog push principle will become a digital push process. Protection from abuse remains at a relatively low level; however, the staff's know-how will be maintained and the potential of this intellectual property will be exploited significantly better.

Omni-IP management

A response to the growing demand for corporate IP management that goes even further than this is omni-IP management. This approach is already familiar in the form of omnichannel management in the finance and insurance industries.[12] A holistic perspective of the various elements of intellectual property and its use is merely its starting point. This will not only provide an overview of registered, but also non-registered IPR. A management platform summarizes a company's IP, from patents and trademarks to utility models, from registered designs to know-how. This way the platform manages the user rights for the intellectual property owned by the company and also that of other companies. It will provide answers to the following questions: Whose intellectual property is this – the know-how, the patent, the utility model? What can I use it for? How can I avoid infringement? What does it cost? How can I update it? When forming teams, the system can also provide information about who has the missing know-how within the company.

The bidirectional principle of IP

However, the platform does not merely provide information. On the contrary, it is organized in a bidirectional way. It serves as a source of information regarding existing intellectual property and absorbs more knowledge every time new IPRs are submitted, company AI learns from the staff, or know-how is purchased through licenses.

IP management as the generator of the IP of the future

In contrast to conventional IP management systems, omni-IP management also connects all other data points in the company. This starts with data that is created

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[12] 2b AHEAD Trendstudie Das Omnichannel-Management bei Versicherungen

during the production process – from in-house production to decentralized production – to the data created by the product itself. If this data is stored, assessed, and connected, then it can provide a new source of knowledge. It thus becomes another – new – part of the company's IP management. The connection of various IPs with generated data will eventually provide the possibility of creating new intellectual property.

Use Cases

With the help of artificial intelligence, the Swiss startup Iprova only needs two weeks to develop innovative and creative ideas for tech companies across the globe. In addition, it increases the probability of success for patents. The underlying software searches for information about newly emerging technologies on the internet. On this basis, companies can then quickly file patents for the commercial use of new technologies.

This process for the generation of new knowledge based on a comprehensive omni-IP platform will be supported by the use of artificial intelligence in the future. The serial connection of neural networks and the combination of varied knowledge, products, and processes will open the door for AI systems to autonomously develop new products. We are already seeing invention-by-demand providers today.

Use Cases

Up until now, systems of artificial intelligence have only been used in the IT sector; however, the researcher Álan Aspuru-Guzik and his colleagues at Harvard University have developed a system that acquires knowledge of chemistry through deep learning. The AI is developing medications. The search for medical substances could thus be significantly boosted, as the system forgoes the extensive simulations of molecular structures which are conventionally used. On the basis of known substances, it offers researchers suggestions about new combinations – and thus new medications.

"In the future an intelligent machine will create invention on demand. This kind of machine will then probably not only provide a single invention on demand, but a hundred inventions on demand by combining all sorts of things. Then the company faces the dilemma: Perhaps the patent application can be filed at the push of a button, but you still have to mail it to the patent office and pay the fees – a real investment decision. Even if the machine itself is able to determine what is interesting, in the end it is still a human being who makes the decision."

Dr. Malte Köllner, Dennemeyer & Associates S.A

Up to 2030, the task and responsibility of the employees who deal with omni-IP management in most companies will be to strategically categorize and evaluate decisions. Humans and machines will form a symbiotic organism. This is the next key goal of omni-IP management: The connection, use, and continuing development of intellectual property – efficient, flexible, and in line with the strategic orientation of the company.

2.4 Licensing staff know-how

While the decisions for an employee and their know-how have so far been inextricably linked, the operating principle of omni-IP management gives space for the scaling of know-how. Technologies such as Whole Brain Emulation (WBE) are relevant here and have long since moved beyond the stage of bold visions.

Use Cases

Carboncopies works on Whole Brain Emulation (WBE)in cooperation with other research institutes. Their goal is to extract data and processes from the human thought system and transfer these to a digital system. Mechanisms of the human brain are thereby translated to programming language and digitally retained. WBE is the first step on the way to a substrate-independent mind (SIM). This means that brain functions can achieve the same results on an external platform as in the human brain...

> People can thus live in a virtual environment – and their knowledge can be used – for an infinite amount of time.

As soon as Whole Brain Emulation and Substrate-Independent Minds open the door to separate thoughts, memories, and eventually all human thinking from the brain – to digitalize it – as soon as know-how can be documented and be measured this way, there will be new forms of usage for the carriers of know-how, the staff. In the future, companies will be able to purchase licenses to use know-how for a certain amount of time or for a certain purpose. From this moment on, the decision of a company for specific know-how will no longer be the decision for a specific employee. It can also be the decision for a license. Knowledge will thus be severed from the knowledge carrier. Companies will no longer hire people, but their intellectual property. Those employees who desire to do so will no longer work for a company, but primarily for themselves.

This is why it is important for companies to possess a powerful platform for IP management. And this is where a successful omni-IP management system comes into play: with the purchase of intellectual property. What comes next is the development, transfer, storage, and finally the use of knowledge.[13]

2.5 Structures and IT for the omni-IP management of tomorrow

Existing IP management systems are systematically differentiated, though exchange and cooperation with other subsystems in the company do exist.[14] In many cases, silo structures prevent the interconnection of knowledge, thus hindering the creation of synergy effects. Eventually this leads to a superfluous execution of tasks and the resulting waste of resources.

"Companies need a combination of various tools: the staff's soft skills and a strategy – that includes the patent strategy as well – but also the necessary organization and obviously the intellectual property rights. In my opinion these are the four tools that a company definitely has to consider. The days when you could apply for a patent and receive protection so strong that no one could copy it or know how to copy it are over."

Patrick Clerens, Clerens Consulting

In order to increase speed and efficiency and eventually to better fulfill customer needs, companies will tend to significantly decrease the separation of individual business units such as research and development, marketing, legal, sales, and mergers and acquisition. Flexible structures will be established that will allow for cross-departmental – interdisciplinary – value-adding work. This will create inter- and multidisciplinary teams for various projects. Omni-IP management will become the enabler of this development.

"The basic idea is that more communication between corporate departments is necessary for companies that operate in a very fast-paced environment. This allows for stronger momentum within the company. A silo mentality should be abandoned. The focus is on the bigger picture. Therefore it is sensible to create positions that possess this overview of the bigger picture, that know a lot about IP management, but also about marketing, strategy, finance, about all of the commercial roles that exist in the company."

Dr. Franz Wittwer, Biotronik

Omni-IP management will thus allow for knowledge transfer along the entire product development process. This begins with the strategic orientation of the company – and before the actual product decision.

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[13] http://wirtschaftslexikon.gabler.de/Definition/ip-management.html
[14] vgl. http://wirtschaftslexikon.gabler.de/Definition/wissensmanagement.html

In the future, companies will factor in considerations about intellectual property when looking at a given market or evaluating the appeal of a certain technology. There will be a comparison between the strategic orientation of the company and the operational level – i.e., the management of IP and innovation. In addition, omni-IP management allows for quick adaptation to legal and economic changes as well as to changed customer needs. This will lead to an automatic optimization of the cost-benefit ratio for companies, an increase in efficiency with regard to IP management, and easier innovation activity.

IT systems must be capable of modeling omni-IP management

On the technological level, omni-IP management primarily requires the connection of all data channels in real time. This includes the recording of registered and non-registered IPR as well as the interconnection with all other channels where knowledge and data are generated.

Companies will then have to deal with three challenges concerning data: First they will have to handle the large amount of data. Today's tools and applications are no longer suitable for the required analysis.

They will also have to be able to process data from different sources and in different formats. This data will be stored in structured form in various databases and will be created in unstructured form on a daily basis in different places through written and spoken language, images, numbers, events, etc. Finally, companies will have to be able to analyze this large amount of data at a very high speed in order to make real-time applications possible. These are the entry-level requirements of the year 2030.

With these big data applications, companies will on the one hand be searching for new connections, differences, and patterns. These will be used to derive hypotheses regarding causes and drivers. On the other hand, companies will map hypotheses about future events and about the needs and expectations of their customers with the help of predictive analytics applications. The chronological perspective is what makes the difference. Big data applications are followed by a reaction of the company to past events. Predictive analytics applications, in contrast, are followed by an action based on conclusions drawn from past and present events.

Omni-IP management will eventually become the foundation for the sustainable use and exploitation of knowledge. This will be further discussed in Trend Area 3.

HANDLING IPR

How companies will exploit their intellectual property

How will the handling of IPRs change on the part of copyright holders? We have identified the following four ways copyright holders will handle their intellectual property in the future:

1. **Intellectual property rights will continue to be a key mechanism for the protection of IP.**

2. **From protection to use: Copyright holders will increasingly make IPR available. The mere protective mechanism will take a backseat in favor of mechanisms for monetary exploitation.**

3. **From use to sharing: The need for cooperation will drive copyright holders to allow cost-free access to their IPRs in the future. They will share their IPRs.**

4. **From sharing to releasing: IPRs will be used freely within cooperative networks, but will serve outwardly as a defense mechanism. Here as well, intellectual property rights will continue to be a key mechanism for the protection of IP. This is where things come full circle.**

3.1 IPR will still be a key mechanism for the protection of intellectual property in 2030

Changes in the value chain

Speed will be one of the most important customer expectations in the coming years. Products will be expected to be available on demand – at the very least for same-day delivery or even same-hour delivery. The first providers have already started to organize their warehouses and production sites in a decentralized way, introducing a highly automated management system in order to fulfill this demand[15]. Another driver for this new degree of speed stems from the drastically increasing possibilities of industrial 3D printers. While companies are already able to print houses, bridges, or clothing, usage possibilities will grow even further by 2030. This will significantly reduce production times – which will be virtually eliminated.

