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Independent research by Chartis

IFRS 9 Technology Solutions 2016

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1. Executive summary

IFRS 9 is a high impact symbolic, operational, IT and organizational transformation event for Finance and Risk: an arranged marriage that is turning an uncomfortable courtship and good intentions into a powerful successful partnership that is greater than the sum of its parts. It is one of a few interlinked, unavoidable initiatives in finance, regulation, compliance and risk management that are catalysts to invest in sustainable best practice.

It has common foundations with a number of other key regulatory trends. Therefore the foundations for an easier implementation of IFRS 9 can be achieved if an organization has performed well, for example, in implementing:

- BCBS 239 for data management;
- CCAR, DFAST and EBA stress testing;
- Rigorous enterprise credit and counterparty risk management and is Internal Ratings Based (IRB);
- Close working practices and a common culture between risk management and finance with regard to risk-adjusted performance management;

Organizational support for implementing and running IFRS 9 will require change, through greater involvement of different departments that hitherto have not been as directly active in finance activities. These particularly include risk and regulatory reporting.

The marketplace, including large tier 1 financial institutions, is turning towards the software vendors for solutions. However, this new marriage of Risk and Finance is not reflected in most of the software vendors' previous experience. There are very few one-stop shops that encompass the whole process from transaction origination to audited P&L and Balance Sheet. Therefore, there are also a lot of integrated, multi-vendor solutions.

There are few fully complete software packages that reflect the target state required by 2018, with deliverables still occurring during 2016 which make some Proofs of Concepts (PoCs) reliant on vendor credibility and trust or successes for the early deliverers.

Large financial institutions' complex structures demand large in-house, development, implementation and operations teams as well as extra support from all their external professional advisers. All other financial institutions can rely on the packaged software marketplace but they require close support from the large audit firms as well as extra consultancy, development and integration resources. Throughout 2016 and 2017 there is going to be a shortfall in suitably qualified experienced support services teams in this market sector, which, as mentioned earlier, has some new methodological and organizational challenges.

Data to support impairment modeling and calculations is a critical success factor. If not assembled comprehensively, aggregated and normalized rigorously within a formal data management and well-engineered IT architecture then firms' results will be negatively affected. Many firms, particularly those that have not been through the internal rating based (IRB) experience will have to upgrade their IT architecture or rely on a vendor's Software as a Service (SaaS) infrastructure.

This report uses Chartis's FinTech Quadrant™ to explain the vendor landscape. The FinTech Quadrant™ uses a comprehensive methodology of in-depth independent research and a clear scoring system to explain which technology solutions meet an organization's needs.

This report covers the following vendors offering IFRS 9 technology solutions for financial institutions, including AxiomSL, Fernbach, FIS, Misys, Moody's Analytics, Oracle, Prometeia, Quantifi, SAP, SAS and Wolters Kluwer FS.

2. Demand-side analysis

2.1. IFRS 9 – A large transformation

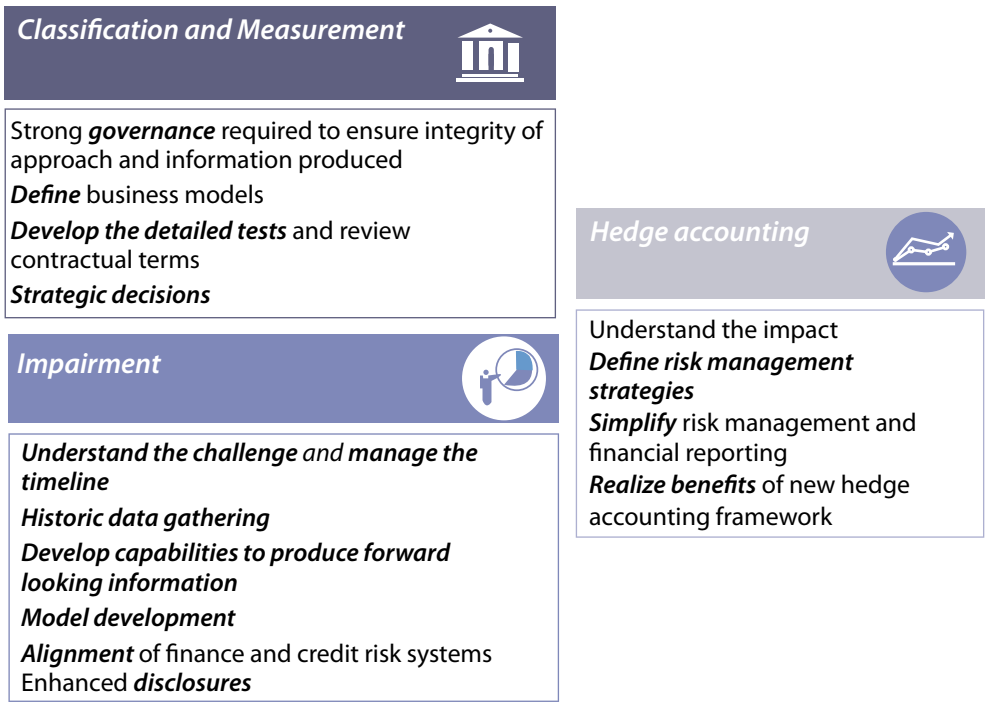
Upgrading to the latest International Financial Reporting Standards (IFRS 9) is a large transformational event for all financial institutions, regardless of their size and complexity. Market commentators have compared the changes required as being similar in scale to the re-engineering required for Basel, but in practice financial institutions will be affected unevenly. For example, a bank that has an advanced BCBS 239 project is likely to have less trouble mining for historic data and linking it back to the General Ledger, than a bank that has invested less in its data infrastructure and governance processes.

Similarly, financial institutions with a mature portfolio of Internal Ratings Based (IRB) credit risk models will be better able to evaluate IFRS 9 exposures and re-engineer these models, than financial institutions following the Basel Standardized Approach with its simpler rules and governance.

Due to the significance of the changes expected, the IASB provided a multi-year period to facilitate the necessary changes and parallel test the new provisions and monitoring systems ahead of formal adoption in January 2018.

2.1.2. Summary of the impact of IFRS 9 on financial firms

Figure 1: IFRS 9 impact on financial firms



Source: PwC

2.2. History and status of the IFRS 9 standard

During the financial crisis, the Group of 20 countries tasked global accounting standard setters to work towards the objective of creating a single set of high-quality global standards. In response to this request, the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) began to work together on the development of new financial instruments standards. The IASB decided to accelerate its project to replace IAS 39, and sub-divided it into three main phases:

- Classification and measurement.
- Impairment.
- Hedge accounting.

At the beginning of the project the FASB and IASB worked jointly on both the classification and measurement and the impairment projects. However, due to lack of support for a three-stage approach for the recognition of impairment losses in the US, the FASB developed a single measurement model, while the IASB decided to continue with the three-stage model. In addition, the FASB decided it would not continue to pursue a classification and measurement model similar to the IASB. As a consequence, IFRS 9 is not a converged standard, and therefore IFRS 9 is not applicable under US GAAP – US financial firms should refer to the guidelines from FASB (FASB.org for more information).

On 24 July 2014 the IASB published the complete version of IFRS 9, *'Financial Instruments'*, which replaces most of the guidance in IAS 39 and is applicable to all jurisdictions operating under IFRS. IFRS 9 is effective for annual periods beginning on or after 1 January 2018, subject to endorsement in certain territories.

2.3. IFRS 9 classification and measurement model

IFRS 9 provides a new model for the classification of debt financial assets that is driven by the business model in which the assets are held and the cash flow characteristics of the assets. This classification dictates the accounting mechanism applicable to the asset. Any equity financial instruments are required to be carried on the balance sheet at fair value. The rules relating to the classification and measurement of financial liabilities contained in IAS 39 are carried almost unchanged into IFRS 9. There is one notable exception, that relating to the recognition of 'own credit gain', whereby any fair value gains and losses on the measurement of liabilities are now reported in other comprehensive income as opposed to the IAS 39 requirement to record such changes in the income statement.

IFRS 9 provides a mixed measurement model for financial assets whereby three main accounting mechanisms are applied to reflect the financial assets on the balance sheet those being:

- Amortized cost.
- Fair value through profit and loss (FVTPL).
- Fair value through other comprehensive income (FVTOCI).

However, as noted above, this determination for debt assets is based on the business models operated by a financial institution and the characteristics of the cash flows associated with those assets.

Accordingly, PwC does not envisage a significant change to be incorporated into existing systems in terms of accounting for the financial instruments. However, the main challenge will be to ensure there is a robust governance structure in place to identify the business models that are in operation and the assets held within those business models and to monitor changes in business models and cash flow characteristics that could lead to a difference in measurement of the assets. Due to the subjectivity inherent in the new requirements, banks will be required to exercise judgment in determining the level at which the business models are applied. In addition, for more complex financial instruments with complex cash flow characteristics, tests would need to be developed to determine the applicable accounting mechanism.

