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Intellectual Property Management

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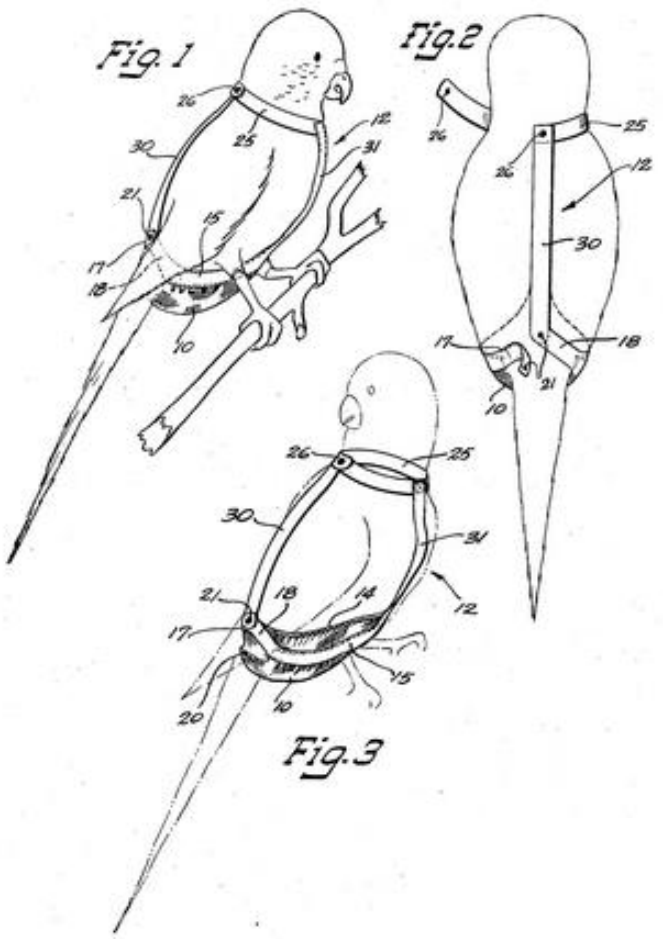
www.innovation.uni-bremen.de

Intellectual Property is the most boring subject in the world, isn't it?

"Intellectual Property, once considered the most boring subject in the world. Until very recently, in fact, simply mentioning the words patents or intellectual property at a social gathering was guaranteed to invite blank stares, followed by an awkward shuffling of feet as everyone suddenly spotted dear old friends that he or she simply had to go talk on.

Today, patent lawyers attract small crowds at parties – rather like astrologers used to and plastic surgeons still do – and find themselves peppered with questions such as wether that wonderful idea for a bird diaper is patentable (the answer is yes – it was issued Patent No 2,882,858."

- Rivette and Kline (2000)



US 2,882,858, filing date 15.10.1956

Source: Rivette and Kline (2000); USPTO: US 2,882,858

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Intellectual Property Management

From patents to insights

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Agenda

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Technological convergence

Technology planning

Technology evolution

Source: IPMI 2016

Agenda

Technological convergence

Technology planning

Technology evolution

Source: IPMI 2016

Within the field of smart grid, we focus on the technologies of power grid infrastructure, wind turbines, electric vehicles (EV), and smart metering.

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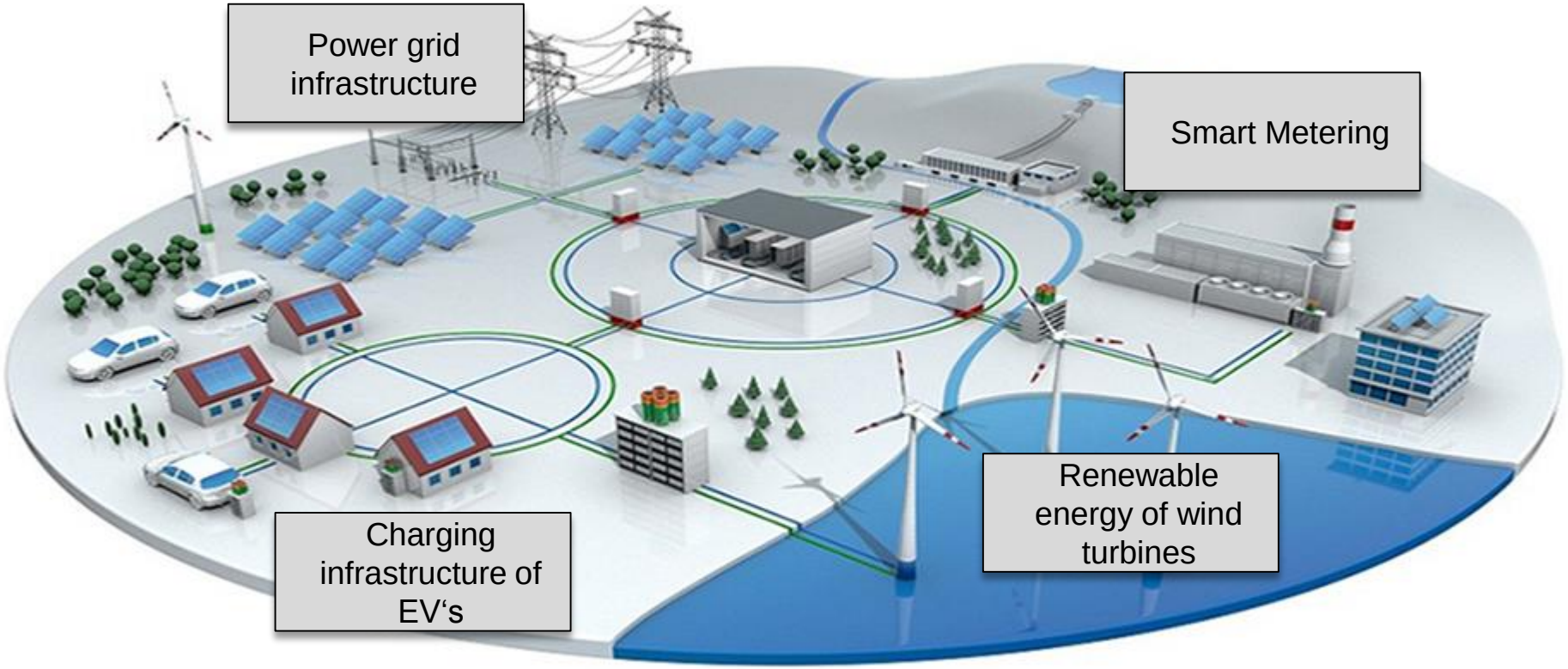
How can technological convergence be measured by a semantic patent approach using textual corpora of technologies in the field of smart grid?



Research question – Technological convergence

Source: Passing, Moehrle 2015; olap.com

We compare the textual corpus of power grid infrastructure with three technologies. Our results indicate convergence (or at least fusion) in the field of smart grids.

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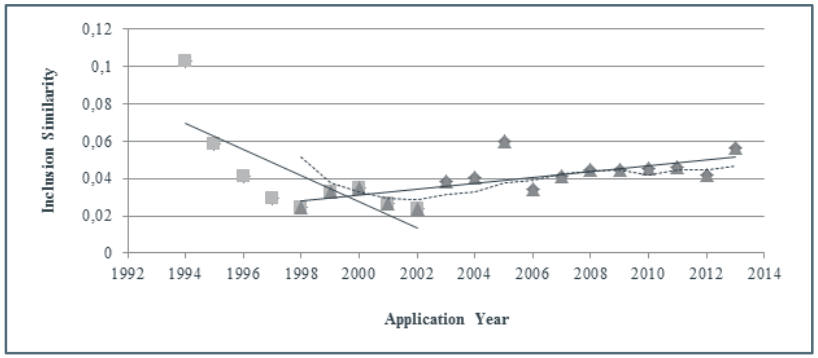
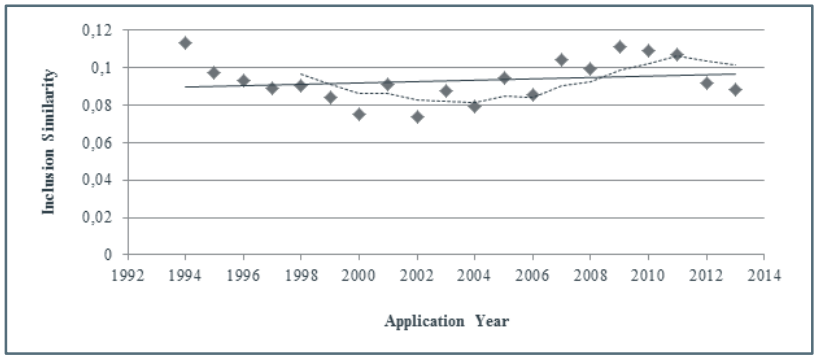
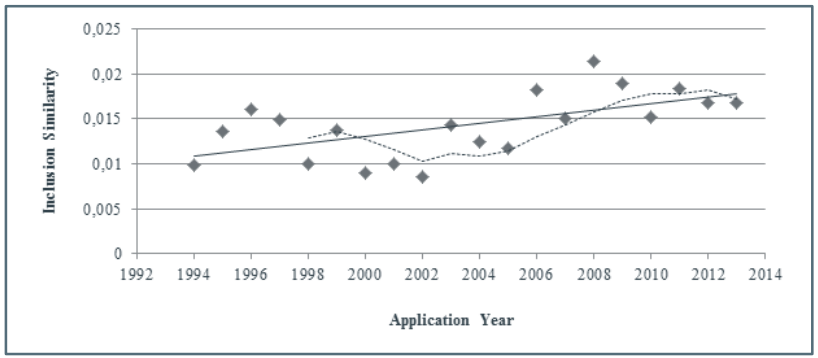


Renewable energy of wind turbines
Focusing on the timeframe from 1998 to 2013 (the second trend line), we are able to identify at least a slight tendency toward technological convergence.



Charging infrastructure of electric vehicles
Between 1998 and 2013, semantic similarities displayed a more or less stable level of high values.



Smart Metering
A slight increase in the value of similarities over time can be identified.

Results – Technological convergence

Source: Passing, Möhrle 2015

Agenda

Technological convergence

Technology planning

Technology evolution

Source: IPMI 2016

In the research field of strategic technology planning our research questions focus on the development of the technology and the competitor situation.

