

PCF - Process Classification Framework by American Productivity and Quality Center (APQC)

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Modellierung nachhaltiger Systeme und Semantic Web

Abstract. In the world of enterprises, effectiveness is key to survival and to being productive. Often enterprises are struggling with the modelization of existing processes within the enterprise. That's why it is necessary to have tools that are capable of developing such models. There are a lot of different PCM systems which are used in all sorts of different fields but there is one particular model which is used so often that its name alone gets used as a synonym for PCM systems. The model in question is the PCF by APQC. This is the model which is the most common among enterprises in all possible fields. There are countless reasons why this system is popular with the most known being the fact that the system is free, public and universal. This allows for another benefit which is essential in a competitive environment. All these reasons make it sound as using the PCF should be a no brainer for any enterprise but is this the truth or just another case of over the top marketing?

1 Introduction to Process modelling (PCM)

Process modelling is often referred to as Process Classification Framework simply for the reason that the PCF is the most common model used and thus seen as a representation of PCM while in reality, PFC is a form of PCM. Process modelling itself is usually referring to business process modelling while PCF is referring to a Framework that is used for that purpose.

Those models are usually a collection of similar processes which are being classified within the model. Thus the model can be seen as a description of processes on the type level.

It is worth noting that a model is used for many applications of similar nature. Usually, the model is not developed for an application but rather a process that occurs in a specific business field. That's why the models can be applied to different applications as long as the field itself suits the model.

PCM is usually developed with 3 goals in mind. The first goal is to be descriptive which means that the model is supposed to track what's happening during a process from the viewpoint of an external observer. The second goal is to be prescriptive which means that desired processes are being defined. In addition to those processes, a set of guidelines/rules and behaviour patterns is being established. The purpose of those guidelines is the improvement of the existing processes.

The final aim of the model is to explain the existence of the processes themselves. This means that the model is supposed to prove that a given process is necessary and not obsolete. The model is also supposed to check for other available options based on rational arguments while establishing linking points between requirements and processes. [1]

2 Overview of different Frameworks

Even though this research is centred on the APQC-Framework which is considered the most famous and most commonly used Framework for Process Classification there are quite a few Frameworks worth mentioning. One lesser-known example would be the eTOM- The enhanced Telecommunication Operations Map. As the name suggests this is a model which is commonly used to describe the business process of telecommunication providers while also defining key elements and giving a guideline for the interaction of all the different elements.

The SCOR- Supply-chain operations reference model is a model which has been developed by the Supply-Chain Council as a cross-industry standard for supply-chain management. This model describes business activities that are associated with customer demand. It is worth mentioning that this model is based on four essential pillars which are: Process modelling and re-engineering, Performance

measurements, Best practices and skills.

Even though only two other Frameworks have been mentioned it's worth stating that there are more Frameworks for Process Classification just like the Value Reference Model. The process models can also be classified by coverage, alignment, granularity or flexibility. [4]

3 What is PCF by APQC?

Before talking about the product which is the Process Classification Framework it's worth taking a look at the author or rather the company responsible for the development of said Framework.

The company responsible for the development of said Framework is usually just referred to as APQC which stands for American Productivity Quality Center. The APQC claims to be the world's foremost authority in many fields like benchmarking, performance improvement and knowledge management to name a few.

APQC was founded in 1977 by Jack Grayson with the initial goal of being a company to provide businesses with information to improve the general workflow. This goal is being achieved by providing independent, unbiased and validated research on benchmark data.

Even though the APQC claims to be a non-profit organization it's worth stating that the APQC has many different forms of membership for different enterprises. Consequently, there are free memberships that could be compared to a trial version of the Framework just as there are paid memberships for complete access to the Framework. Also, a lot of said enterprises have quite the influence on APQC since they are fundamentally supporting the existence of APQC with said memberships and donations. Hence it is really hard to support the claim of being a completely independent and thus unbiased organisation.