As noted above, equity financial assets are always required to be carried at fair value on the balance sheet, although some choice is available as to whether the fair value movements will be recorded in the income statement or other comprehensive income. Banks will be required to develop capabilities to determine fair values for difficult-to-value equity assets (i.e., non-listed equities). Depending on their existing capabilities, this may require banks to invest in technology and data that will support the production of fair value information for such assets.

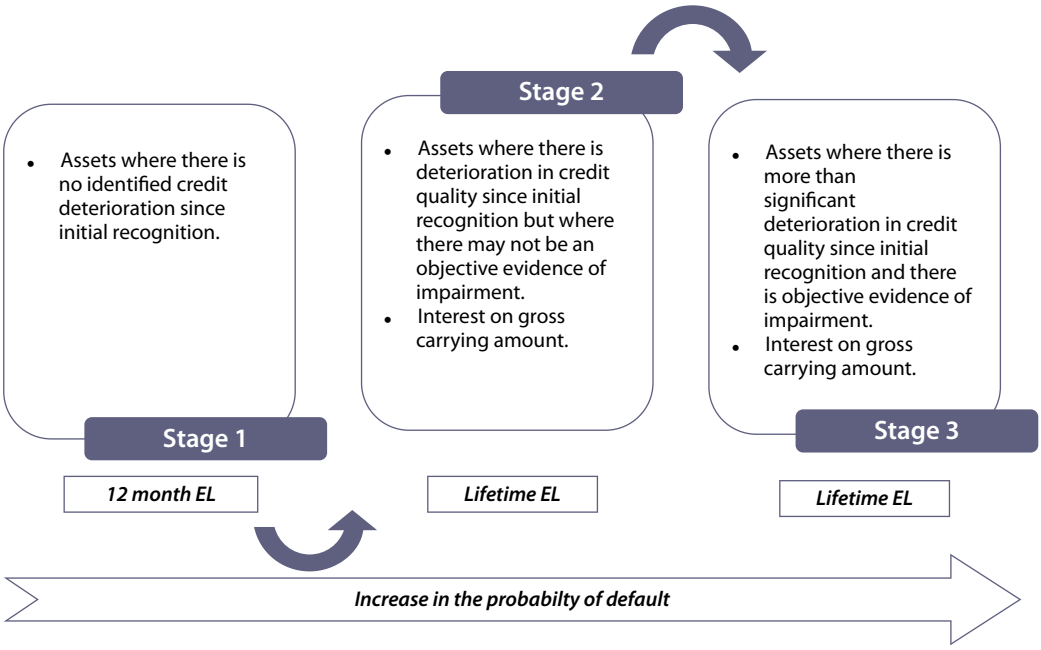
2.4 Impairment - summary of the Expected Credit Loss (ECL) approach under IFRS 9

The ECL model constitutes a significant change relative to the impairment guidance under IAS 39 and seeks to address the criticisms of the incurred loss model which were highlighted during the economic crisis. In practice, the new rules mean that entities will have to record impairment almost immediately equal to the 12-month expected loss after the initial recognition of financial assets that are not credit impaired.

IFRS 9 contains a 'three stage' approach which is based on the change in credit quality of financial assets since initial recognition. Assets move through the three stages as credit quality changes and the stages dictate how an entity measures impairment losses and applies the effective interest rate method.

Where there has been a significant increase in credit risk, impairment is measured using lifetime ECL rather than 12-month ECL. The model includes operational simplifications for lease and trade receivables.

Figure 2: The three stage approach



Source: PwC

Stage 1 includes financial instruments that have not had a significant increase in credit risk since initial recognition or that have low credit risk at the reporting date. For these assets, 12-month expected credit losses ('ECL') are recognized and interest revenue is calculated on the gross carrying amount of the asset (that is, without deduction for credit allowance). 12-month ECL are the expected credit losses that result from default events that are possible within 12 months after the reporting date. It is not the expected cash shortfalls over the 12-month period but the entire credit loss on an asset weighted by the probability that the loss will occur in the next 12 months.

Stage 2 includes financial instruments that have had a significant increase in credit risk since initial recognition but that do not have objective evidence of impairment. For these assets, lifetime ECL are recognized, but interest revenue is still calculated on the gross carrying amount of the asset. Lifetime ECL are the expected credit losses that result from all possible default events over the expected life of the financial instrument. Expected credit losses are the weighted average credit losses with the probability of default ('PD') as the weight.

Stage 3 includes financial assets that have objective evidence of impairment at the reporting date. For these assets, lifetime ECL are recognized and interest revenue is calculated on the net carrying amount (that is, net of credit allowance).

The standard requires qualitative management involvement when determining whether the credit risk on a financial instrument has increased significantly by considering all reasonable and supportable information available. This is in order to compare the risk of a default occurring at the reporting date relative to the risk of a default occurring at initial recognition of the financial instrument. Therefore, the assessment of deterioration in credit quality is a relative assessment. This is a significant change from IAS 39 in the way credit deterioration is determined. Financial institutions are therefore required to gather significant historical data about their credit exposures to enable application of the relative credit quality assessment.

An entity should apply a definition of default that is consistent with the definition used for internal credit risk management purposes for the relevant financial instrument. It should consider qualitative factors (for example, financial covenants), where appropriate. However, there is a rebuttable presumption that default does not occur later than when a financial asset is 90 days past due, unless an entity has reasonable and supportable information to demonstrate that a more lagging default criterion is more appropriate.

2.4.1 Exceptions

There are some exceptions to note.

Simplified approach for trade and lease receivables

The model includes some operational simplifications for trade receivables, contract assets and lease receivables, because they are often held by entities that do not have sophisticated credit risk management systems. These simplifications eliminate the need to calculate 12-month ECL and to assess when a significant increase in credit risk has occurred.

For trade receivables or contract assets that do not contain a significant financing component, the loss allowance should be measured at initial recognition and throughout the life of the receivable at an amount equal to lifetime ECL. As a practical expedient, a provision matrix may be used to estimate ECL for these financial instruments.

For trade receivables or contract assets which contain a significant financing component in accordance with IFRS 15 and lease receivables, an entity has an accounting policy choice to either apply the simplified approach (that is, to measure the loss allowance at an amount equal to lifetime ECL at initial recognition and throughout its life) or to apply the general model. The policy choice should be applied consistently, but an entity can apply the policy election for trade receivables, contract assets and lease receivables independently of each other.

Purchased or originated credit-impaired assets

The general impairment model, as outlined above, does not apply to purchased or originated credit impaired assets. A financial asset is considered credit-impaired on purchase or origination if there is evidence of impairment (as defined in IFRS 9) at the point of initial recognition (for instance, if it is acquired at a deep discount).

For such assets, impairment is determined based on full lifetime ECL on initial recognition. However, lifetime ECL are included in the estimated cash flows when calculating the effective interest rate on initial recognition. The effective interest rate for interest recognition throughout the life of the asset is a credit-adjusted effective interest rate. As a result, no loss allowance is recognized on initial recognition.

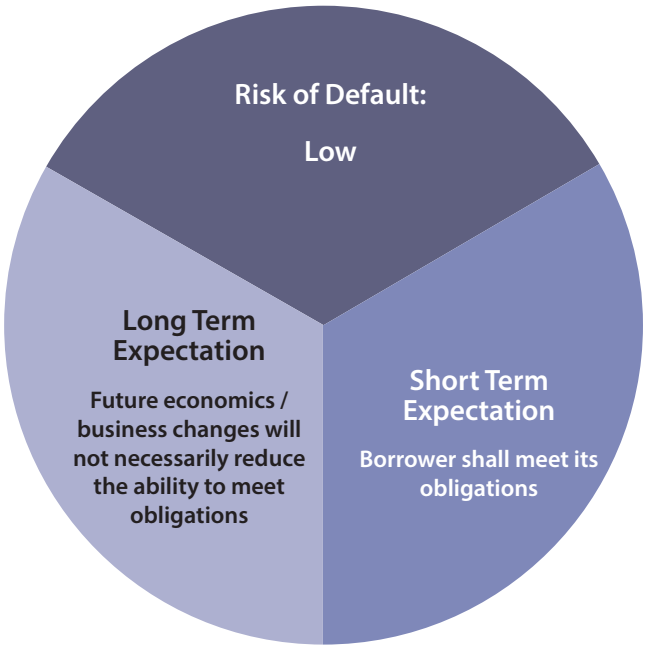
Any subsequent changes in lifetime ECL, both positive and negative, will be recognized immediately in profit or loss.