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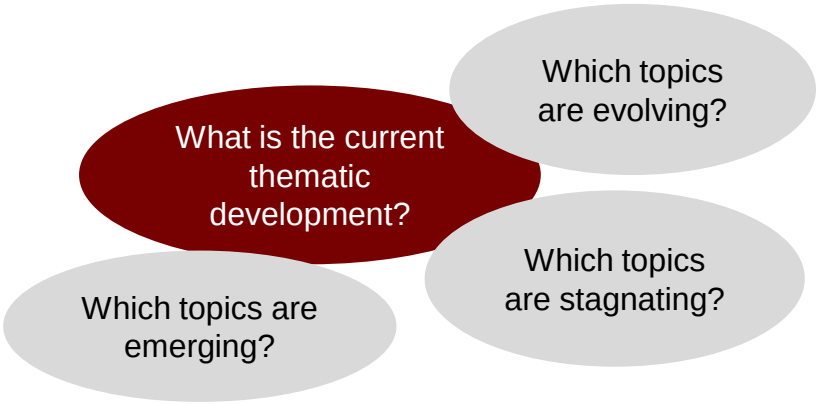

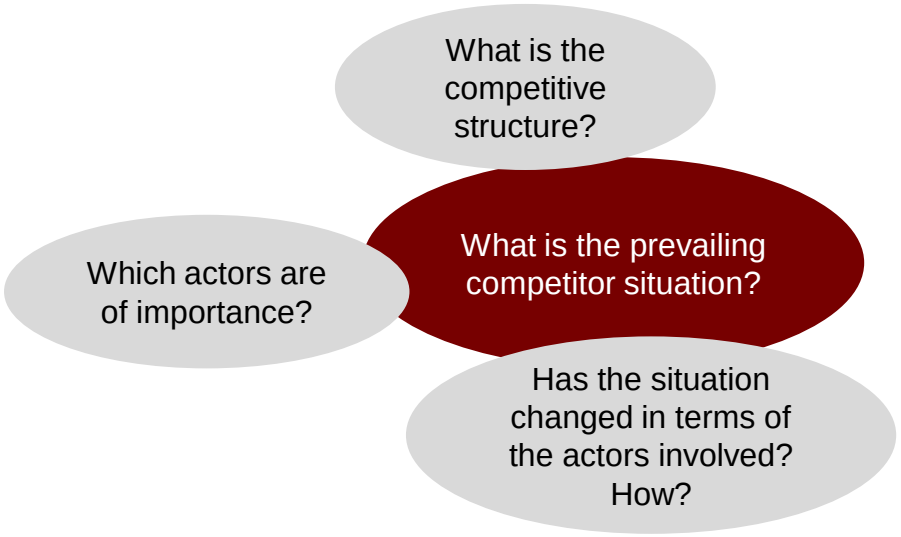

Research question – Strategic technology planning

Ref.: flaticon.com

Bicycles and related technologies are a research field marked by international orientation and high patent activity.

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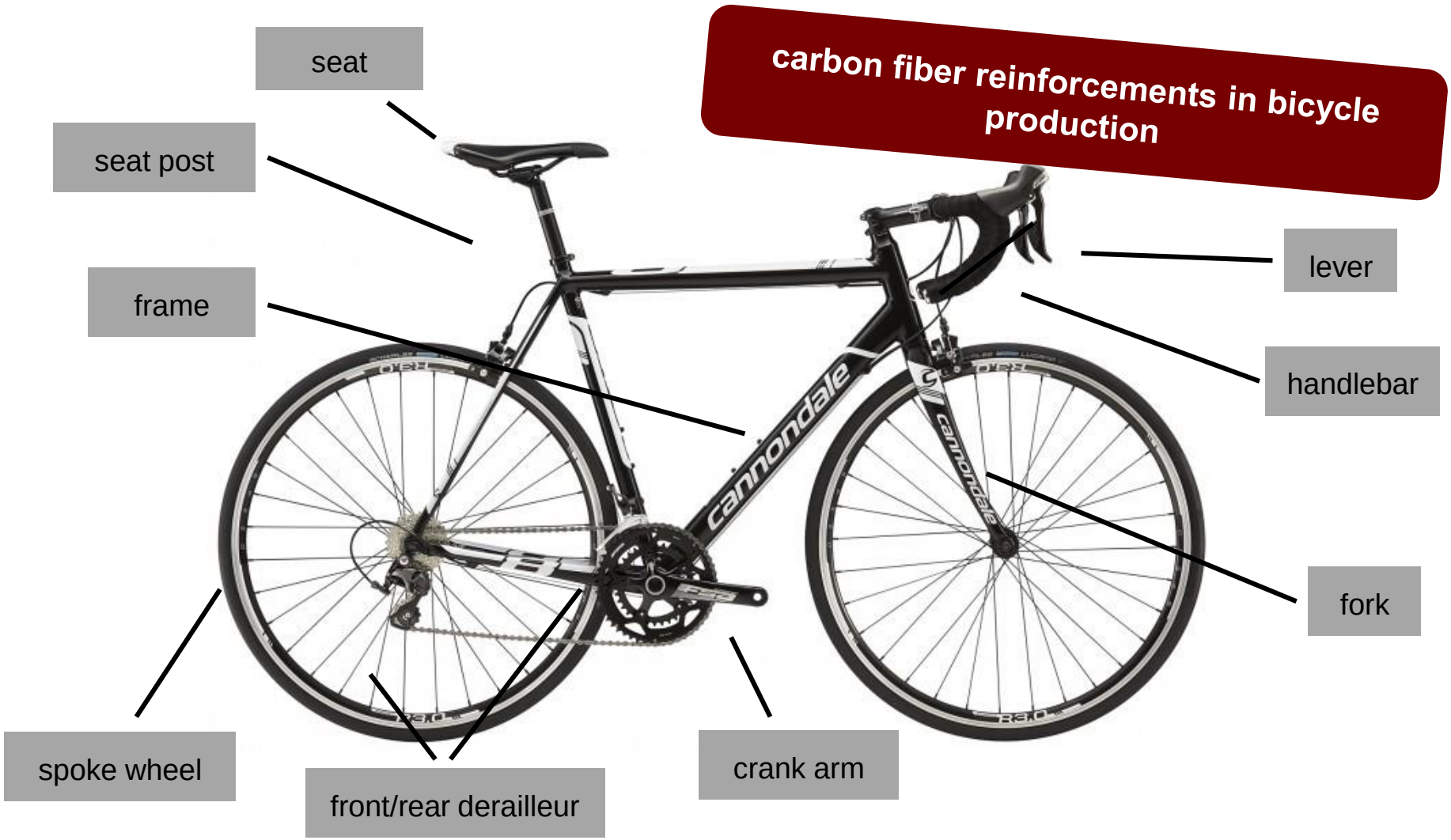

Specification of the research field

Source: cannondale.com

The Patent lanes (# patent applications: 264, # patent lanes: 30) feature all essential components of a bicycle and their development over time.

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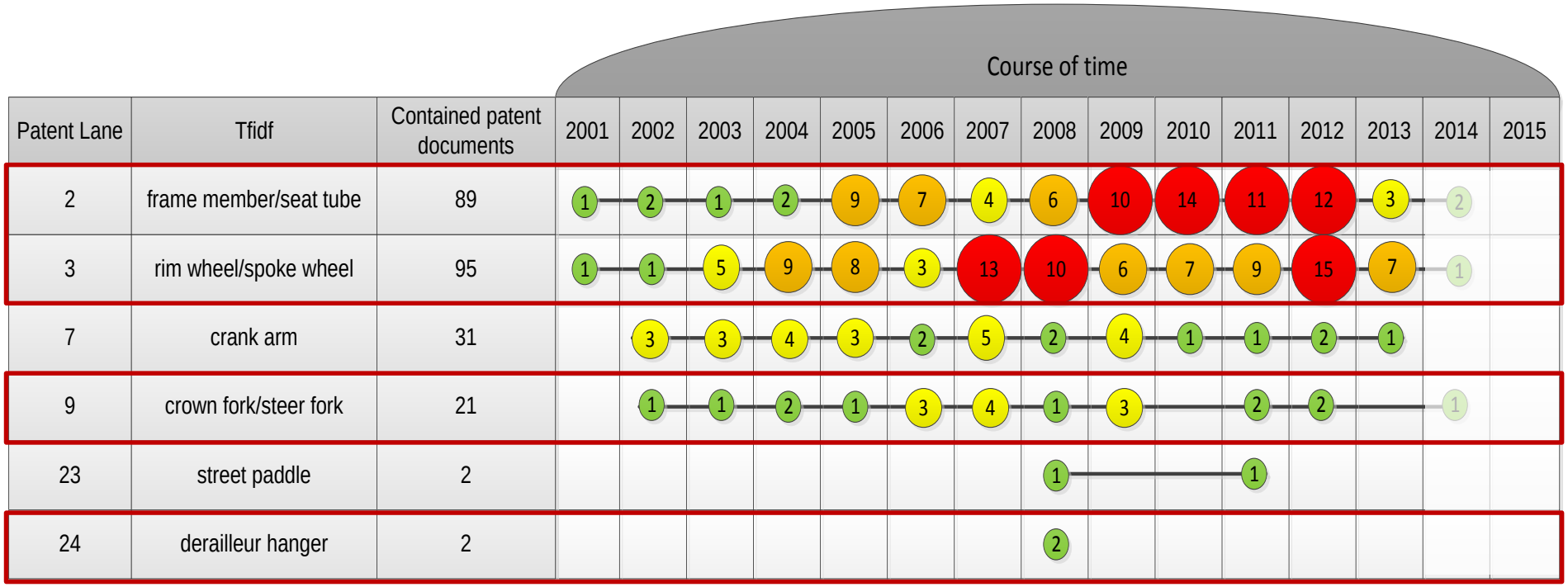

Frames and wheels indicate a development focus on carbon components.

Forks are often made of an aluminium-carbon-composite.

Certain derailleur group components are (partly) made of carbon: brake lever, derailleur, derailleur hanger, crank arm.

- high frequency
- medium frequency
- low frequency

Results – Strategic technology planning

Ref.: own representation, based on Frischkorn & Möhrle 2015

Agenda

Technological convergence

Technology planning

Technology evolution

Source: IPMI 2016

In what way are technological innovation accompanied by business methods?

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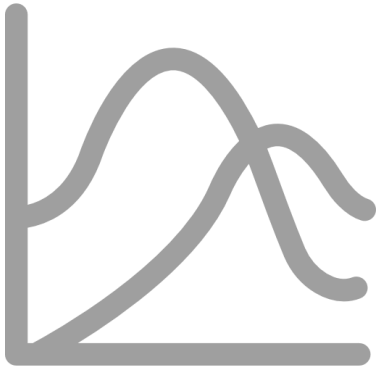
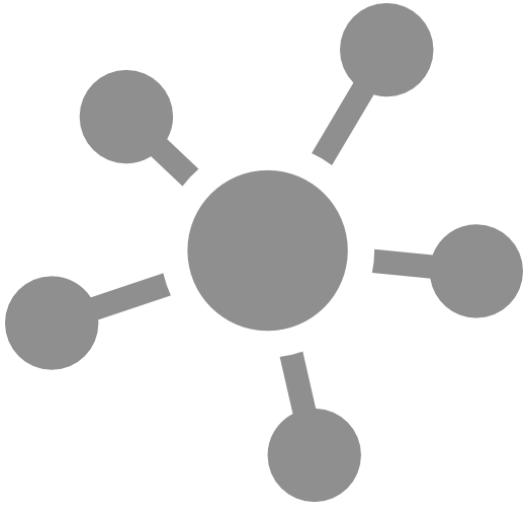
Is there an evolution of business method innovations apart from technological innovations?

Which course does business method innovation take?



Do the organizational origins of business method innovations differ from the organizational origins of technological innovations?

Do the involved companies specialize in any particular way?



Could this direct us to the main application fields?

What are the key-topics of business method innovations in the field of RFID?

Is RFID introduced on a broad scale across industries at the same time or in a recognizable sequence?

What is the sequence in which application fields are influenced by RFID?