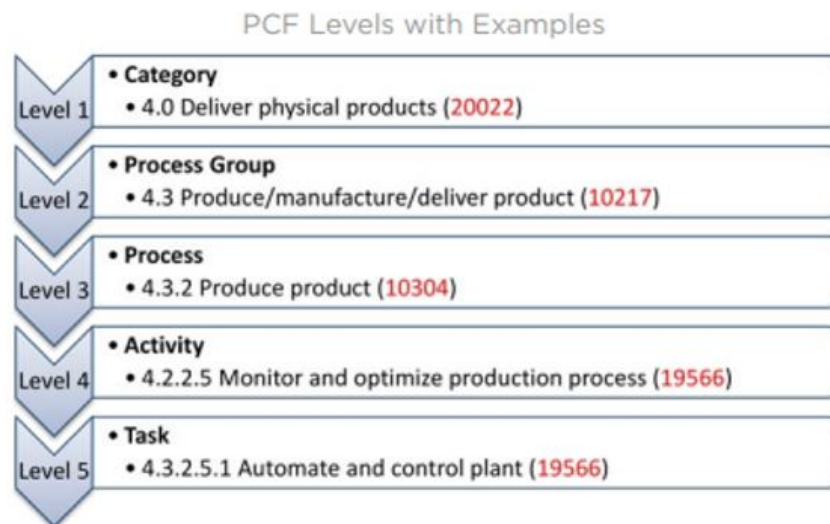
Nevertheless, the undeniable fact remains that the APQC is responsible for the development of PCF which in its base form is available to anyone visiting the site of APQC. Since its deployment in 1992 PCF has become the most used Businessframework worldwide.

The Framework itself is a collection of Businessprocesses that are used by any enterprise to establish a common language for commu-

nication and the definition of workflows. Communication is referring to the possibility of creating a sphere where enterprises can compare each other's processes by actively benchmarking against competitors. [5]

3.1 Construct of the Framework

The Framework can be described as a hierarchical structure of enterprise processes. The processes are divided into 5 levels displayed in the picture below:



PCF levels with Examples[2]

In addition to the 5 categories which are present in the example above there are 13 categories for work. Those categories are further divided into subgroups for further derivation. The red number is the process identification number. This number is unique for every process and only occurs once and thus could be compared to a primary key. Like the functionality of a primary key in a database, this number allows to directly access the linked element. On the other hand, 4.3.2 is the hierarchy number used to localise a process. Usually, this number is used when is required to get an overview of the connected process or simply the concrete process is unknown. Also, it is worth mentioning that every process is equipped with both numbers whether it happens to be a concrete process or even a supe-

rior group of processes. In conclusion, each element can be accessed by 2 methods which refer to the previously mentioned numbers.

3.2 Construction of Process Elements

As shown in the picture below every element is constructed from its children:

- 1.1.1 Assess the external environment (10017)
 - 1.1.1.1 Identify competitors (19945)
 - 1.1.1.2 Analyze and evaluate competition (10021)
 - 1.1.1.3 Identify economic trends (10022)
 - 1.1.1.4 Identify political and regulatory issues (10023)
 - 1.1.1.5 Assess new technology innovations (10024)
 - 1.1.1.6 Analyze demographics (10025)
 - 1.1.1.7 Identify social and cultural changes (10026)
 - 1.1.1.8 Identify ecological concerns (10027)
 - 1.1.1.9 Identify intellectual property concerns (16790)
 - 1.1.1.10 Evaluate IP acquisition options (16791)

Construction of Process Elements[2]

This means that every process group is constructed recursively by the processes that are contained within the group and so on. Looking at the example this would mean that 1.1.1 is built from all the processes which are found below it. It's also worth mentioning that processes within the group are in no particular order and could be aligned in any way the user sees fit.

3.3 What PCF is not

Often the PCF will be confused as a Framework that is supposed to create graphical images like flow charts to display existing processes. However, this is not the case since the PCF doesn't offer any tool or functionality that could be used to create such a chart from within the framework.

On the other hand, the PCF can be used as a foundation for said charts by giving a guideline for the creation of those diagrams. Even though this is somewhat of an exaggeration of the functionality since all the work is done by the user who simply adapts the structure of the PCF into a new diagram.

3.4 What is PCF used for?

Originally PCF is supposed to fulfil three purposes which are Process Definition and Management, Benchmarking and Content Management.

Process Definition and management is a process that is used to describe existing processes. The purpose is the standardization of processes which is used to create comparison points. Those points can be used by enterprises to compare each other's processes against the processes of their competitors. Therefore, the PCF is used to create the baseline for process descriptions and the creation of models. Those models are referring to the complete set of guidelines that have been established with the help of the Framework.

The biggest advantage of this system is the fact that it eases the load to develop such a system just as it simplifies the management of enterprise models. As previously mentioned, one of the main goals of the Framework is to create the possibility to compare different enterprises against each other. To achieve that it is necessary to have a clear picture of what must be compared. Using PCF such a clear model can be established which also leads to the possibility to compare internal and external measurements against each other.

