

APPROACH TO INNOVATION AND CHANGE IN SMALL AND MEDIUM-SIZED ENTERPRISES

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Abstract

In today's highly dynamic and competitive business environment, companies are faced and challenged with increasing numbers of market requirements and customer expectations. In order to ensure the business success, managers need to take innovation and change as strategic elements in their management. Innovation is perceived as a great challenge not only for large companies but also for small and medium-sized enterprises. Innovation contributes to creation of competitive advantage. It is an important tool for a company not only to maintain tempo with dynamically changing markets, but also being step ahead of the competition. The purpose of the paper is to discuss the topic of innovation and change from the perspective of small and medium-sized enterprises. Based on research results, we outline some characteristics of approach to innovation and change of small and medium-sized enterprises operating in Slovak Republic.

Introduction

Innovation and change management, and change itself are current topics, and their importance is still growing with persistent socio-economic changes such as globalization, recession, or turbulent character of an environment. The importance is supported in particular by the fact that science, research and, above all, changes and innovation have become the cornerstones of economic growth in the 21st century and the focus of the competitiveness of enterprises is shifting from the cost-effectiveness to the ability to constantly innovate and to secure success not only for today but also to the future.

The need for change and innovation is driven by the ever-increasing demands of competitive markets and by the endeavour of small and medium-sized enterprises (SMEs) in particular to improve their competitive position, so the basic prerequisite for commercial success is innovative activity supported by the successful implementation of change. SMEs around the world create a major component of the economy, and their importance is indispensable in terms of making change. That is why support for change and innovation has recently been concentrated on SMEs (Gajdošíková, 2016).

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As many scholars and scientists already suggested (e.g. Drucker, 1994; Martín-de Castro et al., 2013; Tidd et al., 2013), innovation contributes to creation of competitive advantage and thus should be seen as a strategic element in company management. Innovation management represents dynamic and systematic process including formation and development of new ideas and subsequently their implementation. The result of this process is creating value for customer, meeting its needs and expectations, and making businesses more competitive and better positioned on the market.

The purpose of the paper is to discuss the topic of innovation and change from the perspective of small and medium-sized enterprise and to present some of the characteristics of approach to innovation and change of Slovak companies. The paper is organized into 3 chapters. In the first chapter, we discuss some of the important issues connected to innovation and changes in small and medium-sized enterprises. In the second chapter, we present our methodology of the research. And the last chapter summarizes some of our main findings and results of the research.

1 Innovation and change in small and medium-sized enterprises

1.1 Innovation and competitive advantage

In general, company can gain a competitive advantage if it does something that rival firms cannot do, or owns something that rival firm desire. To have a competitive advantage implies that company is able to satisfy customer's needs more effectively than their competitors (David, 2011). A competitive advantage is achieved if and when the real value is added for customers. As Porters said (2008), it is created fundamentally out of the value company is able to offer to its customers.

To achieve and to sustain a competitive advantage is a critical strategic step in enabling superior firm performance. Whilst competitive advantage can come from size, or possession of assets or others, nowadays the competitive advantage has roots in development of knowledge and technological skills and experience to create novelty in their offerings (product/service) and the ways in which they create and deliver those offerings (Tidd et al., 2013).

Competitiveness in relation to innovation represents a new way of using already existing resources of the company to acquire new business opportunities. The key to gain an inimitable competitive advantage lies in innovative changes based on creation of something new with potential to attract customers' attention, their interest, and secure a better market position of the company. It is necessary to create and follow strategy that will enable existing organizations to identify opportunities and chances for innovation and then take leading position in this innovation activity (Drucker, 1994). Schumpeter pioneered the idea that entrepreneurial innovation was central to economic change and development (Ziemnowicz, 2013). He also distinguished five types of innovations as new production process, new products, new materials or resources, new markets and new forms of organization (Schumpeter, 1934).

Innovation can contribute to achieving a competitive advantage in several aspects. The major contributions (Tidd, et al., 2013) can be connected to:

- *ability to offer new products* – there is a strong relationship between market performance and new products as they can help capture and retain market shares, and increase profitability in those markets;
- *not only the ability to offer low prices but also ability to add a variety of non-price factors* – design, customization and quality, especially in case of more mature and established products;
- *ability to compete in time* – to shorter product lifecycles or to introduce new products faster than competitors, innovative approach enables companies to react to opportunities coming from changing environment and/or thus create new threats for other competitors;
- *ability to innovate processes* – process innovation has an important strategic role, being able to make something no one else can, or to do so in ways which are better than anyone else is a powerful source of advantage.

It is therefore important to create an environment inside the company, in which innovations will naturally occur. Management of innovation and change as a comprehensive management tool is now becoming one of the main tools for increasing competitiveness.

1.2 Approach to innovation and change in small and medium-sized enterprises

Small and medium-sized enterprises bring to the economic and social environment many positives that are definitely not negligible. They bring a number of positives and positive impacts on the economic and social environment, also from the point of innovations. According to Živělová (2004), Tidd, et al. (2013), Weber (2013), Gajdošíková (2016), small and medium-sized enterprises in connection to innovation and change might:

- look for uncovered gaps in the market and support competitive environment;
- focus on innovation, as they can be more innovative and flexibly respond to changes in the environment, they can easier create space and supporting culture for creativity and initiative of their employees; they can ease of communication, speed of decision-making and increase the degree of employee commitment and receptiveness to novelty;
- contribute to society by creating something new and valuable as they are able to devote necessary time and effort and are more able take risks and expect reward in the form of economic or non-economic satisfaction;
- develop and combine technological and other competencies to provide goods and services that satisfy customers better than alternatives, and that are difficult to imitate;
- make a greater contribution to innovation in certain sectors, such as machinery, instruments and software, than in chemicals, electronics and transport.
- represent and support the local region by creating jobs and development of the regions, contribute to local budgets and also serve as an inspiration and motivation for other potential entrepreneurs.

On the other hand, there are many barriers and limitations of small and medium-sized enterprises (Tidd, et al., 2013; Weber, 2013; Gajdošíková, 2016) as they are:

- having weaker positions, they can be easily threatened by behaviour of the larger companies;
- more dependent on customers and suppliers, particularly due to the weaker power and bargaining position of SMEs;
- being out of business, where there is the need for large investments as they are limited with financial resources and having inability to fund long-term and risky programs;
- having a lower competences and qualification of owners and employees, often we can talk about innovation of lower ranks and their inability to develop and manage complex systems,
- face high taxes, legislation barriers and having a limited access to resources.

The above-mentioned barriers are closely related to problematic areas including bureaucracy, the tax system, excessive payment delays and the already poor availability of finances. Innovation is mainly a matter for businesses and the state can help to create the framework of conditions for entrepreneurship by removing these obstacles and barriers. The direct interventions and measures are necessary if the business environment fails to solve these problems (Vavrinčík et al., 2011). Innovation is essentially about learning and change but is often disruptive, risky and costly (Tidd, et al., 2013).

On the other hand, there are ways how SMEs can support innovation and change and be more innovative. Businesses are constantly affected by changes. If they want to survive on the market, they must implement them, adjusting their structures, processes, operations and thinking. To support innovation, it is necessary to involve employees. Employees represent an important source of new ideas for innovative business processes. A high level of participation of employees can create favourable conditions for bringing new ideas and knowledge for innovation and increasing innovation outcomes (Chen, Huang, 2009).

Every employee should be guided to think about the future of the business, and to participate in creating of new ideas. If companies want to be innovative, they need to create the environment to encourage employees' enthusiasm for innovation (Papulová, Gajdošíková, 2015). Top managers should commit to the innovation with high priority, with an understanding of the necessity of change and change of corporate culture (Tidd, et al., 2013). Support of creative thinking allows professional workers to generate new ideas that can become innovative business ideas (Pillton, Chochinov, 2009).

Brown (2008) identified key competences how to support innovative enterprise thinking that are possible to be applied in SME (table 1).

Table 1. Five competences of innovators

Competences	Characteristics
Empathy	To be able to imagine a problem from the point of view.
Integrating thinking	The ability to analyse and discover aspects of the problem and make synthetization in order to create new solutions.
Optimism	Without respect to limitations is trying to find new solutions.
Experimenting	Put questions and make examination about limitations in a creative way.
Cooperation	The innovator has the character of a passionate, interdisciplinary and cooperative worker.

Source: Brown (2008)

It is very important to support empathy. Empathy should be seen in connection being able to look at the problem from a different perspective, whether from the point of view of colleagues, clients, consumers, or current and future customers. Another competence is an integrative thinking. It is ability to be not depended on analytical processes often directed to a single solution but to be able to discover some new aspects of the problem and create new solutions that are not similar to existing alternatives but they have the character of a dramatic change. The third ability is the optimism that is needed to have a continual ambition to look for new solutions to the problem, regardless of their limitations, and so prepare potential solutions that are better than the existing alternatives. Another key feature is the experimentation that is needed for exploring the problem creatively and opening up new business opportunities. The last ability is cooperation, because the best innovators should work with people to gain, exploit their knowledge, and gain their considerable direct experiences with working in other disciplines (Brown, 2008).

The main driver of change is the human factor. But also in order to make successful change, managers need to support, plan, and develop an innovative culture. Changes should have a permanent nature with purpose of continual improvement. All employees should be involved in the innovation process, which should also be facilitated by free access to information, feedback and collective spirit.