Source: Icon made by Khamsriwath from www.flaticon.com, Icon made by Freepik from www.flaticon.com

Motivation

The best protection of an invention combines technological and business method patents.

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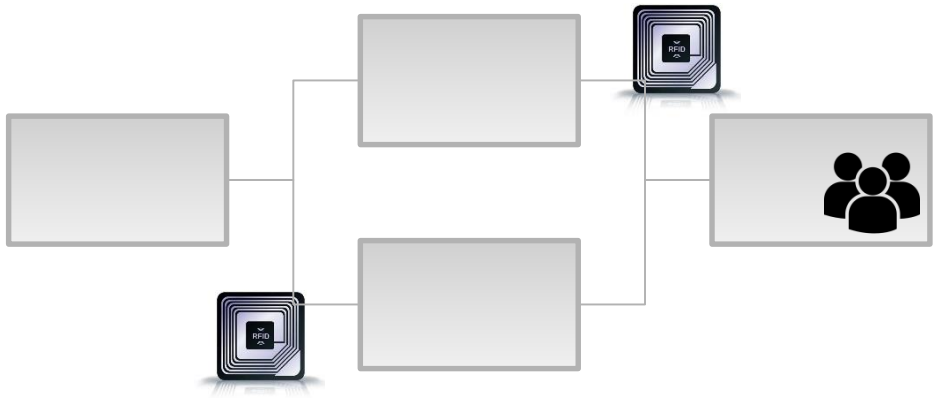


Technological patents:

- technological information
- product features

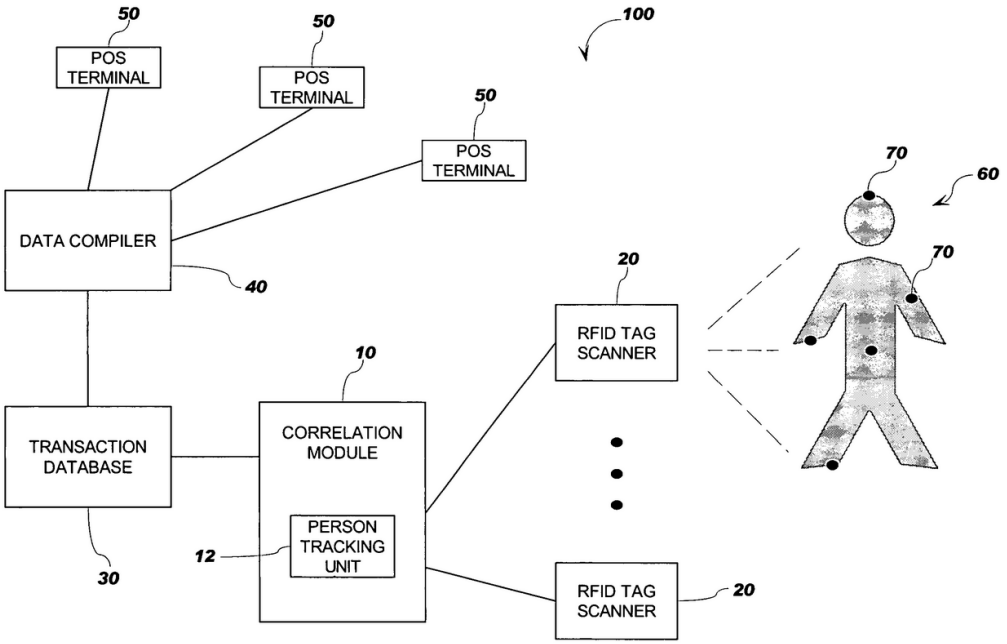
Business method patents:

- integration in customer-related processes
- application fields of RFID

Protection from technological and business method patents

Source: Susdorf.de
Icon made by Freepik [2] from www.flaticon.com

RFID technology is an interesting example because it is used in many business methods.



Business method patent US 7076441 B2

- **Title:** Identification and tracking of persons using RFID-tagged items in store environments
- **Original Assignee:** IBM
- **Current Assignee:** Toshiba Global Commerce Solutions
- **Filing date:** 03.05.2001

Business methods deserve special attention:

- specific type of complementary asset, which serves to derive benefit from innovations
- “fifth Kondratiev wave” changes how companies do business, which necessitates the introduction of new business methods
- business success also depends on organizational aspects, next to successful product and process innovations

Early example of RFID application in a business method

Source: Rothaermel and Hill, 2005; Chesbrough & Rosenbloom, 2002; Teece, 2010; Ernst, 2001; USPTO 2016

Technological patents and business method patents seem to be quantitatively related to each other.

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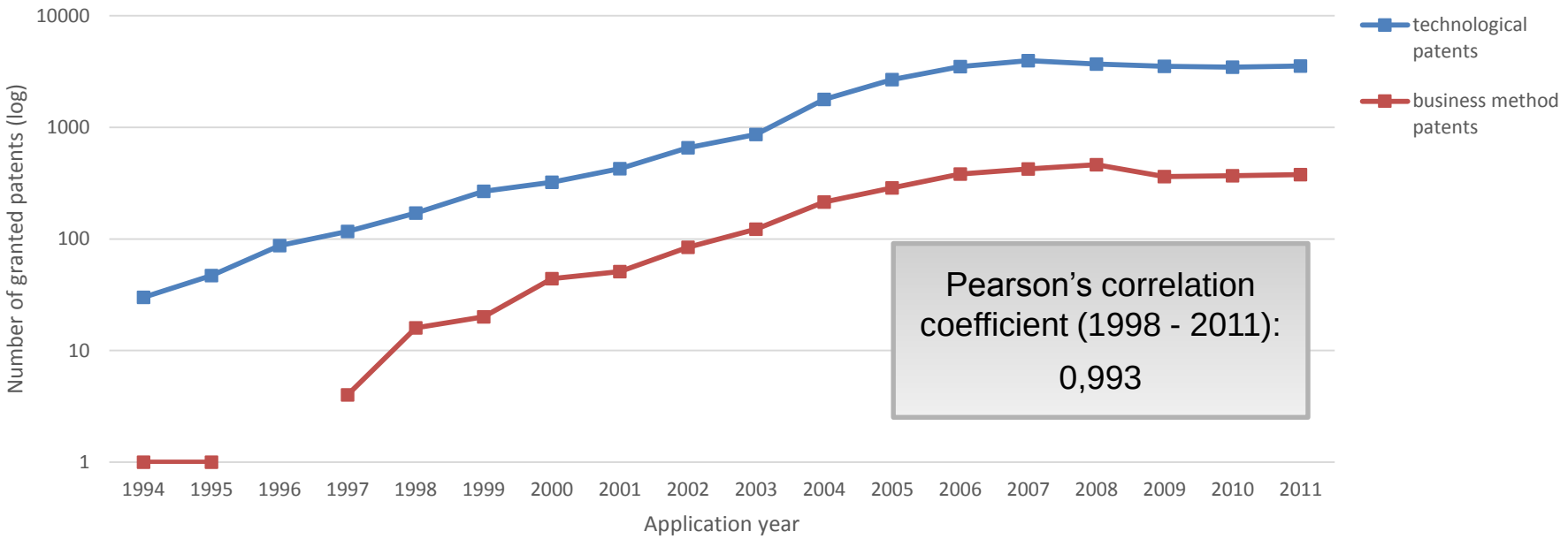

1. Search query for RFID related technology patents (PATFT data base, USPTO)

(RFID OR "radio-frequency identification" OR "radio frequency identification") AND ISD/01/01/1990->31/12/2014 ANDNOT CCL/705$

Result: 33.215 technology patents

2. Search query for RFID related business method patents (PATFT data base, USPTO)

(RFID OR "radio-frequency identification" OR "radio frequency identification") AND ISD/01/01/1990->31/12/2014 AND CCL/705$

Result: 3.764 business method patents

Frequencies of granted patents in the course of time

Source: IPMI 2016

In contrast, the organizational origins of business method innovations seem to differ from technological innovations.

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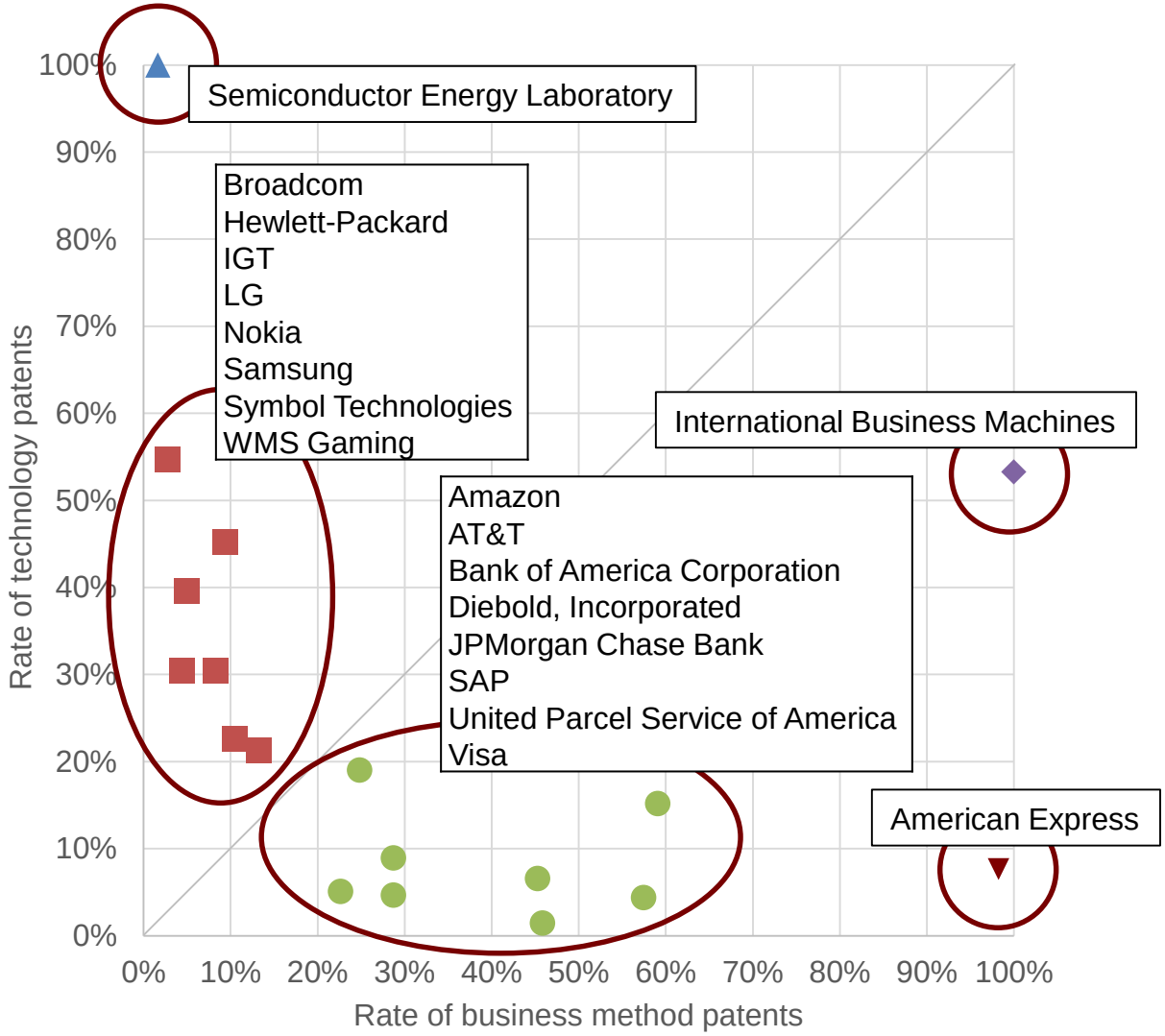

Cluster 1:
Technology specialist

Outlier 1:
Technology specialist (extreme)

Cluster 2:
Application specialist

Outlier 2:
Application specialist (extreme)

Outlier 3:
All-rounder

Comparison of companies which are active in the field of RFID

Source: IPMI 2016

Bi-grams, calculated by tf-lag-idf, give the foundation for the identification of application fields.