During this process, the reference numbers allow the comparison between different measurements. That's why this usage is called Benchmarking since its functions are just as any Benchmark used for hardware testing. The final initial purpose is content management. Big organizations must manage a large amount of content which leads to the necessity of some sort of structuring. The reason for that is simply the fact that it's much easier to work on something which is structured rather than a system that lacks any structure at all. This also means that workloads can be worked on by groups rather than one person since the workload can be easily divided if it's structured.

The organisation of the content is done after the process which means that the process decides the structure of the content of the enterprise. Looking back at the previous picture it's simple to give a small example of the functionality of the system. Imagine a case where we have a new employee looking for a certain file or rather a checklist for machine control. Usually, the user would have to search the whole file system for the given file. If the PCF system is in place the user can simply look for the number 4.3.2 or if he has more concrete information, he could further ease his workload by searching for 4.3.2.5.1. This would make his search a lot quicker and thus reduce the amount of time required for said action. [3]

4 Usage of PCF

As described in the previous chapters there are quite a few different options for the usage of the PCF. But how is PCF used in the real world?

To get a better understanding of this pressing question it is necessary to take a look at a real example where the PCF was used. To do that another derivation becomes necessary since its one of the most important aspects while using the Framework

4.1 Cross-Industry PCF and Industry Specific PCF

It was already mentioned that the goal of the Framework is to create a possibility for Benchmarking between processes of different enterprises. On the other hand, it was only briefly mentioned that the PCF allows comparisons between different enterprises which happens to be one of its major advantages in comparison to other PCMs.

The PCF enables this functionality by dividing its system into two different groups which are Cross-Industry PCF Industry Specific PCF. As the name suggests the Cross-Industry PCF can be applied to multiple Industries while the Industry Specific PCF can only be applied to a certain field. It is also worth mentioning that those 2 different systems can be compared to each other.

This means that it is possible to compare the Workflow of essentially different enterprises and Benchmark those against each other.

At first glance, this may seem like a very underwhelming feature because it may be hard to understand why people would come up with such an idea in the first place. The reasoning for that is very simple, especially smaller enterprises often lack the funds to create such models for themselves and thus may want to compare themselves to different enterprises. Often those smaller enterprises are from fields that aren't that common and thus don't have direct competitors or no specific Framework for their field of work.

This means that those enterprises have no other choice other than to rely on Cross-Industry Frameworks since this is the only viable option that they can use if they want to benchmark against other enterprises or even get a glimpse of how the workflow of other businesses is structured.

In conclusion, Cross-industry PCF is the most general form of the Framework. This form can be applied to any enterprise from any field. This also means that this is the form that contains the least information about the processes since there is a high grade of generalisation and often a few processes can be generalised under one bigger process. Another aspect that can be derived from the mentioned aspects is the fact that Cross-Industry PCFs are usually used for enterprises in less complex fields.

On the other hand, Industry-specific PCFs are used in very complex fields that require a high grade of differentiation. Such fields could be the aviation Industry or even the military. Even the name of those fields suggests a high grade of complexity since they are built from a lot of different measurements or even departments that have to be considered when creating a model. Additionally, those fields require Security standards that are simply unheard of in different fields.

Even though those two fields seem different they still have a lot of intersections that are used when two models of the different fields are compared. The most important aspect in that regard is the fact that the identification numbers are the same for both systems. This means if 4.3 is called process Group in one system it will have an identical name in the other. The only difference will be the complexity of said point. For example, the industry-specific PCF 4.3 has 15 sub captions while the cross-industry PCF only has 4. That's why

both standards can be compared with ease. [2]

4.2 PCF-Versions

Another important topic for the usage of a system like the PCF is the version of the system. The reason for that is the fact that often a new version of a Framework will render an old version deprecated and effectively make it useless since the functionality will be disabled at best or lead to countless unidentified errors at worst.

Every PCF has its version number which generally consists of 2 numbers. The first number is a measurement for the generation while the second is an index for the maturity of a generation. The best part about the numbering scheme of PCF is the fact that the numbers can be used to track the number of changes which has occurred between the versions.

For example, a comparison between version 5.0 and 7.1 tells the user that there were two content-based changes in the system. This means that the version alone can give sufficient information to decide whether it is worth considering an update. The topic of version maturity will be discussed in detail in the next chapter.

The best part about the versions of PCFs is the fact that APQC is granting lifelong support for all existing versions. This means that an enterprise can't be forced to deal with all the issues which usually occur during a generational shift of a system.