[15] 2b AHEAD Textilkunden 2030

Devices will also become cheaper for the customer. While a 3D printer such as Makerbot still cost a couple thousand euros a few years ago, the first models under €1,000 are already available and the price continues to drop. This will enable customers to print at home – or to use decentralized print shops. In the future, regional and local providers in the B2C and B2B segments will print plastic or metal parts on demand. This principle can be applied to other production processes as well, such as the manufacture of clothing.

"First we had vinyl records, then backups on tape. Then the CD emerged as a sound storage medium and tapes vanished. As digitalization progressed, mp3 was invented and it became possible to send backups to friends via email. The music industry has reacted to these market changes and has adapted its business model by establishing streaming platforms. Similar models could be established in additive manufacturing or in production on the whole. The digitalization of the production process opens the door to analog data storage models for the protection of intellectual property, which makes it impossible for the recipient to copy or manipulate the original file at any point. The continuous digitalization of the production process can therefore make a major contribution to the protection of IP."

Ulli Klenk, Siemens

This is where the role of manufacturers will change fundamentally. While the focus so far has always been on the delivery of clothing, household appliances, spare parts, and so on, it will then be sufficient to transfer the non-physical intellectual property to the customer. Clothing manufacturers will no longer send their customers the pair of pants, but the design file: Not the end product is delivered, but the IP. This will pose new challenges in quality management for the producers. If customers manufacture the product themselves, the provider still has to ensure the highest quality. This challenge will be even greater with regards to individualized products whose product life cycles are shorter.

How will these changes in the value chain affect intellectual property as a company value?

Intellectual property rights maintain their basic function

Decentralized production and new means of production will increase the probability of IPR infringement – this is reinforced by growing e-commerce and the corresponding fragmentation of shipments. A study by Europol and the Office for Harmonization in the Internal Market says: "It is hardly surprising that the internet is the most significant enabler for the distribution of counterfeit goods because of its apparent anonymous character, its ability to operate across various jurisdictions, and its potential for presenting sophisticated replicas of official web shops."[16]

"Growing online trade has lead to the fact that customers can already chose from an enormous variety of product offers on the one hand, but are also subjected to a growing complexity on the supply side on the other hand. This development increases the likelihood of finding more and more counterfeit products among these offers. Not only single products, but also entire websites for a branded company are being counterfeited. This is why the actions for the prosecution of product piracy will have to change significantly in the future – e-commerce will open up new supply chains with decidedly smaller delivery quantities per order, and new 3D printing technologies (once they have become available to the masses) will open the door to entirely new possibilities for decentralized and on-demand production – also for unauthorized goods. The trademark will therefore maintain its key strategic meaning and become even more important in the future, as it forms the legal leverage to fight these infringements even on the internet."

Dr. Uwe Over, Head of IP, Henkel AG & Co. KGaA

The dangers and dimensions of plagiarism differ from product category to product category; however, they will contribute to the growing importance of IPRs in the future. While the danger of plagiarism for physical products is increasing due to decentralized production processes, it is decreasing for non-physical products. The code of non-physical products can be copied;

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[16] https://euipo.europa.eu/ohimportal/documents/11370/80606/2015+Situation+Report+on+Counterfeiting+in+the+EU

the uniqueness of the product, however, stems from an unbroken customer dialogue. For more about this topic, see Trend Areas 5 and 6. Intellectual property rights such as patents, trademarks, or utility models will still be used to secure a company's freedom of action in 2030. Brand-product manufacturers, in particular from the textiles, automobile, or consumer goods industries, will use trademarks – and the incorporated prohibition and exclusive rights – to protect themselves from counterfeit products. IPRs will also continue to be important in 2030 as an investment protection for companies whose business model is highly dependent on an idea or on markets with low product density and high innovative activities. However, IPR will not be the only method of protection against plagiarism in the future. This will especially be true for the highly individualized products of the digitalized economy that change over time depending on the customers' expectations, as illustrated in Trend Area 6.

3.2 From protection to use: The end of exclusivity

Defense will remain the basic function of IPR. In an increasingly connected world – by the middle of the decade at the latest, the dawning "Internet of Things" will be replaced by the "Internet of Everything" – intellectual property rights will live up to their true potential, which is not defense, but facilitation. Isolated solutions, whether they consist of physical products or digital services, are limited. In the future, customers will not be looking to purchase products, but solutions – see more in Trend Area 5. If companies want to be part of this solution, they will need to grant access to their intellectual property.

The traditional use of IP assets to ensure exclusivity will continue to lose importance in an increasingly connected world. In fact it seems necessary to avoid using overlapping IP assets to block entire markets. There is a current trend towards sales platforms where licenses are granted as flat fees at low costs, but at a high volume.

Peter Bittner, PATIT – PATents for IT

Companies will give other companies access to their intellectual property in the future – for a fee. Intellectual property rights will be used less for blocking competition in the future than for giving access to intellectual property, inventions, ideas, and knowledge. This way, developments will be promoted further – for a fee.

"The consensus is that our society is currently transforming into a knowledge society. In my opinion, a knowledge society can only work if it is based on a knowledge economy – i.e., a form of economy that allows for the monetization of knowledge thanks to knowledge-based business models. However, this monetization of knowledge is simply not possible without intellectual property rights."

Peter Bittner, PATents for IT

Changing customer needs will drive the spread of license systems in B2C. As digitalization progresses, we can already see how physical products are being replaced by digital solutions in many areas. Customers will not pay for ownership anymore, but for usage. Various models will be in place, from pay-per-use to flat rates. Customer demand is an enormous market power here: One third of all internet traffic in the United States today is caused by the use of Netflix alone.

3D printing in the B2B segment will also be made possible through license models and at the same time will promote their success in the long run. The 3D printer will act as a gatekeeper in this case: There will be 3D printers that prevent the printing of models which would infringe copyrights, only printing files for which a license has been purchased.

Use Cases

The Korean company MarkAny has patented a protective mechanism for 3D printers called 3D SAFER, taking digital rights management (DRM) into the 3D world. The company's DRM procedure is based on various ...

technologies and controls that determine whether and how an object can be printed – in this way, it is also possible to limit authorized printing materials. The printer reads the authorization code of the files and only enables the printing process if there is an appropriate authorization. This is intended to prevent any unauthorized or uncontrolled printing of 3D designs.

The principle behind digital platforms where products are sold will also promote the use of patents in the future. First, patents will be collected on digital platforms and made available for companies. The companies can then purchase needed inventions or expertise for a certain amount of time and at a certain price. In the future, companies will be able to purchase patents at a flat rate on these intelligent platforms. Remuneration is key here; sharing or releasing IP free of charge is not the intention in this case. This way, patents can be made available while disputes are also prevented.

The foundation of this platform is unitary evaluation criteria for patents. A DIN norm for the evaluation of patents already exists. Up to now, this has not had a large influence on the IP sector, as the data needed for the evaluation was often not available and the market volume for patent evaluations was very small. However, patent evaluation will become more important as this development continues.

In the phase leading from protection to use, the focus will continue to be on control and limitation, but new opportunities for IP management will also emerge: IPR as a utility right allows for a broader use of the protected good in addition to additional revenues for the copyright holder. The end of exclusivity will mean new depth for intellectual property.

3.3 From use to sharing: Partnerships as a requirement for success

Digital networking will make cross-sector partnerships inevitable. This begins already with the digitalization of products. In other words: In the future, building a house will no longer be a priority. The emphasis will instead be on the integration of the daily living environment (e.g., the home) into the digitally connected life: from diet to safety, from well-being to communication. This is a task that neither interior designers, caterers, the producers of smoke detectors, nor telecommunications providers can fulfill by themselves. As soon as intelligent products, devices, cars, and buildings are connected through technological platforms, the need for an exchange between different sectors will continue to grow. Many companies will not be able to implement connected products on their own in the future: That would be too complex and time-consuming, and providers will often lack the necessary know-how. This especially applies to companies with a low degree of vertical integration. In a digitalized world, cooperation will become a requirement for success.

"The greater the specialization and the smaller the coverage by the layer of the value chain – i.e., the more and the closer you work with customers, suppliers, or companies from the same level of the value chain – the more important it is to make corporate know-how and thus intellectual property available. This requires protective mechanisms to achieve well-balanced results from this wide variety of formal and informal agreements."

Peter Berg, Lisa Dräxlmaier GmbH

The race for the customer interface is another driver for increased cooperation. Companies that are in direct contact with the customer will have an advantage in the future.

Companies will sell products and services from other companies that they do not offer and cannot provide themselves – all to avoid losing contact to the customer.

Through digitalization, increased connectivity, and growing data exchange, companies will also become more connected on a global level. New technological possibilities will enable companies to digitally complement their knowledge with another company's expertise. This will continue to increase the need for a harmonization of legal conditions as discussed in Trend Area 1.

Sharing of IP: Cost-free sharing

How will increased cooperation affect the management and exploitation of intellectual property? Companies that want to – or simply have to – enter partnerships will develop other forms of management for their intellectual property. They will not file a patent with no intention of using it afterwards or in order to prohibit others from using it. They will not file it in order to make a profit. Instead, registration will be about sharing their intellectual property with others, because the foundation of every partnership will be the possibility of making intellectual property available externally.