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Application field	Concepts / Bigrams				
payment / finance	account payment card service cash deposit cash handle cash recycler	data debtor debtor primary debtor secondary digital payload	directory payment dunnage platform entry transaction instrument payment	loan plurality loan predetermine mobile payment module payment	payload watermark payment selectable plurality prepaid store transponder
logistic	area storage container device container medicine container removable	content protection customer inventory data mail delivery package	delivery tote grocery store identification mail identifier package	inventory management inventory manufacturer inventory product item mass	mail verification mass sensor protection system RFID store
medicine	account health blood data blood sleeve blood vessel	calculate dose clinician device device medical dose medication	dose regimen dose time medical product medical treatment	medical unit medication user portion vessel sleeve vessel	

- Bi-grams from a window-size of 5
- Qualitative classification based on top 20 bi-grams
- Reduction of concepts with obvious non-information (e.g. detect device, specific rule)

Application fields of RFID related business methods

Source: IPMI 2016

We assume that RFID technology diffuses into different application fields over a certain time span and is not applicable directly.

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Application field	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Number of years
liquid	2		3															2
vehicle traffic	2					2			1					2	1	2	2	7
identification		1					3							1			2	4
trade / customer		4		2		4					4							4
logistic			4	6	3	1	1	1	2				1	3				9
air traffic				2				3						1			2	4
medicine				1	3	1				11								4
payment / finance					3			2	2		4	5	1		3		1	8
games / video								1	3									2
construction											1		4					2
Number of application fields	**2**	**2**	**2**	**4**	**3**	**4**	**2**	**4**	**4**	**1**	**3**	**1**	**3**	**4**	**2**	**1**	**4**	

- investigation starts in 1998, because only five RFID patents were classified as business method patents before 1998
- ten different application are influenced by RFID gradually over ten years (1998 to 2008)
- first, industrial applications were influenced, later service applications

Chronological development of application fields

Source: IPMI 2016

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Intellectual Property Management

7D Patent Management Maturity Model

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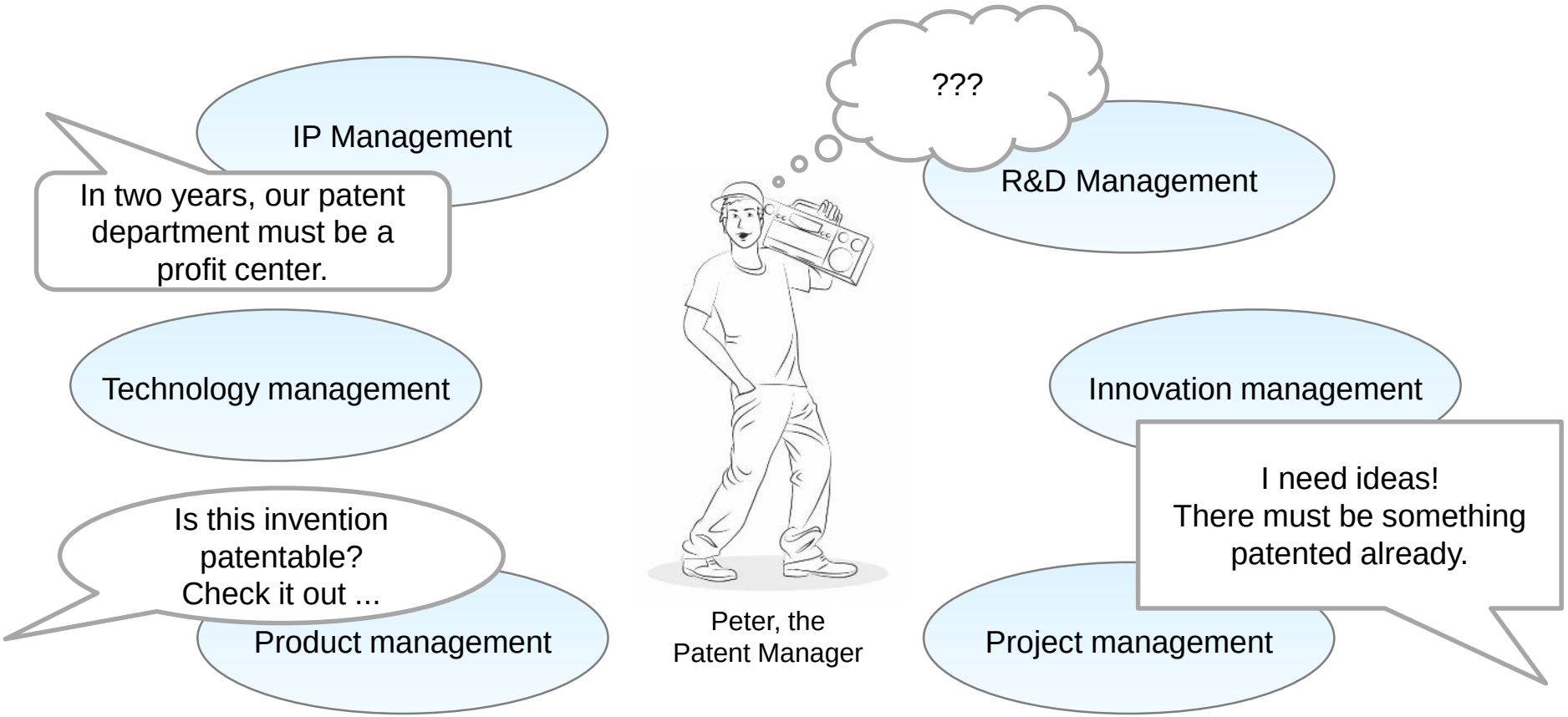
Intellectual property management, especially patent management, is in the tension field of various corporate functions.



Source: IPMI 2016; Walter & Schnittker 2016, S. 265

Design: Xenia Gesthüsen

Some problems regarding the current literature and current research studies in the field of patent management exist.

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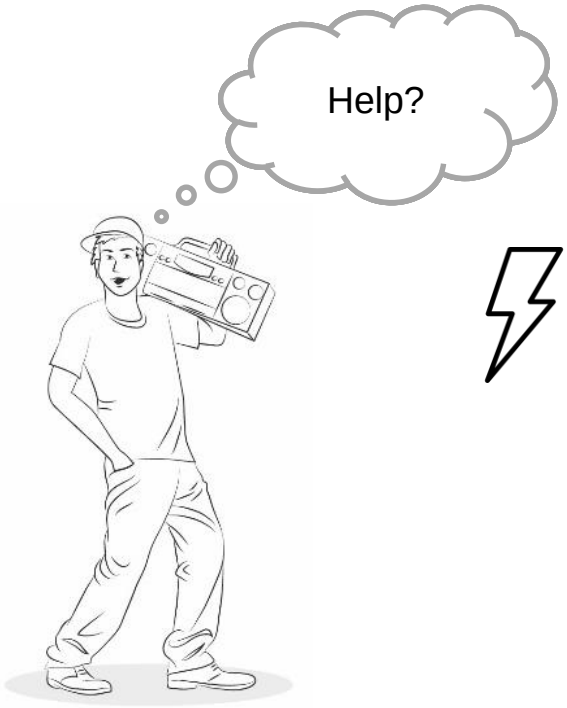
Description of patent functions and not of tasks related to patent management

Description of an ideal conception or specific case studies

Rarely, a holistic view of patent management



Peter, the Patent Manager

Graduation of the patent management tasks are not given (in detail).

Derivation of action measures difficult

Source: IPMI 2016; Walter & Schnittker 2016, S. 265

Design: Xenia Gesthüsen

An advantage of maturity models is the predefined, consistent framework, which can be used as a documentation of quality.

Peter, the
Patent Manager

Strengths and weaknesses can be identified and measures for improvement can be defined.

A predefined, consistent framework is used and maturity levels can be used as documentation of quality.

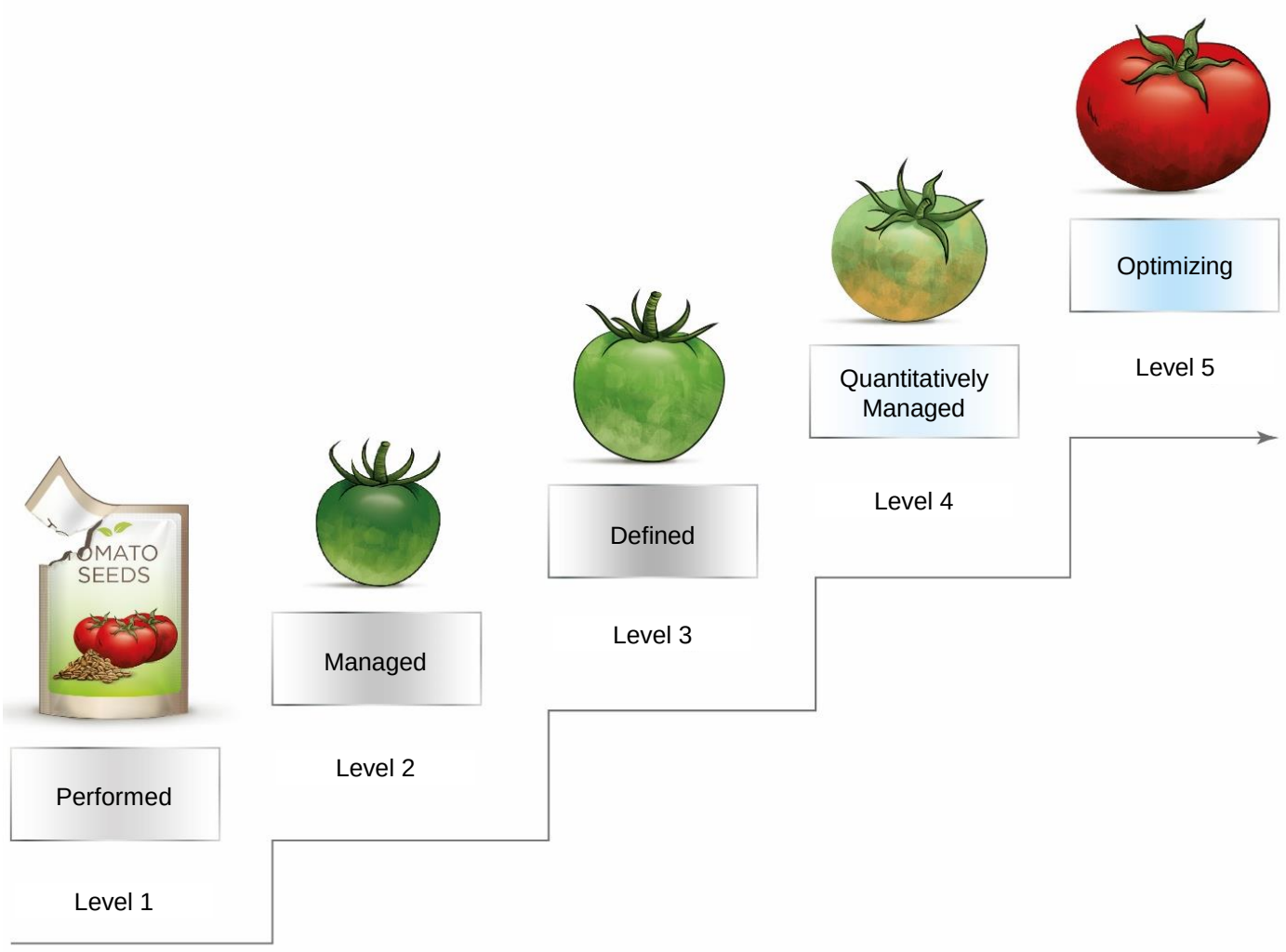
Different organizations or different business units within an organization are comparable.

