EXAMINER'S REPORT

November 2022

Subject F207 – Banking Specialist Applications

QUESTION 1

You are the head of retail sales for a large Southern African bank – WeGro. It is a full-service retail bank offering traditional transactional, credit, savings (overnight), investment (all term deposits, share investment vehicles), life insurance (credit and full life) products. It operates in Southern Africa across 6 different countries and holds roughly a 25% market share across all 6 territories.

An external consultancy from India has developed a "next best product" model that has proved successful in increasing product sales within the banks in India. The banks that made use of the model saw on average 25% growth in their product applications overall. The consultants believe it could be applied as-is within the Southern African market.

The model looks at products held by customers and which product they took next, when compared to what they originally held at the bank, over a 6-month period. The model was built using 12 months of experience data. It considers savings, transactional, funeral and loan products and makes next best product suggestions for these products. Your sales executive has asked you to consider the use of this model as is within WeGro.

i. Detail further information you would assess in consideration of using this model . [11]

Examiner's comment:

This model adoption question was well answered.

Most candidates were able to list considerable additional information to be considered. Poorer candidates did not pick up on the fact that the model did not incorporate the bank's full product set. Many candidates did not give the appropriate (or any) weighting to regulatory/TCF considerations that may differ between the jurisdictions.

Model Appropriateness:

Data used:

The model was built on data from a relatively short period of time (12 months).

The model only considers one variable (current product mix) and uses this to model the next product the customer may be interested in taking up. It is not stated whether this model is built on industry level data (so based on all banks data, and all products held, which is the next best for the customer in question), or if it is bank specific. This could introduce bias in the results, and potentially will not encourage bank switching.

There is also no indication of whether the sales used within the model relate to customer or bank driven initiatives. If they are bank initiated – the customer may be taking a product that is either not appropriate or was not necessarily required but was taken in any case. This could bias the results of the model.

The model was also built on data from the banks within India. While this is also a developing country which may have some similar characteristics to South Africa, there are probably many differences between the banked populations that the current model and calibration thereof may not hold when being applied to the whole of Southern Africa.

Observation period:

The prediction looks at the next product a customer takes over the next 6-month period. One should test to see whether this is appropriate in a Southern African context (longer or shorter period could be used).

Model construct:

The model uses the customer's current product holding to try to determine what next product should be offered to the customer. This is a very simplistic model and could surely be enhanced with several other variables to try to predict or suggest appropriate next best products for a client. While the simplicity will make implementation easier, one could easily debate the relative accuracy of such a simple model.

Model Fit:

There are no statistical measures given to show how well the model ranks and predicts. Post implementation it does not state what the take up rates of the model recommendations are and how this may differ or be better than how it looked in the past. As a result, there is little indication of how well the model really works. In addition, there is no measure of how sustainable the model is. After a customer takes up a product from the model recommendation, how quickly should the model update to give the next best product for the relevant customer.

Products Offered:

The model developed in India does not make any recommendations for Life Insurance, longer term investment or credit card and overdraft facilities as part of its product recommendations. Which means that the bank's customers will naturally get encouraged to apply for or migrate to these other products within the banks product suite. The appropriateness of the recommendations, given that it is only a subset of the banks product offering, should be questioned.

- This simplicity may either talk to the level of sophistication within Southern Africa versus that within the Indian market, or to the sophistication of the chosen banks upon which it was modelled in India.

The sales exec is looking to use the model as it is which means it is presumably not going to be calibrated to behaviour within Southern Africa and the available product mix. It would be ideal to at least test its viability on the populations banking with WeGro to ensure some level of ranking and appropriateness of products offered. It would also be good to test the model on the entire bank population to understand which products are recommended (next) for all clients with WeGro.

Reported Model Successes:

The banks where the model was applied showed a 25% growth in applications However a lot of additional information is missing with respect to the level of success of the model:

- There is no indication of the relative sizes of these banks (market share) that have used the model (could be small banks where growth rates are high from a low base)
- The growth across product mix is not mentioned (is it a well-balanced mix or is there bias in the recommendations)
- They state applications for products increased significantly, but they did not state how many of these resulted in actual sales or actively utilised products

There is no mention of how any other initiatives introduced by the banks in the pilot may have impacted these stats (which could result in over or under statements because of other initiatives – risk cuts, advertising campaigns, etc)

TCF and Regulatory Considerations:

Within Southern Africa there may be regulations regarding the kind of advice can be given to a customer with respect to the products they should acquire from a bank,

which may differ from India, especially with respect to investment and insurance products.

The bank would need to ensure that this recommendation engine does not recommend products that are inappropriate for the client – especially in areas where there are rules and guidelines in this regard. [½]

For example, is a short-term investment always appropriate for a customer – or are there more appropriate longer term investments that are more appropriate.

- There may be similar regulations in place within the market in India which would alter the way in which their models recommend products, and thus would render these recommendations less appropriate / inappropriate within Southern Africa

Is it the most appropriate in terms of price and tenure for example (as loans will be recommended ahead of Cards and Overdrafts – which are likely cheaper and more appropriate in certain instances).

The model uses the customer's current product holding within the bank; however, it does not consider their product holding with external providers and may thus recommend for example taking out secondary funeral insurance, or recommend short term savings products where appropriate long term products are already held.

Mis-selling may lead to problems with persistency and further information should be gathered to establish whether lapse rates/ attrition rates from these sales are acceptable

Model Implementation:

The model is a reasonably simplistic one as it only makes use of internal bank data and only uses one variable (current product holding). However, implementing the model may still require some level of development to consolidate a customer's overall product holding to input into the model.

The bank does not currently have a recommendation engine running on its systems, there will likely be significant development to get the model outputs to display in an appropriate place for the customer to view options available to them.