"Digitalization offers entirely new possibilities for the customer to seek solutions for their daily needs. This will motivate providers from segments that are still very distinct to look for new attractive solutions more intensely and to form partnerships across industries. Companies that can offer IP-based positions within these partnerships will be sought-after cooperation partners. So you can definitely say: IP is the new currency. The requirements for the establishment of a modern IP portfolio will significantly change in this regard, and everyone that remains within their traditional field of IP will soon be left behind despite doing good patent work."

Dr. Uwe Over, Head of IP, Henkel AG & Co. KGaA

Many areas of life will be pooled on digital platforms in the future. Mobility platforms will ensure every kind of transportation, health platforms will connect all players and data concerning human health, and entertainment platforms will guarantee constant amusement.

All these new business models will connect stakeholders, solutions, and products that have so far been distinct. Companies that want to be part of these platforms in the future will have to start sharing their intellectual property within their partnership networks by 2030 – free of charge. This way, companies will make their patents available within these networks; however, the patents will not be open to use by third parties initially.

"In the first step, companies will continue to protect their intellectual property in the future. In the second, they will make joint use of the protected work, for example through cross-licensing. These approaches will not counteract, but complement each other. However, we can already see a trend – the patent world strives for peace, not war. And that's great!"

Medha Rolvering, Software AG

With the end of exclusivity and the appearance of new usage models, the business model of trolls will also come under attack. In the future, companies will share or release their intellectual property in order to cooperate. Cooperation will make it possible for them to acquire a whole new level of development speed. As soon as patents become the ticket into partnership networks, companies will tend to use rather than reject them. This will significantly shrink the basis for the business of non-practicing entities and trolls.

3.4 From sharing to releasing: Open use of IPR

Intellectual property rights prevent unwanted use by third parties in that they make room for use and even sharing. In this way they will open up further possibilities for IP. The key driver here is the pursuit of additional benefit; financially speaking, but also for the exploitation of new business models. By the middle of the next decade we will see further forms of application for the exploitation of complementary possibilities. This includes primarily release strategies.

Defensive publishing can be seen as a first sign of this kind of IP management. This refers to the targeted publishing of descriptions or construction plans for

products, devices, or methods without the filing of a patent. The aim of this method is to discourage competitors from filing a patent, to set an industry standard, or to share intellectual property for unrestricted use. Research institutions and public organizations already use defensive publishing for this purpose[17]. Especially in cases where the inventive depth or the complexity of the product is low, or the enforcement of granted rights cannot be achieved, companies prefer deliberate disclosure to the obtaining of IPR.

The open source movement is another predecessor whereby exclusive usage is given up in favor of faster (software) development .

"The use of open source software can be a useful mechanism for broadly sharing IP so that people can modify the software and embrace the principles of open exchange, collaborative participation, transparency, and community-oriented development. Obviously, the use of open source software has to fit into the broader context of a company's comprehensive IP strategy."

Brian Hinman, Philips

The cost-free release of intellectual property will gain importance by 2030. One of the reasons for releasing knowledge will be to set standards.

The importance of standardization and the definition of communication standards will grow due to the increased connectivity of devices, processes, and living and working environments thanks to the fact that both ensure the interoperability of products and services. Companies will share part of their IP with other companies in order to drive development.

As the continuing development of solutions or products is a key priority, the restrictive protection of IPRs will lose significance. In this perspective, the free usage of IPRs will aid development. Nonetheless, patents will still have an important value in this context. They will serve as an outward defense mechanism for the community. This is the point where the cycle from protection to release comes full circle via using and sharing.

"Open source does not mean that there are no patents. Even in the blockchain world there are many patents. However, often they are not enforced. This basically means: We file a patent so nobody else will, but we let everyone carry on as they wish. This is the strategic approach if you primarily want to achieve network effects, obtain great partnerships, or create something together – and this is the goal of most blockchain applications. Patents can be very obstructive in this process, but also beneficial as protection against large companies that file patents for nearly everything."

Christoph Jentzsch, Slock.it

[17] http://www.defensivepublications.org/

CHANGING CUSTOMER NEEDS
How the importance of trademarks and brands will change

The potential of IP is generated through its activation; however, its real value first appears during customer interaction: This means interaction between companies and suppliers (B2B) as well as between companies and customers (B2C or B2B2C). The future of IP and IPR can thus hardly be described comprehensively without examining customer needs. The needs of individual groups differ greatly, and will do so even more so in the future. Nonetheless, there are still various groups that can be combined into customer segments – and these segments will no longer be economy, standard, and premium.

Standard will vanish ... economy and premium will prevail

The former market pyramid with its clearly defined economy, standard, and premium segments is losing its validity in many segments thanks to digitalization. In the future, there will only be two segments worth taking seriously: the economy segment and the premium segment.

But why is the standard segment vanishing? Because foundational to this trend is a largely invisible development. Up to now, all industry segments

(from economy to premium) functioned according to the same rational logic – the quality-for-money comparison. Correspondingly, those customers satisfied with the lowest quality and seeking the lowest prices were found in the economy segment. Customers willing to pay the highest prices for the highest quality were grouped in the premium segment. Logically, a broad standard segment existed between the two, with middling prices and middling quality. These segments were the mass markets of the old world.

Digitalization is already forcing companies to bid farewell to the principle of the mass market; this will increase even more in the future. The internet and smartphones in particular give customers the power to compare products and services anywhere at any time, and to buy them with a single click. On the one hand, availability will thus completely lose value as a sales argument. On the other hand, comparability will inevitably lead to a ruinous price war for companies: There will always be someone with cheaper prices.

By 2030 it can be expected that some sectors will exclusively offer one-of-a-kind products and services. This can especially be attributed to the fact that both new and established players
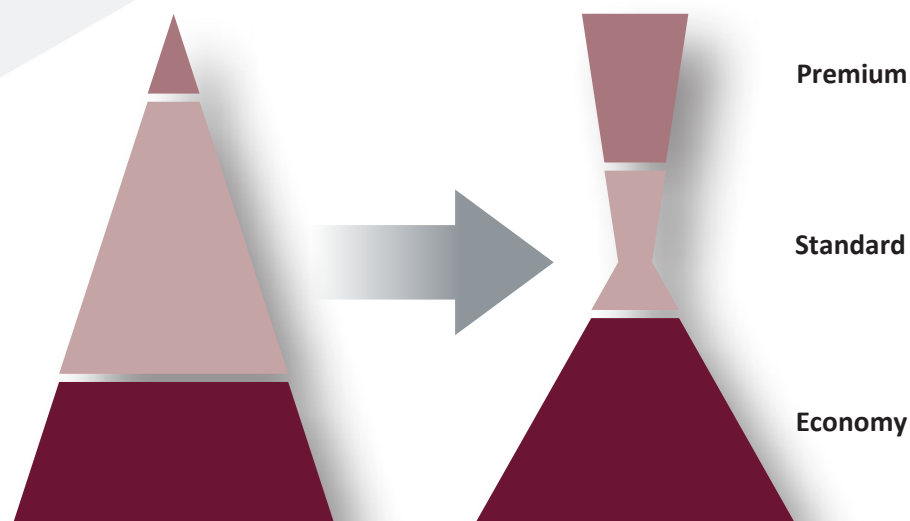
will exploit the possibilities of individualization. In turn, they will also force their competitors to do the same. If these do not follow suit, customers will sooner or later view them as irrelevant. This has already begun. Tech-savvy customers are increasingly used to receiving individualized solutions. From a certain point on, it is to be expected that the customers' perception will evolve from familiarization to habit, and every provider that does not offer individualization, or does so only to a certain degree, will simply cease to register in the minds of the customers.

Economy and premium – The new customer segments

The customer segments economy and premium will continue to exist in the future. In the economy segment, the demand for individuality on the customer's side will increase proportionally to the price. In contrast, customers in the premium segment will behave differently. While the weighing of quality against price will remain present in the economy segment, customers in the premium segment will no longer look for the best product at the best price. They will choose the product or service best suited to represent, maintain, and develop their identity. Which identity or identities they want to express will differ from customer to customer – and can also change over time.

Both in the economy and the premium segments, there will be a broad range of very affordable to very expensive products and services. It is essential to remember that the areas named above are by no means monolithic. There are six subsegments in the economy area. While these do share the same foundational underlying principle of value-for-money shopping, they nevertheless differ significantly. The premium branch is divided into three subsegments. These too share an underlying principle – identity management – but here as well, each segment is very distinct from the others.

The differences between market subsegments can be described in customer-centered terms using the customers' needs, their values, their degree of digitalization, their trust in technology or other human beings, their willingness to release personal data, and their proactivity level as consumers. Each customer segment, moreover, requires its own types of products, processes, and communication. It is self-evident that the lines between the segments are not clear-cut; there will be customers who move in different segments depending on the situation, or who migrate between them.

Premium

Standard

Economy

CUSTOMER SEGMENTATION

PREMIUM

ECONOMY

The businessminded identity seeker.