Mutual support between organizations or within an organization between business units leads to an efficient use of resources.

Source: Fraser et al. 2002; Röglinger und Kamprath 2012; Jacobs 2013; Kamprath 2011; Khan 2016

Nutzen eines Reifegradmodells

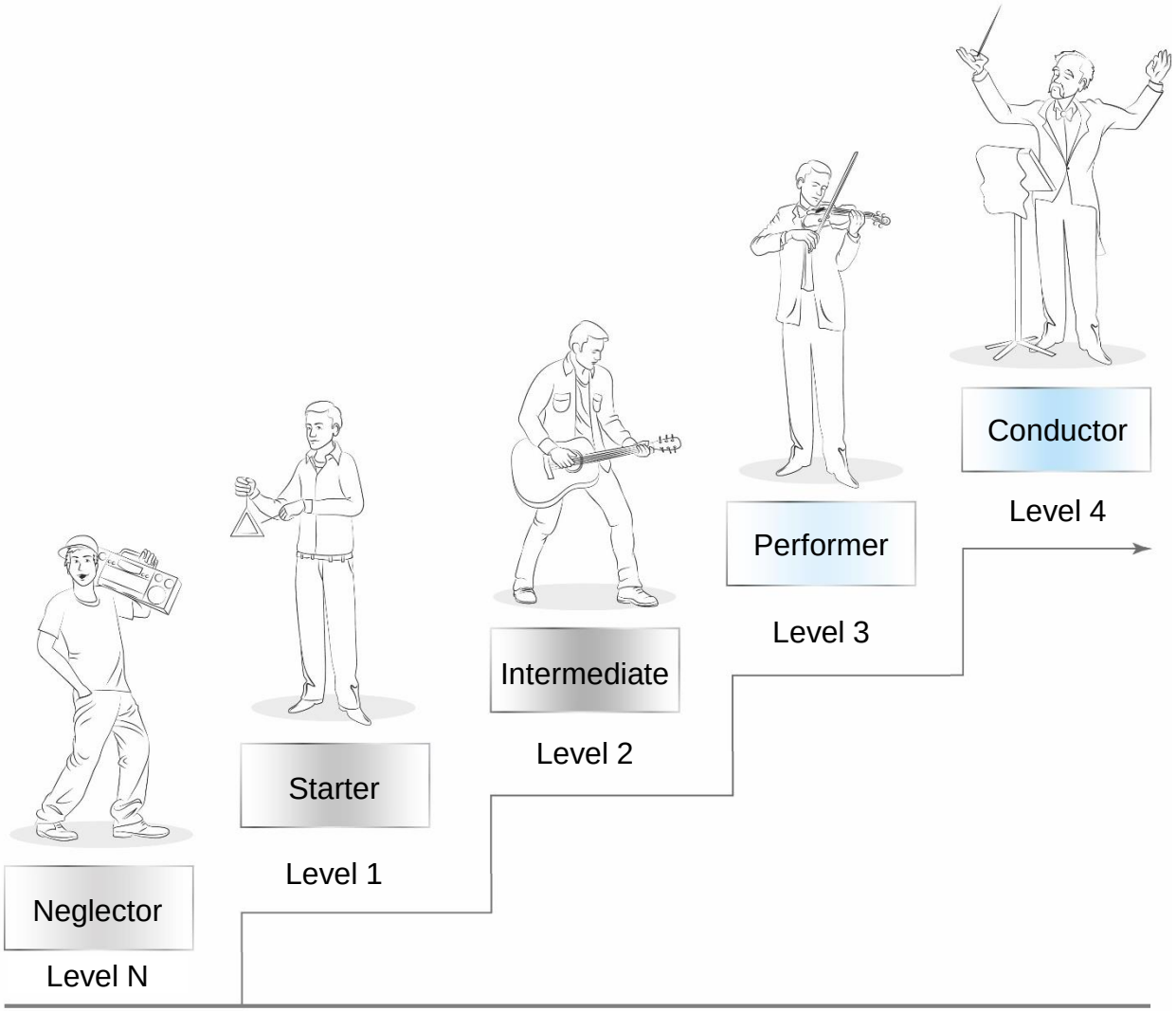
The basic idea of a maturity model is the description of a process in maturity levels.



Corporate development supported by a maturity model

Source: IPMI 2016, Paulk et al. 1993
Design by Xenia Gesthuesen

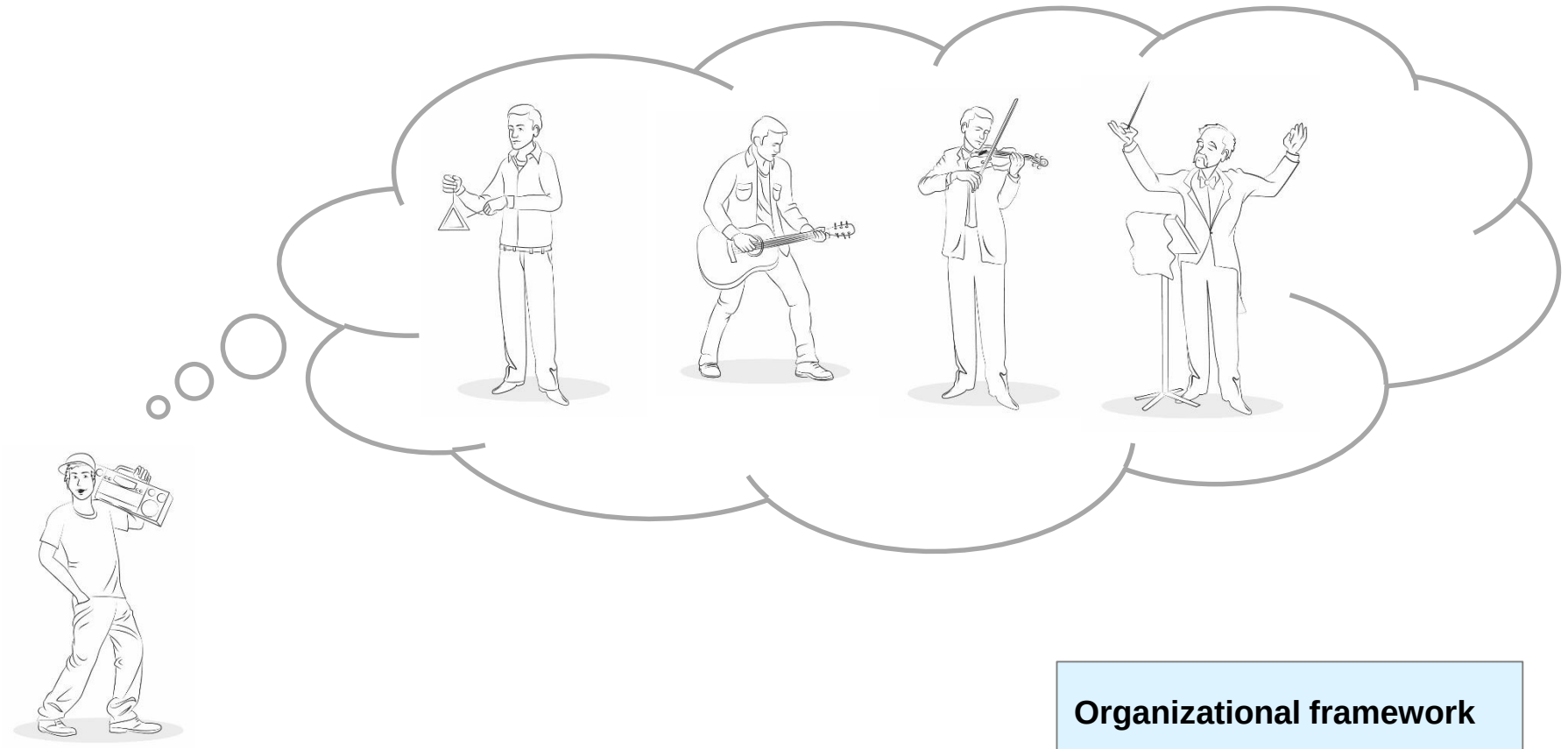
The basic concept of the patent management maturity model is to describe the different capabilities in maturity levels.



Idea for the Patent Management Maturity Model

Source: IPMI 2016;
Design by Xenia Gesthuesen

The basic concept of the patent management maturity model is to describe the different capabilities in maturity levels.