In addition to this, the bank would ideally like a seamless application process to follow off the back of the recommendation supplied (ideally self-help, with links taking the customer directly to application processes or pages). This too will require development.

There is also no indication of how the model ingests the information around the customer's current product holding – with respect to novel products available to them from the bank. For example, if the customer already has longer term savings products, do these get mapped under "savings", are they ignored, or are they allowed for as "other products" within the engine itself. This mapping may prove difficult to accurately allow for and could cause incorrect model outputs.

After some consideration, the bank has decided to apply the model as-is within the bank and its self-help channels (App / Online). Below are the application results and product balances for different products held within the bank over the 2 financial years prior to the model implementation and then the first 12 months after launch.

Outstanding Balances & Facilities	**Credit Division - R'm**			**YoY Movements**	
	2020 FY	**2021 FY**	**2022 FY**	**2020/2021**	**2021/2022**
Credit Card - Drawn Balances	R1 100	R1 200	R1 150	9%	-4%
Credit Card - Total Facilities	R2 250	R2 500	R2 560	11%	2%
Personal Loans	R1 500	R1 600	R2 000	7%	25%
Overdrafts - Average Drawn Balances	R300	R330	R334	10%	1%
Overdrafts - Total Facilities	R1 250	R1 350	R1 360	8%	1%
Total Facilities (Limits)	R3 500	R3 850	R3 920	10%	2%
Total Exposures (Drawn Down / Paid Out)	R2 900	R3 130	R3 484	8%	11%

Transactional Accounts - Volumes	**Transactional Division - R'm**			**YoY Movements**	
	2020 FY	**2021 FY**	**2022 FY**	**2020/2021**	**2021/2022**
Active Transactional Accounts	350 000	375 000	450 000	7%	20%

Outstanding Balances	**Secured Credit Division - R'm**			**YoY Movements**	
	2020 FY	**2021 FY**	**2022 FY**	**2020/2021**	**2021/2022**
Mortgages	R15 000	R15 500	R16 000	3%	3%

Account Balances	**Investment Division - R'm**			**YoY Movements**	
	2020 FY	**2021 FY**	**2022 FY**	**2020/2021**	**2021/2022**
Overnight Savings	R2 000	R2 150	R3 800	8%	77%
Term Deposits - 32 Days	R1 400	R1 500	R1 510	7%	1%
Term Deposits: 6,12,24,36 Month	R1 000	R1 100	R1 050	10%	-5%
Tax Free Savings	R1 800	R2 000	R2 030	11%	1%
Share Investment Portfolios	R3 000	R3 200	R3 000	7%	-6%
Totals	R9 200	R9 950	R11 390	8%	14%

Total Premium Income	**Life Division - R'm**			**YoY Movements**	
	2020 FY	**2021 FY**	**2022 FY**	**2020/2021**	**2021/2022**
Funeral Cover	R1 800	R2 200	R3 000	22%	36%
Life Insurance	R2 500	R2 800	R2 850	12%	2%
Dread Disease Cover	R800	R850	R855	6%	1%
Totals	R5 100	R5 850	R6 705	15%	15%

Application Volumes & Approval Rates	**Application & Scoring Division**			**YoY Movements**	
	2020 FY	**2021 FY**	**2022 FY**	**2020/2021**	**2021/2022**
Credit Cards - Applications	100 000	110 000	90 000	10%	-18%
Credit Cards - Approval Rates	25.0%	24.5%	28.0%		
Overdrafts - Applications	40 000	41 000	36 000	2%	-12%
Overdrafts - Approval Rates	29.0%	30.0%	35.0%		
Personal Loans - Applications	80 000	86 000	160 000	8%	86%
Personal Loans - Approval Rates	35.0%	34.0%	20.0%		
Total Application Volumes	220 000	237 000	286 000	8%	21%
Overall Approval Rate	29.4%	28.9%	24.4%		

ii. Highlight trends, comment on their desirability, and recommend possible further actions.

[13]

Examiner's comment:

Most candidates performed poorly on this question.

Many candidates did not consider recommendations from the perspective of the customer or in the context of TCF requirements. Many candidates also only considered desirability of trends in the context of short-term profitability implications and not holistically/ over the longer term, considering the desirability to clients and the consequent long-term relationship with the bank.

Poorer candidates commented on growth in products individually, without looking at the relative movements between products (product mix) and the implications and failed to link the growth patterns observed to the construct of the model.

Better candidates commented on the impact of clients being steered toward a certain product set by the model in the context of ensuring product recommendations are appropriate for customer needs.

Better candidates recognized the potential reputational impact of decreased approval rates (most likely due to promotion of lending products to ineligible clients).

Some candidates included commentary on risk appetite/shifting risk profile of the book, making implicit assumptions about changes in risk appetite/application scoring cut-offs etc. Credit was not given where assumptions were unfounded in the context of the question.

General:

It is worth reviewing the financials per product to understand and track the trends to see what makes sense and what was expected, versus what was unexpected and concerning with respect to the outcomes observed.

For example, margins/ pricing may have changed with a material impact on profitability and/or competitiveness

Likewise, one would need to assume that no other strategic or other changes have been made across the products and the bank which may have altered or caused some of the outcomes shown. This includes significant advertising campaigns or pricing changes to drive market share or to change customer behaviour. One needs to assume any other changes did not materially impact the results.

In the past the bank does not appear to have had any sort of recommendation engine or specific product push, so the new model is not replacing an old one where perhaps one can compare old and new models to see if there is a positive change.

The model was only implemented on self-help channels within the bank. It would be useful to be able to see the split of the data and sales between assisted and un-assisted as this may allow one to accurately show the impact of the recommendation engine itself.

Investment products:

The book has shown increased overall growth in balances (and presumably accounts) since the model went live with an annual increase of 14% versus 8% in the prior year. At an overall level this is promising and tell us the model is encouraging more investments to be made.