The communityminded identity seeker

The brand-conscious identity seeker

The responsibility delegator

The passive add-on buyer

The conscious risk manager

The cautious DIY seeker

The normal Facebook user

The comfortable nonseeker

Shrinking segment

Growing segment

Customer migration
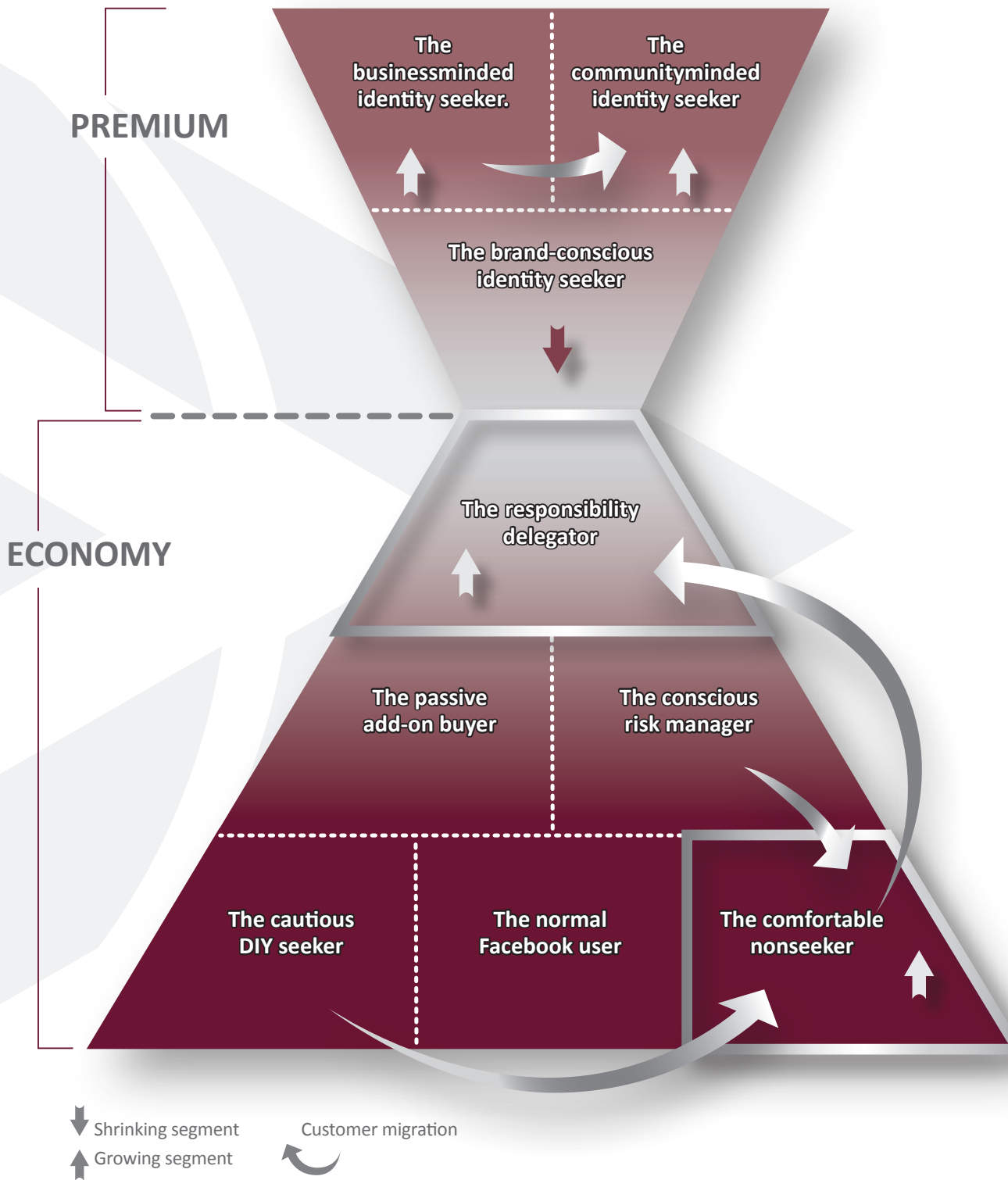
How different customer needs will change the importance of trademarks

Trademarks are registered IPRs. "A trademark identifies the owner of a particular product or service. Signs that differentiate the products or services of a company from those of another company can be protected. This can be, for example, words, letters, numbers, and images, but also colors or sounds."[18] New technological possibilities for registration will drive the establishment of new trademarks in the future – for example for specific thoughts and emotions.

"Technologically driven segments will continue to depend heavily on patents (electronics, pharmaceuticals, etc...), whereas emotionally driven businesses (consumer businesses such as cosmetics for example) will rather be tied to trademarks."

Dr. Jörg Thomaier, Bayer Intellectual Property GmbH

In the future, trademarks will still offer companies a defense mechanism against plagiarism. The shift in the traditional market pyramid will also change the importance of trademarks for customers. The original promise of trademarks for companies was: Given the multitude of products – in the standard segment – my customers can quickly and easily decide which product meets their expectations. If customers were happy with product A by company Z, then they will probably be happy with product B, C, and D by company Z as well. The trademark was the filter for a quick and convenient purchase experience. This was the past.

This mechanism of trademarks has only limited scope in the present, one which will further decline in the future. As already described above, the standard segment will significantly shrink over the next few years due to digitalization and the constant availability of products and services on digital platforms. Think of the standard segment as a movie theater that shows a supposed blockbuster at a fixed time every night.

Why should customers go to the movies if they have Netflix and Amazon? Furthermore, there are a multitude of illegal streaming platforms for the impatient that show the latest movies before they even hit the cinemas. The originally attractive offer to show a movie for the masses at a time acceptable to most and at a relatively central location is still competitive on average, but not for the individual. With the shrinking standard segment, the number of customers that perceive trademarks as filters for the mass market is shrinking, too. However, these customers will obviously not disappear. They will move to the growing segments of economy and premium.

The decreasing importance of brands in the economy segment

"Algorithms are not influenced by emotions or reputation. This is why I expect brands to lose importance in digital direct sales."

Dr. Jörg Thomaier, Bayer Intellectual Property GmbH

Brands will only achieve limited effect in the economy segment. Most customers in this segment will use a digital assistant in 2030 that will continuously monitor their behavior in many areas, recognizing the customer's needs by constantly collecting and analyzing data. In some instances, the forecasts will be even faster than real time. When the user enters the supermarket, the digital assistant system will have already suggested which products to buy. This system does not use emotional categories, but connects a variety of data from the past and present, as well as making predictive assumptions about the future. The brand and the provider are only two trees in a veritable forest of data. Besides: In 2030 fewer and fewer people will go to supermarkets, as instead they will simply confirm the suggested grocery list with a click and have the products delivered to the place of their choice. There will be fewer emotional impulse purchases.

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[18] https://www.dpma.de/marke/

This phenomenon obviously not only applies to picking up the groceries at the supermarket. Fashion, technology, cars, furniture, insurance, financial products, energy – the list goes on and on.

Brands – The identity carriers in the premium segment

The premium segment will grow significantly over the next 10 years. Even if does not reach the size of the economy segment: This by itself makes the premium segment attractive to companies. In addition, the segment promises considerable margins. For the price will not be the only – and in most cases not the crucial – decisive factor.

In 2030, brands will play a new and major role, especially in the premium segment. Here customers will consciously switch off their digital assistants. Premium customers do not want to make a rational decision based on a technological system and heaps of data. Instead, they want to express their own identity to themselves and the people around them. Brands are the obvious possibility for customers to easily express their identity to their environment. This is why it is not the brands that try to attract the attention of as many customers as possible that will be the successful ones in 2030, but those that stand most convincingly for a given identity: No matter if this is regionalism, fitness, wealth, sustainability, health, an ecological lifestyle, good taste,

being part of a certain group, or the promotion of certain values. It is to be expected that companies who want to act in the premium segment will use a multi-brand strategy in order to appeal to more customers. Brands will have the same effect in the B2B sector. B2B companies will also want to express their identity with the help of brands.

The key thing is: Companies with non-static brand promises and products will have an advantage. "Brand XY stands for a healthy lifestyle" – a standard slogan that will not be sufficient for premium customers any more. In the future, a brand will be especially valuable to premium customers if it expresses their individual and situational needs. Premium customers will have a dynamic brand awareness, and this awareness will be created through the dialogue between customer and provider. Customer needs are collected and analyzed based on a seamless interaction between the company and the customer – companies then react to these needs by changing their products. From the brand provider's view, the value of the brand – of the intellectual property – is only created through interaction with the customer. An essential step for the future of IP and its management: The customer will become an integral element in the generation and growth of intellectual property.
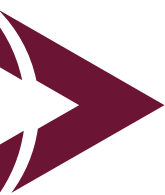
DATA – THE FOUNDATION FOR THE IP OF THE FUTURE

How the source of new intellectual property will change

Due to the spread of the Internet of Everything, new types and sources of data will emerge. Individual customer needs can be determined and eventually fulfilled on this basis. Products will become customized, and even adaptive, in order to fulfill the individual customer's needs in every situation. Continuous communication between companies and customers will become a necessity here as this guarantees access to current data and therefore actual needs. For customers, this interaction will be the point where value is created. For companies, it will be the source of new intellectual property. In the future, data will be the foundation of a company's intellectual property.

The spread of the Internet of Everything

While the most varied sectors exploit the opportunities of the "Internet of Things" in 2017 and analyze the potential lying in the connection of multiple everyday objects for their respective business models, technological progress will have taken major steps throughout the next ten years. In 2017 we are still looking at the options for connecting devices and creating interfaces.

By 2030, the notion of unconnected devices will have vanished entirely: the Internet of Everything.

The Internet of Everything and the rapidly growing amount of available data will significantly change the perception and use of the related services. This development will be driven by the customers and their direct benefit on the one hand. On the other hand, there will be the companies that recognize business opportunities. The range of potentially useful services for customers will be just as limitless as that of the positive assumptions about the revenues and profits that can be generated here.