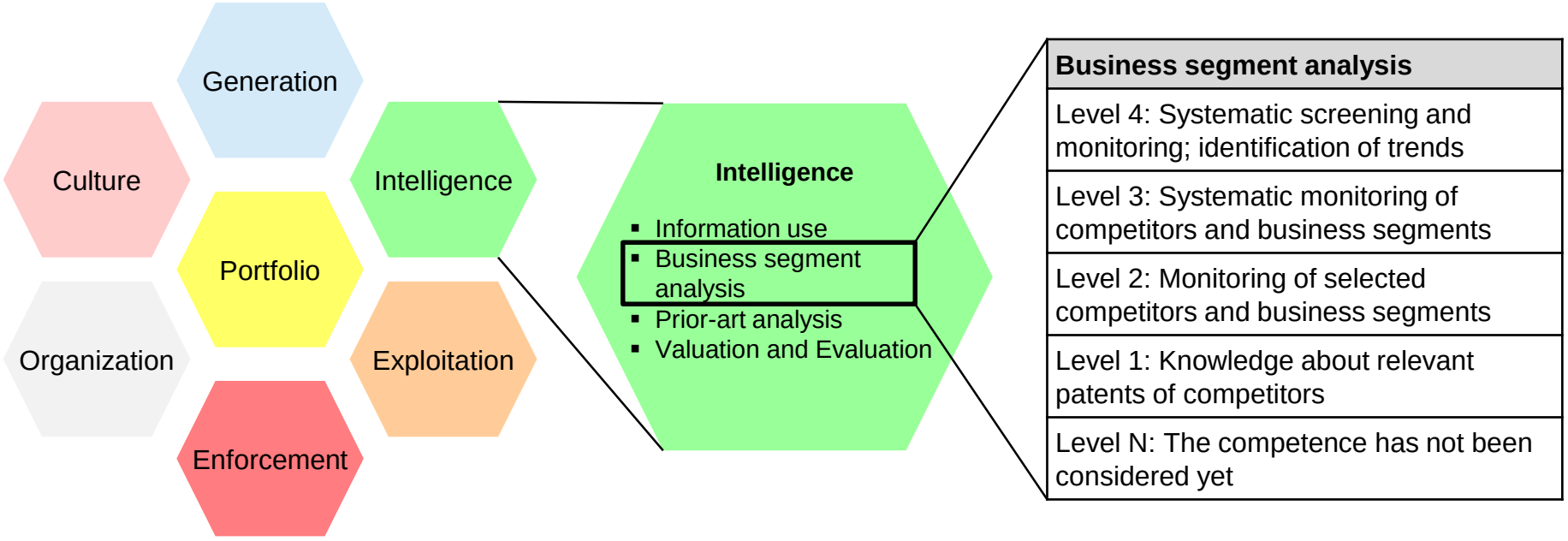


Organizational framework

Idea for the 7D Patent Management Maturity Model

Source: IPMI 2016;
Design by Xenia Gesthuesen

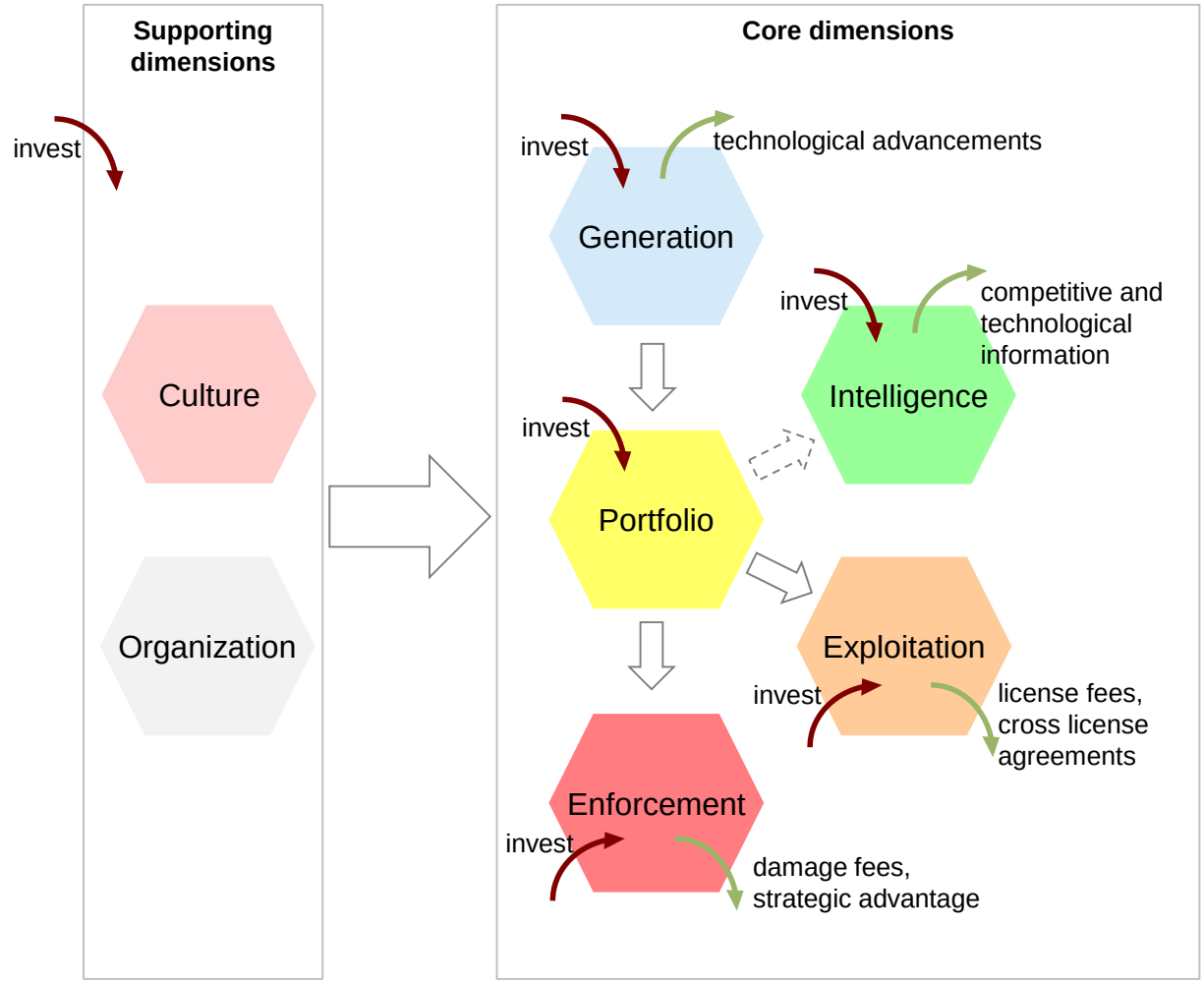
The 7D Patent Management Maturity Model is structured in a hierarchical manner.



Structure of the 7D Patent Management Maturity Model

Source: IPMI 2016

The 7 dimensions of the maturity model cover important aspects of "general management".



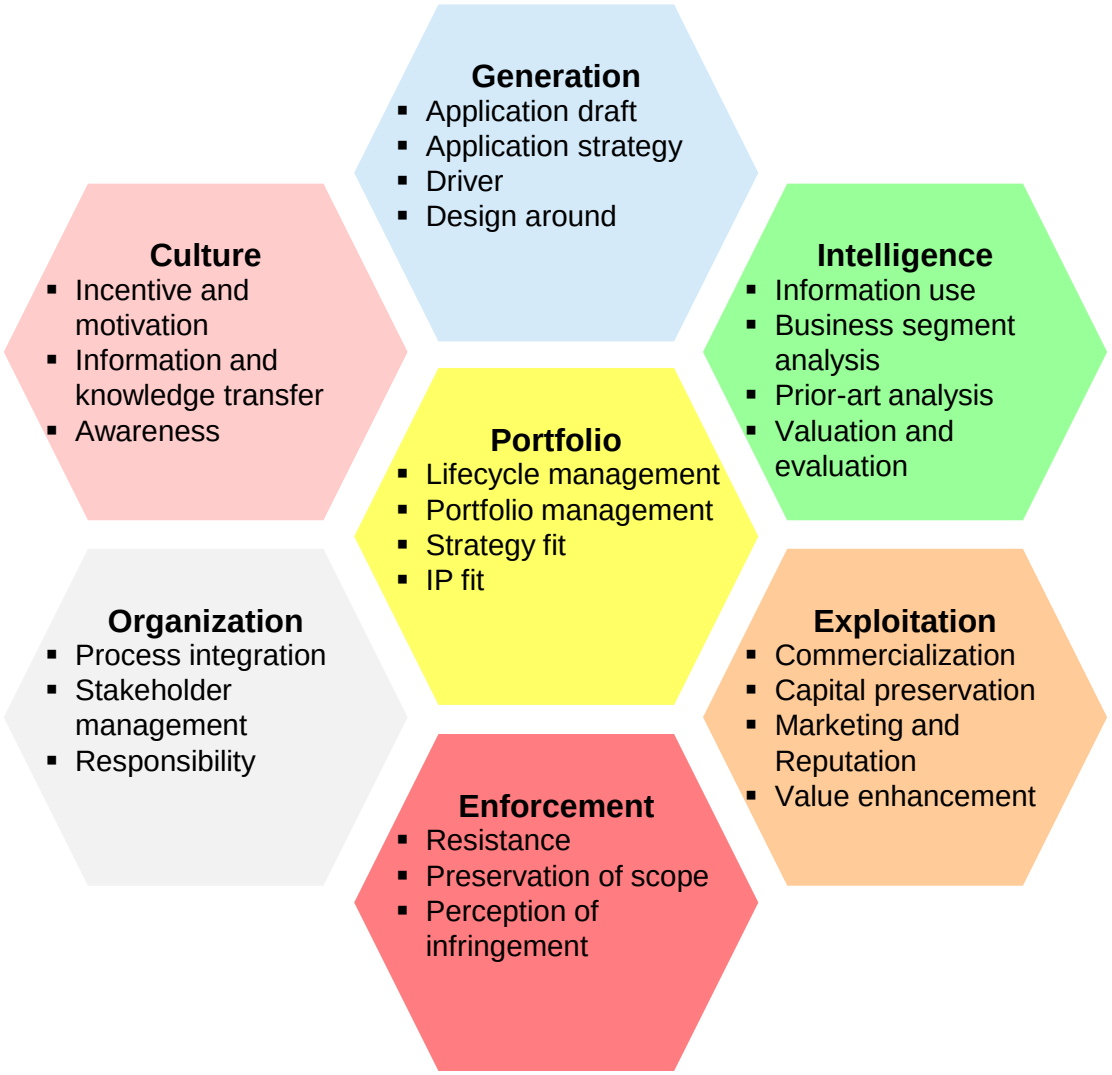
Conditions for a dimension

- One dimension covers one important aspect of patent management
- A distinction is made between core and supporting dimensions
- Core dimensions can be switched on or off by management decision
- Performance indicators (KPI) can be defined per core dimension
- A dimension contains several elements that can be executed at different levels

Dimensions of the 7D Patent Management Maturity Model

Source: IPMI 2016

The 7D Patent Management Maturity Model enables a holistic view on the patent management of an organization.



