White paper: Know-How Transfer Paradigm Change

By Dr. Patrick Kehl

Abstract

Current practices in know-how transfer do not take the transfer to the general public much into consideration. In this paper a system will be presented to increase the incentives to transfer know-how to the general public after an embargo period of 20 years. This system presents a complement and in some cases an alternative to the patent system. The embargo period of 20 years remains an imperative for individual inventors as it allows them to commercialize their inventions. For the general public it means a delay but no hindrance of progress.

For the new system to work it is crucial that constant documentation takes place. This documentation practice can be audited and certified for public recognition and trade. A new non-profit foundation and audit organization needs to be founded for these purposes and to promote the application of new know-how transfer practices. The presented approach is unique in its automatism of know-how publication even when commercialization is over and the inventors shifted their focal point to other areas.

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Introduction

Efficiency in operation generates wealth. This statement is independent of competition. For the market player it is always important to be better than the competition and striving for leading advantages. This behavior is shaping fit companies and generates individual wealth. However, on the macroeconomic level it is much more important how efficient all market players operate. The combined output of all market players translates into what is available for society. Any measures to increase efficiency of all market players will translate into more wealth in society.

Operation know-how is actively sought after, and already a big supply of varying quality exists. External input is a welcome stimulation, but it remains art to improve the individual operation. The only valid hallmark of operation advice is success in operation. This means the only way to qualify operation advice is to know all details of a real world operation that is successful on the market – to evaluate the very details that represent a leading advantage of one market player. These details are usually kept secret in order to preserve that leading advantage.

We have the patent system that makes innovations known to society. However there is a big gap from the level of details described in patents to the organization of efficient operations.

I would like to close this gap by the introduction of a new know-how transfer concept. Applying it will increase the level of details to the individual operation step required to manufacture goods or to offer services. This concept represents a paradigm change in how know-how is transferred. A paradigm change does not happen by itself. It needs to be promoted by incentives that are aligned with the goals of the individual market players. The concept needs to become a system that is available for everyone.

This new know-how transfer system should increase wealth in society by increasing the level of operation efficiency on the horizontal level of an epoch. There is even more to be gained in the long run on the vertical level of passing epochs. The new system should increase wealth even more by supporting the innovation process.

Background

The general idea is that we all profit from the development of know-how by an increased standard of living. There are products in our life that make life easier compared to let's say 300 years ago. For example: radio communication, computers, internet, cars, trains, planes, central heating, air conditioning, food processing, healthcare, etc. What makes our lives better are not theories but real products and services designed to satisfy specific needs. Knowledge needs to be translated into know-how to satisfy these needs. Therefore the practical value is in the know-how and not in general text book knowledge. Knowledge by itself is just the potential to find solutions. It does not represent ready to use solutions.

How did we exactly get from pre-industrialized products to our modern products? There was a gradual progression that did build on many, many individual inventions, building on top of other inventions. This progression works only if the inventions become known to the public. There is no direct benefit for inventors to make their inventions known to the public. Actually they

should keep the inventions secret so they alone can sell products manufactured by using their inventions. Patents were developed in the past as strong incentives to make inventions public. With a patent, Society gives the inventors the exclusive right to use the invention for a limited number of years, usually 20 years, in exchange to full disclosure of the invention. The patent system is essential to secure large investments in resource intensive areas and has surely advanced technological development in society at large.

However, inventions and products are not the same. Replication of a product after the expiration of patent protection is no easy task. The novelty of the invention is known from the patent, but real-life manufacturing know-how still needs to be developed in order to reproduce the patented product.

New approach

Could we do any better from now onward? Yes, we could. We have all that is needed already here to do so. From personal experience, I can confirm that there are better ways of know-how transfer possible. I took part in transferring know-how from one company to another. There were no patents transferred, just know-how on how to organize people, procedures, documents, material and information flows. My experience showed me that there is another value than patents in companies that is transferable between organizations and independent of patents. The know-how transferred to replicate operations is much more detailed than patents usually are, and patents never tell you how to organize operations. Unfortunately in modern society exchange on the deep level as in my experience usually only takes place in merger and acquisition type of situations. Usually, there is no transfer on this level to the general public taking place.