The developmental leap from the Internet of Things to the Internet of Everything will be larger than the leap from a 56k modem to the WiFi of today. Various factors will promote the rapidly increasing quantitative spread and qualitative transformation of the technology:

1. The increase in the performance of electronic devices will continue to grow exponentially. The price for the connection of devices of all kinds will plummet – eventually it will be free.

2. The power supplies of technological devices will improve. The development of interfaces that make it possible for even the smallest devices to draw energy from their environment will accelerate this evolution enormously.

3. The required memory space for the growing volume of available data will cost virtually nothing in the future. The continuing development of data transfer technology and the correspondingly increasing speed, intelligence, and efficiency of transfer systems will be additional enablers for the Internet of Everything.

4. The rapid spread of the Internet of Things will be driven by companies in the areas of energy, transport, health, production, and smart homes. Companies that want to survive in this frantically growing market will have to form partnerships. They will need to seek technological connectability as alone they would face the danger of becoming irrelevant or vanishing entirely.

With the increasing connection of varied types and sources of data, the foundation for attractive products will grow as well in the future. With every smartphone or wearable sold, with every smart home system installed, with each connected car and all other connected areas of life, people will generate additional new data. This will change product landscapes and will serve as the foundation for new business models.

Why the solution is superior to the products

Knowledge about customers will grow. New types of data and data sources will allow companies to gain a more precise understanding of their customers. They will now be much better able to collect, analyze, meet – and even predict – their customers' needs. The prerequisite for this is an unbroken communication with the customer. This will guarantee access to current data and serve as the foundation for reliable results. It will yield added value for the customer that can clearly be communicated:

Companies use the data, form intelligent connections, and offer the customer the right solution for every situation. The result is this: Owning products will be less important to customers than today. Products alone will not be able to fulfill customers' changing individual and situational needs. Thus the focus of companies will shift from selling products to selling solutions. They will become providers for solutions as not the product, but the customer, will be at the center of the business model. The emphasis will no longer be on selling customers cars, but fulfilling their individual mobility needs through mobility solutions. Selling winter coats, t-shirts, or a pair of jeans will be replaced by selling fashion solutions according to the customer's specific needs. For customers, the use of products will replace the ownership of products.

"Medical technology companies have traditionally sold technical devices such as implants or catheters or some kind of measuring instrument. However, today these companies increasingly try to sell solutions that also include services related to the product. This means there is a trend to basically sell the healing of the patient. This is a change in the business model that raises the following question: What does this mean for the management of intellectual property? Patents only protect a small part of the product or solution sold. This will lead to the fact that patents will no longer be as essential for the protection of intellectual property, and other types of IPRs (such as trademarks, copyrights, and trade secrets) will gain importance."

Dr. Franz Wittwer, Biotronik

In the future, data and the underlying services will be the essential differentiating characteristic between companies. Hardware will not only be replaceable, but will also cease to be the chief asset in business. This is why the share of digital goods will exceed that of physical goods in the digitalized world. Intangible assets will be more valuable than tangible assets. Apple, Google, and Microsoft are the companies with the greatest market value today – even though their company value is based on intangible assets such as software, data, networks, and platforms.

"As some companies shift their corporate strategies from a purely product focus to a services focus, forms of IP protection other than patenting become prominent as well, such as trade secrets, copyright, trademark, etc."

Brian Hinman, Philips

As soon as companies become providers for solutions that do not focus on products, but on the customer, the source of their new intellectual property will shift as well. While products have so far been conceived and developed largely in companies, this will shift towards customers in the future. New products will be developed based on customer input. New ideas, new products, and new intellectual property will mainly be created through interaction with customers.

Different product landscapes

Standardized products, standardized services, and standardized communication have already become incapable of fulfilling customer needs in themselves. In the future, customers will expect the individualized fulfillment of their needs – and companies will be able to provide this. And they will do so by addressing the individual needs of the customers with unheard-of accuracy on the basis of big data and predictive analytics.

For companies, this will not only mean modularizing products in a highly detailed way to make them customizable. It also means that the place where new expertise, where new intellectual property is generated will change. For standardized products, intellectual property is generated within the company. Companies develop chemical formulas, patterns, design forms, and construction plans, protect them, and launch them on the market. Due to the growing importance of individualized products, the locus where intellectual property is generated will change as well: It will move closer to the customer. For individualized products, new knowledge will be generated through those technologies that recognize the individual needs of the customers. The value of intellectual property will be created here.

Products that adapt to changing customer needs will even take a step further. Adaptive products will mean increasingly fragmented patents for the patent system in the short term, as both the base product and its individual adaptation to user expectations will need to be patented. However, the number of patent applications will only be on the rise until products with lot size one enter the market. This is the apex of individualized solutions – added value is generated for exactly one person. The foundation for this is once again unbroken customer dialogue. Without this, needs cannot be recognized and fulfilled situationally. This means that the place where knowledge is generated will move even further towards the customer. Knowledge, and therefore the value of intellectual property, can only be created through the interaction between customer and company.

Data – The foundation of intellectual property

These future changes on the product level clearly show how data will be the basis for the successful business models of the future. The customer dialogue, the products offered, and the cooperation between companies – everything is based on data and its collection, analysis, and exploitation. Thus data will become the key currency of the future. It will be the foundation for the new generation of intellectual property.

"I may have a great sensor and a great algorithm to analyze the sensor – but generally speaking the customer doesn't care which sensor is used, and the provider of the mobility solution might not care either. If he doesn't get this sensor, he will use another one. The most important thing is access to the data and access to the customer, the user. I can then offer various value propositions to this user. This can be a mobility service or something that can be offered alongside a mobility solution, such as advertising."

Prof. Dr. Martin Bader, BGW AG Management Advisory Group St. Gallen - Wien

In a connected world, business models will no longer focus on the exploitation of IPRs, but on the exploitation of data. IPR will only be important in the context of the generation, structuring, and use of data – in the deployment of technology. Companies will continue to use intellectual property rights in the future to protect the technologies for recording and structuring data. The protection of the technology needed for the collection of data will lie upstream from the exploitation of data. IPRs will thus be a means of increasing the feasibility and security of data collection, thus ensuring the foundation of future business models.

"Data is also a form of IP. The question of protective mechanisms remains unanswered and will be one of the fascinating questions of the next few years. We can expect that there will be another form of protection for proprietary data. Trade secret laws could be an option here: The EU is already doing it."

Dr. Jörg Thomaier, Bayer Intellectual Property GmbH

Data protection as part of IP protection

As data increasingly becomes the center of business models, data security will become a key part of the protection of intellectual property. Apart from personal data, so far no means of a clear and final allocation of data ownership has been found.

Data security will comprise various aspects in the future. This begins with access to those sensors, products, and processes where data is generated. A protection against attacks, as well as operational security, will have to be guaranteed in this context. The focus will be on safety and security. Systems will have to be protected from attacks by third parties, and process safety and reliability will have to be ensured.

Users will also need a guarantee that the generated data will only be recorded and collected if they have given their consent and data protection is in place.

Control over the data will be essential for them. Users will want to decide what data to share, who will receive the data, and how it will be used. Users will also expect the freedom to change their mind any time. Data protection will be scalable. This need will be supported through privacy by design, and will thus further promote that approach at the same time. This will give the customer ownership of their data. For companies, privacy by design provides the opportunity to stand out from those that collect as much data as possible, use it in a non-transparent way, and place no importance on security.

Data management will be a key element of product design in the future. The recent debate in the USA about the release of Apple's user data to the FBI shows that companies are certainly able to protect their users' data and can receive approval for doing so. Data protection in this sense will mean a head start in the market. In the digital world, the combination of intelligence and data protection will be the foundation for the users' trust. This means that those companies which combine functionality and privacy by design will have the advantage. By taking this step, companies can secure customer loyalty in the short and long term while also driving innovation and success.

The relevance of data protection has also become clear with the EU's new General Data Protection Regulation that will become effective in 2018. This regulation will control what personal data can be collected and combined by companies.[19] Thus a new aspect comes into play: Companies will have to comply with European law if the data has been collected on European soil, no matter where the company is located or where the data is processed. Users can also request companies to delete their data[20]. The debate about what data is worth protecting and where privacy begins will thus become even more important.

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[19] https://netzpolitik.org/2016/eu-parlament-beschliesst-datenschutzgrundverordnung/
[20] https://netzpolitik.org/2016/eu-parlament-beschliesst-datenschutzgrundverordnung/

THE DEATH OF PLAGIARISM

How customer interaction will prevent plagiarism

In a digitalized world, the interaction between companies and customers will reach new heights through the use of artificial intelligence in customer contact. As soon as the interaction between providers and customers has become the central point for new knowledge – new intellectual property – reproduction by third parties will no longer be possible. This intellectual property can no longer be imitated, stolen, or copied: the death of plagiarism.

IP protection through the use of products

Due to a growing number of patents in a globalizing market, it will be more difficult to register and successfully prosecute infringements of proprietary IPRs in the future, especially for multinational companies. The forms and possibilities of plagiarism will also differ according to product types. Here distinguishing between physical, hybrid, and non-physical products is necessary.

The copy of a physical product can mean dysfunction, compromised safety, and lower product quality. This means a plagiarized power adapter does not fit the socket, a replicated high chair is not safe, or the seams of a copied bag are not durable enough.

As described in Trend Area 3, the risk of plagiarized physical products will increase in the next few years due to the decentralization of the production process, new forms of production, and the expansion of e-commerce, together with the ensuing fragmentation of shipments. At the same time, the total volume of physical products will shrink. With the Internet of Things, more and more physical products will receive a digital interface. In ten years' time, every product will have one. With the Internet of Everything, this distinction will be obsolete – only hybrid or purely non-physical products will remain.