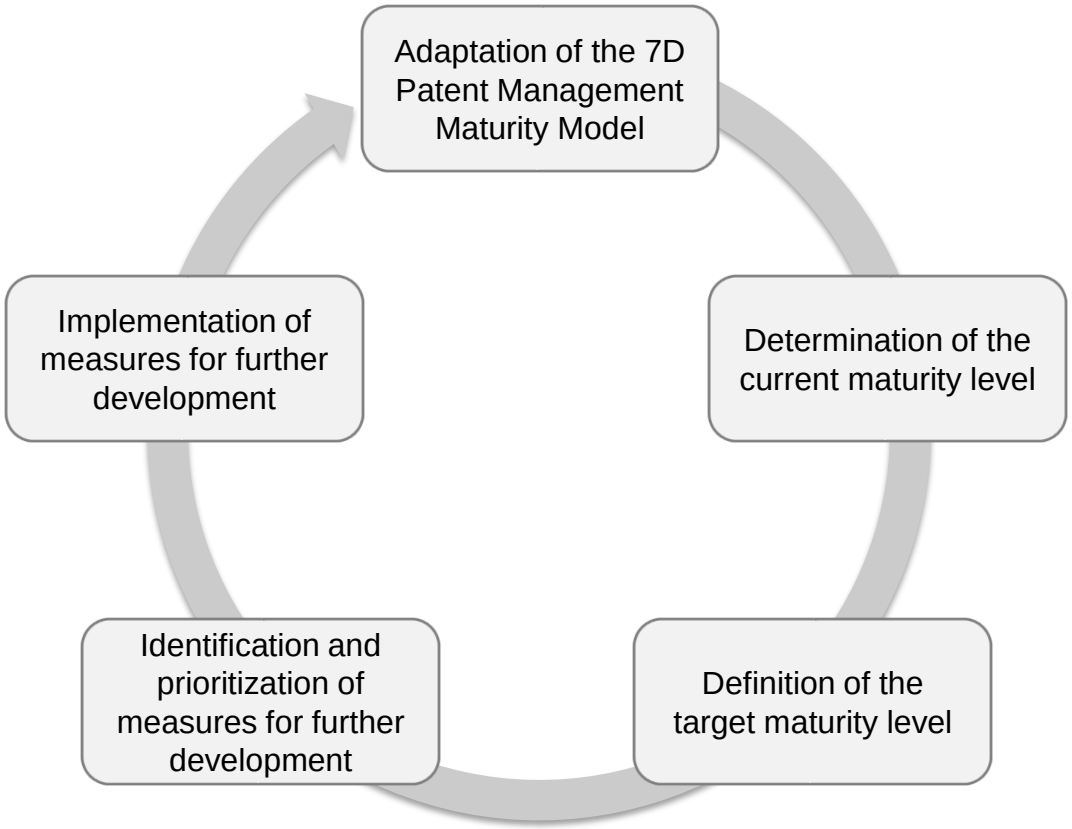
Conditions for a dimension

- One dimension covers one important aspect of patent management
- A distinction is made between core and supporting dimensions
- Basic dimensions can be switched on or off by management decision
- Performance indicators (KPI) can be defined per core dimension
- A dimension contains several elements that can be executed at different levels

7D Patent Management Maturity Model

Source: IPMI 2016

The patent management maturity model can be applied by following five subsequent steps.

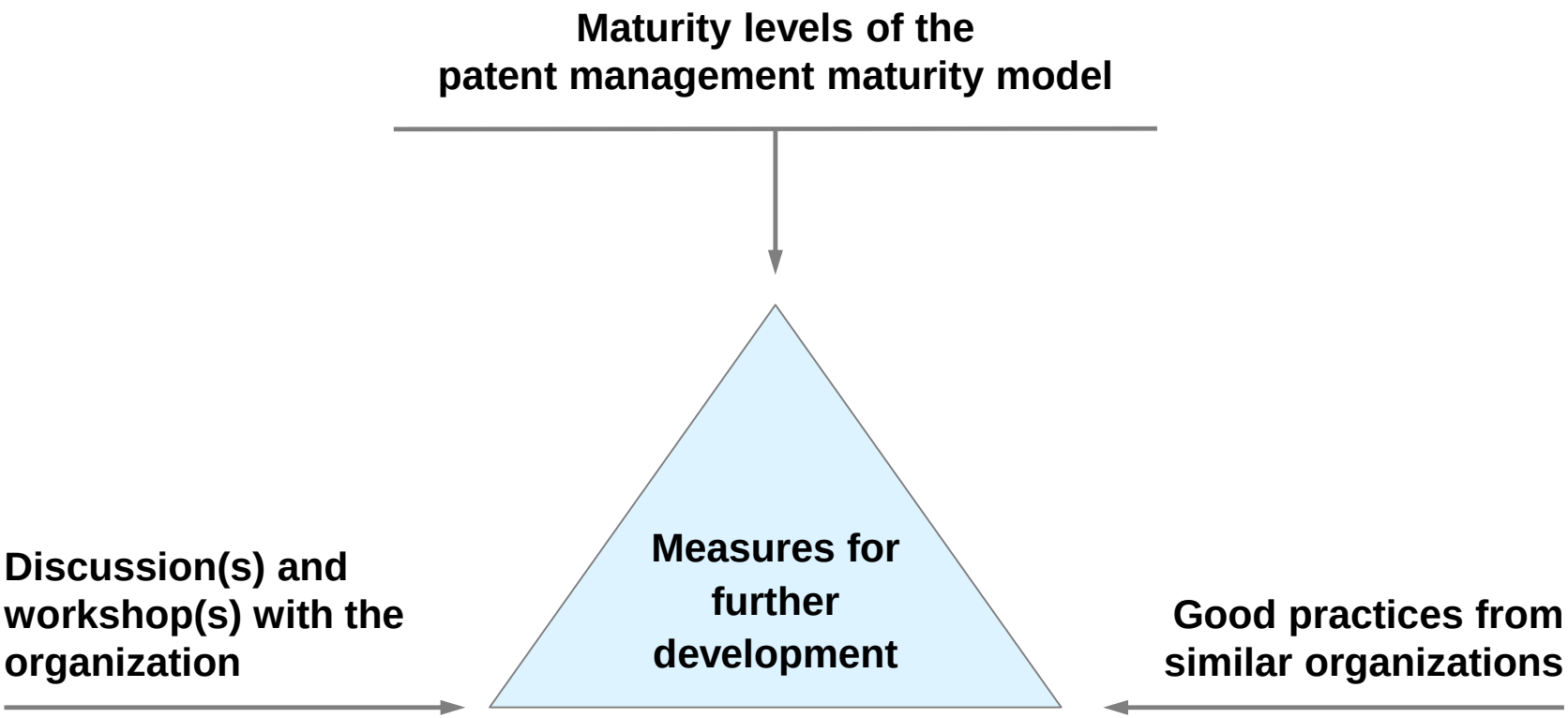


After the determination of the current maturity level, the target maturity level can be reached by identifying, prioritizing and implementing measures for further development.

Application of the patent management maturity model

Source: IPMI 2016

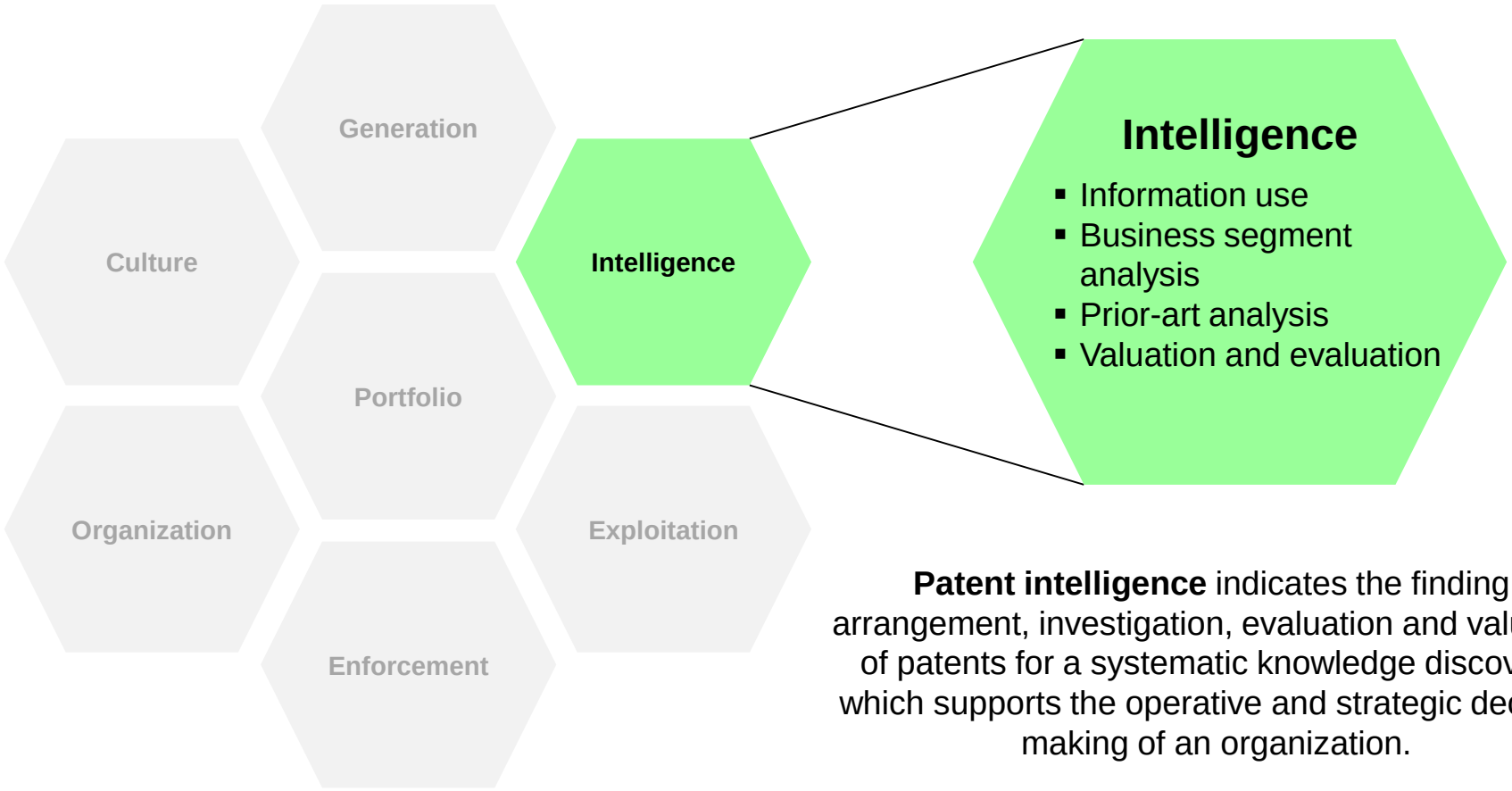
Three possible ways exists to generate an individual set of measures to further develop the patent management.



Measures for further development

Source: IPMI 2016

The dimension “Intelligence” consists of four different competences, which deal with knowledge gathering.



Patent intelligence indicates the finding, arrangement, investigation, evaluation and valuation of patents for a systematic knowledge discovery, which supports the operative and strategic decision making of an organization.

Source: Own definition based on Walter und Schnittker 2016; Abbas et al. 2014; Park et al. 2013; Kaiser 2012; Lupu et al. 2011; Möhrle et al. 2010; Tseng et al. 2007; Porter und Cunningham 2005; Trippe 2003

Patent Intelligence Capabilities

The competence “Information use” focuses on how patent information is generated within the organization.

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Intelligence

- **Information use**
- Business segment analysis
- Prior-art analysis
- Valuation and evaluation

Information use

4	A centrally coordinated and continuous information retrieval is implemented to analyze quantitative and qualitative information from patents.
3	Methods and tools are regularly used for information retrieval from patents. This information is made available centrally.
2	If necessary, specific methods and tools for information retrieval from patents are used in the organization.
1	In the organization, no particular methods or tools are used for information retrieval from patents.
N	The competence has not been considered yet.

Source: IPMI 2016
Design by Xenia Gesthuesen

The competence “Business segment analysis” focuses on analyzing technology evolution and competitors’ behavior.