Innovation should be part of a strategy and be connected to the vision of organization. For SMEs is suggested to base their innovation strategy on (Tidd, et al., 2013):

1. The position of the firm, compared to its competitors, in terms of its product, processes and technologies; and in terms of the national system of innovation in which it is embedded.
2. The technological paths open to the firm, given its accumulated competencies, and the emerging opportunities that these enable it to exploit.
3. The organizational processes followed by the firm, in order to integrate strategic learning across functional and divisional boundaries.

SMEs should actively strive for their development and to seek for opportunities for change and exploited them for their own benefit. In order to succeed, they also need to think

about effective implementation mechanisms to move innovations from idea or opportunity through to reality. It also requires to have skills in project management and to pay attention to managing the change process itself, including anticipating and addressing the concerns of those who might be affected by the change. Finally, innovation depends on having a supporting organizational context in which creative ideas can emerge and be effectively deployed (Tidd, et al. 2013). Therefore it is important to create an environment in which innovation will naturally develop. Also it is important to train and develop appropriate skills and competences of people inside the company. Innovation should be seen with strategic importance.

2 Research goal and methodology

The main goal of our research was to examine approaches to innovation and change in small and medium-sized enterprises. The purpose of the paper is to discuss the topic of innovation and change from the perspective of small and medium-sized enterprise and to present some of the characteristics of approach to innovation and change of SMEs in Slovak Republic.

Our sample consists of 164 respondents. Our respondents were managers of SMEs operating in Slovak Republic (each respondent from different company). To gather data, we used questionnaires. We studied companies from various sectors (table 2) as the topic is important to all of the sectors in the economy.

Table 2. Number of companies in different sectors

Sector	Number	%
Automobile industry	8	4,88
IT Technologies	14	8,54
Services	77	46,95
Trade	7	4,27
Transport	3	1,83
Financial and advisory services	10	6,10
Telecommunications	4	2,44
Manufacturing	20	12,20
Building industry	8	4,88
Engineering industry	4	2,44
Metallurgy	2	1,22
Retail trade	5	3,05
Energetics	2	1,22
Total	164	100,00

Source: authors

It can be seen from the table 2, that the most represented was the service sector with 46.95%. We also distributed the sample based on the size, especially by the number of employees (Table 3).

Table 3. Number of companies in different sizes

The size of enterprises	Number	%
Micro-enterprise	26	15,85
Small enterprise	78	47,56
Medium-sized enterprise	60	36,59
Total	164	100,00

Source: authors

The largest group in the research was represented by small enterprises, almost the half of the sample (47.56%).

3 Results and discussion

3.1 Strategic context of innovation and change in SMEs

In the first part of our research, we examined the approach of SMEs to innovation and change from the perspective of importance. The main factor affecting companies' access to innovative change is approach, respectively the perception of innovation and change by the management of the company. This is illustrated in the following table 5.

Table 5. Importance of innovation and change among the priorities of the company

Priorities	%
The top priority	5,80
In top 5 priorities	32,61
In top 10 priorities	14,49
Important, but not in the top priorities	42,03
Non-essential	3,62
Without identification	1,45

Source: authors

As it is shown in the table 5, innovation and change are perceived with certain importance (almost 95%). But it is not perceived in general as top priority in SMEs. Only 5.8% of the SMEs identify it as a top priority. However, 32.61% consider it in 5 top priorities and 14.49% in the top 10 priorities. For 42%, innovation and change is important but not a priority.

In addition, with regard to business-focused approach to innovation and focusing on the strategic aspect, we asked how they are depended on innovative changes in terms of long-term success. For a sufficient detection of association and connotation, we used a semantic differential where the answer was evaluated on scale 1 to 7 (value 1 means that the innovation changes have no impact on the strategic success of the enterprise and value 7 means the enterprise is extremely dependent on innovative activities). The median of SMEs responses was 5. The most common occurrence value, the modus, was also the value 5. The maximum

possible, this corresponded to 67% of the intensity of the dependency ratio of SMEs from innovation activity as a strategic presumption of success.

We also studied how SMEs perceive that innovation and change contribute to their basic business success. Respondents were evaluating it on scale 1 to 7 (value 1 means that management does not have a clear idea that innovations and changes contribute to the basic business success and value 7 that innovation and change are key to business success). The median of SMEs responses was 6. The most frequent occurrence was value 7. This corresponded, from a maximum of 83%, to the intensity that innovations and changes contributes to the basic success of the business.

3.2 Areas of contribution and reasons to innovation and change

To understand the approach to innovation and change, we also studied the main and significant reasons for SMEs to innovate, having benefits from implementing innovative changes and what areas companies want to contribute with innovation. According the research, the most preferable reasons were in these five areas:

- 31.1% of SMEs identified **cost optimization** as the main reasons for innovation and changes and up to 73.2% perceive cost optimization as a significant reason to innovate;
- 31.1% of SMEs also identified **increase in revenues** as the main reasons for innovation and changes and 54% perceive cost optimization as a significant reason to innovate;
- 24.4% of SMEs identified **process optimization** as the main reason for innovation and changes and 49% perceive cost optimization as a significant reason to innovate.
- 15.9% of SMEs identified **increase in market share** as the main reason for innovation and changes and 36% perceive cost optimization as a significant reason to innovate;
- 12.2% of SMEs identified **market penetration** as the main reason for innovation and changes and 28 % perceive cost optimization as a significant reason to innovate
- 11.6% of SMEs identified **operational risk mitigation** as the main reason for innovation and changes and 23 % perceive cost optimization as a significant reason to innovate.

We also studied, what areas have strategic importance for SMEs for innovation and change. More than half of the SMEs mentioned the relationship with customers is the main area of strategic change, and 29.5% of SMEs identified the area of development of skills and competences of employees as very important and for 44.5% were significant. Other identified that strategic importance has technology, marketing, and research and development of product and service. The following table 6 shows the important areas to implement innovative changes and medium and modus evaluation.

Table 6. Important areas to implement innovative changes

Priorities	Modus	Median
Developing skills and competencies of employees	7	6
Research and development of products and services	7	5
Organizational structure	4	4
Technology	7	5
Marketing	7	5
Production	7	4
Relationship with customer	7	7
Purchase	1	4

Source: authors

3.3 Support of innovation and change in SMEs

In the research, we also studied how innovation and change is supported in the company. Our first area was oriented to the support of management. Respondents could mark a support rate on the scale 1 to 7 (value 1 means that there is strong support management of innovative business changes and 7 that there is no such support). The median of SME responses was 5, modus 7.

We also studied whether a formal process of managing innovation and change is taking place in SMEs and if they are learning from the implemented innovative changes. The respondents indicated on scale 1 to 7 (value 1 means that there is a formal process of learning from the realized innovative changes and value 7 that such a formal process in the enterprise does not work). The median of SME responses was 5. The modus was also 5.

We were also interested how companies are searching for new opportunities to innovate and change and what kind of the sources they analyse in terms of searching for new innovation and change:

- Almost half of the SMEs (48,2%) considered **market sources** as the most important source of information to innovation. Market sources are represented by suppliers, customers, competitors or consulting companies
- 34,1% of SMEs identified **internal sources of information** as the most important source for innovation.
- With regard to institutional sources of innovation activities, such as **universities, and government institutions**, 22% of enterprises consider that to be a primary resource for their innovation-related activities and 36.6% of enterprises as less important.
- Other sources of information coming from **associations, conferences and professional publications** are considered by 18.9% of enterprises as an unimportant source of innovative change, and 35.4% of enterprises consider these resources to be little important.

In these results, we can see a very small support of innovation and change in the SMEs. We also can see that companies are primarily relying on the information coming from the market and internal sources. They are underlying institutional, scientific and professional

sources and published information as they can also contribute to their development. Many times, they are not even aware of these other sources.

Conclusion

Competitiveness in relation to innovation represents a new way of using already existing resources of the company to acquire new business opportunities. Effective management of innovation and change is conditional and it is therefore necessary for SMEs to have a good understanding of this issue. In the context of a high competitive environment, the changes should now be of a continuous nature.

Based on the research results, SMEs are at a 67% intensity of dependency on innovation activity as a strategic predictor of success, and for more than half of companies, they have a clear idea that innovation and change are essential to business success. As the main reason for introducing innovative changes, companies have identified process optimization, cost optimization, and revenue growth. SMEs considered as important market sources as suppliers, customers, competitors and consulting companies, and internal sources as sources of information for effective management of innovative activities. In identifying areas of change that are strategically important for businesses, more than half of SMEs identified the relationship with customers is the main area of strategic change, and the development of skills and competencies of employees.

Based on our results, we also identified some weakness of SMEs in their approach to innovation and change. And our recommendations are directed to understanding that innovation and change require a strategic approach and should be seen with strategic importance as directly is influencing competitive advantage and competitive position on the market from long-term perspective. Innovation and change should be seen as a priority or among strategic priorities of the company. In the SMEs there should be also implemented learning process. A formalised process for monitoring the progress of change in business is conditional for more efficient implementation of future changes, taking into account the lower frequency introducing changes in SMEs. Also top management support and employees' development and their involvement are necessary.

Managing innovative change in SMEs needs harmonization with situation and conditions in which they operate. Last but not least, there is also a need for strategic thinking with intention to prepare SMEs for the future, and through innovation and managing innovation change contribute to their competitive advantages.