However, if one looks at the product mix since the model went live, there is a significant lift in balances for the overnight savings type products, while other products have largely remained flat or decreased slightly since the model went live. This is likely a function of the recommendation engine pushing short term investments only and not recommending a mix of investment products.

The increase in overnight savings may improve the cost of funds (and net interest margin) for the bank. However, it may come at a cost of a decrease in liquidity strength

While increased savings are generally accepted to be good news, it is concerning that the mix has changed as it is very possible that customers are not investing appropriately for their personal financial situation. For example, one would expect to see continued growth in tax free savings vehicles (as this is arguably the same as overnight savings), and the decrease in the mix of some of these products probably points to the model giving a simplistic recommendation for all clients.

For the share portfolio it would be difficult to know if the changes in balances are as a function of the values of underlying shares changing or if it is a function of reduced new investments.

Possible remedial action could include either adjusting the model to give a mix of investment recommendations (dependent on the customer situation), suggesting the customer get in touch with an investment consultant with WeGro or running additional initiatives now to enhance or adjust the customers product holding (to more term and return appropriate investments)

Credit products:

For credit products overall there is a decent increase in the drawn exposures / paid out exposures overall. The recommendation engine does recommend some level of credit product (unsecured loans) and so the model could have been the main influence in this increase in credit exposures (went up by 11% post model implementation vs 8% in prior years).

A further interrogation of the mix between products and facilities does show though that the recommendation engine is clearly driving customers apply for and take up Personal Loans ahead of credit facilities (Overdrafts and Credit Cards). This manifests in two ways:

- Firstly, at a product level we see massive loans growth YoY post model implementation (25%) while for other facility type products there is almost no change YoY in either facilities or the draw down thereof (growth slowed YoY)
- Secondly there is a massive increase in the Personal Loans applications, while applications for credit cards and overdrafts both dropped significantly. At an overall application level, the credit application volumes went up significantly – but this is all attributable to Loans applications

There are a couple of concerns with this outcome. Personal Loans are typically more expensive to service than facility type credit (fees and rates) – so the bank may be seen to be pushing more expensive credit. In addition, a facility does not get drawn down straight away while this is the case for a Loan, which means interest on the full facility becomes payable straight away.

Secondly one could argue the product and its construct itself may be inappropriate for the customer and as such the bank may be seen to be offering the wrong credit product.

The other concern worth highlighting is the massive increase in applications for credit, but with a subsequent massive decrease in the approval rate for these products. The overall volumes of successful applications has increased, however there are significant volumes of declines coming through the application system.

Since these are for Personal Loans, which typically have a higher risk appetite than Facility types of credit, the reason for the decline is likely due to an overall worse risk mix of customers applying for credit. This is probably due to the incorrect customers – from a risk perspective – being encouraged to apply for credit.

This is probably a tremendous frustration to customers who are declined (especially if the recommendation engine suggested they apply for credit).

Insurance products:

For the insurance products at an overall level there is consistent growth in total premium income on the portfolio pre- and post the recommendation engine implementation. It is consistently sitting at 15% per annum.

However, when reviewing how this has changed at a product level, there is a definite shift towards customers taking out funeral cover in place of taking out either full life or dread diseases cover. There was a marked increase YoY in funeral cover premiums, while for Life and Dread diseases this was largely flat (and growth is down on the prior year). This is likely attributable to the fact that the recommendation engine suggests funeral cover only and does not include dread or full life cover.

This may be a concern as the incorrect level of cover or product type may have been suggested to the customer, where perhaps a higher level of cover is required.

It could also be a concern if the customer already has funeral cover with another provider, and as such is double ensuring themselves for funeral cover. Funeral cover can also be relatively expensive compared to what one can receive otherwise for full life cover.

Possible remedial action could involve contacting customers who have taken funeral cover recently and who qualify for full life cover, to either upgrade them or to cross sell a more appropriate product (based on needs and income levels).

Transactional products:

For the transactional accounts we see significant growth in the active transactional account base (20% growth post model implementation vs 7% in the previous year). This is likely to be due to the recommendation engine as this is one of the products it proposes, and this would generally be seen as a good news story for the bank (given the stickiness of these products and regular fee income). There would probably be a high level of comfort around this outcome, post the sale the bank may wish to ensure the customer has acquired the correct product type for the client need.

The increase could also be seen positively due to the increase in the number of ‘banked’ customers.

This could decrease overall credit risk if salaries are paid into the account.

This could also assist the bank in increasing the transaction history of customers, improving customer behaviour scorecards and credit offerings.

iii Detail how the model could be improved to make it a more accurate and viable model for WeGro. [8]

Examiner's comment:

Many candidates did not answer this question with sufficient depth to have scored well. Many candidates failed to reflect on the undesirable trends in part (ii) which may have been caused by model construct; i.e. changes to improve the long term viability of the model

Most candidates captured points regarding calibration of model to internal data and expanding the product set included in the model.

Better candidates included recommendations for model segmentation and highlighted the need to link recommendations to internal credit risk assessments.

The model could be rebuilt on WeGro's own experience using the same modelling approach but including some other internal or external variables to create several sub-segmentations and models which would improve the model ranking and success overall. For example, age of customer, life stage, income level, etc.

This may introduce bias towards WeGro's own experience and may not be reflective of the general population (i.e. it may reflect WeGro's own strengths and weaknesses).

The bank may need to consider building a new model from scratch using its own set of rules and features to ensure the model is making appropriate and viable recommendations to the customers.

- Some appropriate features could include for example life stage, age, product holding (internal and external), product and spend behaviour, broad income bands.
- In rebuilding the model, the bank can also ensure that the model takes into account all the products offered by the bank as the bank has a wider product offering than the stock standard off the shelf model offers
- The model could then also be tweaked to allow for some of the more detailed nuances within some of the products the bank offers (for example investments) where perhaps a more detailed needs analysis completed by the customer could assist with genuinely giving the client the best options available to them
- In addition, regulatory nuances within each of the territories that WeGro operates can be allowed for.