What if for a larger number of cases in key areas proven and tested product manufacturing know-how would be transferred to the public after an embargo period of 20 years? This would be beneficial of everyone who needs to develop something. Why invent the wheel several times? Why not start with a real-in-use wheel of another plant and improve from there? The embargo period would ensure the know-how disclosure of production processes would not be to the disadvantage of the current manufacturer.

Seeing the bigger picture: What would be the effect of such a paradigm change over the course of 100 years? The paradigm change could well change our timeline as humanity at large if seen over longer time spans. There would be more inventions for sure - especially inventions that build on top of other inventions that were only possible by the paradigm change. The big inefficiency now is the loss of know-how with time and that so many brilliant minds in the business world need to reinvent what others already have developed a long time ago.

Know-how transfer to the public will not happen by itself, because it currently goes against the economic incentives and market beliefs of the individual players such as inventors, investors and production personnel. Trade secrets were in the past best never written down. They were stored in the heads of the personnel. Everyone was thereby protecting their very own job, but for a production plant the situation was not ideal. Change management was more difficult in these environments and personal fluctuation meant losing vital know-how. Nowadays most companies have standard operation procedures, people have formed replacements ready,

everything is written down and external audit organization come to evaluate their quality systems. The systems are already transparent, but the evolution of best practices did not yet reach its last stage when all know-how becomes 100% transferable. This may for one part be due to the lack of incentives to make know-how transferable, but for another part it may be due to security concerns.

Know-how can now be stored in a safe form with cryptotechnology. This in itself would not be a game changer. However, since it can be hidden with a timer that opens it at a future date the technology becomes a game changer. It could also be opened for any predefined purpose with custom keys. Everything is possible. The know-how could even be traded if trading parties have confidence in legal standards and an independent control. Actually, the cryptographically hidden know-how could represent a company's value in some cases more than its physical property.

A non-profit foundation and an audit organization need to be formed for a change to happen. The foundation will develop the applicable legal framework and ensure compliance with a newly to develop norm, a new know-how transfer standard. The task of the audit organization will be to check the records and actual manufacturing operations of companies in order to ensure all know-how needed to produce is cryptographically recorded. The independent control is required to ensure trust and make the know-how tradable.

The new standard should be welcomed by investors. The incentive for them is clear: By transforming all know-how into an extractable form they become free from the manufacturing site. Scale up of operations, duplicating or moving an operation site to another place becomes much easier. Know-how becomes an even more valuable asset that it is today. It can be more easily traded by an all-encompassing link to known products on the market.

Diminution of negative effects from the patent system

The big limitation for the application of the current patent system for inventors is that only “real” innovations can be patented. What is the percentage of businesses that operate with entirely new concepts and inventions? Everything that is prior known is not patentable. Therefore the vast majority know-how developed is not patentable at all.

In today’s patent jungle almost everyone tries to make a patent as broad as possible but only gives as little information as needed to get the patent granted by authorities. The patent is more valuable if the granted scope is bigger. There is a risk for society that a patent is granted for a too broad application. Innovation may stop for the whole patent scope during almost the whole patent lifetime even if there were never any applications for the whole patent scope developed. The scope of a patent can be adjusted anytime by a court case, but who would want to start an investment with the incertitude of a court dispute? A granted patent does not mean the innovation is safe for the whole patent lifetime. Anyone coming and proving prior knowledge of the same innovation can invalidate the patent in a court case.