Assets with low credit risk

Another simplification provided in IFRS deals with assets which are considered to have a low risk of default. In accordance with IFRS 9, if the credit risk of a financial instrument is low at the reporting date, firms can measure impairment using 12-month ECL, and so they do not have to assess whether a significant increase in credit risk has occurred. In order for this operational simplification to apply, the financial instrument has to meet the following requirements:

- It has a low risk of default;
- The borrower is considered, in the short term, to have a strong capacity to meet its obligations;
- The lender expects, in the longer term, that adverse changes in economic and business conditions might reduce the ability of the borrower to fulfil its obligations.

Figure 3: Financial instrument requirements



Source: PwC

The credit risk of the instrument needs to be evaluated without consideration of collateral. This means that financial instruments are not considered to have low credit risk simply because that risk is mitigated by collateral. Financial instruments are also not considered to have low credit risk simply because they have a lower risk of default than the entity's other financial instruments or relative to the credit risk of the jurisdiction within which the entity operates.

PwC has offered a clarification that the use of this practical expedient is optional. Management can choose to apply the general model for those assets that would meet the low credit risk requirements. It is expected that this operational simplification will provide relief to financial institutions who hold large portfolios of securities with high credit ratings, e.g. for the purposes of Liquidity Risk, in their HQLA portfolios. This expedient will avoid having to assess whether there are significant increases in credit risk for financial assets with low credit risk.

Financial instruments are not required to be externally rated. An entity can use internal credit ratings that are consistent with a global credit rating definition of 'investment grade'.

The low credit risk simplification is not meant to be a bright-line trigger for the recognition of lifetime ECL. Instead, when credit risk is no longer low, firms should assess whether there has been a significant increase in credit risk to determine whether lifetime ECL should be recognized. This means that just because an instrument's credit risk has increased such that it no longer qualifies as low credit risk, it does not automatically mean that it has to be included in Stage 2. Firms need to assess if a significant increase in credit risk has occurred before calculating lifetime ECL for the instrument.

2.4.2 Recognizing changes in impairment

Generally, a financial instrument would have a significant increase in credit risk before there is objective evidence of impairment or before a default occurs. The standard requires both forward-looking and historical information to be used in order to determine whether a significant increase in credit risk has occurred.

Lifetime ECL are expected to be recognized before a financial asset becomes delinquent. If forward-looking information is reasonably available, an entity cannot rely solely on delinquency information when determining whether credit risk has increased significantly since initial recognition; it also needs to consider the forward-looking information.

However, if more forward-looking information is not readily available, there is a rebuttable presumption that credit risk has increased significantly since initial recognition up till when contractual payments are more than 30 days past due.

This presumption can be rebutted if there is reasonable and supportable evidence that, regardless of the past-due status, there has been no significant increase in the credit risk: e.g. where non-payment is an administrative oversight, instead of resulting from financial difficulty of the borrower. Another example is where a firm has access to historical evidence that demonstrates that there is no correlation between significant increases in the risk of a default occurring and financial assets on which payments are more than 30 days past due, but that evidence does identify such a correlation when payments are more than 60 days past due.

Generally, a significant increase in credit risk happens gradually over time and before the financial asset becomes credit-impaired or is in default. As a result, the lifetime ECL should not be delayed and is recognized before a financial asset is regarded as credit impaired or in default.

2.4.3 Granularity for analyzing credit risk assessment

The model can be applied at an individual or portfolio level. However, some factors or indicators may not be identifiable at an instrument level. In such cases, the factors or indicators should be assessed at a portfolio level. Firms cannot avoid calculating lifetime ECL by considering the assessment at an individual asset level only, if information available at portfolio level indicates that there has been an increase in credit risk for the instruments included in the portfolio.

Depending on the nature of the financial instrument and the credit risk information available for particular groups of financial instruments, firms might not be able to identify significant changes in credit risk for individual financial instruments before the financial instrument becomes past due. This might be the case for financial instruments such as retail loans for which there is little or no routinely obtained updated credit risk information monitored on an individual instrument basis until a customer breaches the contractual terms.

If changes in the credit risk for individual financial instruments are not captured before they become past due, a loss allowance, based only on credit information at an individual financial instrument level, would not faithfully represent the changes in credit risk since initial recognition.

In some circumstances a firm does not have reasonable and supportable information that is available to measure lifetime ECL on an individual instrument basis. In that case, lifetime ECL should be recognized on a collective basis that considers comprehensive credit risk information. This comprehensive credit risk information must incorporate not only past-due information but also all relevant credit information, including forward-looking macro-economic information. This is to approximate the result of recognizing lifetime ECL when there has been a significant increase in credit risk since initial recognition on an individual instrument level.

Firms can group financial instruments on the basis of shared credit risk characteristics. This is to facilitate an analysis that is designed to enable significant increases in credit risk to be identified on a timely basis. The entity should not obscure this information by grouping financial instruments with different risk characteristics.

Examples of shared credit risk characteristics might include, but are not limited to:

- the instrument type;
- the credit risk ratings;
- the collateral type;
- the date of origination;
- the remaining term to maturity;
- the industry;
- the geographical location of the borrower; and
- the value of collateral relative to the commitment if it has an impact on the probability of a default occurring (for example, non-recourse loans in some jurisdictions or loan-to-value ratios)

Determining appropriate segmentation of credit exposures based on shared risk characteristics is a very important element of application of IFRS requirements. It is also very important when determining whether a significant deterioration in credit quality of a portfolio of assets has taken place. Financial institutions need to ensure that segments are determined such that they should not mask any inherent credit risk.

2.4.4 Measuring ECL

ECL forecasts a probability-weighted estimate of credit losses. A credit loss is the difference between the cash flows that are due to an entity in accordance with the contract and the cash flows that the entity expects to receive discounted at the original effective interest rate. Because ECL consider the amount and timing of payments, a credit loss arises even if the entity expects to be paid in full but later than when contractually due.

The time value of money must be taken into account when calculating the ECL (regardless of whether it is the 12-month or the lifetime ECL). Firms should discount the cash flows that they expect to receive at the effective interest rate determined at initial recognition; or an approximate in order to calculate ECL. If a financial instrument has a variable interest rate, ECL should be discounted using the current effective interest rate.

An estimate of ECL on loan commitments should be consistent with expectations of draw-downs on that loan commitment. Management should consider the expected portion of the loan commitment that will be drawn down within 12 months of the reporting date when estimating 12-month ECL. Also the expected portion of the loan commitment that will be drawn down over the expected life of the loan commitment when estimating lifetime ECL.

For a financial guarantee contract, a firm is required to make payments only in the event of a default by the debtor in accordance with the terms of the instrument that is guaranteed. Cash shortfalls are the expected payments to reimburse the holder for a credit loss that it incurs, less any amounts that a firm expects to receive from the holder, the debtor or any other party. If the asset is fully guaranteed, the estimation of cash shortfalls for a financial guarantee contract would be consistent with the estimations of cash shortfalls for the asset subject to the guarantee.

For a financial asset that is credit-impaired at the reporting date, but that is not a purchased or originated credit-impaired financial asset, an entity should measure the ECL as the difference between the asset's gross carrying amount and the present value of estimated future cash flows discounted at the financial asset's original effective interest rate. Any adjustment is recognized in profit or loss as an impairment gain or loss.

2.4.5 ECL estimation period

For loan commitments, the maximum period over which ECL should be measured is the maximum contractual period over which the entity is exposed to credit risk.

Some financial instruments include both a loan and an undrawn commitment component, such as revolving credit facilities. In such cases, the contractual ability to demand repayment and cancel the undrawn commitment does not necessarily limit the exposure to credit losses beyond the contractual period. For those financial instruments, a firm should measure ECL over the period that the entity is exposed to credit risk and ECL would not be mitigated by credit risk management actions, even if that period extends beyond the maximum contractual period.

For those types of instrument, the factors to be considered when determining the period over which to estimate ECL are:

- The period over which the entity was exposed to credit risk on similar instruments;
- The length of time for related defaults to occur on similar financial instruments following an increase in credit risk; and
- The credit risk management actions that an entity expects to take once the credit risk on the financial instrument has increased, such as the reduction or removal of undrawn limits.

2.4.6 ECL estimation – relevant information

The standard establishes that firms should measure expected credit losses over the remaining life of a financial instrument in a way that reflects:

- An unbiased and probability-weighted amount that is determined by evaluating a range of possible outcomes;
- The time value of money; and
- Reasonable and supportable information about past events, current conditions and reasonable and supportable forecasts of future events and economic conditions at the reporting date.

When estimating ECL, firms should consider information that is reasonably available, including information about past events, current conditions and reasonable and supportable forecasts of future events and economic conditions. The degree of judgement that is required for the estimates depends on the availability of detailed information.