The reference data used to develop the model could be run through some level of pre-scoring and affordability checks to help prevent inappropriate model recommendations to customers that would not qualify for the products coming out of the recommendation engine.

The model could be optimised on sub-populations/ targeted market segments aligned with current strategic priority

It would be worth implementing the new model – however it is changed – just on a sub-population of customers (at least for a month or so) to better understand whether the model is making any difference to the types of products taken up by customers, and to understand if this differs per channel, to optimise the strategy. I.e. to what extent does operational execution impact model results.

The model could be enhanced and put through some model risk governance process, e.g. some sort of validation and independent review. The enhanced model should include performance testing on the relevant segments.

Regular monitoring of the model outcomes will be beneficial and subsequent outcomes such default rates over time.

[32 Total]

QUESTION 2

You are an actuary and senior partner at a consulting firm specialising in banking risk.

BankAfrica is a large South African bank that offers a full suite of retail and commercial products. BankAfrica has recently acquired the personal lending and card portfolio of a retail micro-lender, RetailX, that became insolvent due to the pandemic.

The CRO of BankAfrica has indicated that he is concerned about the operational risk associated with the acquisition, in particular the threat of cyber risks to the bank due to data and systems integration. He has appointed your firm to provide advice.

i. Cyber risk is defined as any risk of financial loss, disruption, or damage to the reputation of an organisation from some sort of failure of its information technology systems. Discuss the practical considerations in determining the extent of inherent cyber risk, especially in the context of BankAfrica's recent acquisition of RetailX's portfolios. Note, you do not need to discuss the choice of distributions in quantifying tail risk.

[20]

Examiner's comment:

This question was generally poorly answered and proved to be a strong differentiator.

Poorer candidates discussed cyber risk in general, rather than referring to the specifics of the question, which asked for practical considerations in risk evaluation.

Better candidates discussed different aspects to be considered when assessing the extent of cyber risk, and commented on them in the context of the system integration.

Specifically, candidates that followed the (classic actuarial) approach of sizing inherent risk (e.g. by counting number of systems, physical sites, number of external integrations, number of capital projects, etc) and then following a risk ratings approach per major category (e.g. internal audit activity, process documentation, staff training activity, business interruption/ continuity plans, insurance, thirds party support, etc), followed by estimating a loss per event gained better marks.

It is critical that the assessment of inherent risk be inclusive data assets and data processing systems that the bank relies on from suppliers or other third parties

To evaluate the extent of Cyber Risk, the following would need to be considered:

<u>*Inventory of data assets and data processing systems*</u>

- Perform an assessment to obtain all available data assets and data processing systems.
- This should include BankAfrica's legacy systems as well as those of RetailX.
- Furthermore, an assessment of data and system integration will need to be considered
- Historic data from BankAfrica would need to be available and assessed

Inventory of network architecture and interactions on the network by information systems

- These systems' network architecture needs to be identified and assessed (versions and update history)
- Interactions and dependencies between the different information systems also need to be identified
- Whether any changes to network architecture is required to accommodate RetailX would need to be assessed.
- Where significant changes are required, additional risk is introduced.

Inventory of physical IT hardware and their supporting systems

- Equally important is an inventory of physical IT hardware and related systems
- With the acquisition of RetailX, it would need to be determined whether additional hardware would be required, or whether BankAfrica's existing hardware can be used to manage the portfolio.
- Supporting systems maintained by RetailX, such as that at loan origination, would need to be integrated.

Details on security patches on all vendor provided software- a catalogue of being up to date on latest patches and security upgrades

- The software catalogue of all key technology needs to be established, including version control, update protocols and patches for known defects
- BankAfrica will need to ensure that it is able to understand vulnerabilities associated with RetailX's existing infrastructure.

Cybersecurity protocols and assessments

- An assessment of all protocols for Cyber related events needs to be established, including a protocol for escalation of risk and mitigations needs to
- It is likely that BankAfrica would already have existing protocols that could easily be adapted to include RetailX's features
- These may need to be enhanced for specific nuances, or to incorporate risks associated with RetailX continuing its retail operations (for example data capture, loan ID information, phishing)

Access control framework

- Access control for existing BankAfrica infrastructure will need to be updated for RetailX's business.
- Where some of RetailX staff are moving to BankAfrica (e.g., credit modellers, risk functions), access control may need to be granted.
- BankAfrica would need to ensure that appropriate security protocols are in place to limit access by RetailX staff to existing BankAfrica data and systems.
- These protocols at minimum should include:
    - 2 and 3 factor authentication as well as
    - Enforced minimum system access procedures by use monitoring (revoke access where systems not actively used)

Staff training in terms of social engineering and the maturity of the on-going effectiveness and depth of awareness

- Phishing and other related cyber scams are a common way for hackers to gain access to a company's information systems
- All staff need to be aware of current phishing scams and a protocol of dealing with this needs to be established
- Additional training may need to be done to RetailX staff. For example, bank staff and loan origination officers are likely to be trained in data protection, whereas retail staff may be less aware and may give away sensitive information more easily.

A response plan in case of incident

- Cyber threats that are identified early can be appropriately mitigated. The response plan needs to be updated to include potential additional risk associated with the acquisition of RetailX.
- Malware and ransomware in particular need to dealt with carefully as these can have significant consequences across the business.

Cyber insurance, especially as way to gain access to experts via the underwriting process

- As Cyber events are becoming more common place, BankAfrica likely has existing cyber insurance cover to protect against losses.
- The insurer would need to be informed of the acquisition to include the acquired RetailX business under the existing cover.
- As part of this process, BankAfrica may have access to Cyber experts as part of the underwriting process, which could help provide insights into the risks faced and mitigation.