The situation is very frustrating for inventors as they have to dedicate part of their time to prepare for possible patent court cases. The investment of time and money rises constantly during a development process. The risk of losing this investment is not acceptable. Up to now, the best strategy was to develop in great secrecy until a patent could be filled for sufficiently

unique parts of the development. The main goal would not be to exclude others from using these parts but to prevent others to file a patent with a patent scope that would forbid the usage of one's own development. Inventors can prevent that future patents are granted with a scope too broad to impact their inventions by submitting their own patents first. The high costs of such patents are justified by the partial protection they provide for the invention. Indeed there are parties that specifically look to exploit unprotected inventors, and there are always companies in the same field of application as the inventors that have larger lawyers' payrolls than unprotected inventors could possibly compete with.

If the intention of the patenting party is as described more in the realm of self-defense, then the new patent will more likely just add to the complexity of the patent system instead of transferring know-how to the general public.

The expected development costs are surely always compared to the expected returns, especially in an early phase of the development process. If the application in development does not promise to generate sufficient returns in comparison to the expected costs including possible patent and lawyer's costs, then the development will be aborted at all: A situation when the current patent system is preventing invention instead of promoting invention.

I propose to improve the situation by offering another option to inventors: The invention could be documented and encrypted by the inventors during its development. A timestamp of the time when the invention step was recorded and encrypted will allow proving unambiguously when an invention was made. Possible future patent court cases will no longer be an issue for inventors as the evidence of the encryption will be undisputable. This fact will allow more inventors to go forward without making a patent, and the barrier to start inventing will be lowered.

In the next chapter, I will present the future non-profit foundation and audit organization that will provide the required infrastructure for encryption and guide the documentation of invention steps.

Foundation and audit organization

The current management of know-how will only change with the introduction of new players – a foundation and an audit organization which will promote new best business practices.

The audit organization needs to be steered by a non-profit foundation. The foundation will have a clear mission to foster full know-how transfer to the general public after an embargo period of 20 years and support inventors to generate know-how as well as to make profits with them.

The inventors profit from the standard generated by the foundation when the standard is well-known to the public. As long as the embargo period of a patent is not shortened, a new rule to disclose all know-how after the embargo period is no big concern for inventors today. A paradigm change to disclose all manufacturing know-how will make a big difference for society and future inventors. The foundation will have a huge impact on the future of humanity by defining and promoting a full disclosure standard.

The foundation's mission needs to be totally transparent, and its actions guided by clear rules. Trust is everything. Its mission is to bring as much production know-how into public availability as possible.

It is important to respect the embargo period of 20 years on which the current patent system is built and support all stakeholders such as inventors and investors. These will in return support the know-how transfer paradigm change. There are advantages for all current players, but the biggest winner is the whole world. There will still be a delay of 20 years from the leading companies to the lagging companies. Nothing will change with the 20 year embargo period. However, patents cover only a very small part of the exiting know-how. They describe new inventions but not the reapplication of existing inventions.

Most companies would not bother to protect their 20 year old operation procedures, and these procedures are currently almost never published. When detailed operation procedures are published, it becomes very easy to copy an operation step. Even when the copy act comes usually first to attention, the real gain will be in the development process of new applications: All the brainpower that is currently invested to develop solutions for problems that were already overcome in other applications over 20 years ago becomes available for other tasks.

There is also know-how that remains hidden because oral transmission is sufficient to pass it and up to now, no one insisted in properly writing it down.

The foundation and audit organization need to address all these areas in order for innovation to start in the future on a more equal level with more know-how available. The gained efficiency will make everyone profit in the long run.

Drivers for success

The presented concept is clearly an advantage for society, but why should it become a success? After all everyone could already now publicize his or her know-how. The content of patents is known to the general public from the moment the patent is granted. However, the level of details in the description is not sufficient to clone operations after 20 years when the patent has expired. There are already now many good examples in full know-how disclosure with minimal delays, especially in the free software and maker scenes. Why does full know-how disclosure currently not happen with most commercial operations?

By definition commercial operations are profit oriented. This excludes an up-to-date know-how donation. A timed donation would most of the time not be against operation logic, but operation personnel are usually occupied with other tasks. What is missing is a gentle reminder and much more important, a public recognition for a know-how donation. There no recognition as the public is not yet aware that know-how donations can be made today with a publication date in the future. This could change after promoting the new know-how transfer standard and making it really well-known to the public.