For periods beyond "reasonable and supportable forecasts", firms should consider how best to reflect their expectations by considering information at the reporting date about the current conditions, as well as forecasts of future events and economic conditions.

As the forecast horizon increases, the availability of detailed information decreases, and the degree of judgement to estimate ECL increases. The estimate of ECL does not require a detailed estimate for periods that are far in the future – for such periods, firms may extrapolate projections from available, detailed information.

PwC notes that the standard is not specific on how to extrapolate projections from available information. Different methods of extrapolation can be used. For example, a financial firm may elect to apply the average ECL over the remaining period or use a steady rate of expected credit losses based on the last available forecast. These are only examples, and other methods might apply. Financial firms should choose an approach and apply it consistently. This is a highly subjective area which could have a large impact on the allowance for impairment.

The standard requires the estimate of ECL to reflect an unbiased and probability weighted amount that is determined by evaluating a range of possible outcomes. It is specific that at least two outcomes should be considered:

- management should consider the possibility of a credit loss occurring and
- the possibility that no credit loss occurs.

In practice this may not need to be a complex analysis. In some cases relatively simple modeling may be sufficient, without the need for a large number of detailed simulations of scenarios. For example, the average credit losses of a large group of financial instruments with shared risk characteristics may be a reasonable estimate of the probability-weighted amount. In other situations, multiple scenarios that specify the amount and timing of the cash flows for particular outcomes and the estimated probability of those outcomes may be needed.

2.4.7 Collateral

For measuring ECL, the estimate of expected cash shortfalls should reflect the cash flows expected from collateral and other credit enhancements that are part of the contractual terms and are not recognized separately by the entity.

The estimate of expected cash shortfalls on a collateralized financial instrument reflects the amount and timing of cash flows that are expected from foreclosure on the collateral less the costs of obtaining and selling the collateral. This is irrespective of whether foreclosure is probable (i.e. the estimate of expected cash flows considers the probability of a foreclosure and the cash flows that would result from it). Consequently, any cash flows that are expected from the realization of the collateral beyond the contractual maturity should be included in this analysis. Any collateral obtained as a result of foreclosure is not recognized as an asset that is separate from the collateralized financial instrument unless it meets the relevant recognition criteria for an asset.

2.4.8 Disclosure

Extensive disclosures are required, including:

- Reconciliations from opening to closing amounts of the ECL provision, assumptions and inputs.
- A reconciliation on transition of the original classification categories under IAS 39 to the new classification categories in IFRS 9.

These are material activities which require detailed information.

These changes to disclosure will require more data to be available and will require greater alignment between risk and finance functions. This is a significant aim of the new standards and the new disclosure standards aim to direct financial institutions to make changes to their accounting and risk processes and systems.

IFRS 9 includes consequential amendments to other accounting standards. The lengthiest amendments are to IFRS 7, 'Financial Instruments: Disclosures', with the introduction of significant additional disclosures relating to credit risk and expected credit loss allowances. Identifying the information and data required for these disclosures will often need detailed analysis and is unlikely to be simple:

- Financial institutions should not plan to simply replicate the illustrative disclosures in IFRS 9, or else they risk being too simplistic and missing portfolio complexities.
- More detailed analysis than the published disclosures will typically be needed, in order to identify what should be separately disclosed.

There is also likely to be significant overlap between the data required for the new IFRS 7 disclosures and the data needed to address other broader stakeholder reporting needs for IFRS 9. Examples of this broader reporting might include:

- Management reporting – what caused movements seen in IFRS 9 loss allowances and which factors contributed most?
- Business planning and forecasting – how might loss allowances change in the future and what are the key sensitivities?
- Investor & analyst questions – what effect did the change in macro-economic assumptions and other factors have on loss allowances?
- Regulator requests – Enhanced Disclosure Task Force (EDTF) and other additional 'best practice' disclosures in annual reports or non-public reporting?

Auditors and main boards are emphasizing that the required data and systems for all these needs will be critical to ensuring the completeness of IFRS 9 project planning, implementation and production.

2.4.9 Disclosure - practical issues

To illustrate the unexpected potential complexities and considerations, a good example is the requirement of paragraph 35H of IFRS 9 to present a reconciliation from the opening balance to the closing balance of the loss allowance (sometimes referred to as a 'roll forward' reconciliation). This reconciliation is required by particular classes of financial instrument and, for each class, by each of stages 1, 2 and 3 and purchased / originated credit-impaired assets.

Four examples help to illustrate the scale of disclosure envisaged for IFRS 9:

1. Models / risk parameters: the impact of changes in models and risk parameters are combined in a single row in the IFRS 9 illustrative disclosure. In practice, this might combine the effects of a range of factors, such as changes in credit ratings, changes to model assumptions or changes in forward-looking information. Some of these factors might be individually significant and require separate disclosure, particularly if economic expectations worsen and loss allowances increase significantly. When developing IFRS 9 models, granular data showing the impact of individual factors will typically be required for model development and model validation procedures to properly understand the behavior of the firm's new models, particularly in stressed scenarios.
2. Passage of time: loss allowances are likely to be impacted by the passage of time in a number of ways. As time passes, the effect of discounting expected credit losses will unwind. This is an item already commonly included by financial institutions in existing disclosure of impairment allowance movements. Where assets have a remaining life of less than one year at the period end, part of the reduction in loss allowance will have arisen from the passage of time reducing the probability of default (PD), with the PD often calculated as 12-month PD x number of days to maturity / 365. This is particularly the case for shorter maturity loan books such as unsecured personal loans where a stable overall loss allowance might result from a combination of increased loss allowances from new business and decreased loss allowances from loans nearing maturity or that have matured.
3. Transfers to lifetime expected losses: the illustrative disclosure includes a row showing the transfer of 12-month expected credit losses when an asset moves from stage 1 to stage 2 or 3. However, in many cases the loss allowance required will increase, potentially significantly, when an asset moves from stage 1 to stage 2 or 3, given that lifetime credit losses have to be recognized. This increase is not shown separately in the illustrative disclosure but is likely to be of interest to users of the accounts and be a material component of the period-on-period movement for many financial institutions.
4. Derecognized assets: as well as loans that have been fully derecognized during the period, the reference to "Financial assets that have been derecognized during the period" in IFRS 9 will also need to include the effect on loss allowances of partial derecognition events. An example would be the receipt of a monthly capital and interest repayment on a mortgage. The effect of partial derecognition events might prove challenging to calculate if robust interfaces do not currently exist between cash management, accounting and / or risk systems.

Many other technical disclosures are required to fully comply with IFRS 9 and IFRS 7 such as those concerning sensitivities, granularity of disclosure, modifications, changes to impairments since initial recognition, definitions of default and re-statement of IAS 39 to IFRS 9. Luckily the IFRS 9 standard provides many worked examples.

2.5 Challenges to build and re-purpose credit risk models for IFRS 9

IFRS 9 Expected Credit Loss provisions change the way financial instruments have provisions accounted for – currently, credit loss provisions are posted on an incurred loss basis. This fundamental change in the way provisions are estimated will require all financial institutions to re-purpose (or build from scratch) their main credit models for Probability of Default (PD), Loss Given Default (LGD) and Exposure at Default (EAD).

In particular, the models will need to predict credit exposure at a Point in Time (and hence on the same basis of preparation as other data in the Annual Report), rather than Through the Cycle, which is the basis for preparation for Basel IRB.

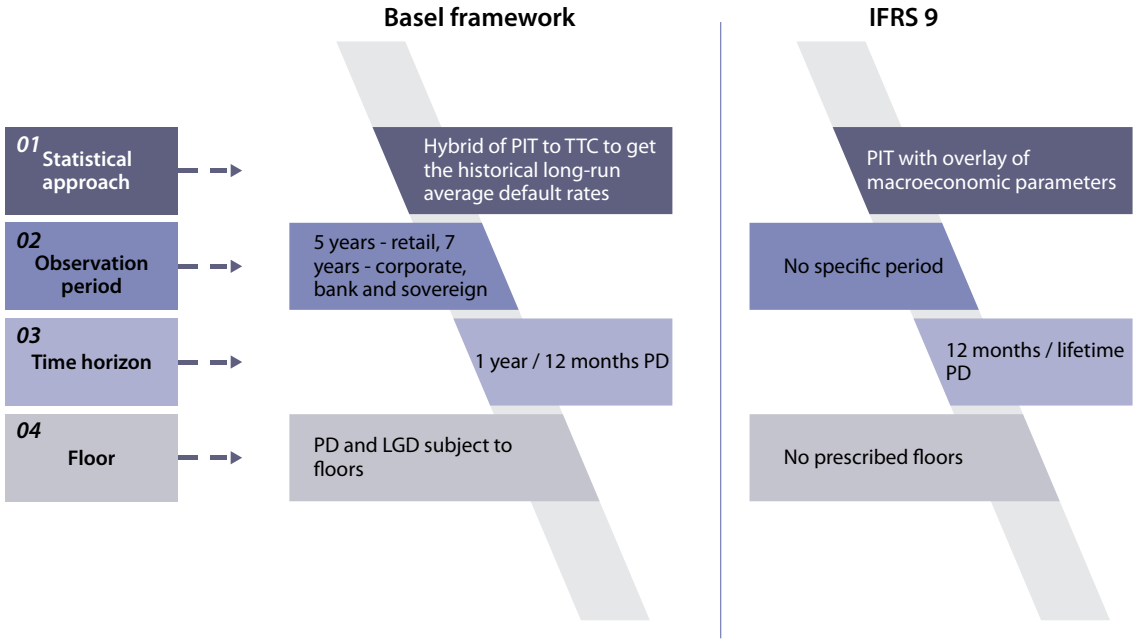
PwC clarifies that this standard allows entities to make the assessment of changes in credit risk by using a 12-month PD where it would not be expected to give a different result to using lifetime PDs. This does not mean that the 12-month PD used for regulatory purposes can be used without adjustment.