Hybrid products will no longer strictly consist of mechanical components, but also of sensor technology and software. The physical side of hybrid products is only a container for the actual added value of the product. The real added value of the product includes the software and the algorithms based on this software (as examined in Trend Area 5). These allow for the individualization of the product. Plagiarism will thus become much more difficult. Of course the   physical product can be copied – copying the core service will be significantly more complex.

"Obviously, the proportion of electronics and software is growing in almost all of our products; it is probably already near 50% in high-end cars. Copyrights as the sole protective mechanism for the software could easily be circumvented by making slight adaptations to the software."

Peter Berg, Lisa Dräxlmaier GmbH

Non-physical products are based on software, computer programs, or platform solutions. "Under the EPC, a computer program 'as such' is not a patentable invention (Article 52(2)(c) and (3) EPC). Patents are not granted for mere lists of program commands: These are protected by copyright."[21] This means that, based on current intellectual property rights, action cannot be taken as efficiently against the reproduction of a digital product as against that of physical products. Anyone can try to replicate digital products. In contrast to many physical products, however, the forgery of a digital product is indistinguishable from the original.

"When speaking about platforms, the network effect is often the greatest value. Take for example AirBnB or Uber – of course they have a ton of patents, but it would not be very difficult for a good software developer to copy what they've produced. The network effect is actually the most important thing: the number of customers and users. Patents are not a big help in this regard. The key thing here is really to establish the market and attract customers, rather than trying to protect everything with patents."
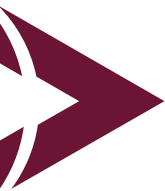
Christoph Jentzsch, Slock.it

The analysis of the customer needs of the future in Trend Area 5 has shown how interaction with the customer will become the key component of the IP of the future.

IP will be based on individual customer data and will only be created through customer interaction. An unbroken customer dialogue will ensure access to the customer data. Only this will enable companies to offer the customer personalized products. The product becomes forgery-proof once the customer data is directly used for and processed in a product: The product automatically adapts to the situational needs of the customer, and the solution cannot be reproduced without this interaction. The smaller the lot size of a product, the stronger the protective effect. A continuous interaction between companies and customers, the integration of this interaction into the products, and a consequent focus on solutions will increase intellectual property, allow for effective protection, and prevent unwanted access by third parties. An interactive solution that is valuable to the customer will always be an original. This will be the death of plagiarism.

As customers use, and thus further develop, products because of and during this interaction, the usage itself will become a protective mechanism. Technological IPRs such as patents and utility models will retain their basic meaning for the defense against the violation of intellectual property. Actual use by the customers will both protect and multiply the company's intellectual property! This is why companies will focus on the protection of the customer interface in the future: It will be the source of new knowledge, new products, new intellectual property, and ultimately the success of the company.

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[21] https://www.epo.org/news-issues/issues/software_de.html

EPILOGUE

2030 and beyond

Apple, Google, Microsoft, Amazon, IBM, Facebook: Together they have formed the Partnership on Artificial Intelligence which aims achieve three goals: Disclosing the opportunities and risks of artificial intelligence to society, linking research and industry, and supporting best practices.[22]

This partnership clearly reveals that artificial intelligence is already one of the most important topics of the coming decade. At the same time, the approach to artificial intelligence will change. When Garry Kasparov lost against Deep Blue in 1996, it was still human vs. machine – there was no talk of artificial intelligence. Even today, news about humans losing to machines still draws considerable attention. A chronology of the last few years: IBM Watson wins against the best Jeopardy players in the USA, Google's AlphaGo bests the best Go players worldwide, and Claudico beats top-ranking poker pros hands-down. This brings us to two conclusions: First, the chronological intervals between these events are becoming shorter and shorter, and the performance capability of AI is growing rapidly. Second, statements like "But a computer can't do this!" are now being dismissed faster than some would like to see.

These are the same people who ask the question: "When will a computer take my job?" Regardless of personal opinions about artificial intelligence, the development cannot be stopped.

Although these questions are justified, many often forget that this battle of human vs. machine is largely inflated by society. Because in the end, the development of artificial intelligence is mostly for the benefit of human beings. By now IBM Watson, for example, is the best cancer diagnostician in the world. Saqib Shaikh, a blind developer at Microsoft, is developing a pair of glasses that will read to him, describe his environment, and assess other people's emotions. Garry Kasparov is still playing chess – Advanced Chess – together with a computer against a second human / computer team.

As with Advanced Chess, the players in the business world that who are able to combine human strengths with those of AI will gain a tremendous advantage. Computers are at an advantage over humans especially when it comes to the analysis and evaluation of large amounts of data.

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[22] https://www.epo.org/news-issues/issues/software_de.html

IBM Watson is the best cancer diagnostician because it has access to all publications available online and – what is even more important – can handle this sprawling amount of information. In contrast, humans have an advantage over computers when there is only a small amount of data and the focus is on unknown correlations, emotions, or empathy.

Obviously, there will be tasks in 2030 that will no longer be carried out by humans. However, this is by no means a new phenomenon, but a continuous process that has been in place since the industrial age and is further accelerated by technological progress. At the same time, it is to be expected that completely new fields of work will be generated through the cooperation of man and machine.

Thanks to digitalization, more jobs have been created than eliminated in the last few years. A study by Booze & Company's in 2011 shows that "[…] digitization (sic) had the greatest employment effect in constrained and emerging digitized economies. East Asia, South Asia, and Latin America received the most employment growth of all regions, with more than 4 million jobs created as a result of these regions' digitization improvements. Conversely, digitization provided little employment growth in North America and Western Europe. […] As companies in digitally advanced countries improve their productivity thanks to digitization (and replace jobs by technology), they transfer jobs to digitally emerging countries."[23]

The continuing development of artificial intelligence will be advanced in two ways. On the one hand, a multitude of large, medium-sized, and small players will work on developing AI. On the other hand, more and more players will make their innovations available to others. The speed of development will thereby rise. This is Tesla's strategy for the implementation of their self-driving cars. This is the strategy of Google's Deep Mind for the development of AlphaGo. This is the strategy with which Sentient opened the door to predictive day trading.

As a result, partnerships and the sharing of knowledge will lead to great progress over the next few years.

Use Cases

TensorFlow is Google's open source library for comprehensive machine learning. The technology forms the foundation for applications such as image recognition or language processing. However, it can also be used on a much larger scale. According to Greg Corrado (Senior Research Scientist, TensorFlow), machine learning will be the essential software of the future. By releasing the source code for the library of machine learning, Google is promoting the exchange of knowledge and research, and eventually the use of machine learning itself.

In companies, the rising efficiency of artificial intelligence will take effect in almost every area within the next few years – from R & D to procurement, from logistics to production, from sales and services to the management of intellectual property.

Intellectual property will also be generated through the interaction between AIs in the future – wherever they are used by customers as well as companies. Digital assistance systems that are based on artificial intelligence will become part of the consumers' daily lives. These will analyze users' behavior and emotions as well as their needs and communicate this information to the company. Artificial intelligence will take over the adaptation of products for companies in the future. Through the interaction of the customer's AI with the company's AI in the future, new knowledge, new intellectual property, and eventually new products will be created.

Artificial intelligence can also be used for the application and exploitation of intellectual property in the future. As soon as companies use intelligent IP management software, this will not only analyze and subsequently further develop the existing knowledge within the company: It will also be able to manage

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[23] http://www.strategyand.pwc.com/me/home/press_media/management_consulting_press_releases/details/52364755

existing proprietary intellectual property rights. In the future, companies will communicate through their intelligent IP management software and will also use it for the negotiation and management of user rights. This way companies will determine the conditions under which proprietary IP or the IP of another company can be used in the future.

Once artificial intelligence begins to negotiate the use of intellectual property, two things will become necessary. First, a digital currency as payment: Currencies based on blockchain such as Bitcoin already allow for the secure transaction of financial assets. In the future, they will also make trading with intellectual property possible. The use of cryptocurrencies for the transfer of digital intellectual property will give these monetary vehicles a new meaning, as only cryptocurrencies are fast enough for this purpose and can be used globally. Secondly, artificial intelligences that negotiate with one another must be granted the authority to legally prosecute each other as well.

In the judicial system of the future, there will be an electronic person in addition to natural and legal persons. At the beginning of 2017, the Committee on Legal Affairs of the European Parliament formally recommended "creating a specific legal status for robots, so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons with specific rights and obligations, including that of making good any damage they may cause, and applying electronic personality to cases where robots make smart autonomous decisions or otherwise interact with third parties independently."[24] As soon as artificial intelligences become electronic persons with legal capacity, they can become carriers of intellectual property rights as well. This is the face of intellectual property after 2030: Through interaction with artificial intelligence it will be digitally expanded, autonomously shared, and thereby multiplied.

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[24] http://www.emeeting.europarl.europa.eu/committees/agenda/201701/JURI/JURI(2017)0112_1/sitt-3764889

STRATEGIC RECOMMENDATIONS
How to make your company future-proof

Intellectual property will be at the center of corporate activity in the future. This radical transformation is driven by technology. How can you unlock the true potential of your intellectual property? Start securing a decisive market advantage today: 27 strategic recommendations for decision makers, IP managers, and patent attorneys.

The customer is the source of the intellectual property of the future. The customer is the driver, the interaction is the prerequisite, and the data is the foundation of the intellectual property of tomorrow. Put the customer at the center of your development of products, services, and processes.