The standard will in addition make unknown know-how tradeable. There needs to be trust that the other party was checked by an audit organization to follow the standard to its heart. There needs to be trust that the insight of the audit organization is not accessible within the audit

organization after encryption. The audit organization's operations need to be totally transparent for everyone.

The application of the standard allows better following and controlling invention steps in the development process of a product or service towards a successful market launch. The know-how behind successful product or services will be easily recognized as an asset that can be traded. However, not all inventions make it to the market. Some fail on the market or the development process never makes it to the final stage. However, there is even value in failed projects that can be extracted by following the standard as the following example might illustrate: An inventor receives funds from an investor to develop a product, and both parties together form a small start-up company. After some years the money is used up, but no product enters the market, and the company goes bankrupt in consequence. If the company was founded based on the new know-how transfer standard, then the new audit organization could ensure that all development steps were documented in a transferable manner. When the company goes bankrupt, then the know-how would be recognized by the investor as an asset which could be traded to pay for the depths of the company in an auction. This setting increases the trust of the investor in the inventor. The inventor has one go to make it with this start-up. The investor would have access to the development files, and these files could be sold during the business liquidation. If there were no potential buyers known an auction would be a good way to find them. Anyone could bid for the data set to build on the development. For sure, outsiders would need to have trust in the description of the development steps by a neutral party in order to participate in the auction. The new audit organization could inform people about the auction and what kind of data is for sale without disclosing the invention.

Living examples and know-how auctions

Living examples of commercial operations are crucial for the standard to grow in application. The foundation will therefore support projects in key areas to make the system better known to the general public. Each project shall develop a specific product that satisfies a customer need. The projects will be selected on the public benefit of the project (e.g. advancement of technology that will benefit society) and the gained publicity for the support for the new standard. The projects will be carried out by existing or start-up companies. The support will be tied to the full application of the standard within the whole company. Product development is allowed to take maximal 5 years. Patents may or may not be filled by the supported company. This will depend if exclusive market access is required and if patenting costs are justified by the expected additional financial returns. The task of the audit organization will be to ensure that all product relevant know-how is recorded.

The products developed by the supported companies will be put on market with a reference to the foundation and its standard. A percentage of revenues will flow back to the foundation during the first 5 years on the market in exchange for the seed money. The foundation will list all supported products and their annual revenues publicly. Know-how of manufacturing operations will be continuously improved and documented by the companies. The complete documentation will represent real-life proven manufacturing processes with a high practical value and its content needs to be kept secret by encryption.

An auction for the know-how transfer files including patent rights (if present) will take place after 5 years of the product on the market. The goal for the foundation will be to make the standard better known and extract the seeding money for the next project. For the supported company, publicity is beneficial. Their business case just needs to be aligned from the very beginning to the first 5 years on the market. The company has either a first mover advantage during these 5 years or the exclusive rights for the invention if they have filled a patent.

Know-how transfer projects will be known long in advance of the auction. Their know-how will have application-proven value. This monetary value will be easily estimated based on the standing of the product on the market and the revenues it generates. The state of the know-how at the auction time represents the initial development and all scale up improvements of the production process during the first 5 years.

The winner of the auction gains exclusive access to the know-how transfer files and possible patents for the next 15 years. Anyone can participate in the auction, even the original inventors. However their bid needs to be publicly announced. In case the inventors are not biding or losing the auction, they will be bound by legal contracts not to disclose the invention for the next 15 years. This disadvantage for the inventors will be the prize they pay for the seed money that is essential to bring the product to the market.

These explanations show that the auction is for the know-how but not for the inventors' companies using the know-how. The companies may well continue to use the know-how unless a patent prohibits them to do so. Know-how value is well separated from the physical property of the inventors' company.