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APPLICATION OF MTM ANALYSIS ON LOGISTICS OPERATIONS IN AN INDUSTRIAL COMPANY

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Abstract

Having standardized procedures in manufacturing companies for manufacturing is today common. Specifically, time measurement of the duration of operations is important for their efficient performance. Several methods for time measurement can be applied, for example, lean management prefers to use direct observation and/or video recording. However, the paper specifically focuses on time measurement of logistics operations with the help of MTM analysis. The procedure is showed as a case study on the real example from manufacturing company operating in the automotive industry.

Key words: logistics operations, automotive industry, Method Time Measurement analysis, process optimization, standardized operating procedures.

Introduction

Material flow is a necessary part of production system in the manufacturing companies. It is ensured by both manufacturing and logistics processes and operations. For the efficient carrying out of material flow, standardized operating procedures are a necessary part of production system. They consist of:

- The sequence of work
- Determined number of units (produced and/or transported)
- Time duration of operations

Standardized operating procedures are well designed and described for manufacturing operations in production systems. However, this is less common for only logistics operations. There are several methods relating to setting time for operations. For example, lean management concept prefers to set this time only by direct work observation with stop watches and repeating it for each operation approximately 10 times. However, when many different manufacturing and logistics operations are performed in an industrial company, this task can be enormous. Another options can be to utilize Method Time Measurement (MTM) analysis, which does not require this enormous task. Moreover, MTM is not well described in literature sources as a concrete procedure based on real example from manufacturing company. The paper is, therefore, focusing on the application of MTM analysis for

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determining time duration of logistics operations based on the case study from manufacturing company located in the Slovak republic.

1 Method Time Measurement Analysis

MTM expresses the time needed to perform certain activities. It represents an internationally recognized performance standard for manual labor. The application of MTM standards brings the following benefits (Kuhlang, 2009):

- Accurate assessment of time spent on operations, transport and adjustments
- Evaluation of performance and rate of utilization
- Reduction of delivery times by improving and redesigning the current methods and reduction of times for operations and transport
- Standardization of processes
- Improvement of efficiency and rate of utilization
- Improved workplace design
- Comparison and evaluation of current and target state.

The main limitation MTM analysis is mainly in the lack of ergonomic analyzes. When analyzing the activities, they do not take into account the examination of posture and effort (Di Gironimo, 2012).

MTM is a system of predetermined time of each worker movement within the framework of manual operations. It was made by three authors – Maynard, Stegemerten, and Schwab – during their industrial research in the 40-ies of the 20th century. The system is based on standard times of basic movements such as gripping, moving, achievement, laying down, etc. Analyses were conducted by experts who in the evaluation of movements used records from high-speed cameras. The research was carried out on skilled workers. During the analysis, the factors were taken into account, such as endeavor and efforts of workers, working conditions, and consistency of job performance. All times are expressed in the so-called Time Measurement Unit (TMU), while one TMU is approximately 0.036 seconds. Over the past decades, the original standard known as MTM-1 was supplemented by the times of a more complex movements ranged from combination of movements through the basic process to the overall work procedures in selected sectors (Sobotka, 2014).

Good theoretical description of MTM method provides Beno, et al. (2013). He provides basic information about characteristics of MTM method, describes the possible areas of using this method and presents the illustrative example of practical application for the time analysis of material flow.

2 Methodologies

The main objective of the paper is description of the practical application of MTM methods for analyzing logistics processes in a company operating in the automotive sector.

To achieve this objective, several sub-objectives are necessary to follow:

1. Clarifying the procedure for carrying out the MTM analysis in the company.

2. Analysis of existing logistics processes and working hours in the chosen company.
3. Evaluation of the workforce usage for logistics processes.
4. Proposals for improvement of procedures.

To achieve these sub-objectives, we have personally participated in research in the company operating in automotive sector. Prior to carrying out the research, we have been given training in the respective issue and we were accompanied by employees of the company to achieve a better overview of the processes. When developing MTM analyzes, we have been provided a professional consultation by the company employees. The empirical research was carried out in the company in 2015.

When carrying out the research, we drew information from the video-recording of workers and from standardized workflows. With the help of MTM tables and software tools Microsoft Excel and AutoCAD, we could further process information obtained about the individual work activities. The result was the development of transparent analysis of the duration of processes, while the duration of each process was divided into transport time and time of handling produced parts or packages. Based on the acquired experience, it was possible to fulfill the last sub-objective and to suggest improvements to the implementation of MTM analyzes.

The company, where research was conducted, is mainly a manufacturing company consisting of three manufacturing companies and of three service providers in the field of maintenance of technical equipment of buildings and installation, repair, maintenance and inspection of air-conditioning equipment and fans, engineering center and clearing house. The company is a part of a multinational concern.

The company is dedicated to the installation of seats in cars for more than 30 years. It offers comprehensive services in design, engineering, and manufacturing and has the expertise and capabilities that enable it to deliver an innovative and highly functional seats from concept to the finished product. The research was conducted in the branch plant whose main business is the supply and installation of car seats for its customers.

3 Results

3.1 Work Analysis based on MTM tables

We carried out MTM analysis in the selected company with the support of standardized work procedures. Analyzes were carried out for each package and for all processes. For each process, we also made the video-recording, because, otherwise, we could miss some details during the analysis that were not captured in the workflow. One process consisted of the dislocation of package from one point to another in accordance with the pre-defined chain of logistics processes applicable to the plant (see Fig. 1).

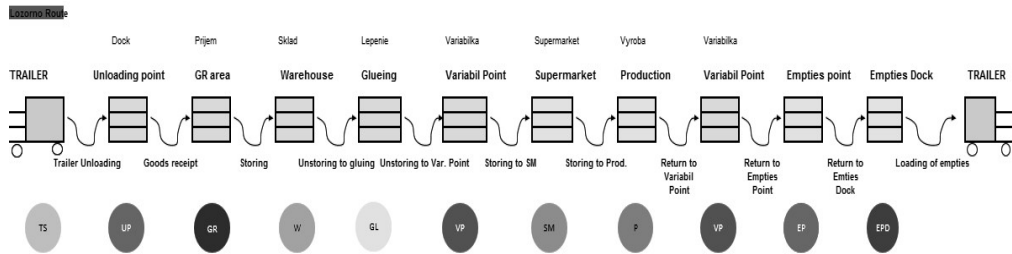


Figure 1. Chain of logistical processes from receipt to empty bins expedition (Source: authors)

Each package has its own unique routes as seen from the Figure 1. For example, SAB package that contains airbags, does not proceed to Glueing process, but after putting it away in the shelves it goes in front of the production line, so called Variable point.

For each operation, the time from MTM tables has been used that corresponds to the time for which the worker should be able to perform certain operation. The time is given in TMU units. Tables that were used, issues MTM - Institut.

You can see in Figure 2 the standard time for the load movement by means of three types of forklifts. In addition to the type of forklift, height, in which the load is held, and to which height should be placed, it should be noted that the load must be precisely aligned (for example, when putting away in the rack) or not (mostly, when transporting the goods to Receipt area). On this basis, it is possible to determine according to the MTM table the exact duration of the operation.

Lift Trucks – Operation sequences		Forklift truck			Counterbalanced truck		Walkie stacker	
Lift	Place	Code	Time values in TMU					
			with 90° aligning		without		with 90° aligning	
Ground	Ground	SAAA	833	603	983	718	971	646
	1.2 m	SAAB	981	751	1168	903	1327	1002
	2.5 m	SAAC	1142	912	1370	1105	1767	1442
	4.0 m	SAAD	1328	1098	1602	1337	2274	1949
1.2 m	Ground	SABA	934	854	1084	1014	1210	1105
	1.2 m	SABB	1082		1269		1556	

Figure 2. Extract from MTM table (source: adjusted by authors)

For the movement of load, forklifts are used in the company. In addition to the type of forklift, height, in which the load is located and to which height should be placed, it should be noted if the load must be precisely aligned (for example, when placing to the warehouse), or not (mostly in transporting to the Goods Receipt). On this basis, it is possible according to the MTM table to determine the exact duration of an operation.

The analysis of handling and transporting packages was not done with all packages that have been brought into the company, but only on a selected sample. This sample was the number specified in the standard operating procedures. Based on this sample, it was then computed the average daily time, spent on handling according to daily consumption of parts, or part groups that were in this package. Thanks to this, it was possible to calculate also the average daily distance that the driver travelled, and, therefore, the average daily time spent on transporting respective parts, or part groups in a given package, as well.

In the analysis, we distinguished between the primary and secondary processes. The primary process was one that was associated with transportation. It means that except of MTM analysis itself, we had to assign in the ABC tool the time spent on moving and transporting package. ABC is the tool used in that company that significantly makes easier the MTM analyses and allows to clearly look at the duration of individual processes. As a secondary process, it was considered an activity, which a forklift driver had to perform and it did not relate directly to the transportation. Such activity was particularly label scanning of packages, shelves, orders, material replenishment, the distance which the driver passed on foot, and others.

An important part for carrying out such analyses was the knowledge of package dimensions and shelf height, so that we can determine exactly from which height the package is collected and to which stored. For example, in the put-away process, we usually counted with an average height to which the forklift driver put material away, since based on a sample, specific time for put-away operation had to be applied for all other pieces of the same package. If we counted with the lowest height point, the average daily time spent on the put-away packaging would be underestimated.