1. Develop your products even further by letting your customers use them (and while they do so) – in the future, this will generate new intellectual property for companies.

2. Enter into seamless interaction and communication with your customers. Record their data, evaluate it, and share the results with them.

3. Align R&D, as well as product development, marketing, and sales with your customer dialogue.

The quantity and quality of your customerinteractions will determine the future success of your company.In comparison, the products themselves are mere temporary solutions.

4. *Always beta* was yesterday, be *always gamma*. Expand the idea of continuous product development and early market trials. Focus on the continuous growth of your intellectual property in the framework of costumer dialogue.

5. Interact individually with each customer, even in bulk business. Use the efficiency of artificial intelligence to do so. Only AI can evaluate the complexity of the customer dialogue at the necessary level of detail.

6. Create trust between your customers and your technology. This way, your artificial intelligence will become your product developer.

Without a customer interface, there is no intellectual property. Without intellectual property, there is no company success. Protecting intellectual property means protecting the customer interface. This is the source of new knowledge, new products, new intellectual property, and a successful business.

7. Employ intellectual property rights to protect those technologies used to record and structure data. See IPR as a medium for increasing the opportunity for and security of data collection, thereby ensuring the foundation of future business models.

8. Are you leaving static products behind? Then leave static brands behind as well. Dynamic products require dynamic brands. With the creation of an adaptive product through customer dialogue, the brand will also continue to evolve.

9. See data security and data protection as an essential part of the protection of intellectual property. This includes safety and security just as it does the transfer of data sovereignty to the user. The user will decide what data they want to share and how it can be used.

Shape the internal organizational structure of your company like a customer interface. Also, view potential staff members as your most important partners. Where they share their expertise with you is where your company's intellectual property will grow.

10. Your staff drives the development of your company, so drive the development of your staff! Use your corporate IP management to map and then to develop your know-how.

11. Identify potential employees according to their know-how. Pitch yourself to suitable candidates specifically on this basis. Consciously expand your network to gain the necessary foundation.

12. Human HR is over; use artificial intelligence during the recruiting process. Algorithms are able to assess candidates better than human experience can. Automate processes in order to raise quality and avoid expensive wrong decisions.

3 Use after-sales HR marketing. Maintain contact to your staff even after they have left the company. This is will provide you with a reliable expertise network.

4 Prepare for the next step in the development process, when you cannot hire carriers of knowhow any more, but purchase a license to their knowledge instead. Become a license broker for the expertise of those in your network.

If you shelve your intellectual property in the form of patents locked away in your filing cabinets, you will shelve your company's success as well. No matter the industry, your company's success depends on the proactive management of your intellectual property.

15. Only technology will be able to record and process the growing piles of data and knowledge within companies. Establish an omni-IP management system. Gather all elements of your intellectual property in one platform – from registered to non-registered IPR.

16. Your members of staff will decide if, and what part of, their expertise they want to make permanently available to you, and under what conditions. Ask them!

17. Use machine-learning algorithms that understand innovation processes. The more intelligent the system, the sooner it will create suggestions for optimization and take your speed of development to the next level.

18. Stop spreading your knowledge aimlessly in your company. Share it in a targeted way. Use artificial intelligence in order to introduce knowledge at the right place and at the right time – this also applies to setting up teams. AI knows exactly who in the company has the expertise needed to fill the gaps.

19. Omni-IP management of the future also means radically introducing new corporate structures. Stop thinking in terms of departments! Think in terms of projects! Set up temporary interdisciplinary teams for each project.

20. AI is quicker, more precise, and more reliable than your patent attorneys. Use artificial intelligence to gain an overview of the patent landscape or to determine the value of new patents.

21. Do not accept any decision of your IP managers, patent attorneys, or innovation mangers that has not been made based on an AI-supported, intelligent omni-IP platform. Train your experts accordingly.

The first to share will be the first to profit. Let go of the idea of exclusive usage in favor of rapid development. Purposefully share your intellectual property within partnership frameworks in order to boost your speed.

22. The protection of intellectual property is over. Sharing and releasing are the future. If you want to be successful in a connected world, share your intellectual property. Develop solutions together.

23. Together with partners, create a blockchain-based alternative for conventional IPR that is quicker, more transparent, impossible to manipulate, and works without middlemen. Do not try to be an essential driver for the legislation here – you have other options.

24. An intelligent omni-IP management system will also provide an interface to other companies. The AI will negotiate user rights for your intellectual property with your partners.

For patent and trademark offices:

Reality and regulation are drifting apart; traditional protective mechanisms now miss the mark. Become the advocate for the intellectual property of the future. Do not digitalize existing mechanisms – create digital processes for the protection of intellectual property.

25. Ensuring the protection of intellectual property is your raison d'être. Develop ways to ensure this again, and specifically in the digitalized world.

26. Establish an intelligent patent database with digital interfaces for companies. Offer quick application processes: Use intelligent software that autonomously analyzes – and later even grants – patents. This will boost your speed and appeal.

27. Do not view new protective mechanisms based on technologies such as blockchain as a threat, but as an opportunity. Be a pioneer of a digitalized IP management. The significance of blockchain technology will not be decreased if blockchain options are not included in the legislation – in that case legislators would simply sever themselves from real developments.

28. Analyze companies' needs and adapt your processes accordingly. Be as individual and adaptive as the companies are towards their customers' needs. Organizations that do not address individual needs will lose significance in the future.

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THE AUTHORS

Scientists, Trend Researchers, and Strategy Consultants

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Michael Carl is Managing Director Research & Consulting at the 2b AHEAD ThinkTank. He is responsible for the methods and content of the institute's future studies, manages their implementation, and guides the development of specific strategic recommendations. He is also a sought-after keynote speaker on trend and future-related topics.

After his studies in Theology in Germany and Great Britain, Michael was active in journalism, working as an editor and moderator for various public and private radio broadcasters. After several years as personal advisor to an ARD radio director, he moved to the corporate sphere. Initially Michael established and managed the strategy office of the Berlin Brandenburg radio network, where he was responsible for major structural, strategic, and HR projects. Michael is also experienced as an independent consultant for strategic and organizational development. His passions are music and his literature blog.

Maria Lübcke

Maria Lübcke holds the position of Researcher in 2b AHEAD's department of Analysis and Studies. She is responsible for the conception, coordination, and independent implementation of future studies and analyses. She also coordinates the various research projects

of the 2b AHEAD ThinkTank. Maria was previously heavily involved in the organization of the Future Congress, where she was primarily responsible for guest management. She received her university degree in Cultural Sciences, studied in Spain, and then began her career at the Leipzig Grassi Museum in the field of Public Relations and Event Management. In her spare time, Maria's passion for rock climbing often takes her to extraordinary places.
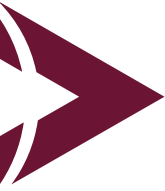
THE METHODS

The Delphi Method and Qualitative Expert Interviews

The present study is a qualitative, empirical study using the Delphi method. This method is a future-studies method that takes its name from the famed oracle of ancient times. It was developed during the middle of the last century in the US and is used for the preparation of forecasts. Because hardly any expert in these complex times is able to successfully observe several mutually influential fields of expertise at once, Delphi method studies draw on the assessments of several experts, each with their own specialist knowledge. The interviews are conducted using a two-stage process.

During the first phase, the experts are asked individually to give their personal assessments on specific topics over the course of guided expert interviews. In the second phase, in contrast, they are presented with the collective results of the first round. The experts are then asked to hold to their positions from the first phase, or to integrate the results of the first phase into a revised assessment of the subject matter.

The selection of the expert study participants is particularly important for this scientific approach to trend research. For this reason, a so-called "trend cycle" is compiled in a workshop format with Philipp Hammans after an extensive desk research phase covering existing topic-related studies and publications. The trend cycle constitutes a list of all of those companies within and outside of a given industry whose resources are sufficient to ensure that the strategic decisions they make today will have a significant effect on the future of the target industry,

either because other players are sure to follow their example, or because they can successfully push their business models thanks to the influence they have over the market. One expert was chosen out of each relevant group of industry players who did not merely speak about their own company, but was also able to give an overview of their group.

The pool of experts consisted of scientists, patent attorneys with various areas of industry specialization, innovation managers and technology providers. A total of 20 experts were chosen. In the context of one-to-one interviews, the experts were confronted with various theses and asked to give their assessment of the relevant future developments. The statements given by the experts subsequently underwent a qualitative analysis and were organized into six trend areas. The trend areas condense the essential statements of the expert participants concerning the future of intellectual property.

These recommendations are based on a synthesis of the exploration of the trend areas, the statements given by the experts, and the future scenarios, and also the expert knowledge of the 2b AHEAD ThinkTank in innovation management strategies.

THE EXPERTS

Investment decision makers, strategy leaders, and future experts.
The experts include:

Prof. Dr. Paul Schrader
Junior Professor for Civil Rights, Industrial Property Rights and Civil Procedure Law, University of Augsburg

Prof. Schrader enriched the expert panel by contributing a broad overview of the world of intellectual property.

Ulli Klenk
Head of Additive Manufacturing Product Management & Sales, Siemens AG

Ulli Klenk supported us with his in-depth expertise in the field of 3D printing and the corresponding challenges for intellectual property.

Prof. Dr. Martin Bader
Patent Lawyer, European Patent Lawyer, Managing Partner, BGW AG Management Advisory Group St. Gallen – Vienna

Prof. Bader complemented our panel of experts with his comprehensive knowledge of IP.