Methodology, Definitions, Approach

- Loss definition – There may be differences in categorisation of losses between the two banks.
- Loss Thresholds – BankAfrica may have higher thresholds than for RetailX, may need to look at different thresholds to incorporate RetailX specific data that would likely be below the threshold for BankAfrica
- Date of Loss Allocation – challenges with estimating any losses accruing but not yet identified that will pass over to BankAfrica as part of the acquisition. Strength of RetailX's cyber security systems and protocols would impact this estimate.
- Grouping of loss events – data would need to be grouped in a sensible manner. Depends on size of acquired RetailX portfolio relative to existing BankAfrica portfolio. May be small enough to aggregate under one group.
- Model Granularity – RetailX may not have an existing approach, would need to integrate
- Consider historical audit reports; evaluate findings have been remediated and those that are open.
- This will provide insight into residual risks that remain and the extent of further investment required to reduce residual risk.

ii. The following table shows the breakdown of potential operational risk events, including cyber risk for BankAfrica post integration.

Category	Expected number of events	Average gross expected loss (per event) in ZAR	Mitigating controls impact
Internal fraud	10	1,000,000	70%
External fraud	50	20,000,000	70%
Employment practices and workplace safety	2	2,000,000	60%
Clients, products, and business practices	3	4,000,000	65%
Damage to physical assets	5	50,000,000	80%
Business disruption and system failures	100	20,000,000	20%
Execution, delivery, and process management	30	5,000,000	55%

You may assume that the BankAfrica's annual operating profit is ZAR 40 billion per annum. "Mitigating controls impact" are defined as the percentage reduction in gross loss because of controls in place.

Briefly describe each category of operational risk, including an example, determine the gross and net expected loss due to operational risk and comment on the results.

[14]

Examiner's comment:

Most candidates scored well on this question, correctly calculating the required loss amounts and providing sensible definitions and examples (the bookwork part).

Poorer candidates did not comment in sufficient depth on the results obtained from the calculations.

Category	**Gross Loss**	**Net Loss**	**Gross Loss % of Gross Profit**	**Net Loss % of Gross Profit**
Internal fraud	10,000,000	3,000,000	0.03%	0.01%
External fraud	1,000,000,000	300,000,000	2.50%	0.75%
Employment practices and workplace safety	4,000,000	1,600,000	0.01%	0.00%
Clients, products, and business practices	12,000,000	4,200,000	0.03%	0.01%
Damage to physical assets	250,000,000	50,000,000	0.63%	0.13%
Business disruption and system failures	2,000,000,000	1,600,000,000	5.00%	4.00%
Execution, delivery, and process management	150,000,000	67,500,000	0.38%	0.17%
Total	**3,226,000,000**	**1,986,300,000**	**8.07%**	**4.97%**

Internal Fraud

- Losses due to acts of a type intended to defraud, misappropriate property or circumvent regulations, the law or company policy, excluding diversity / discrimination events, which involves at least one internal party.
- Examples include Transactions intentionally not reported, Misappropriation of assets, Malicious destruction of assets, Bribes / kickbacks, Insider trading
- There are relatively few (10) internal fraud events estimated, with a relatively low expected loss (R 1,000,000)
- The gross loss for internal fraud is estimated as R 10,000,000, or 0.03% of Gross Profit.
- Mitigations in place appear relatively effective and reduce this by 70% to R3,000,000
- Overall Internal Fraud makes up a small proportion (0.03% gross and 0.01%) of BankAfrica's annual operating profit.

External Fraud

- Losses due to acts of a type intended to defraud, misappropriate property, or circumvent the law, by a third party.
- Examples include Theft/Robbery, Forgery, Hacking damage
- There are relatively more (50) external fraud events estimated compared to internal fraud, with a significantly higher expected loss (R 20,000,000)
- The gross loss for external fraud is estimated as R 1,000,000,000, or 2.50% of Gross Profit.
- Mitigations in place appear relatively effective and reduce this by 70% to R300,000,000.
- The large reduction in loss indicates there is likely to be an effective insurance policy in place.
- Overall External Fraud makes up a large proportion (2.50% gross and 0.75%) of BankAfrica's annual operating profit.

Employment practices and workplace safety

- Losses arising from acts inconsistent with employment, health or safety laws or agreements, from payment of personal injury claims, or from diversity / discrimination events.
- Examples include Employee Relations such as termination issues, Safe Environment such as workers compensation, and Diversity and Discrimination.
- There are relatively few (2) of these events expected in a year, with a relatively low expected loss (R 2,000,000)
- The gross loss for Employment practices and workplace safety is estimated as R 4,000,000, or 0.01% of Gross Profit.
- Mitigations in place appear relatively effective and reduce this by 60% to R1,600,000
- Overall Employment practices and workplace safety makes up a small proportion (0.01% gross and 0.00%) of BankAfrica's annual operating profit.
- This seems reasonable given the nature of business conducted by the bank.

Clients, products, and business practices

- Losses arising from an unintentional or negligent failure to meet a professional obligation to specific clients (including fiduciary and suitability requirements), or from the nature or design of a product.
- Examples include Suitability, Disclosure & Fiduciary such as KYC or sales issues, Improper Business or Market Practices such as money laundering, and Product Flaws such as model errors, amongst others.
- There are relatively few (3) of these events expected in a year, with a relatively low expected loss (R 4,000,000)

- The gross loss for Employment practices and workplace safety is estimated as R 12,000,000, or 0.03% of Gross Profit.
- Mitigations in place appear relatively effective and reduce this by 65% to R4,200,000
- Overall Clients, products and business practices makes up a small proportion (0.03% gross and 0.01%) of BankAfrica's annual operating profit.
- This size of the gross loss may be indicative of the customer profile of BankAfrica and RetailX (lower income customers). The number of losses appears reasonable given the standardised nature of banking products and the high levels of regulation in the financial services industry that ensure financial advisors are properly licensed, accredited and trained to provide client-appropriate financial advice. It is also likely that suitable liability insurance is in place to cover any claims arising resulting in the high level of risk mitigation provided after.