If we counted only with the lowest shelf space, we would apply this to all packages in MTM analysis which would not be correct. It is, therefore, important that we always have to count with the average values (in this case the average height to which the forklift driver stores package), since we then apply the time from MTM analysis for the respective sample to all packages.

3.2 Design of MTM analysis on a real example

We performed MTM analyses by using Microsoft Excel. One sheet had always represented one process, that is, all operations between two points of the chain.

ANALYZING SHEETxxx

Station / Option: **template a**

Analysis type: Please select from list

Description: _____
Starts: _____
Includes: _____
Ends: _____
Limitations: _____
Production Line: _____
Operation: _____
Model: _____
Date: _____
Analyst: _____

Option: Standard
Process view: _____
Remarks: _____

Value code	MTM-sec	MIX-sec	Code filter	Subtotal-sec
TOTAL	-	-	KVB	-
AV	-	-	KVS	-
NAV	-	-	CT	-
T	-	-	WT	-
W	-	-	PT	-
OW	-	-		-
AV code	-	-		-

Mix%	Context	Total TMU
100,00%	Seat set	-

Error count	Description	Error code
		Code ???
		Freq ???
		AV code ???

DESCRIPTION	ACTION	CODE	Number x Freq.	ADDED VALUE CODE	T.M.U.	TOTAL T.M.U.	SECONDS	DOCUMENTS COMMENTS
-------------	--------	------	----------------	------------------	--------	--------------	---------	--------------------

Figure 3. Blank sheet of MTM analysis (source: authors)

In Figure 3, we can see a blank sheet that serves to analysis with the help of MTM tables. Important was when filling in these sheets, especially description (Description – at the above side), start and end point (Starts, Ends), who informs at what point in the chain the activity starts and ends. At the bottom, in the DESCRIPTION field (line), the name of a particular activity was filled in; in the ACTION field, the activity was broken down into specific operations; in the CODE field, the code from the MTM tables was entered, and then the number of iterations was filled in (Number x Frequency field). Other fields in the right included the formula, for example VLOOKUP, which assigned a code to the specific time.

ANALYZING SHEET

Station / Option: **1_PP19 a**

Analysis type: Please select from list

Description: Storing to Warehouse, 1006LS
Starts: Goods receipt area
Includes: _____
Ends: Warehouse
Limitations: _____
Production Line: _____
Operation: _____
Model: Pag/Mac
Date: 25 september 2015
Analyst: _____

Option: Standard
Process view: 2nd row RS
Remarks: Rear Seat
ODS Vykładka a naskladovanie ekopakov 1006 LS.
4 packs

Value code	MTM-sec	MIX-sec	Code filter	Subtotal-sec
TOTAL	161,82	161,82	KVB	-
AV	-	-	KVS	-
NAV	-	-	CT	-
T	-	-	WT	-
W	-	-	PT	-
OW	-	-		-
AV code	-	-		-

Mix%	Context	Total TMU
100,00%	Seat set	4 228,00

Error count	Description	Error code
4	Missing Value	AV code ???

DESCRIPTION	ACTION	CODE	Number x Freq.	ADDED VALUE CODE	T.M.U.	TOTAL T.M.U.	SECONDS	DOCUMENTS COMMENTS
Reposition of stack (4 packs) to area near the warehouse				TOTAL:	35,39			
	floor to floor	SAAASM	1,00		983,00	983,00	35,39	
Reposition of 2 packs to the warehouse				TOTAL:	67,21			
	from 1,2m to 4m	SABOSM	1,00		1 703,00	1 703,00	61,31	
	further 1m of lifting	SZAWS	1,00		164,00	164,00	5,90	
Reposition of remaining 2 packs to the warehouse				TOTAL:	49,32			
	from floor to 2,5m	SAACSM	1,00		1 370,00	1 370,00	49,32	

Figure 4. Store-in of eco-pack of 1006 LS type, primary process (source: authors)

In Figure 4, we can see the entire analysis of stocking process 1006 LS Ecopack. The first activity in this case is the transfer of the stack with four Ecopacks into the storage space. It is a transfer from the ground to the ground, as the forklift driver takes the entire stack from the ground and places it back on the ground in the area in front of the warehouse shelves. Therefore, the code SAAASM was used. The first four code letters indicate the height from which the load was collected and to which height it was laid out. The fifth letter indicates the type of forklift truck and the last letter says that the load had to be aligned when laying down.

Another activity was the transfer of top two packages (out of 4 overall) into the warehouse rack. Since each Ecopack of this type had the height 60 cm, it was then a transfer from a height of 1.2 meters to a position in the warehouse into the 5 m height. Such code for transferring from 1.2 meters to 5 meters, however, we cannot find in MTM table. Therefore, the next code was used for transfer from 1.2 m height up to 4 m height, and, subsequently, with the help of additional code (SZAWS), we have added additional meter separately. If we would need to add smaller, respectively, greater height, we just write down to the field for the number of iterations a number by which we multiply the height of one meter (if we want to add additional 80 cm, so we enter to the field a value of 0.8).

DESCRIPTION	ACTION	CODE	Number x Freq.	ADDED VALUE CODE	T.M.U.	TOTAL T.M.U.	SECONDS	DOCUMENTS COMMENTS
Log in				TOTAL:	2.62			
	Get scanner	EH3	1,00		55,00	55,00	1,08	
	Reading of display	JALE	1,00		15,00	15,00	0,54	
Scanning of packs				TOTAL:	10,80			
	Scanning of packs	IDES	4,00		60,00	240,00	8,64	
	Reading of display	JALE	4,00		15,00	60,00	2,16	
Walks				TOTAL:	16,20			
	from trolley to pack	KA	6,00		25,00	150,00	5,40	
	from pack to rack	KA	12,00		25,00	300,00	10,80	

Figure 5. Scanning of Eco-pack 1006 LS, secondary process (source: authors)

The last activity is a put-away of remaining two packages from the ground to the rack in the height of 2.5 meters. In this way, we analyzed the material handling process between goods receipt and warehouse. The total time in seconds is written down in the cell F5. The distance and time spent on transportation has been completed in the ABC tool. When putting away material, we did not take into account the distance traveled by the forklift driver during

taking the package on forklift rails and storing it in a warehouse, or a number of turns, which he carried out, since that time is already included in the code itself for relocation.

For this process, a secondary process also exists, which is the scanning (see Figure 5). The first activity was the grip of a scanner and control of display. This was followed by Ecopack scanning. After each scanning, driver must check a display whether the scanning was successful. This operation is repeated four times, as the driver scans 4 packages. In the same way, he must scan two positions in the racks to which he put goods away. As he performs movement during scanning, the number of meters that he passes must be counted. This way we get the total time in F5 cell.

After making an analysis of all packages and for each process for the respective package, the analysis using the MTM tool ends up. We have written down in one line the total time of each process together with description in the given order (Figure 6).

Station	Process	Process Code	Description	Process Time	Types of Transport	Transport Code	Empty Trip Factor
VZV01	SP19		Storing to Warehouse	34,92			0

Figure 6. Result of MTM analysis (source: authors)

In addition to time and description, we also entered the driver and process code. Driver code was the same in all processes. It is because it was not clearly defined who does what work. All processes were assigned to one man, and, in the end, we then divided the total time by the number of employees.

4 Discussion and Conclusions

The basic benefit to an organization is the measured time of all processes in accordance with internationally recognized performance standard. These periods can then be incorporated into the standard operating procedures.

Another benefit is the ability to optimize processes based on carried out analysis, which would result in shortening delivery time. For example, based on the analysis, it was found out that the time spent on handling when moving packages from the trailer to the ramp is in most cases many times greater than the transit time to the ramp. In this case, the organization can skip this partial step in a put-away operation and the packages could go directly from the trailer to the store or to material receiving point. Since this procedure would slow down the trailer unloading, two forklift drivers at a time could be involved in unloading. It is also possible on the basis of these analyses to ascertain, whether, for example, put-away of some parts of a high demand does not take too long time because of the long distance to the warehouse. On this basis, it could be possible to reorganize warehouse in order to shorten the time for transportation as much as possible.

The result of this analysis was daily duration of the logistics processes, so the organization can assess whether it has enough staff or not for these processes, or even surplus.

When we started to work on our research, standardized operating procedures for logistics processes were still not created. It is very important to have these standards developed even before carrying out the MTM analysis. We have performed the first analysis only on the basis of staff (forklift drivers) experience since standardized procedures were not finalized at that time, yet. It turned out, however, that some standards for processes, which we have already analyzed, were slightly different from what we have learned from the workers. This difference showed up in these standards, because there was a requirement to write every detail in the standards in order to keep safety on the workplace. This ultimately led to the fact that we had to redo the first analysis. Therefore, it is necessary to have standards available that are approved by relevant staff who have responsibility for the accuracy and safety of procedures contained therein.

Another important step is to inform employees about the meaning of these analyses before starting assessing their activities. It is important to explain to employees that they will be watched for some time in order to make these analyses and also it is important to explain them that the analysis regards the capture of individual operations they performed and not measuring the performance of individuals. First, the team will save time spent on explaining some employees this issue and secondly, the fear and insecurity of these employees will be reduced.

It is important to have a detailed elaboration on the working procedures. When the working procedures are written in a sufficient detail and it is possible on the basis of them to identify each operation, which the worker performs, it is not necessary to make a video recording and capturing individual operations of employees. For example, in the put-away processes, it could be given in addition to the type of storage also designation, identifying the particular rack into which the package should be put.