The encryption of the data will be achieved in such a way that all data will emerge after 20 years to the general public. This implies the auction winner has 15 years' time to use the know-how till the data of the market entry will emerge. The 20-year-old improvements of the production process will come out in in real-time speed to the general public for the next 5 years, always with a time lag of 20 years.

Further improvements will only continue to emerge with a 20 years' time lag if the auction winners continue to follow to the standard and encrypt on-going improvements after winning the auction. There should be recognition from the general public for continuation of know-how donations. The auction winners will gain firsthand experience with the know-how publication standard, and they need to decide if they want to follow the standard. Hopefully they become convinced that a continued publication is not only beneficial for society but also aligned with the company's own cultural values.

This is an example in how the standard could be applied. There will be great freedom in defining its application based on specific needs. Something similar could be defined for spin-offs from universities. As these are publicly financed there should be an obligation to give something back to society. A contract for spin offs could demand to follow the know-how transfer standard from market entry up to 5 years on the market. Such a contract would ensure that spin-off companies give stringently more back to society than currently. The spin-off companies could continue to follow the standard after 5 years on a voluntary basis. It is up to universities to define rules for spin-off foundation.

Funding and sustainability of the foundation

The foundation and audit organization will be financed by donations and fees for their services. Other sources of income are revenues and auction sales from seed money to promote the application of the standard. The foundation and audit organization are non-profit. All income will be used for the foundation's and audit organization's goal to promote the generation and transfer of know-how to the general public.

Simple road map

A foundation and an audit organization are required to promote the know-how transfer paradigm change. I would like to present a simple road map to bring them into operation:

- A non-profit foundation will be created after collection of donations. The bigger the foundations finance, the faster and more widespread a know-how transfer paradigm change can be achieved.
- The foundation will develop the legal framework and standards of operating the storage, trade and publication of know-how.
- The foundation will develop and promote means to cryptographically encrypt, timestamp and decrypt large data-sets of know-how. Decryption happens either automatically after 20 years or by intention of the inventors as key holders.
- The new encryption and decryption infrastructure will become operational and available to all inventors. A new audit organization will be put into place. It will ensure the standard is followed to its heart.
- The foundation will support projects to promote the implementation of the standard and serve as examples for the know-how transfer paradigm change. The know-how transfer standard needs to become a label showing a future contribution of the label holder to society.
- Guidelines for know-how documentation and audit techniques for the specific purpose to ensure full know-how capture will be constantly fine-tuned and practiced within every project.
- After 20 years a constant flow of know-how will be released from the generated infrastructure to the public.

Mechanisms and rules

The foundation and audit organization will focus on products and services that satisfy concrete customer needs. After all it is the market that gives know-how its legitimation and value. There are many ways of transferring know-how and it is a world of free decision. The foundation and audit organization will develop a standard that describes a best practice in know-how transfer and give out a certification for complying with this standard.

The standard will entail the following rules:

- All know-how regarding the production process of products and services on the market needs to be recorded and encrypted. However, the invention phase of products and services that are not yet offered on the market will not be obliged to be recorded and encrypted.

- For some applications also the invention phase may be chosen by the inventors to be encrypted in real time for transparency reasons or just to create a time proof of the invention steps. When the pre-production phase is documented and encrypted on a voluntary basis, then its decryption timer can be reset once upon market entry to 20 years. It is beneficial to document and encrypt the development phase to prove prior knowledge in case of a future patent dispute.

- The standard will demand documentation only when the actual production process for a customer product or service starts. Then all know-how of this production process including their development files describing their function and application needs to be encrypted. Additional R&D activities of the company are never obliged to be documented. Only when these activities lead to new products or services, then the corresponding know-how needs to be encrypted.

- During the lifetime of the product or service on the market all know-how of the production process needs to be documented and encrypted in real time in order to follow the standard.

- The concept of the decryption process is very simple, what goes in comes out after 20 years.