Generally speaking, there are 2 rules when it comes down to dealing with the versions of a PCF. It is always recommended to use the most recent version which is available since it's the one from which further changes will derivate. This means that by using the most recent version of the said system the lifetime of it can be prolonged since required changes have already been implemented. Finally, it is only recommended to switch the version if there have been major upgrades in the subprocesses. The reason for that is the aspect that a major change in the subprocess makes finding information way more complex than it is supposed to be. [2]

4.3 Preparation for Implementation

Before a PCF system can be implemented an overview of all the processes in an enterprise are necessary. After this first overview has been created the operations of an enterprise are being divided into 4 different categories.

The most general category is the category that is the most general level of a process in an enterprise. An example of this would be something like “Manage the supply chain”.

The next level is the process group which collects similar processes into a group.

The process is the following level which describes a concrete process like creating a plan for the materials.

The last level is the activity. This level contains the major occurrences during a process.

5 Importance of Maturity of the Version

An essential part of any software is to keep up with the current version. The reasons differ from software to software but in general, it always comes up to either keep up with safety measurements or to extend the content of an existing system to enable further functionality.

In the case of PCF, it comes down to the fact that the system is always extended by further processes and becomes more precise with every iteration. This could be crucial in either matching all processes or being a few processes short that haven’t been around in the previous iteration of the system.

5.1 The five levels of Knowledge Management

Since APQC believes in the value of knowledge management there is a high emphasis on it. That’s why APQC’s levels of knowledge management provide sort of a road map to move to mature and consistent forms of knowledge management. Those levels are included in any implementation which is handed out by APQC. This road map is divided into the following 5 levels:



Five Levels of KM[6]

Initiate as the name suggests is the most basic level of KM which is used by those organizations that have just begone the journey of KM. It lacks consistent processes just as it lacks best practices to apply knowledge.

To move to the next stage a set of actions has to be taken. KM has to be explained inside the enterprise so that employees understand its purpose and benefit. In addition to the employees, the enterprise has to take the interest of key stakeholders by showcasing areas that could be improved by implementing such a system.

The second level is labelled Develop with the name being somewhat self-explanatory. In this stage, the enterprise has to develop a basic form of a KM system. It is important to note that the KM system has to be linked to the goals of the enterprise itself.

The third level is called Standardize which means that the KM has to be as general as possible so that it can be applied to many different situations. Standardizing is the most important part when it comes down to maximizing profit and establishing best practices inside of the enterprise. The main goal during this stage is the establishment of standardized and replicable KM approaches and processes while also designing and implementing pilot opportunities. In addition to

that, the enterprise has to capture the lessons it has learned from the usage of the KM system and apply them by communicating and marketing the methods of the KM system.

On level 4 the goal is to optimize the existing system. For that purpose, an expansion strategy has to be developed and the methods of the KM system have to be adopted throughout the organization. The hardest part is to manage the growth and especially the confusion which usually occurs during this stage while also continuing the communication and marketing of the KM methods.

At the final level of Innovation, the enterprise has reached a stage where it is deeply dependent on the usage of KM systems. On level 5 the essential goal is the improve core processes by optimizing standard KM approaches. Key activities are the monitoring of the health of the KM system and the embedding of standard methods into the business model. [6]

6 Implementation of a PCF-System in Healthcare

To keep the usage of a single abbreviation every PCF mentioned in this chapter will be referring to the specific PCF used in healthcare. To demonstrate the proper use of the PCF system a case study will be reviewed. The case study is dealing with the application of the PCF system in the medical field. Precisely the case study is dealing with 2 hospitals that want to improve the existing workflow. One hospital is working in the field of urology while the other is working in the field of gynaecology.

Its also worth mentioning that the following chapters will refer to the construct of the Framework which was explained in chapter 3.1.

6.1 Approach

To be capable to map the current situation at the clinics the current situation has to be analysed. For the first step, the Content Management System of the first clinic is analysed since all the process descriptions are stored within this system. In the second step, the second clinic performed observation sessions which were held by

medical personnel. The goal of this step was to find out what happens inside of a clinic. In addition to that, the practises were tracked and specific questions were asked to achieve a more precise process description.

In the supposedly final step, interviews were held with all sorts of staff involved in the clinic. The purpose was to achieve validation of the observations which have been made in the second step.

While analysing the data from the content management system it was realised that only descriptions for the task level were available. The available data was far more detailed than the data required for the PCF system. On the other hand, observation has shown that there was insufficient data to describe the processes on the process level.