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Intelligence

- Information use
- **Business segment analysis**
- Prior-art analysis
- Valuation and evaluation

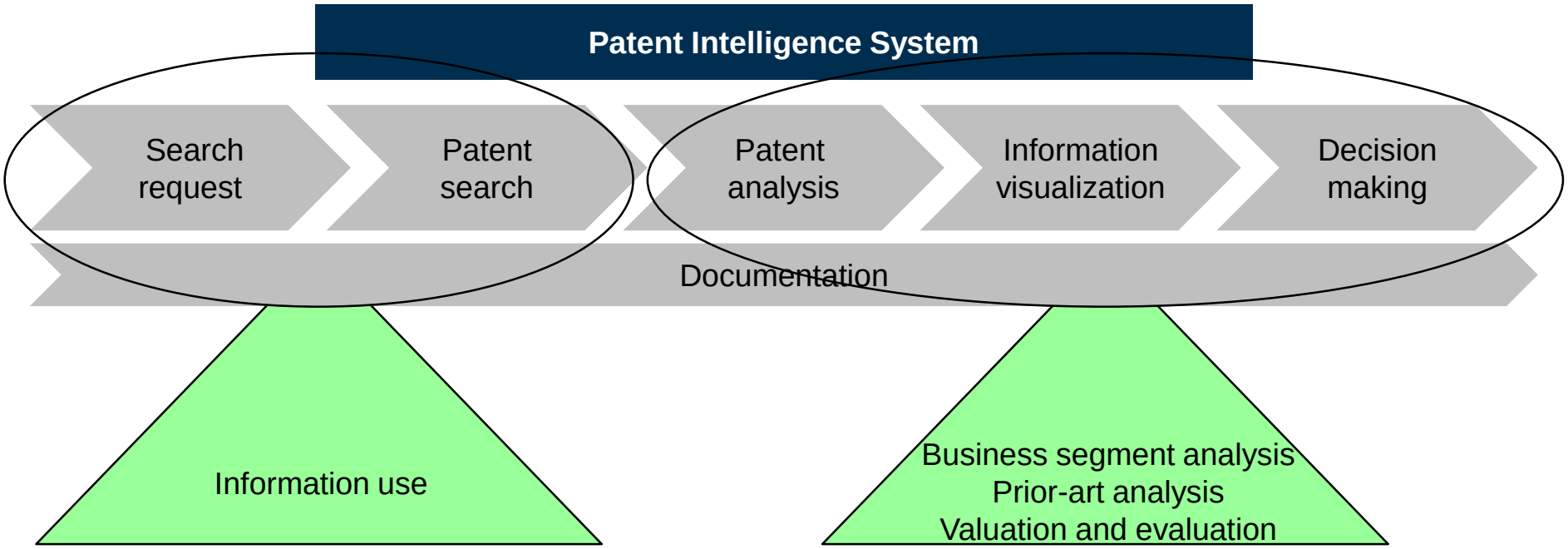
Geschäftsfeldanalyse

4	The organization practices a systematic screening and monitoring beyond its area of business to identify trends early on.
3	The organization practices a systematic monitoring of its area of business with special regard to its competitors and the technologies used.
2	In selected business segments, the organization knows the patents of (direct and indirect) competitors.
1	The organization knows its own patents and, in selected business segments, it knows the most important patents of direct competitors.
N	The competence has not been considered yet.

Geschäftsfeldanalyse

Source: IPMI 2016

A patent intelligence system supports the implementation of patent intelligence competences within an organization.



Level 4 (Information use):
- Centrally coordinated
- Specific methods and tools
- Continuous information retrieval

Level 4 (Business segment analysis):
- Systematic screening and monitoring
- Early identification of trends
- Not only in own business segments

Connection between the PI System and the maturity model

Source: IPMI 2016

A patent intelligence system supports the implementation of patent intelligence competences within an organization.

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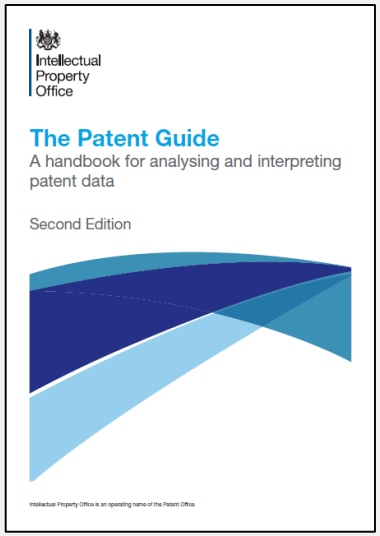
Patent Intelligence System

Search request → Patent search → **Patent analysis** → Information visualization → Decision making

Documentation

Bibliographic analysis

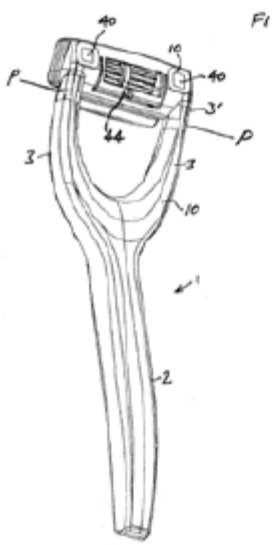


Text analysis

Connection between the PI System and the maturity model

Source: IPMI 2016, IPO 2015

Geographical representations allow comparison between patent systems or the filing habits of applicants in different countries



GB2452411B
GB2452412B
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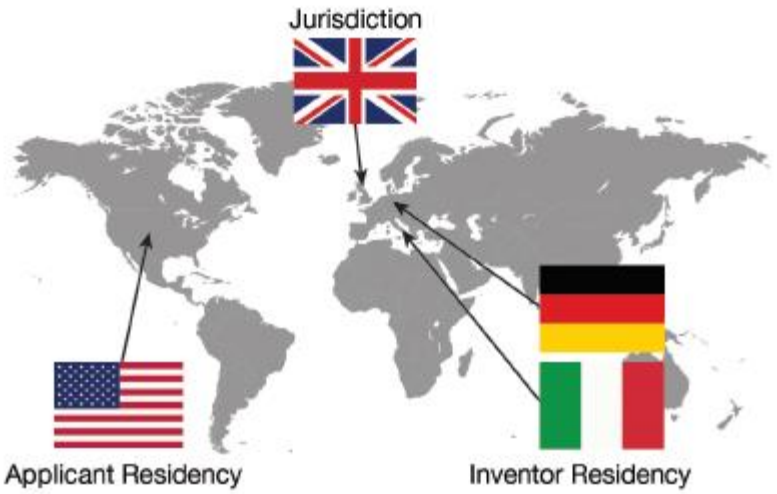


Jurisdiction:

- Represents the geographical area in which patent protection is required.
- First two letters of a patent number usually represent the jurisdiction of protection.

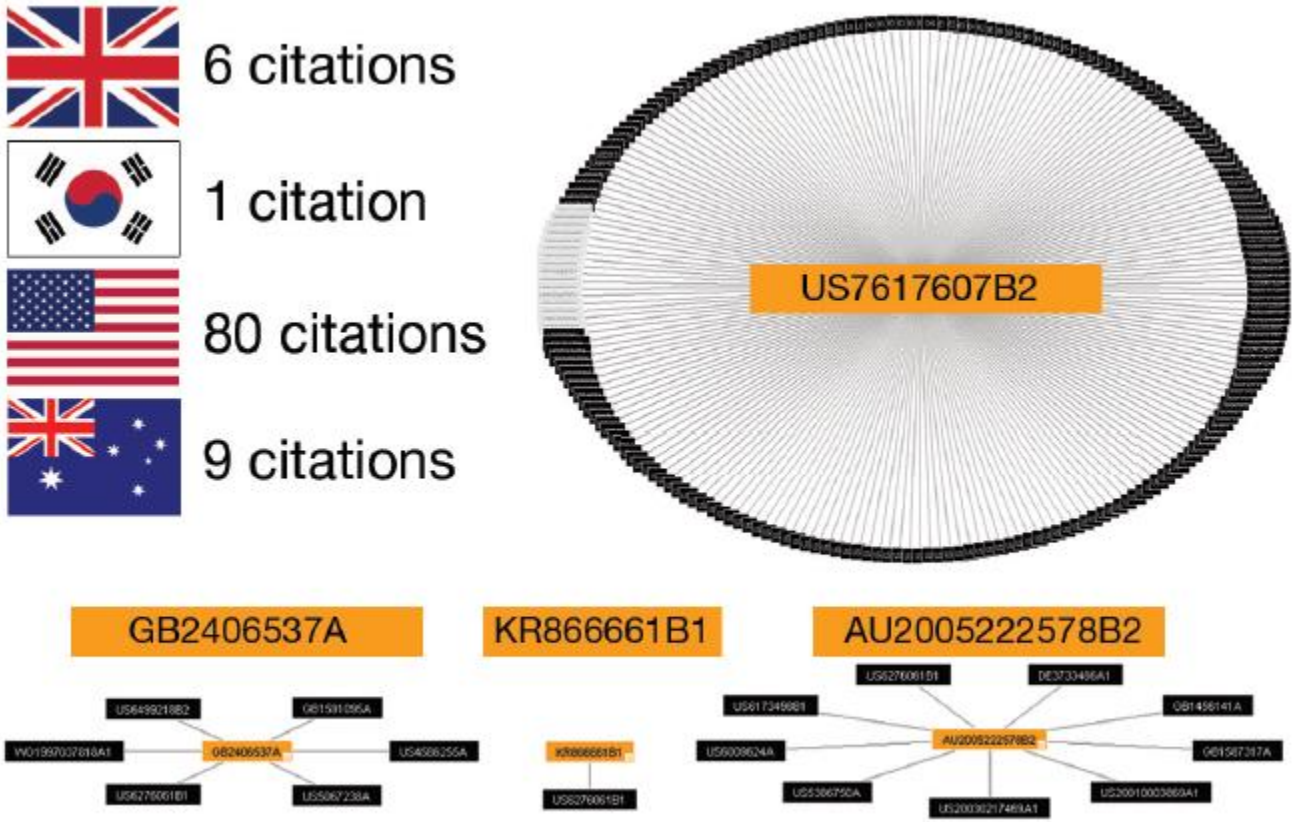
Residency:

- Represents the country, the applicant (original owner), assignee (current owner) and inventor(s) have stated as part of their address.
- The address may be that of the head office of a company rather than the from which the application was made.

Jurisdiction and Residency

IPO 2015

A citation is prior art relevant to the patent, but IP offices have different rules for how citations are determined and reported.



The claims of a patent application provide statements defining the scope of protection sought. On a granted patent the claims define the exact scope of protection.

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Patent as filed		Granted patent
EP2278401A 48 claims		EP2278401B 133 claims
US2006/0114445A1 34 claims		US7321419B2 7 claims
CN1802726A 26 claims		CN100459036C 26 claims
JP2012138618A 33 claims		JP5488635B2 114 claims

- Number of claims on four patents in the same patent family
- No correlation between the number of claims on each patent (filed or granted)
- Simple claim counting should not be used for analysis
- Difference in length of claims for the same invention filed in two jurisdictions (drafted by different patent attorneys) is possible

US2009/0318167A1
Claim 1 = **88** words

EP2677344A1
Claim 1 = **165** words

88%
increase

Collaborative research in patent management is happening and can be expanded to the field of innovation management.

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Conclusion

Intellectual Property might not be the most boring subject in the world, or is it?

Different ways to analyze patent data, also for strategic management decisions

The 7D Patent Management Maturity Model support the development of PM

A patent intelligence system supports the implementation of patent intelligence

Students, researches and enthusiasts are more than welcome to do research in Bremen

Conclusion

Source: IPMI 2016

Thank you very much for your kind attention.

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