Research result for the company was the processing analyses by using MTM standards for existing logistics processes. This allowed the company to proceed to optimization of certain processes and, thus, to shorten delivery time. In addition, the company was able to verify the capacity utilization of the labor force relating to the amount of work. The research result showed that the company had sufficient number of logistics employees, who almost meet performance limit. The analysis was based on the developed standardized operating procedures and video recordings. We can say that the decision to perform such analysis has given rise to standardized operating procedures for logistics processes, previously not been established. We consider it important in such analyses to utilize standardized operating procedures, and not just the actual observation of work activities, because the information contained in the standards are subjected to approval by relevant staff who is responsible for the accuracy and security of that workflow.

We could not in this paper give a detailed analysis of all logistics processes, as they are complex in the real company, so we used just a few examples to demonstrate the application of MTM tables for standardizing internal logistics processes in manufacturing company of the automotive industry in Slovakia.

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THE IMPACT OF IFRS 9 (INCREASE IN CREDIT RISK PROVISIONING) ON BANKS' REGULATORY CAPITAL

Petra Blažeková¹

Abstract

Since 2010 numerous amended regulations have been introduced to strength financial position of the banks and avoid losses similar to those caused by the last financial crisis. Since 2018 European banks have to start to use heavily discussed new IFRS 9 rules. New IFRS 9 should enhance financial safety in banking system by an increase of the stock provisions in comparison with pre-state before its implementation. However, there are still numerous open issues related to implementation IFRS 9 and Basel regulation which should be further investigated. The scope of this paper is to examine the impact of IFRS 9 on the capital position of banks and financial institutions, which are supervised on a prudential level by relevant authorities. The aim of the paper is to explain quantitatively the impact of IFRS 9 credit risk provisioning on bank's regulatory capital and to quantify the changes in its reporting components. The aim is also to concentrate on changes and impacts on banks' capital ratios (CAR, TIER 1, CET 1 and Leverage). We found out that, institutions mainly using IRB approach suffer from lower deterioration in capital ratio (capital realignment) in comparison to banks using SA approach also within transitional arrangements, which were introduced by the BCBS and they consist of potential add-back of the portion of IFRS 9 provisions to institutions' capital in order to avoid capital shock and possibility to rebuild capital base during the period. Transitional arrangements are beneficial for both SA and IRB banks as far as relieving their CET 1 capital base. Moreover, the main issue is the supervisors' lack of uniform definition of the categorizing of GCRA and SCRA for banks. Apparently, IFRS 9 transitional arrangements cause volatility and realignment of regulatory capital and there is potential threat of ununiformed implementation across national jurisdictions, but it enhances also market discipline through more detailed and reliable disclosures and with sufficient information about institutions' capital.

Key words: IFRS 9, credit risk, financial regulation, capital ratios, banking.

Introduction

During the last years banks have been enforced by Basel Committee of Banking Supervision (BCBS) to comply with stricter supervisory requirements and processes in order to create more stable financial and banking system. Nowadays supervisors' call for more prudent rules has been moving towards implementation state, especially for credit risk provisioning via IFRS 9 (International Financial Reporting Standards 9) mechanism.

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Financial institutions and banks have spotted an increase in regulation, both in ways of the amount, complexity and also in the impact of their current risk position due to this new regime. Reactions on these new rules for creation and accounting of credit risk provisions encouraged a complex discussion about its impact on banks' risk position, the ability to fulfil supervisors' capital requirements and consequently to appropriately report these changes in regulatory reporting. The main issue within this topic is to properly estimate the negative impact of IFRS 9 their capital position in order to plan potential increase in capital base (buffer) of these institutions and to analyze the impact of this new rules to other risk parameters such as ratios, financial position and stress testing, disclosures with its connection to ECL (Expected Credit Losses).

The aim of this paper is twofold: firstly, to examine quantitatively the impact of the new IFRS 9 credit risk provisioning on bank's regulatory capital and to analyze the changes in its reporting components. Secondly, to focus on quantification of the impact to banks' capital ratios (CAR, TIER 1, CET 1, Leverage) in order to avoid capital shocks for banks.

To sum up, IFRS 9 increases the stock provisions created in comparison with pre-charge state before its implementation. However, banks suffer from a decline in regulatory capital, mostly and sharp deterioration of CET 1 (Common Equity Tier 1) capital, which also causes decline of its capital ratios. These unexpected changes could cause decline banks' capital base which could cause failure to meet strict capital requirements assigned by supervisors. Transitional arrangements should be used with five years from the first day of application of IFRS 9 and they allow institutions to include a portion of IFRS 9 provisions as an add-back CET 1 capital during the period. The amount of ECL provisions decreases to zero over time and transitional arrangements ensures institutions would not to benefit from increase in capital and also decrease in exposure value. Therefore, the implementation of transitional arrangements is a solution in order to decrease the sharp negative impact. Generally, the quantitative impact for IRB (Internal-Ratings Based Approach) banks is lower in comparison to SA (Standardised approach) peers and they do not suffer from sharp deterioration of capital, only from its realignment. Moreover, transitional arrangements guide both SA and IRB banks to prepare in advance for rapid decrease of CET 1, which was its goal and it requires from institutions to have adequate disclosures.

The structure of the paper is as follows. First section consists of introduction to the topic and its current status is mainly in the field of regulation. The second section includes an analysis of IFRS 9 regulation with its connection to relevant issues. Consequently, the third section encompasses the quantitative results. The last section is a conclusion and discussion of the results.

1 IFRS 9 in regulation review

New regulatory standard IFRS 9 introduces new accounting rules for financial assets, financial liabilities, impairment methodology, fair value options and hedge accounting. This new regulation largely replaces the IAS 39 standard. (International Accounting Standards 39) The final version of IFRS 9 has been published on July 2014. The main differences are among

classification and measurement of the instruments, instrument methodology and hedge accounting. IFRS 9 final implementation date is planned after 1 January 2018 (IFRS 2017), but there is also option of earlier application. The mandatory application after this date creates the arising issue between IFRS 9 Framework and Basel III on banking regulation, especially in the field of the connection between IFRS 9 expected loss (for all assets) and regulatory expected loss (EL).

The BIS (Bank for International Settlements) has published first guideline (BIS 2015) in conjunction with this new regulatory IFRS 9 standard in February 2015 and after that time another two guidelines have been published. (BIS 2015, BIS 2016). This first guideline (BIS 2015) document sets 11 principles for credit risk practices, which are in interaction with supervisory requirements of measurement of credit losses. The second guideline (BIS 2015) sets supervisory guidance for credit risk and accounting for expected credit losses which sums up into 8 principles and adds three principles for evaluation of these issues and its connection to capital adequacy. The standard (BIS 2017) has introduced analysis of the calculation of regulatory treatment of accounting provisions, for interim approach and transitional arrangements. Moreover, it sets principles for these two approaches and defines the process of calculation of difference between “static” and “dynamic” approach and in the Annex I of the document offers a summary of rules for transitional arrangements. It sets the approach for calculation of deducted part and the impact on CET 1 capital of the bank and its deduction and the disclosure, which is obligatory for banks, which choose transitional arrangements. (EBA Consultation paper, 2017). The BIS also points out that this approach is used in order to smooth potential negative effects of introduction of ECL accounting on regulatory capital through jurisdictions.

The EBA has contributed to the current discussion about IFRS 9 impact on capital with the first impact assessment in order to prepare for this new regime with greater uniformity (EBA, 2016). The assessment validates the negative impact on CET 1 ratio which is estimated to be higher than the impact on total capital ratio. (Decrease of 75 bps and 50 bps: 75th percentile). The lower negative impact on total capital ratio is because of the add-back of an excess of accounting provisions over expected losses for IRB portfolios to Tier 2 capital (shortfall). This absorption of impact of IFRS 9 is not a case for SA banks because of the current prudential treatment of provisions. The reason is because of recognition of CRAs (Credit Risk Adjustments), which both GCRAs (General Credit Risk Adjustments) and SCRAs (Specific Credit Risk Adjustments) impact CET 1 capital, but only in case of SCRAs there is reduction in exposure value and there is no inclusion of them in Tier 2 capital for SA banks (only GCRAs are added back in Tier 2 capital).

The second impact assessment (EBA, 2017) for quantitative and qualitative assessment of the impact of IFRS 9 points observation for preparation of implementation of new rules and its impact on regulatory own funds. The report validates that banks have already prepared for implementation, and they are in further stage of implementation process than in the previous impact assessment. (EBA, November 2016). The report validates increase of provisions and deterioration of own funds and capital ratios higher for smaller banks (mainly using standardised approach), which means more convenient for larger ones with using IRB approach to credit risk. Moreover, larger banks with most of the exposures in IRB

portfolios do not notice decrease in own funds, when accounting provisions have risen above regulatory EL. Consequently, significant number of banks recognize excess of EL in Tier 2, where 40% of banks still recognize a shortfall. On the other side, smaller banks have noticed lower increase in provisions. The impact of reclassification of the of financial instruments through IFRS 9 has limited impact even if it would be applicable for all categories. On the other hand, volatility in profit/loss account is highly probable because of the new impairment requirements and in the time of change of forecasted economic conditions. However, it should be acknowledged that IFRS 9 results in an earlier recognition of losses in comparison to IAS 39 in general.