To get the missing information for the process level descriptions, another set of research was conducted. For that purpose, there is a set of observations conducted in the patient clinic just as there is another set of interviews conducted with the medical staff. After this research, the clinic was able to describe all activities and tasks which were linked to processes. [7]

6.2 Results

In addition to the mapping of supporting processes, it was found that certain tasks and processes can't be tracked to the PCF even though they are essential for the primary process.

After contacting the APQC support it was suggested to implement those tasks on a higher level which wasn't helpful since the goal of the clinic is a case-by-case match for the supporting processes.

That's why it was decided to group all supporting processes into the following distinct sets:

- Logistics
- Pre-Visit
- Planning
- Pre-Treatment
- Post-Treatment

- Communication

In conclusion 12 out of 13 supporting processes of category 4.0 could be matched case-by-case. The only missing process was a very specific form related to urology. In the second clinic, 11 out of 13 processes could be matched while the two missing processes didn't follow a particular pattern.

In category 5.0 in both clinics, two out of four supporting processes match the existing PCF. Just as with the former category, this category also contains subprocesses of essential value which are not included in the PCF.

In conclusion, it can be said that the existing PCF for healthcare doesn't put sufficient emphasis on supporting processes since in both category half of the supporting processes was missing. To further investigate this a case study with far more hospitals would be necessary since it isn't possible to make an accurate statement using such a small reference group.

6.3 Conclusion of the Study

In conclusion, it can be said that over 93% of the practical situations occurring in the clinic could be mapped to the existing PCF. The metrics which couldn't be mapped were simply too specific and too deep in the field of urology.

A comparison between both clinics has shown that over 92% of the processes could be matched to each other. In this case, the reasoning is just as obvious since the fields are simply too different to be completely matched with each other thus leading to the minor difference.

Another aspect that has to be considered is the fact that the PCF was developed for US healthcare while our study took place in the Netherlands and thus is related to a different system of healthcare. This is further proven by the absence of common practices in Dutch healthcare. In the Netherlands, hospitals don't need a signature upon discharge while it is essential in the US.

Finally, it is concluded that the PCF provides a comprehensive view of supporting processes and can be used for hospitals that wish to improve the quality of existing processes. The PCF has proven to be

effective in increasing safety, reducing costs and general performance improvement in healthcare. [7]

7 Discussion

In conclusion, it can be said that the PCF is a very interesting system that has the added benefit of being free of charge and applicable to all sorts of different enterprises. The case study that was held in a very specific field and a different health care system proved the system to be effective. This is amazing in itself because the system was originally developed for a completely different healthcare system yet it managed to deliver results beyond 90% . This alone proves how effective it can be when the circumstances are more fitting than in this particular study.

The real question is not about the effectiveness or accuracy of the system but rather the real-life benefit enterprises can gain by using it. This is a very subjective question since it has a lot of parameters that are different for any given industry. Thus to make a real conclusion one would have to refer to the specific field but since the goal of the PCF is to be a universal system this question should be answered from a universal point of view. Even though the point of view is supposed to be universal it will inevitably come down to the country where the system is supposed to be used. That's why for this work the final opinion will be based on the situation in Germany since it is simply impossible to give an appropriate opinion that would represent any given country.

In my book, this is a system that is interesting for large scale enterprises that can gain a real benefit from adjusting the existing processes in a form as the PCF suggests. For the majority of companies who have way fewer employees and way less workload in general the effectiveness of the said system is questionable at best and wasted resources at worst. Smaller companies simply do not have the manpower or even the financial prowess to implement such a system even though the system in itself is free. Even if they would manage to bring up the necessary resources to implement the system the benefit of such action is highly questionable.

The harsh reality is simply the fact that it is impossible to imple-

ment a system that works after the principle of one fits all. In reality, especially in Germany most companies already have some sort of system which is used to describe the existing processes and it's usually a fundamental part of achieving the business allowance in the first place. Those systems are usually developed for the concrete field of the enterprise and thus much more accurate and effective since they consider local circumstances rather than trying to find a solution that would satisfy everyone.

It can be said that enterprises must consider the existing processes which are happening inside of the enterprise to maximize profits, minimize workloads or even improve existing processes. Although the most effective way to achieve that is to use systems that were developed for the concrete field of the enterprise.

To summarize the PCF is a very effective system that can be used by large scale corporate companies but is rather limited for medium-sized enterprises which here in Germany at least build the majority of all the existing enterprises. That's why I would consider the APQCS PCF as an interesting system but by no means an essential tool for any given enterprise. [7]

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