Twelve-month expected credit losses used for regulatory purposes are normally based on Through the Cycle probabilities of a default (i.e. probability of default in cycle-neutral economic conditions). PD used for IFRS 9 should be Point in Time probabilities (i.e. probability of default in current economic conditions).

Under IFRS 9, estimates of PD will change as an entity moves through the economic cycle. Under many regulatory models, as PD is calculated Through the Cycle, estimates are less sensitive to changes in economic conditions. Therefore, regulatory PDs reflect longer-term trends in PD behavior as opposed to IFRS 9 Point in Time PDs.

The key differences are summarized in Figure 4 below.

Figure 4: Basel and IFRS 9 frameworks



Source: PwC

Many financial institutions re-purposing their existing IRB credit models and scorecards are isolating Through the Cycle metrics and adding a macro-economic overlay which equals either 12 month, such as 12 Month PD for Stage 1 exposures, or lifetime macro-economic adjustments to calculate the correct factors for Stage 2 and 3 exposures.

Historic data will be required, especially origination data, to build 12 month and Lifetime estimates of PD, LGD and EAD. The fact that some (e.g. Emerging Markets) financial institutions are using the Standardized Approach under Basel will mean this is the first time they have considered any form of PD models. Therefore, there is a risk that insufficient time series will be available, and Lifetime ECL at Stage 2 will be the default – which will significantly increase the amount of provisions.

IFRS 9 model validation will follow many existing IRB processes, but diverge from IRB in the following key areas:

- there is likely to be more diversity in the models that require testing, for example the complexities in validating Low Default Portfolios and expert judgement models (especially LGD calculations);
- IRB models are tested as Through the Cycle and IFRS 9 are Point in Time, so validation for IFRS 9 will be a parallel and separate process to IRB;
- IRB does not require full coverage of the balance sheet, however, IFRS 9 coverage has a much higher coverage, and so more models will require validation.

Model validation will be required at a minimum to cover the following:

- Review of model documentation (methodology, delivery of models, testing);
- Governance process – status, compliance and appropriateness;
- Methodology review – challenges to the techniques in use, focus on weaknesses and limitations – IRB models often cater for weaknesses through being conservative, however, IFRS 9 models are not meant to be conservative, but best estimates;
- Review of model performance – through back-testing, historic model testing for each period under review, re-performing models, comparison of model performance using other models etc.

Documentation from model validation will be a key input to overarching governance for IFRS 9 and will be required to be performed regularly to ensure models are appropriate and calibrated for Point in Time – i.e. estimates of PD should rise and fall with the economic cycle, through the macro-economic factors.

IRB calibration tests will need to be enhanced for IFRS 9 calibration, including:

- Calibration for a maximum of 90 Days Past Due (DPD) for IFRS 9 (with some exceptions) versus possible 180 DPD for IRB;
- Conservatism in IRB models to adjust for model error or uncertainty, versus IFRS 9 measures which are meant to be the current best estimates;
- Expected life can be greater than contractual life (e.g. revolving credit facilities) which can affect the quantum in the EAD calculation.

2.6 Overview of the hedge accounting rules under IFRS 9

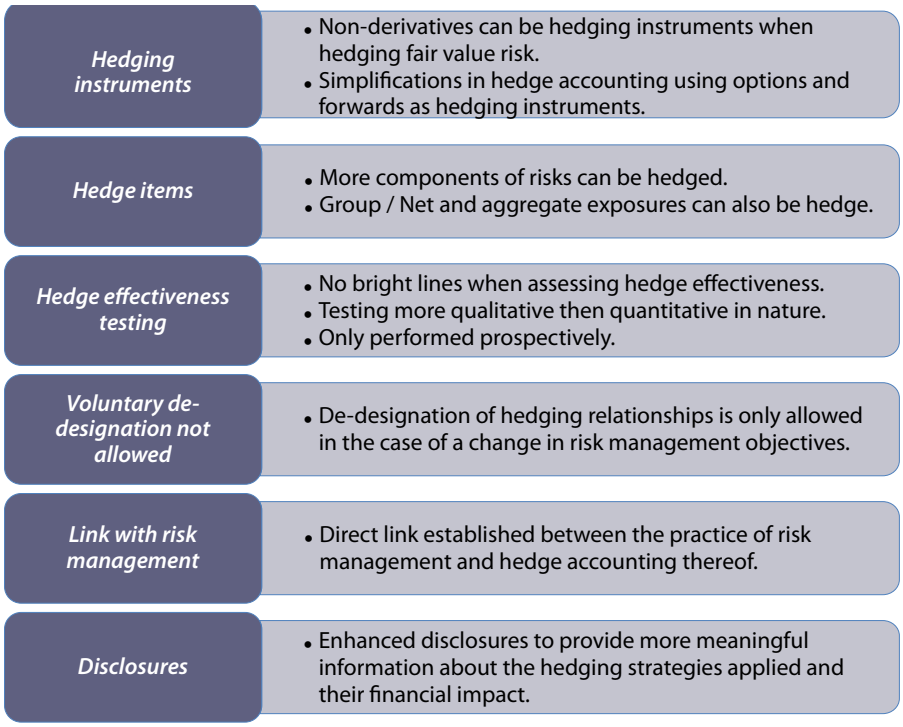
As part of the development of detailed requirements of IFRS 9, the IASB also revised the existing rules relating to hedge accounting contained in IAS 39, viewed by some as disconnected from the practice of risk management.

The rules on hedge accounting in IAS 39 have frustrated many accountants and auditors, as the requirements have often not been linked to common risk management practices. The detailed rules under IAS 39 have, at times, made achieving hedge accounting impossible or very costly, even when the hedge has reflected economically rational risk management strategies. Similarly, users have found the current rules for hedge accounting less than perfect, and they have sometimes struggled to fully understand an entity's risk management activities based on its application of the hedge accounting rules. So, users and preparers alike supported a fundamental reconsideration of the hedge accounting rules in IAS 39.

IFRS 9 improves the decision usefulness of the financial statements by better aligning hedge accounting with risk management activities of an entity. IFRS 9 addresses many of the issues in IAS 39 that have frustrated Treasury and ALM departments. In doing so it makes fundamental changes to the current requirements, by removing or amending some of the key prohibitions and rules under IAS 39.

The main changes in IFRS 9 in relation to hedge accounting are in the following areas:

Figure 5: Hedge accounting changes



Source: PwC

2.6.1 Macro hedge accounting rules

It is important to note however, that the IFRS 9 hedge accounting rules do not apply to fair value hedges of the interest rate exposure of a portfolio of financial assets or financial liabilities (commonly referred to as 'fair value macro hedges'). This is because the IASB carved out the macro hedge accounting part of the overall hedge accounting project, which will be issued separately outside of IFRS 9. In the meantime, until the macro hedge accounting rules are finalized, companies applying the IFRS 9 hedge accounting framework can continue to apply IAS 39 requirements for fair value macro hedges.

This is important for the banking sector as banks generally take a portfolio view of interest rate risk i.e. when hedging the interest rate risk on mortgages. At the moment there is no clarity on the timing of when the rules relating to macro hedge accounting will be finalized and, accordingly, they will require work in the future.

2.6.2 Hedging of credit risk

IFRS 9 takes the view that the credit risk of a debt instrument is a risk component that does not meet the eligibility criteria to be designated as a hedged item (by virtue of the fact it cannot be separately identified).

Credit derivatives that are used to hedge credit risk are accounted for at fair value through profit and loss account, whereas credit exposures are carried at amortized cost or are unrecognized (i.e. loan commitments). When credit deterioration occurs it results in recognizing a fair value gain on the credit derivative. Whereas impairment on the credit exposure is recognized on a different basis, resulting in profit and loss volatility.