Comparability across banking system is also the key issue, because of the complexity of processes, data, systems and models for different institutions, especially variable measurement of ECL within the new IFRS 9. The discussion continues before its initial application date at EU (European Union) international level. For banks, which choose transitional arrangements, the EBA (European Banking Authority) has published a guideline on uniform disclosure of IFRS 9 transitional arrangements of capital and leverage ratios within this approach because of the importance of transfer of key useful information for stakeholders of the bank to assess the impact of IFRS 9 on financial position of bank. Generally, the larger institutions benefit from IFRS 9 with mainly usage of IRB approach because of the recognition of CRAs, which can be added all back as Tier 2 capital, which is not case for SA banks. Therefore, the EBA calls for recognition of the new IFRS 9 provisions only as a SCRAs, which cannot be added back to Tier 2 capital for SA banks and which is also in conjunction with its RTS (Regulatory Technical Standard).

1.2 IFRS 9 and General and Specific Provisions Distinction

Based on the article in CRR 575/2013 there is distinction between general and specific CRAs. Quantitative relationship to credit risk adjustments in general to regulatory capital of the banks is the same for the both of them, in the meaning of the reduction of CET 1 capital in the case of shortfall and in the case of the excess they are added back to Tier 2 capital of the banks. The difference is only in quantitative (1.25 % from RWA for SA and 0.6 % of RWA for IRB). Therefore, it is necessary to distinguish between GCRAs and SCRAs in order to asses which amount should influence the regulatory capital of the banks and which proportion of any credit risk adjustment is attached to GCRAs or SCRAs. The EBA defines criteria which part of credit risk adjustments can be considered as GCRAs, while all other credit risk adjustments shall be included as SCRAs. (EBA, RTS 2013). Moreover, there is a problem within the definition of SCRAs, when in some cases there a defined for a single exposure or single obligor, which is in contradiction with GCRAs which are related to the whole group of exposures. The difference between SCRAs and GCRAs is that SCRAs reduce exposure value and cannot be added back to regulatory capital in comparison with GCRAs. The EBA in its opinion clarifies that IAS 39 provisions and provision under national accounting standards are generally classified as SCRAs. On the other hand, there is existence of different interpretations and inquiries whether provisions classified under IFRS 9 in stages 1 and 2 should be considered SCRAs or GCRAs according to the RTS. The EBA states that for the recognition of IFRS 9 provisions as GCRAs two criteria must be fulfilled (EBA 2017),

because they are allocated to group of exposures or individual exposures. Therefore, IFRS 9 provision should be considered as SCRAs.

2 IFRS 9 and Its Impact on Regulatory Capital

The existence of different scopes of application within the implementation of IFRS 9 in conjunction with supervisory rules for banking, which is based on their usage of the type of the model for calculation capital requirements for credit risk. Standardised banks (SA) suffer from rapid decline of CET 1 capital based on the treatment of accounting provisions within this approach (CRR 575/2013). Moreover, regulation does not obligate banks for measurement of regulatory loan loss provisions for SA banks. (Novotny, 2016) The impact for SA banks is stricter, because the creation of IFRS 9 expected loan loss provisions is obligatory for any type of financial assets and accounting provisions have direct impact on CET 1 capital. Even though, there is a possibility of inclusion of the excess of general credit risk adjustment under SA approach (general loan loss provisions) in Tier 2 capital within the limit of 1.25% of RWA. Importantly, banks with SA deduct specific credit risk adjustments from the exposure value in the calculation of capital requirements, but the impact of IFRS 9 is always capital depletive, because of the classification of all IFRS 9 provisions as SCRAs (EBA's opinion above). Furthermore, proper clarification and definition of potential recognition or forbiddance of part of IFRS 9 provisions as GCRAs provides ground for discussion and task for regulators in order to ensure uniformity is the scope of application of this new regulatory regime. Even there is no common available clarification and there is possibility of different interpretations of the added back part of IFRS 9 to TIER 2 (GCRAs or SCRAs) by BIS, depletion of capital is more important for stakeholders from the point of view of CET 1, because it is always depletive.

On the other hand, IRB banks calculate regulatory expected loss based on their own estimates of PD (Probability of Default), EAD (Exposure at Default) and LGD (Loss Given Default) and "shortfall" for performing and non-performing loans from their credit risk portfolios. The calculation requires deduction of the regulatory expected losses from accounting expected loss, consequently, if there is the excess of the regulatory expected loss, banks deduct the amount from Tier 1 capital. The excess of accounting expected loss is added back to Tier 2 capital within the limit of 0.6% RWA (valid for the whole portfolio of accounting provisions). It is important to stress that the add-back applies to the whole provision stock, not just general credit risk adjustments and it is stricter compared to SA (1.25% of RWA). In this case, the split between GCRAs and SCRAs is important for banks, which still have calculated part of their portfolio under SA approach. This is case for some IRB banks with smaller portfolio under SA approach. Moreover, the impact for IRB banks depends on the relationship between EL and VAAP (Value Adjustments and Provisions). Therefore, banks with excess of EL do not have big impact on CET 1 capital resources because of transition to IFRS 9 (capital drain because of missing amount of provisions before). The impact of IFRS 9 on IRB banks with the excess of VAAP over EL can be more material in depletion of CET 1 capital in general and also in the times of economic downturn. (Regulatory EL calculation based on through the cycle (Deloitte, 2016). This impact is

mostly capital depletive for CET 1 capital, but it is mostly capital realignment for regulatory capital in comparison with banks using only SA approach.

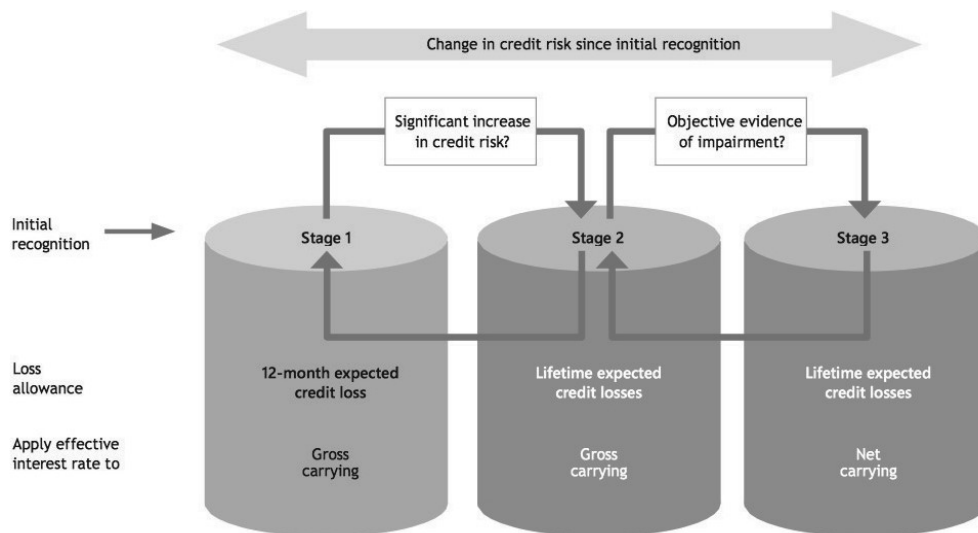


Figure 1. IFRS 9 framework and impairment of financial assets (Source: Deloitte, 2017)

3 IFRS 9 and Transitional Arrangements

The application of the new IFRS 9 takes into the effect the sharp changes in the institutions' available CET 1 capital and leads to problem to adequately meet and satisfy supervisors requirements within own funds of the banks. (discussion in the second part of this article). The BCBS has published the standards for the regulatory treatment of accounting provisions - interim approach in order to minimize and avoid deterioration of capital and to prepare in advance to the need of potential rapid increase of capital. The main aim of this standard is to avoid the threat of deterioration of their risk position by raising wrong type and amount of the new capital and worsening banks' profitability position. The main issue within transitional arrangements by which the transitional period has been introduced is recognition of the general and specific provision. This is discussed and clarified by retaining the current the current treatment of provisions under SA and also IRB frameworks within interim approach. Standardised banks have currently distinguished between GCAs and SCRA in regulatory capital framework, however jurisdictions have interpreted the definitions for GCRA a SCRA differently. On the other hand, for IRB framework the Committee retained the treatment from Basel II when adopted Basel III, which allows all provision to be treated as a deduction from regulatory expected loss and can be added back to Tier 2 capital. The distinction does not exist among accounting frameworks, which complicates uniform implementation of IFRS 9 across national jurisdictions. Therefore, BCBS has decided to retain current treatment of provisions for IRB and also for SA framework and expects from jurisdictions extension of their existing approaches for categorizing GCRA a SCRA. It

should be noted, this does not preclude them to categorize part of new provisions as GCRA's even when all provisions would be historically categorized as SCRA's (BIS, 2017). The problem still remains the same, therefore the BCBS points out the importance of regulatory action and expects introduction of categorizing of the provisions calculated under new applicable ECL accounting model (which portion should be regarded as GCRA's or SCRA's or if any) by national jurisdictions or supervisors in order to mitigate various practices across jurisdictions. Importantly, transitional arrangements for provisions are valid for only for the provisions, which have not existed before the implementation of IFRS 9 (pre-ECL accounting), only to those which banks creates under the new regime. This is also valid for regulatory required creation of provisions (without application of transitional arrangements).