Brian Hinman
Chief Intellectual Property Officer, Philips

Brian Hinman is the Chief Intellectual Property Officer at Philips, one of the most innovative technology companies worldwide, and our expert for the field of technology and IPR.

Dr. Malte Köllner
Patent Attorney (DE), European Patent Attorney, Dennemeyer & Associates S.A.

Dr. Köllner is an expert in law and strategy with a keen ability to look at the bigger picture. He has received multiple awards as a patent attorney, and has served on the DIN committee for patent evaluations.

Lukas Roesgen
Director Products & Innovations / Manager IP

SLM Solutions is one of the market leaders in the 3D printing of metal parts. Lukas Roesgen is our expert for intellectual property in this innovative new field.

Patrick Clerens
Managing Director, Clerens Consulting

Patrick Clerens looks back on several years of experience as an intermediary between business and politics, with a focus on the energy sector. He complemented our panel with regards to policy making and strategies in a European environment.

Dr. Franz Wittwer
Senior Innovation Manager, Biotronik

Biotronik is one of the leading companies in the field of medical technology. Dr. Wittwer completed our panel with his expertise concerning advanced technology in medicine.

Peter Bittner
LLM in IP Law and Management (CEIPI), Peter Bittner and Partner - European Patent Attorneys, Chairman of the I3PM Advisory Board

Peter Bittner was formerly a leading portfolio manager for patents at SAP and is now a successful patent attorney. He is our specialist for the field of software.

Christoph Jentzsch
Founder, Slock.it

Christoph Jentzsch of Slock.it has programmed an investment fund with blockchain technology that works without any staff or management. He has thereby proven that this technology can revolutionize business models, and is our expert for blockchain technology and future IP approaches.

THE EXPERTS

Investment decision makers, strategy leaders, and future experts.
The experts include:

Peter Berg
Head of Patents, Lisa Dräxlmaier GmbH

The family-owned business Dräxelmaier a leading automotive supplier with a staff of 55,000. Peter Berg enriched the study with important conclusions for the industry and specific challenges concerning intellectual property.

Dr. Michael Meier
European Patent Attorney, Vodafone GmbH

Dr. Meier is an european patent attorney at Vodafone. Thanks to his work, he is highly familiar with telecommunications and IP.

Dr. Stephan Wolke
Chairman of the Board / CEO, ThyssenKrupp Intellectual Property GmbH

Thyssenkrupp Intellectual Property GmbH is a young subsidiary of the industrial group thyssenkrupp AG and specializes in the protection of intellectual property. As the CEO, Dr. Wolke provided information about the protection of intellectual property in a global industrial group.

Dr. Jörg Thomaier
Head of IP Bayer Group, Bayer Intellectual Property GmbH

As Head of IP at Bayer Intellectual Property GmbH, a Bayer AG company, Dr. Thomaier complemented our panel of experts with insights on IP from the pharmaceutical industry.

Medha Rolvering
Global Head of Intellectual Property, Software AG

Software AG is one of the largest software providers in Europe. As Global Head of IP, Medha Rolvering has a comprehensive knowledge of intellectual property in the field of IT.

Dr. Christoph Rieken
Attorney, Associated Partner, Noerr

Dr. Rieken is an Associated Partner at Noerr. He is our expert for legal matters relating to intellectual property.

Dr. Uwe Over
Head of IP, Henkel AG & Co. KGaA

Dr. Over is the Head of IP at Henkel, a major producer of consumer goods. He is the leader of the patent and trademark team and is responsible for the company's global IP portfolio. He is our expert for the consumer goods industry.

Leigh Outten
Senior Patent Counsel, Adidas Group

Ms. Outten completed our panel with her expertise in textiles. She gave us insights into how textile companies like adidas view the protection of intellectual property.

Christian Bunke
CO-Founder, Director, Aalbun

Christian Bunke is the COO of the startup Aalbun that offers new software solutions for the protection of IP portfolios. He showed us how startups handle new solutions for the management of IP.

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STUDY PARTNERS

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The 2b AHEAD Think Tank is Germany's most modern institute for trend analysis and future studies, and employs both scientists and policy advisors. For its customers, the 2b AHEAD ThinkTank analyzes – using scientific trend studies – both the opportunities and risks associated with trend developments in their business. The 2b AHEAD ThinkTank not only analyzes within the target industry, but across industry boundaries, incorporating all stakeholders that shape the future of the respective business model. With its analysis, the 2b AHEAD ThinkTank helps its customers to understand who or what is driving their relevant trend environment, and for what reasons.

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Dennemeyer
The IP Group

About Dennemeyer Group
The Dennemeyer Group, originally founded as a patent law firm in Luxembourg, has been setting benchmarks for all services and software solutions in the IP sector for over 50 years. Dennemeyer evolved very rapidly into a global full-service provider for the protection and management of intellectual property rights - from legal services (Dennemeyer & Associates), software and management solutions (Dennemeyer IP Solutions) right down to IP consulting (Dennemeyer Consulting). Today, with 24 offices in 16 countries, the group manages nearly three million property rights of more than 3,000 clients.

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GLOSSARY

adaptive products
Product feature which describes products or services that are both individualized and situational, and adapt to the respective needs of the user even after being purchased.

always-beta products
Products that have already been launched in the beta phase to enable testing by customers and continuous further development are called always-beta products. Due to shorter innovation cycles and a faster rate of development, they remain in a more flexible state that ensures faster adaptation to identified customer desires.

physical products
Analog products that lack a digital interface. Thanks to digitalization and the Internet of Everything, more and more physical products will receive a digital interface and thus become hybrid products.

assistance systems, digital/electronic
Software (e.g., smartphone apps) for customer advice and support which gives recommendations based on data analysis. Services providers and third parties can – among other things – offer customers individual products. The precursors of this system are today's comparison portals.

big data
Denotes enormous heaps of data which are too large to be evaluated by human effort alone. This data results mainly from the evaluation of internet use, but also from other devices such as cameras, microphones, etc. In order to process this mass of data, new technologies and analysis systems are necessary.

blockchain
Blockchain technology makes it possible to transact digital exchanges without a middleman. All transaction-related information is be stored in a decentralized system, which increases transparency and also means that information in the system can no longer be changed.

caring companies
Caring-oriented companies with appreciative company culture and a strong focus on long-term employee loyalty as well as strong bonds with the employee's social surroundings.

cloud
An IT model in which data is not saved on in-house hardware, but rather on the internet and is thus accessible at anytime, anywhere, for any authorized person. A more secure version of cloud computing is so-called fog computing

decentralized production
This refers to a division of production processes between different sites or regions. Digitalization in particular, as well as new forms of production, are driving decentralized production.

non-physical products
Digital products such as software and apps.

fluid companies
Companies with an HR strategy aimed specifically at the targeted attraction and release of project workers. These organizations are usually globally oriented companies that depend on permanent access to highly qualified knowledge workers.

hybrid products
Hybrid products combine physical and non-physical components (e.g., coffee machines and tablets). With the Internet of Everything, many products that are purely physical today will receive a digital interface and become hybrid products.

Internet of Things / Internet of Everything
The Internet of Things refers to the increasing networking of all objects in everyday life and business. Over the next few years, every object will receive an IP address and be connected to the internet.

M2M
Machine interaction refers to the flow of information and automated communication between terminals – e.g., containers, shelves, products, vehicles, etc. – which allow an increasing level of autonomous processes in production and logistics.

omnichannel management
A continuation of the multichannel or cross-channel approach. The coordination and control of activities inall company divisions according to a strategy of creating a unified one-to-one experience for the customer across all communication and touch points and without media interruption.

open source
Open source code, normally software (but also knowledge and information in general), which third parties can use, further develop, change, and copy – usually free of charge.

GLOSSARY

predictive analytics/ smart forecasting
Predictive analysis refers to an approach which combines various statistical methods – such as data mining and fact finding – in order to generate forecasts. This technology enables, for example, early recognition of customer needs and thus the ability to offer a product that has already been individualized to fit these needs – if the customer is interested.

privacy by design
This describes a concept that considers data protection and privacy even during the development process for a technology. Products and services are designed in a way that already incorporates value structures, transparency, and data protection in the design of the product or service from scratch. Users thus retain ownership of their data.

reinforcement learning
A branch of artificial intelligence which stands for "machine learning." This means that algorithms learn through interacting with their environment and through the consequences of their actions (trial-and-error learning). The aim of this approach is to find the best strategy within a certain context in order to maximize performance.

smart home / smart building
Buildings will become intelligent through the use of technology. While smart home refers to private homes, rented apartments or condominiums, the term smart building comprises intelligent functional buildings such as public buildings, hotels, or company buildings.

Substrate-Independent Mind (SIM)
SIM describes the replication of the functions of the human brain in another substrate, such as an external platform. The end result is the same as would be produced by a human brain.

trend cycle
A compilation of all those businesses – both within and beyond a given industry – which possess sufficient resources that the strategic decisions they make today will have a significant influence on the future of the industry.

Unfair Advantage
Players with exclusive access to certain data, know-how, technologies, or to the customer interface, possess an "unfair advantage" over their competitors. This gives them a head start that is initially very difficult to catch up with.

usability
The usability of a product or service for a given customer. This includes usage context as well as the desired effects and aims in order to optimize customer satisfaction.

wearable technology
Clothing that can be optimized with technology and is capable of creating interfaces to intelligent devices or is equipped with LED displays.

Whole Brain Emulation (WBE)
The goal of WBE is to extract data and processes from the human thought system and transfer them into a digital system. To this end, mechanisms of the human brain are translated into programming language and stored in digital form.

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