To address this, IFRS 9 provides an option to designate a credit exposure (all or a portion of it) at fair value through profit and loss. This option is only available where:

- The name of the credit exposure matches the reference entity of the credit derivative ('name matching').
- The seniority of the financial instrument matches that of the financial instrument that can be delivered in accordance with the credit derivative.

Unlike other fair value options in IFRS 9, the fair value option for credit exposures can be elected at initial recognition, subsequently or even when the hedged exposure remains unrecognized. In addition, the election is not irrevocable but, once this option is elected, specific criteria must be met to discontinue its use.

This is an important change from IAS 39 helping those who hedge credit risk using credit derivatives to better reflect the effects of their credit risk hedging strategies in the financial statements.

IFRS 9 provides for a number of other changes from the existing IAS 39 rules. These changes, while technically challenging, provide opportunities for entities across a wide variety of sectors but also for the banking sector to simplify hedging strategies and to align hedge accounting with the practice of risk management.

2.7 Model building for IFRS 9

As a guide to the process for building an IFRS 9 model, outlined below are two approaches, one for Wholesale / Corporate and one for Retail, to help identify the key activities.

IFRS 9 model build, in total, requires a significant investment in people and technology, so the information below provides only an overview of the major elements of any IFRS 9 program. Statistical packages and other modeling tools are required to perform the analytics necessary to produce PD, LGD and EAD.

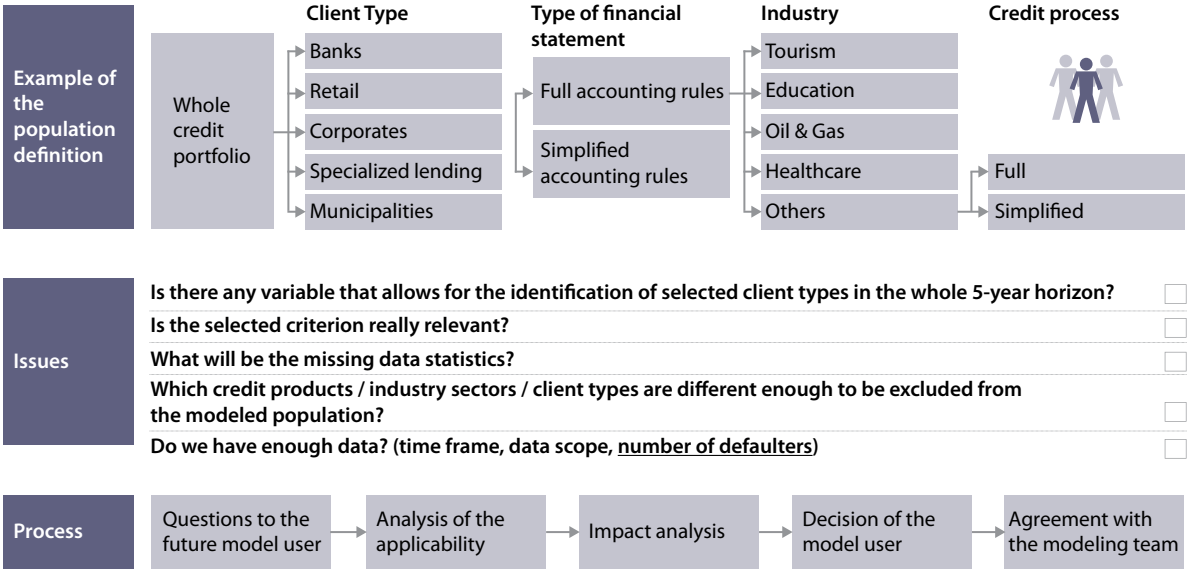
2.7.1 Wholesale / Corporate IFRS 9 model build

The main activities that are involved in building a wholesale / corporate model can be summarized as:

- Determine the client segmentation
- Define the targeted model structure (group / local model, number of modules etc.)
- Define the input data and identify the candidate variables for the analysis - often split between quantitative factors (e.g. ROA, ROE, Debt Equity Ratio etc.) and qualitative factors (e.g. quality of the management board, market share, market structure (monopoly v competitive), hurdles to entry etc.)
- Definition of default, such as 30/60/90 DPD
- Perform data quality verification
- Define the historic data population for development and validation (typically ~ 70% for development)
- Development of subsequent modules:
    - Univariate analysis
        - Definitions of the variables
        - Variables transformation
        - Categorization (if required)
        - Missing data analysis
        - Assessment of each variable – discriminatory power, stability, correlations
    - Multivariate analyses
- Development of the joint model from separately developed modules
- Analyses of the prepared models, final model selection
- Pre-implementation tests

In terms of defining the population of data for the model, the following graphic provides a simplified guide to this process.

Figure 6: Defining population



Source: PwC

2.7.2 Retail IFRS 9 model build

Anyone familiar with IRB models will appreciate that retail models are driven by scorecards, and the models used to calculate PD, LGD and EAD leverage this capability. A significant divergence from the wholesale approach is to determine a homogenous group from a risk perspective – also taking into account laws governing discrimination based on gender, social or ethnic grouping. Segmentation into homogenous groups has a significant effect on the analytics performed later in the process, and therefore vital areas for consideration are not only statistical but also areas such as governance and model validation / calibration.

A summary of candidate variables for a retail model are offered below:

Credit Application Models:

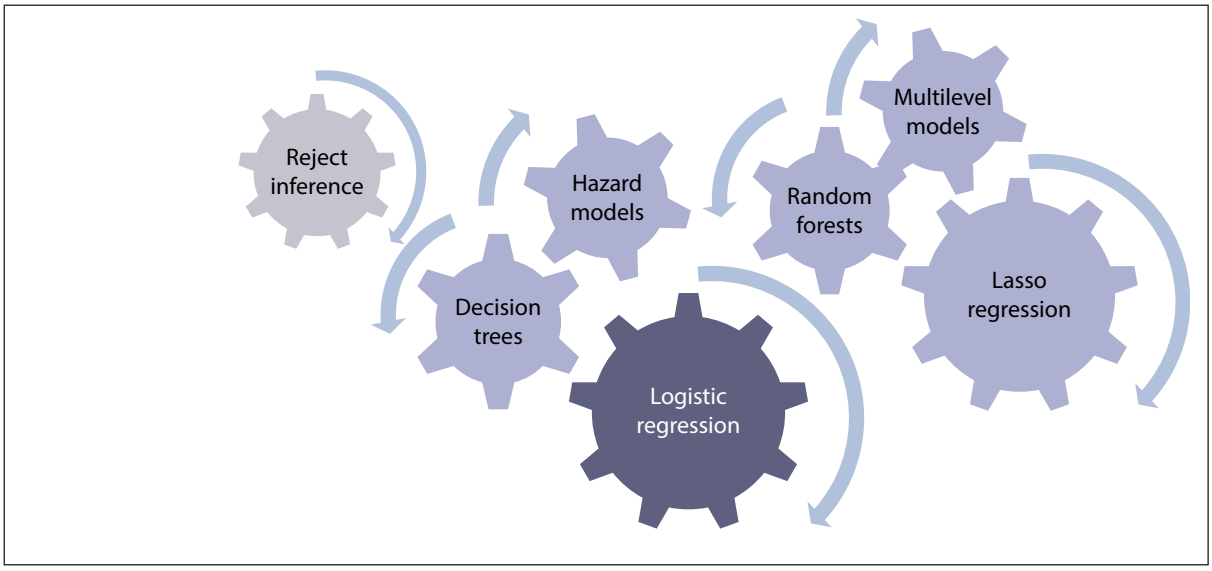
- Socio-demo variables: income, profession, region, age, marital status, education, employment type, employment duration etc.
- Relations with the Bank: length of the cooperation with the Bank, average amount of loans (or info on current account), product mix etc.
- Interactions between variables (complex variables) – like age and income, region and income etc.
- Variables based on credit bureau data, describing:
  - Repayment history – debt level, number of days past due
  - History of loan origination (frequency, level of debt, loan types)
  - History of queries to credit bureau

Behavioral models:

- Behavior on current accounts
- History on delinquency
- Level of exposure, exposure amount divided by exposure as at origination date
- Frequency of loan origination (how frequently the client takes new loans)
- Delinquency value to exposure value
- Usage of the available off-balance limit (in case of revolving products)
- Number, value, frequency or share of cash transactions and cashless transactions
- Repayment patterns for subsequent instalments
- History of cooperation with the bank

When it comes to choosing a model for retail PD, LGD and EAD, it cannot be unambiguously stated which modeling technique is the best and which should be unconditionally used. That is why best practice is to use several techniques or a combination of these. Final selection of the models is then based on its statistics and not on the assumptions of modeling techniques. Figure 7 provides a guide to some candidates for consideration:

Figure 7: Combinations of modeling techniques



Source: PwC

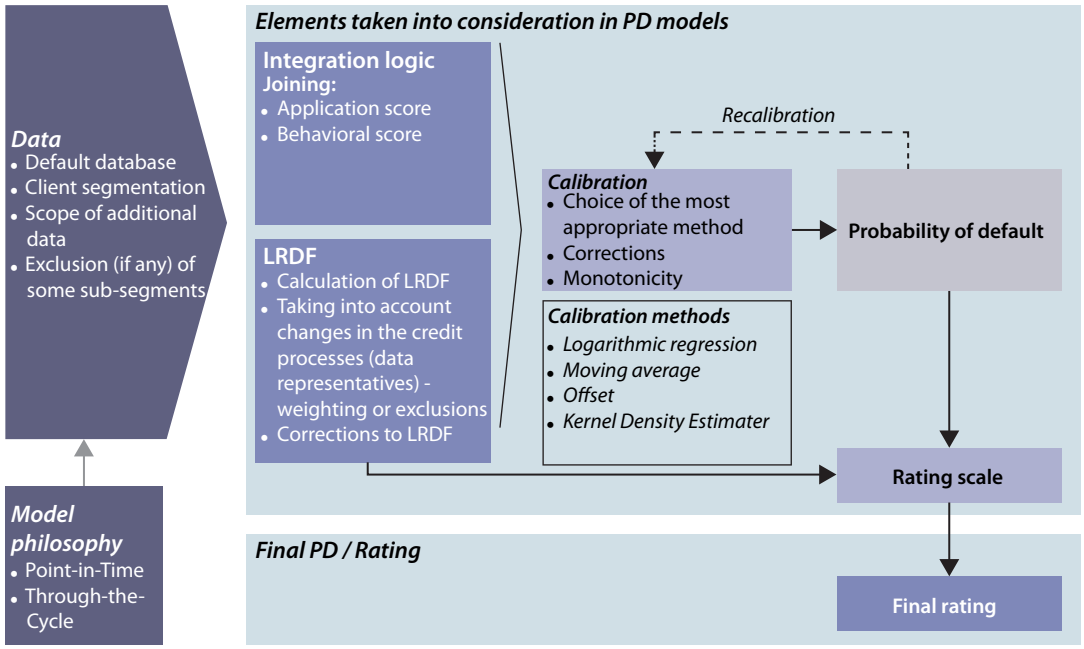
A typical number of steps in building a retail PD model is listed below. This is not meant to be exhaustive and is relative to IFRS 9 only (e.g. stress tested PD is excluded from the list below):

- Definition of the population to be covered by PD model (relation of the scoring models to PD models may vary in nature, as
  - o there may be significant differences between the definition of 'bad' and 'default';
  - o segmentation for PD models is usually driven much more by IRB / IFRS 9 segmentation than the segmentation for scoring models)

- Definition of additional data required for the preparation of PD model and data quality verification
- Development of a framework for calculating PD estimates based on historical default experience; use of statistical models for PD estimation for retail exposures (pool wise) and development of PD for retail pools
- Calculation of the Long Run Default Frequency (LRDF)
- Integration logic – i.e. matching the results from several scoring models into one PD
- Develop statistical process for derived variable creation and selection exercise; employ the calibration method (e.g. logistic regression or neural networks) and calibration of scores to LRDF
- Additional pooling factors for PD (if the model is to be based on pools)
- Calculation of the estimation error
- Pre-implementation validation: quality of the calibration, stability, concentration of the exposures in rating grades / pools etc.
- Finalize the model based on discussions and presentations made to the senior management

Figure 8 below provides a guide to the high level process in creating an IFRS 9 retail PD.

Figure 8: The process of creating an IFRS 9 retail PD



Source: PwC

Significant effort is also required in a number of other areas, principally:

- Integration of credit application scoring, behavioral scoring and credit bureau scoring. The main issue is to avoid volatility in the PD value during its lifetime, so the scores are merged using time-smoothing. This is mainly due to application scores losing their predictive power after origination. Calibration changes therefore have to adjust the average PD output to the LRDF using one of a number of algorithms and taking into account the different GINIs derived for each model through time.
- Calibration methodology is a specialized area for IFRS 9 and deals with techniques such as and including Logistic Regression, Logarithmic Regression and Kernel Density Estimators as well as offsets to LRDF. This area is of importance in ensuring that models are reviewed frequently to ensure they continue to reflect the default experience in the period under analysis. It follows that this will also require governance to validate that the process is adequate and that sufficient oversight is being exercised by the different bodies within the financial institution.

2.8 Risk and Finance integration for IFRS 9

Re-engineering these analytics will also require changes to the Target Operating Model for both the Finance and the Risk departments of each bank, as they work together to create and reconcile new data points and embed comprehensive governance around these enhanced / new processes.

Figure 9: Combining risk and finance processes

Source: PwC

Examples of where the risk and finance function will have to come together as one team include:

- Reconciling IRB and IFRS 9 models, validation and calibration;
- The requirement to reconcile the credit risk monitoring controls (absolute measures) with IFRS 9 requirements to monitor changes in expected credit loss from origination (relative measures);
- Transmitting the effect of changes in ECL to business lines to better inform and service business heads as they manage their portfolio P&L;
- Product design may require changes to revolving product lines to clarify origination dates;
- Investor relations will also need to be upgraded in line with the issues concerning disclosure;
- Attendance and reporting to the Audit Committee as it will have to review and challenge numerous areas of the IFRS 9 calculation;
- Skills sets will be affected between risk and finance teams as risk models are increasingly used to calculate ECL provisions.

As with many aspects of IFRS 9, the impact of the changes is expected to be significant, but the main agents for change in a financial institution will be the Finance and the Risk functions. The success of IFRS 9 will revolve around how effective these two groups are at working towards a common goal.

2.9 Governance

One special area of concern will be the composition of IFRS 9 committees. Banks will need to consider who should be included in IFRS 9 committees and working groups, in particular the Steering Committee will be ultimately responsible for monitoring progress and approving key decisions. Risk, Finance, Regulatory Reporting, IT and PMO will typically be key members.

ECL will have a major impact on the economics of many businesses, so input from the businesses themselves needs to be considered. This will be particularly important if IFRS 9 leads to product changes, for example changes in credit card terms to clarify origination dates, so that IFRS 9 projects anticipate these changes and respond accordingly.

During the project it is vital that adequate controls are established around areas of accounting judgement, variable selection, definition of default, etc. in order to satisfy the numerous stakeholders that the decisions taken are appropriate, follow best practice and are considered appropriate by external auditors and regulators.

2.10 Operational Challenges

The operational requirements for IRB and IFRS 9 credit measures to co-exist within a bank will require careful planning. There are inevitably going to be unforeseen consequences for such a fundamental change, but the following are some likely candidates for challenges from January 2018.

PD models

Due to the definition of IRB PDs as Through the Cycle, regulatory capital is less susceptible to the business cycle and therefore leads to lower volatility in bank capital requirements. However, IFRS 9 PD will be Point in Time and is likely to diverge from IRB PD, especially when the business cycle is less benign or in crisis.

The ability to track both metrics and explain the differences will possibly be a source of controversy. Being able to explain the differences is likely to emerge as an operational process once the IFRS 9 regime has been implemented. This will affect both Finance and Risk.

Historic data requirements are likely to have a significant impact on IFRS 9 models. If a suitable time series (for example ten years) is not available, then regulators and auditors are likely to challenge the statistics derived from the population being analyzed. As at 2016, with two years remaining ahead of formal adoption, banks have some time to help increase the length of their time series.

As a forward looking measure, the ability to forecast at the transaction level is likely to be extremely onerous. The availability of the projected cash-flows and underlying assumptions will likely be required for review by regulators and auditors. In particular, the basis for choosing macro-economic indicators and their forecasts is inevitably going to diverge from bank to bank. It is likely that industry level guidance will be provided in some jurisdictions to help reduce undue differences in data and assumptions.

Future recognition of credit deterioration

A simple or absolute comparison of PDs at initial recognition and at the reporting date is not appropriate. All other things staying constant, the PD of a financial instrument should reduce with the passage of time. Monitoring of the relative maturities of a financial instrument at inception and at the reporting date is required when comparing PDs.

This means that the PD for the remaining life of a financial asset at the reporting date (for example, two years if three years have already passed on a five-year instrument) should be compared to the PD expected at initial recognition for the last two years of its maturity (that is, for years 4 and 5).

When determining whether the credit risk on an instrument has increased significantly, firms should consider reasonable and supportable best information available without undue cost or effort. This information should include actual and expected changes in external market indicators, internal factors and borrower-specific information.