The transitional arrangements involve the adjustment on the CET 1 capital, which is not fully reflected in the point of transition and is phased during the transition period. This approach takes maximum 5 years and involves static and dynamic approach. Moreover, for the practical impediments, which involve implementation of this new regime the BCBS states that straight line amortization should be used and its impact should not be neutralized during the transition approach. Moreover, any DTA should be disregarded for the transitional impact to CET 1 capital and also to risk-weights. Banks are now in the phase of deciding of transitional treatment and they can also choose between "static" and "dynamic" approach. The factors, which influence this decision between these two approaches depends on the current treatment of banks' provisioning, its jurisdiction and usage of SA or IRB approach and existence of shortfall within IRB approach. For banks applying the IRB approaches, the portion of "new" Stages 1 and 2 provisions under ECL accounting at a given reporting date that falls within any "shortfall" of accounting provisions compared to regulatory EL would be disregarded. There should be noted that not all provisions created in the Stage 1 and 2 are "new" ones, because of the existence of them under IAS 39 incurred loss approach and jurisdictions, which will choose this approach should make a clarification of this issue (BIS, 2017). The BCBS intend to review long-term regulatory treatment of the provision, but due to limited time before the effective date of IFRS 9 it has decided to retain current treatment of provisions (IASPLUS, 2017).

3.1 Impact of IFRS 9 on Regulatory Capital without Application of Transitional Arrangements

We have used example in Table 2 for quantification of the impact on capital ratios for SA approach without application of transitional arrangements, the example is based on the one published by Deloitte. (IASPLUS, 2016) We assume CET 1 capital equals Tier 1 capital in our Tables 1, 2, 3 and 4.

Table 1. Internal rating-based approach (IRB) without transitional arrangements (comparison of assumption of shortfall and excess before implementation)

	IRB approach (amounts in thousands of EUR)	Pre-charge	IAS 39	IFRS 9
1.	New impairment of provisions		20,00	50,00
2.	of which GCRA's		10,00	20,00
3.	of which SCRA's		10,00	30,00
4.	Regulatory capital (r.10+r.13)	1445,00	1445,00	1445,00
5.	Paid-up capital instruments	400,00	400,00	400,00
6.	Share premium	20,00	20,00	20,00
7.	Retained earnings	800,00	800,00	770,00
8.	Accumulated other comprehensive income	10,00	10,00	10,00
9.	CET 1 CAPITAL (r.5+r.6+r.7+r.8)	1230,00	1230,00	1200,00
10.	TIER 1 CAPITAL (r.9)	1230,00	1230,00	1200,00
11.	Paid up capital instruments and subordinated loans	200,00	200,00	200,00
12.	IRB Excess of provisions over expected losses eligible	15,00	15,00	45,00
13.	TIER 2 CAPITAL (r.11+r.12)	215,00	215,00	245,00
14.	RWA	8000,00	8000,00	8000,00
15.	Maximum amount in Tier 2 (0,6% x r. 14)	48,00	48,00	48,00
16.	CAR (r.4/ r.14) x 100	18,0625%	18,0625%	18,0625%
17.	TIER 1 (r.10/r.14) x 100	15,3750%	15,3750%	15,0000%
18.	CET 1 (r.9/r.14) x 100	15,3750%	15,3750%	15,0000%

Source: author

The quantitative impact of the increase in provisions under IFRS 9 (whole) is reflected directly in retained earnings. If we consider the excess of provisions over profit loss eligible before implementation of IFRS 9, the increase in amount consequently relocates to Tier 2 capital as excess of provisions over ECL (GCRA's and also SCRA's). Apparently, for this case the impact is direct and negative on CET 1 capital (evidently also Tier 1), but there is also obvious increase in Tier 2 capital. (0.06% RWA) Accordingly, we can conclude that IRB banks suffer from direct decrease in CET 1, but because of the transfer of excess of provisions to Tier 2, quantitative impact for regulatory capital is mostly its realignment. In the case of existing shortfall before implementation of IFRS 9, the IRB banks still suffer from direct decrease in retained earnings, but the impact on CET 1 is moderate and lower, because of the netting of the existing shortfall before the implementation by increase in provisions. Moreover, if the newly created provisions are higher than shortfall, the institution can also add this excess to Tier 2 capital. (0.6% RWA) To conclude, these banks would have lower

quantitative impact to CET 1 (amount of the shortfall) and their regulatory capital is realigned respectively.

Table 2. Standardised approach (SA) without transitional arrangements

	Standardised approach (amounts in thousands of EUR)	Pre-charge	IAS 39	IFRS 9
1.	New impairment of provisions		20,00	50,00
2.	of which GCRAs		10,00	20,00
3.	of which SCRAs		10,00	30,00
4.	Regulatory capital (r.10+r.13)	1445,00	1445,00	1425,00
5.	Paid-up capital instruments	400,00	400,00	400,00
6.	Share premium	20,00	20,00	20,00
7.	Retained earnings	800,00	800,00	770,00
8.	Accumulated other comprehensive income	10,00	10,00	10,00
9.	CET 1 CAPITAL (r.5+r.6+r.7+r.8)	1230,00	1230,00	1200,00
10.	TIER 1 CAPITAL (r.9)	1230,00	1230,00	1200,00
11.	Paid up capital instruments and subordinated loans	200,00	200,00	200,00
12.	SA General credit risk adjustments	15,00	15,00	25,00
13.	TIER 2 CAPITAL (r.11+ r.12)	215,00	215,00	225,00
14.	RWA	8000,00	8000,00	8000,00
15.	Maximum amount in Tier 2 (1,25% x r. 14)	100,00	100,00	100,00
16.	Gross exposure	8316,00	8316,00	8316,00
17.	Average RW	95%	95%	95%
18.	Performing RWAs (r.16 x r.17)	7900,20	7900,20	7900,20
19.	Gross Defaulted Exposure	300,00	300,00	300,00
20.	Net of specific adjustments	80,00	70,00	50,00
21.	Average RW	125%	125%	125%
22.	Defaulted RWAs (r. 19 x r. 20)	100,00	87,50	62,50
23.	Total RWA (r.18+r.22)	8000,20	7987,70	7962,70
24.	CAR (r.4/r.23) x 100	18,0620%	18,0903%	17,8959%
25.	TIER 1 (r.10/r.23) x 100	15,3746%	15,3987%	15,0703%
26.	CET 1 (r.9/r.23) x 100	15,3746%	15,3987%	15,0703%

Source: author

The quantitative impact of the increase in IFRS 9 provisions transfers directly to retained earnings and for this component of regulatory capital is same as for IRB institutions. SA institutions have the direct impact on CET 1 capital (reduction by an amount of the

increase in provisioning under new regime). On the other hand, SA institutions can reduce exposure value by the amount of the increase in SCRAs created under new regime. (IFRS 9) and add an excess of GRAs (potential recognition of combination of Stage 1 and Stage 2 provisions as GCRA) to Tier 2 capital (1.25 % RWA). Consequently, they also realign their regulatory capital, which is not the same amount as for IRB institutions. Moreover, the EBA's opinion about recognition of the new IFRS 9 provision as only SCRAs can cause more sharp impact on regulatory capital and no potential realignment, but this negative impact is minimized by greater reduction in RWA (recognition of all provisions under IFRS 9 as SCRAs). Consequently, the decrease in capital ratios is lower.

In conclusion, SA institutions suffer from more sharp decrease of CAR (Capital Adequacy Ratio) and also in regulatory capital than IRB institutions, but because of the reduction of exposure values and consequent decrease in RWA, they do not suffer from sharp decrease in CET 1 and Tier 1 ratios.

3.2 Impact on Regulatory Capital with the Application of Transitional Arrangements

The quantitative impact during the transitional arrangements in the first year contains the add-back of the increase in the provisioning under a new regime in CET 1 capital of the bank. The add-back contains the amount of the newly created provisions multiplied by coefficient (0,75 for the first year of implementation), which depends on the amount of the years in transitional arrangements (for straight line amortization). We assume 4 year of transitional arrangements and straight line amortization without considering tax effects for IRB and also SA example. In the Table 3, we consider for IAS 39 (negative shortfall, ELVAAP) in amount -15 thousand EUR, which impacts CET 1 capital and also IFRS 9 add back in the static approach (negative shortfall before implementation). The amount of provisions added to Tier 2 capital depends on amount, which have been not added back to CET 1 capital, because only this amount (part of the coefficient) can be added back to Tier 2. Moreover, in case of reduction of exposure value, there is same approach and only not-deducted part can reduce exposure value (use of the coefficient). Evidently, the impact for CET 1 capital is broadly quantitatively positive with application of transitional arrangements and SA banks would suffer from lower decline of CET 1 ratio, but there will be higher negative impact within total capital ratio in comparison with IRB banks with the excess of provisions before implementation. The impact of the implementation of IFRS 9 depends on how national jurisdictions interpret and set rules for the distinction between GCRA and SCRAs, because this is the turning point of the potential add back of non-distracted CET 1 amount of IFRS 9 provisions to Tier 2 capital.

The quantitative impact during the transitional arrangements in the first year contains the add-back of the increase in the provisioning under a new regime in CET 1 capital of the bank and it is the same as for SA approach during transitional period. IRB banks also recover their Tier 2 capital by an added part of the excess of the new provisions to Tier 2 (part, which was not added back to CET 1). The difference does not exist in retained earnings even for

banks with existence of shortfall, but their CET 1 is lower (in comparison with excess or provisions before) and also add-back part is netted for amount of shortfall in CET 1.