There will be audits that control if the standard is followed. In the case of non-compliance, advice for improvement will be given by the audit organization. Severe or repeated non-compliance will lead to the retraction of the certification.

Application areas

Is the presented approach advisable for every company in every sector? Generally, society will always benefit from the application of the standard. The analysis from a company point of view needs to be more distinguished. There are direct costs to write down and encrypt the operation procedures. However, there are also indirect costs to react the future publication of the actual operation procedures. There needs to be a constant competition with oneself. The situation is dangerous for the company if it is not ahead of itself by the time the know-how gets published. The question is if current R&D efforts are sufficient or not. If not, these need to be increased, and the additional costs should be attributed as indirect costs to follow the standard.

In consequence, there are only little additional indirect costs for companies in technologically fast advancing sectors. They are already heavily investing in R&D. The additional indirect costs may be much higher for the company if it is operating in a small market niche or if its technology is no longer advancing at a fast pace.

If the company gave their actual know-how away then the very survival of the company could be endangered. A disclosure of the actual know-how would happen in the future if the product or service would not change within the next 20 years. The company would be losing its advantages over its competitors – a situation that companies generally want to avoid. However, most companies will be between the very extremes where either all or no know-how changes within 20 years. Therefore, every company needs to evaluate additional costs and risks on an individual basis. Can the company afford the direct and indirect costs to follow the standard? Some companies will not be able to voluntarily disclose their know-how by following the standard as it would endanger company survival in the future. The story would be different if the standard was a global law to be followed by every company on earth. Then the standard would not endanger some company's survival but accelerate change and progress for everyone.

The question for the company will also be what are its long term goals and what are its cultural values. Could the company culture be aligned to a global vision to accelerate progress?

There are benefits coming externally from an increased publicity as well as recognition for the donation and internally from an increase in clarity on know-how generation. The application of the standard supports companies in seeing know-how as a highly valuable asset that needs to be regenerated continuously. The biggest impact for the companies following the standard would be cultural. When you state today, that you disclose all know-how in 20 years, then progress is crucial for the survival of the company. It is a strong statement: The company is capable of re-inventing itself in a 20 years' time frame. Competitors that use its 20 year old technology are no competition at all.

Any additional costs might well be outperformed by the described benefits. The foundation will start its activities with a focus on fast advancing sectors as the additional costs for companies are smaller there than in slowly advancing sectors. It will be easier to establish the standard as a best practice and allow it to become rooted in company cultures.

Whatever the company's circumstances will be, the application of the standard will always be a great giving to society. The goal of the foundation will be to develop the means to facilitate this giving and increase its appreciation by society.

Summary

Know-how has by nature a timer on its usability for inventors. A lot of know-how is lost once it is no longer actively applied by inventors, and there is currently no mechanism in place that passes this body of know-how automatically to the public.

A new know-how transfer standard will make 20 years a general rule for disclosing all know-how. Thereby know-how will become better available for everyone. The standard needs to be developed by a non-profit foundation and an audit organization. Its application will represent a big paradigm change in society for what best practices in know-how management are. It should become new best practice that with every invention step a cryptographically record will be generated that passes to society after 20 years. These records will be time stamped and allow proving unambiguously when the invention was made. The records will also be essential for

commercial survival of inventors if they were to be accused of infringing patents that were registered after they made their invention.

The task of the foundation will be to develop and maintain the cryptographical means by which know-how can be safely stored and published automatically after 20 years. The audit organization will address the control and certification of companies for following the standard. The independent control will enable the trade of know-how before it passes to the general public after 20 years.

The application of the standard will accelerate know-how generation by the better availability of know-how from time-proven real-life manufacturing and service processes. A time lag between the invention and general publication is required to keep the currently existing incentives on the inventors' side alive. The new standard will make the donation of know-how clearly defined and visible to the public.

The new foundation and audit organization will foster a cultural change in how know-how is generated, managed and distributed. With the presented mechanisms and rules a clear amelioration of know-how transfer to the public can be achieved.