Damage to physical assets

- Losses arising from loss or damage to physical assets from natural disaster or other events.
- Examples include Natural disaster losses and Human losses from external sources (terrorism, vandalism).
- There are relatively few (5) of these events expected in a year, with a relatively high expected loss (R 50,000,000)
- The gross loss for Damage to Physical Assets is estimated as R 250,000,000, or 0.63% of Gross Profit.
- Mitigations in place appear relatively effective and reduce this by 80% to R50,000,000. The bulk of this reduction is likely to be insurance based.
- Overall Clients, products and business practices makes up a relatively small proportion (0.63% gross and 0.13%) of BankAfrica's annual operating profit. This seems reasonable given the very low likelihood of such events.

Business disruption and system failures

- Losses arising from disruption of business or system failures.
- Examples include Hardware, Software, Telecommunications, and Utility outage / disruptions.
- There are relatively many (100) of these events expected in a year, with a relatively high expected loss (R 20,000,000)
- The gross loss for Business Disruption and System Failures is estimated as R 2,000,000,000, or 5.00% of Gross Profit.
- Mitigations in place appear relatively ineffective and only reduce this by 20% to R1,600,000,000
- The high frequency of losses suggest that there may be a need for increased risk mitigation strategies – for example a change in Telecoms provider, better IT support systems, installation of alternative forms of power supply etc. The high net loss could also indicate the need for business interruption cover to reduce expected losses to more tolerable levels.
- Overall Business Disruption and System Failures makes up a the majority of BankAfrica's operational risk at (5.00% gross and 4.00%) of BankAfrica's annual operating profit.

Execution, delivery, and process management

- Losses from failed transaction processing or process management, from relations with trade counterparties and vendors.
- Examples include Transaction Capture, Execution & Maintenance, Monitoring and Reporting (failed or inaccurate), Customer / Client Account Management, amongst others.
- There are a number (30) of these events expected in a year, with a relatively low expected loss (R 5,000,000)

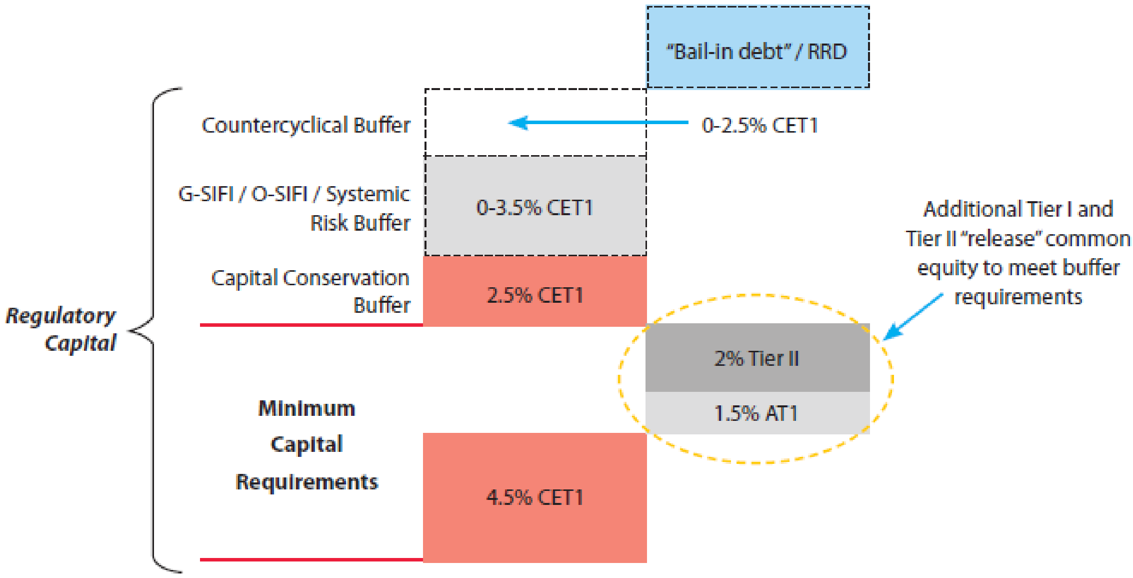
- The gross loss for Execution, delivery and process management is estimated as R 150, 000,000, or 0.38% of Gross Profit.
- Mitigations in place appear moderately effective and reduce this by 55% to R67,500,000
- Overall Execution, delivery and process management makes up a relatively small proportion (0.38% gross and 0.17%) of BankAfrica's annual operating profit.

[Total 46 marks]

QUESTION 3

You are the head of BankZ's balance sheet management team. BankZ offers a combination of retail and wholesale products and is considered a large and systemically important bank, operating in the Southern African region. The BankZ is operating on advanced approaches for capital management.

i. To deal with unexpected losses and ensure that the Bank can remain solvent and operate as a going concern, a regulatory minimum capital level is required. Regulatory requirements are those of the national regulator and international regulatory considerations as set by the Basel capital rules. The figure below summarises the key components of regulatory capital.



Briefly describe each of these components:

- Minimum Capital Requirements made up of CET1, AT1 and Tier II. [3]
- Capital Conservation Buffer [1]
- Globally Significant Financial Institution /Systemic Risk Buffer [1]
- Countercyclical Buffer [1]
- "Bail-in debt" / RRD [1]

Total[7]

Examiner's comment:

Most candidates performed well on this question.

Many candidates did not provide sufficient detail for the first part of the question to obtain the total marks allocated.

Better candidates included the ranges for the different buffers in their responses.