Examples of ways in which the assessment of significant increases in credit risk could be implemented more simply include:

- Establishing the initial maximum credit risk for a particular portfolio by product type and / or region (the 'origination credit risk') and comparing that to the credit risk at the reporting date. This would only be possible for portfolios of financial instruments with similar credit risk on initial recognition;
- Assessing increases in credit risk through a counterparty assessment, as long as such assessment achieves the objectives of the proposed model; and
- An actual or expected significant change in the financial instrument's external credit rating.

The examples above are not exhaustive, so other ways of assessing a significant increase in credit risk might be used.

Forward preparation in design is required to enable this functional capability, especially the ability to capture necessary data points throughout the lifecycle of the transaction.

2.11 IT Systems

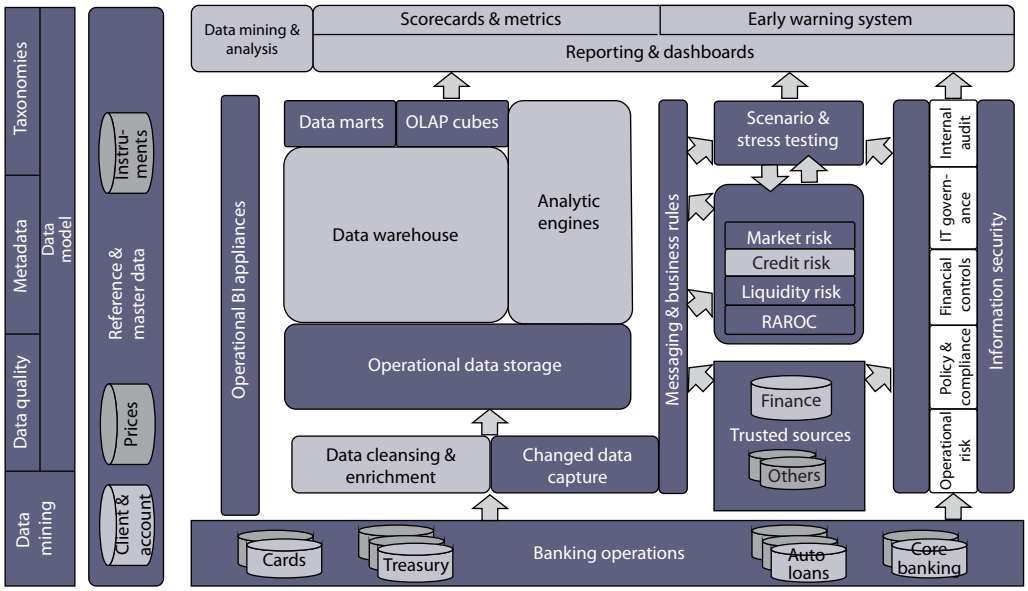
IFRS 9 puts further pressure on financial institutions that are already faced with increasing regulatory reporting requirements. These further stress the IT systems that are increasingly seen as outdated and not fit for purpose.

Forward preparation in IT design and architecture for IFRS 9 is required covering:

- Historic data analysis and retention
- Analytics
- Calibration
- Monitoring

Figure 10 below summarizes the affected IT infrastructure for a typical IFRS 9 project – see light blue boxes.

Figure 10: Affected IT infrastructure for IFRS 9 projects



Source: PwC

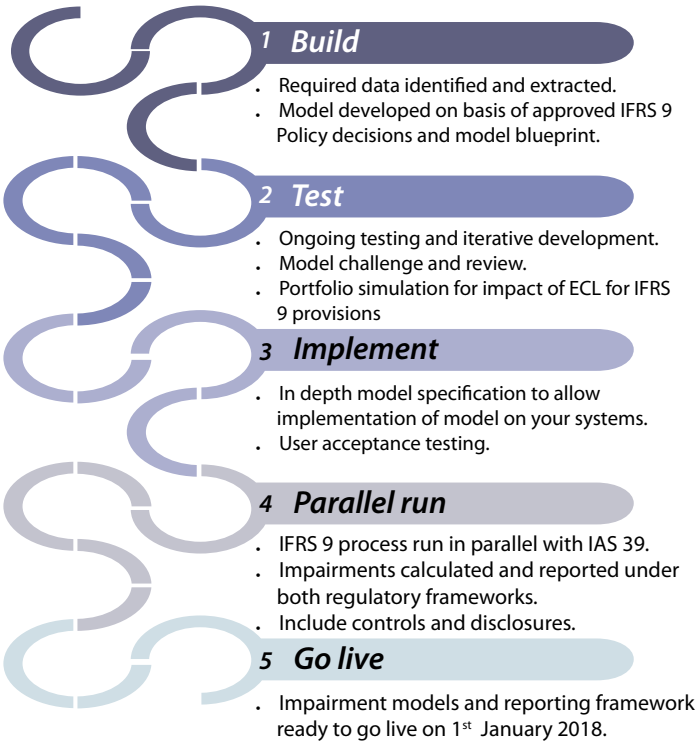
Apart from the obvious changes to IRB models required for IFRS 9, workflow across the enterprise is a key area for analysis. The extensive re-working of models is shadowed by the requirements for continuous monitoring of relative changes, since origination, in PD, LGD and EAD. Early Warning Systems, Limits and Exposure Measurement systems will all require review to ensure they are IFRS 9 enabled.

Overall, the technologies that will be required for IFRS 9 will need to bridge the gap between Risk and Finance. As an accounting initiative, the controls and reconciliations that exist for other accounting processes will be a priority. Any re-purposing of existing IRB and risk technology will therefore have to address these emerging functional requirements.

2.12 High level IFRS 9 delivery roadmap

A typical high level IFRS 9 delivery roadmap is depicted below.

Figure 11: IFRS 9 roadmap



Source: PwC

About PwC Contributors

Zulfiqar Unar – Senior Manager, Capital Markets and Accounting Advisory Services

Zulfiqar leads PwC's Middle East IFRS 9 advisory service. He previously worked in London with another Big 4 firm and the Prudential Regulation Authority ("PRA") in the UK as a financial instrument specialist assisting supervisory teams in dealing with financial instruments related risks in their regulated firms, including assisting on ARROW and thematic reviews. Zulfiqar also played a key part in negotiating in the EU the PRA's policy positions on Basel 3 regulations relating to capital requirements for banks. Zulfiqar was also the principal author of PRA's guidance document relating to forbearance and impairment provisions for mortgages. Zulfiqar.unar@ae.pwc.com

Ian Gilmour – Director, Financial Services Risk Consulting

Ian leads PwC's Middle East Risk and Treasury advisory team, specialising in analytics. He previously worked in a number of leading banks in London, New York, Singapore, Beijing, Brussels before moving to Abu Dhabi in 2010. Projects have included Basel 1, 2 and 3 across developed and developing economies as well as extensive experience with vendor technologies for Credit and Asset Liability Management. He has been working closely with the IFRS 9 team covering Expected Credit Loss impairment modeling. Ian.Gilmour@ae.pwc.com

Steve Drake

Steve is a Partner with PricewaterhouseCoopers (PwC), heading the Capital Markets and Accounting Advisory Services in the Middle East region. CMAS are responsible for technical accounting changes, including IFRS9. Steve has worked as a Capital Markets specialist for more than 14 years with the last 9 years based in the Middle East. Before joining the Middle East firm, Steve worked in geographical locations as diverse as Japan, South Africa, Middle East, United States, UK and Continental Europe advising some of PwC's largest global clients with their stock exchange and regulatory obligations. S.drake@ae.pwc.com

About Chartis Contributors

Peyman Mestchian

Peyman Mestchian is Managing Partner at Chartis overseeing research strategy, key commercial relationships and advisory services. His special area of interest and research is the application of information technology to risk management, and he is an established thought-leader and writer on the subject. Previously, Peyman was a Director of the Business Risk Consulting Practice at Ernst & Young and Global Head of the Enterprise Risk Management Practice at SAS Institute. Peyman is a Fellow of the Institute of Risk Management (FIRM) and an approved person by the FCA.

Hugh Stewart

Hugh has over 25 years experience in global capital markets, commercial banking and associated technologies focussing on risk management, trading, commercial lending and data management.

Trading and risk management experience has been gained at banks, software vendors and consultancies including Bankers Trust, Misys, SunGard, SmartStream, GoldenSource and Algorithmics

Hugh has an MA from Oxford University.

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- Identification of suitable implementation partners
- Review of vendor proposals
- Assessment of vendor presentations and demonstrations
- Definition and execution of Proof-of-Concept (PoC) projects
- Due diligence activities

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4. Further reading

- RiskTech100® 2016
- Enterprise Stress Testing Systems 2015
- Global Risk IT Expenditure in Financial Services 2016
- Risk Data Aggregation and Reporting Solutions

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