Table 3. IRB with static approach in transitional arrangements (comparison of assumption of shortfall and excess)

	IRB approach (amounts in thousands of EUR)	Pre- charge	IAS 39/ positive shortfall (excess)	IAS 39/ negative shortfall	IFRS 9	Static/ positive shortfall (excess)	Static/ negative shortfall
1.	New impairment of provisions		20,00	20,00	50,00	50,00	50,00
2.	of which GCRAAs		10,00	10,00	20,00	20,00	20,00
3.	of which SCRAAs		10,00	10,00	30,00	30,00	30,00
4.	Regulatory capital (r.11+r.14)	1445,00	1445,00	1415,00	1445,00	1445,00	1415,00
5.	Paid-up capital instruments	400,00	400,00	400,00	400,00	400,00	400,00
6.	Share premium	20,00	20,00	20,00	20,00	20,00	20,00
7.	Retained earnings	800,00	800,00	800,00	770,00	770,00	770,00
8.	Add back					22,50	7,50
9.	Accumulated other comprehensive income	10,00	10,00	10,00	10,00	10,00	10,00
10.	CET 1 (r.5+r.6+r.7+r.8+r.9)	1230,00	1230,00	1215,00	1200,00	1222,50	1207,50
11.	TIER 1 (r. 10)	1230,00	1230,00	1215,00	1200,00	1222,50	1207,50
12.	Paid up capital instruments and subordinated loans	200,00	200,00	200,00	200,00	200,00	200,00
13.	IRB Excess of provisions over expected losses eligible	15,00	15,00	0,00	45,00	22,50	7,50
14.	TIER 2 (r.12+r.13)	215,00	215,00	200,00	245,00	222,50	207,50
15.	RWA	8000,00	8000,00	8000,00	8000,00	8000,00	8000,00
16.	Maximum amount in Tier 2 (0,6% x r.15)	48,00	48,00	48,00	48,00	48,00	48,00
17.	CAR (r.4/r.15)	18,0625%	18,0625%	17,6875%	18,0625%	18,0625%	17,6875%
18.	TIER 1 (r.11/r.15)	15,3750%	15,3750%	15,1875%	15,0000%	15,2813%	15,0938%
19.	CET 1 (r.10/r.15)	15,3750%	15,3750%	15,1875%	15,0000%	15,2813%	15,0938%

Source: author

To conclude, CET 1 capital base is completely relieved (lower for negative "shortfall" IRB ones), but their Tier 2 capital is lower than that one without transitional arrangements. Accordingly, the change of the capital ratios is positive (capital realignment) compared with no implementation of transitional arrangements and the CET 1 capital base is relieved for both SA and IRB banks.

Table 4. SA with static approach in transitional arrangements

	Standardised approach (amounts in thousands of EUR)	Pre-charge	IAS 39	Static
1.	New impairment of provisions		20,00	50,00
2.	of which GCRA's		10,00	20,00
3.	of which SCRA's		10,00	30,00
4.	Regulatory capital (r. 11+ r. 14)	1445,00	1445,00	1440,00
5.	Paid-up capital instruments	400,00	400,00	400,00
6.	Share premium	20,00	20,00	20,00
7.	Retained earnings	800,00	800,00	770,00
8.	Add back			22,50
9.	Accumulated other comprehensive income	10,00	10,00	10,00
10.	CET 1 CAPITAL (r.5+r.6+r.7+r.8+r. 9)	1230,00	1230,00	1222,50
11.	TIER 1 CAPITAL (r.10)	1230,00	1230,00	1222,50
12.	Paid up capital instruments and subordinated loans	200,00	200,00	200,00
13.	SA General credit risk adjustments	15,00	15,00	17,50
14.	TIER 2 CAPITAL (r.12+r.13)	215,00	215,00	217,50
15.	RWA	8000,00	8000,00	8000,00
16.	Maximum amount in Tier 2 (1,25%x r. 15)	100,00	100,00	100,00
17.	Gross exposure	8316,00	8316,00	8316,00
18.	Average RW	95,00%	95,00%	95,00%
19.	Performing RWAs (r. 17 x r. 18)	7900,20	7900,20	7900,20
20.	Gross Defaulted Exposure	300,00	300,00	300,00
21.	Net of specific adjustments (in r. 3)	80,00	70,00	65,00
22.	Average RW	125,00%	125,00%	125,00%
23.	Defaulted RWAs (r. 21 x r.22)	100,00	87,50	81,25
24.	Total RWA (r.19+r.23)	8000,20	7987,70	7981,45
25.	CAR (r.4/r.24) x 100	18,0620%	18,0903%	18,0418%
26.	TIER 1 (r.11/r.24) x 100	15,3746%	15,3987%	15,3168%
26.	CET 1 (r.10/r.24) x 100	15,3746%	15,3987%	15,3168%

Source: author

3.4 IFRS 9 and its Impact on Tier 1, Total Capital and Leverage Ratio

The quantitative impact on the ratios (Tables 1, 2, 3 and 4) is the strictest for the CET 1 ratio of the bank, for both SA and IRB banks they suffer for the same decline of the CET 1 ratio. Based on the relationship between Tier 1 and CET 1 ratios the impact is almost the same, but there is very important factor which influences this quantitative impact, the existence of the “shortfall”, before the final implementation date (for IRB banks). When the shortfall (excess) exists before the implementation date, the impact on CET 1 capital is less depletive by the amount of the shortfall and neutralized also the by the impact on Tier 1 in the same amount. Moreover, for the banks with the existence of the excess of the provisions with comparison to regulatory EL, the part of the newly created provisions is added back to their Tier 2 capital, which leads to more realignment impact on the total capital ratio. SA banks suffer from a twice stricter depletion of their total capital ratio than IRB banks, but there is still option for then to added part of the new provisions to be recognized as GCRAs (also in Stage 1 and Stage 2) as add-back to their Tier 2, despite the recommendation of the EBA to recognized all newly created provisions under IFRS 9 as SCRAs. (BIS, 2017) This is possible because of the different interpretations of GCRAs and SCRAs definitions across jurisdictions. There should be noted that common definition and application is enforced. The BIS has settled the rules for the transitional arrangement, which also points out that the new IFRS 9 provision add-back for newly created provisions to Tier 2 capital within transitional arrangements. It is only valid for those, which are deducted from the CET 1 capital (adjustment amount, which is not deducted from CET 1 capital should not be added back and reduce exposure amount and also reduce total exposure measure for leverage). Moreover, the rules remain the same for SCRAs, which cannot reduce exposure amount and cannot serve as a reductive factor in the total exposure measure in the leverage ratio.

3.5 IFRS 9 and Disclosures (Market discipline – Pillar 3)

Banks, which choose transitional arrangements of IFRS 9 have to use obligatory template for disclosures which is included in the EBA Consultation Paper (on Guidelines on uniform disclosures under the proposed draft Article 473a, part Eight, of Regulation (EU) No 575/2013). The effective date is January 2018 and the template (KM1) requires to disclose sufficient information about the impact of IFRS 9 to regulatory capital of the bank, RWA, capital ratios and leverage ratio and to compare its quantitative impact before the state of application of this new regime. All of these components should be disclosed quantitatively as IFRS 9 transitional arrangements are not applied. Moreover, this leads to easier comparability and assessment of the potential impact on the supervisory reporting, which means Common Reporting Standards (COREP). (EBA, 2017) For institutions, which choose not to comply with transitional arrangements there should be a narrative commentary disclosed. It can be concluded that the uniformity of this disclosures during the transitional arrangements leads to more effective market discipline via offering the market participants sufficient and effective information about the capital position of the institution, which satisfy regulators’ expectations and requirements. The EBA has taken into account the need of uniformity of disclosures at an international level, therefore disclosures regarding capital and leverage ratios, obligatory for institutions using transitional arrangements of IFRS 9, are consistent with Standard on Pillar 3

disclosure requirements-consolidated and enhanced framework (BCBS 2017), which leads to broader and stronger enhancement of market discipline.

Conclusions

The IFRS 9 regulation causes a decrease of capital base of the banks. Differences exist also between the institutions, which use mostly SA or IRB approach. The quantitative impact of the increase in provisions is relocated directly to retained earnings (whole impact). IRB banks suffer from direct decrease in CET 1, but because of the transfer to Tier 2, quantitative impact for regulatory capital is mostly its realignment. On the other hand, SA institutions reduce exposure value and realign their regulatory capital base but suffer from more sharp decrease in CAR and also in regulatory capital than IRB institutions. Generally, the highest quantitative impact is within CET 1 ratio. Transitional arrangements relieve CET 1 capital base due to the add-back. Consequently, the impact for CET 1 capital is broadly quantitatively improved by implementation of transitional arrangements. SA banks suffer from its lower decline (CET 1 ratio), but there will be higher negative impact within total capital ratio in comparison with IRB banks with the excess of provisions before implementation. Moreover, the impact of the implementation of IFRS 9 depends on how national jurisdictions interpret and set rules for the distinction between GCRA and SCRA. IRB banks recover their CET 1 capital and Tier 2 capital and their capital base, which is nearly completely relieved (lower for "shortfall" ones) and the change of the capital ratios is just minimally deteriorated (capital realignment), which was the goal of transitional arrangements. Consequently, transitional arrangements relieve CET 1 capital base and by requiring of proper and detailed required disclosure templates, they can enhance broadly market discipline.

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