The bail-in debt definition provided by many candidates was incorrect.

Minimum Capital Requirements made up of CET 1, AT 1 and Tier II

- Basel III has increased the minimum common equity Tier I, total Tier I and total capital adequacy ratios.
- There is a requirement to form core capital predominantly through common shares and retained earnings.
- In certain jurisdictions, the local regulator have even higher requirements than the Basel II guidance.
- For example, in South Africa, the SARB is even more strict, demanding up to 6.5% RWA as Common Equity Tier I (versus 4.5% for Basel III), and up to 2% additional Tier I, thus raising total capital up to 14% of RWA. Basel III requires a leverage ratio (Tier I capital / total assets, including off-balance sheet exposures) of at least 3%, while SARB requires a 4% minimum. (Credit for any other accurate example)
- Core equity Tier I (CET1) capital consists in principle of share capital, share premium and retained earnings attributed as regulatory capital.
- The features that make a long-dated liability eligible as Additional Tier I (AT1) and Tier II (T2) are as follows:
    - Additional Tier 1
        - Perpetual; not callable prior to year 5;
        - Non-cumulative, discretionary distributions.
        - Deeply subordinated.
        - Conversion to equity or principal write-down at a trigger of CET1 < 5.125% (or higher) subject to the discretion of the prudential authority.
        - Conversion or write-down at the point of non-viability, where the point of non-viability is determined at the discretion of the SARB prior to the failure of the bank.
    - Tier II
        - Minimum maturity of 5 years (with capital credit amortising 20% per year 5 years prior to maturity);
        - Subordinated.
        - Conversion or write-down at the point of non-viability.

Capital Conservation Buffer

- Basel III introduces an additional 2.5% capital conservation buffer (2.5% of RWA) to withstand future stress periods.
- This was to be implemented from 2016 onwards.
- BankZ may want to consider whether this is adequate to allow for the expected effects of COVID-19.*Systemically Important Financial Institutions (G/O-SIFI)*

- Basel III further introduces an additional buffer for systemically important banks, ranging from 0-3.5%, to withstand future stresses.
- Implementation of this measure was from 2016, but set only for those banks deemed by the local regulator to be systemically important.
- Given the size of BankZ, this is likely to apply.

<u>Countercyclical capital buffer</u>

- Basel III further introduces an additional countercyclical buffer, ranging from 0-2.5%, to withstand future stresses.
- Implementation of this measure is also from 2016 to 2019.
- BankZ may want to consider whether this is adequate to allow for the expected effects of COVID-19.

<u>Bail-in debt</u>

- The Total Loss Absorbing Capacity (TLAC) standard requires G-SIFIs to have financial instruments available during resolution to absorb losses and enable them to be recapitalised to continue performing their critical functions while the resolution process is ongoing.
- Shareholders and unsecured creditors should bear the losses if a firm fails.
- If bail-in regulation functions well, the investors in these instruments should expect to bear losses during resolution, with their instruments converted to equity on a defined ranking schedule (after common equity and other capital instruments
- RRD refers to the recovery and resolution directive which aim to ensure large systemically important banks are able to perform their operations when faced with a specific stress event.

ii. Outline the key considerations that an effective capital and capital resource management policy for BankZ needs to cover. Also indicate how the covid pandemic would have applied to these considerations during the Covid pandemic and afterwards.

[15]

Examiner's comment:

Candidates performed poorly on this question, with most candidates not evidencing an understanding of the different aspects of capital management <u>as applied in practice</u>.

Better candidates understood the question, covered a range of both measurement and allocation considerations, and commented on specifics of regulator (e.g. restructuring advances relief) and bank actions (e.g. dividend policy and adjusted short to medium term resource allocation) during the pandemic.

- BankZ's Capital Management should be articulated formally in a policy standard
- clarifying roles, responsibilities and governance structures for efficient and effective decision making and execution
- The objective of the policy is to describe how the bank will:
  - Set and review its capital risk appetite

- This aspect of the capital management policy considers the regulatory capital ratios which form a key input into setting the capital risk appetite.
- BankZ should examine all key regulatory capital ratios, including performing trend analysis over the prior 3-5 years to evaluate normal and stressed fluctuations
- The risk appetite would weigh the opportunity cost of holding additional buffers to ensure on-going compliance to minimum ratios, with the risks of breaches in these ratios

- Meet its regulatory and other legal obligations
    - This aspect of the policy extends to the classes of capital instruments used and the legal obligations stemming from the instruments used to capitalise the bank
    - During the pandemic the local regulators typically issued guidance to provide certain relief measures in terms of required ratios
    - and/or the treatment of certain asset classes to support financial stability. This guidance would have informed and guided any capital actions
    - Specifically, dispensation was often provided to treat contracts under payment relief during the pandemic not as defaulted advances [These relief measures were often accompanied by a requirement to retain dividends

- Maintain its capital resources and buffer as required and in line with the stated risk profile of the business.

    - At the outset of the pandemic the potential impact of reduced business activity, increased impairment losses and potential liquidity events would have needed to be evaluated to ensure that the capital buffers in place would be sufficient

    - Should there've been a materially enhanced risk of potential breach indicated by these stress tests, remediation plans would've needed to be formulated an executed by the actors described in the policy

- Define measurement approaches for capital adequacy and approaches to manage any discrepancy between these measurements and regulatory requirements

    - Economic capital should consider a broad range of risks and may need to be expanded to incorporate emerging or new risks not necessarily covered by regulatory capital

    - Whilst the board has a duty to meet regulatory requirements, higher capital ratios can be demanded where these requirements are inadequate, as indicated by this internal risk assessment.

- Define management of capital planning in an efficient and cost-effective manner.

    - The development of the bank's portfolio and capital requirements needs to continually be monitored to ensure the capital levels are maintained within appetite

    - This monitoring would need to cover all regulatory territories the bank operates within
    - taking into account any specific local authority requirements, tax regimes and local laws on capital flows

    - The capital planning should result in timeous identification of suitable interventions to maintain capital needs,
    - considering all possible instruments available to ensure they the most cost effective options are availed of

- Allocate capital to different business activities

    - Each business line will need to prepare, and regularly update, a business case for capital demand, based on RWA and economic capital

    - Each business case contains key metrics including return on capital, net generation of equity and economic profit.

    - The Balance Sheet Management department sets targets for RWAs and capital usage as part of the budget forecast and allocation process.

    - Capital is allocated to produce optimum return, in line with the strategy and risk appetite of the bank.

    - A monitoring team, such as Treasury Balance Sheet Management (BSM), will present capital usage limits at regular intervals, for approval by an appropriate forum, such as the asset and liability committee (ALCO)

    - During the pandemic, regular updates would have been of elevated importance where rapid changes to capital numbers and asset and liability profiles could have been possible.

    - If a forecast exceeds a limit, the business line will submit a request for mitigating action to be taken or for an increase in the limit. BankZ would need to consider the range of possible mitigating actions.

    - During the pandemic, certain business units, products and portfolios may have been affected to a greater or lesser extent. Government support to affected persons and businesses also varied.

    - The pandemic may have resulted in longer lasting impact on certain industries and business lines and the allocation of capital towards these activities needs re-evaluation

    - For example, commercial office building developments and tourism sectors

- Performance measurement

    - The policy will describe the performance metrics and the process for evaluation of appropriate targets for each business line.

- This will include ROC and capital usage (RWA) metrics, against which performance of each business line is evaluated.
- Some banks also consider economic profit or profit after regulatory capital cost depending on which view of risk is more onerous.
- During the pandemic the achievement of performance metrics probably was of a secondary concern as compared to the maintenance of solvency and liquidity levels
- and ensuring continued access to capital and liquidity resources across all jurisdictions

- Recovery from stress events.
  - The policy will describe the accountable roles and decision processes required in the event of a severe event impacting solvency
  - It will detail the information that will need to be disclosed to regulators and instrument holders, together with the frequency and channel of information
  - The policy may outline potential structures to ring-fence operational entities to ensure ongoing activities are not disrupted

[Total 22 marks]

QUESTION 4

i. Explain the concept of "a significant increase in credit risk" in context of IFRS9

[2]

Examiner's comment:

This question was generally well-answered, with most candidates able to explain the concept of SICR.

A number of candidates did not separate the definition of SICR from the 30-day backstop in IFRS 9, and implied this backstop could be adjusted without reflecting on the impact of modelled PDs in the trigger (both in this question and the next).

- Significant Increase in Credit Risk, in the context of IFRS 9, is a significant change in the estimated Default Risk
- over the remaining expected life of the financial instrument)
- a significant increase event triggers the measurement of accounting impairment at an amount equal to Lifetime Expected Credit Losses
- instead of the 12-month Expected Credit Losses estimate
- and results in an advance staging classification of either stage 2 or stage 3

You are the head of risk for a medium sized bank. The credit risk modelling team has improved the current probability of default ("PD") risk rating model (the "new model") used to measure on-book credit risk in the SME loans portfolio by incorporating new data characteristics into the rating model. The new ratings model is calibrated to the same outlook as the current model and total 12-month and lifetime expected defaults from both models are the same.

Using the PD estimates from the new model results in balance sheet impairment per the table below.

Current model	Advances	Impairment	Coverage	New model	Advances	Impairment	Coverage
Stage 1	1000	10	1,0%	Stage 1	950	8	0,8%
Stage 2	100	10	10,0%	Stage 2	150	15	10,0%
Stage 3	50	20	40,0%	Stage 3	50	20	40,0%
Total	1150	40	3,5%		1150	43	3,7%

The finance director has asked you to comment on the possible reasons for changes in the total portfolio coverage, and to comment on the desirability of implementing this improved ratings model from a shareholder perspective. [10]

Examiner's comment:

This question was generally not well-answered, with many candidates failing to generate good insights from the information provided. Candidates did not seem to have a solid understanding of the mechanics of impairment calculation, for example not grasping that PD for defaulted accounts is 100%.

Better candidates referenced the mechanics of coverage calculation when looking at reasons for the increase in coverage.

Most candidates were able to comment sensibly on the change from the perspective of shareholders, with better scoring candidates also reflecting on the possible impact on regulatory and economical capital of a higher impairment coverage level and market disclosure impacts

- Introductory comments on how coverage is determined and what influences staging and coverage levels
  - Coverage is a function of PD, LGD, EAD, with 12-month parameters for stage 1 and lifetime parameters for stage 2 and 3. Also FLI
  - Movements between stages determined by backstops and SICR
  - Whether account triggers SICR is a function of current PDs relative to PD at origination and of SICR triggers/model used to determine which accounts have experience SICR
  - For this case, comment on info provided in question and conclusions on what movements could have caused coverage movements and what has stayed constant
- Observations on coverage movements
  - Stage 1 coverage is lower, stage 2 and 3 coverage are the same. Advances in stage 1 lower and in stage 2 higher.
  - New model has resulted in more accounts in stage 2 i.e. more accounts triggering SICR
  - Comment on how this could occur (PD/SICR trigger changes)
- Comments on coverage movements
  - Remaining accounts in stage 1 likely lower risk, resulting in the stage 1 coverage decrease.
  - Overall increase due to more accounts in stage 2 with higher coverage applied to these accounts. Coverage in stage 2 calculated on lifetime rather than 12-month basis
  - Stage 2 coverage is the same, despite 50% increase in advances in stage 2 – implies that risk profile of new accounts in stage 2 is same as that of previous accounts.

  - Overall coverage increased from 3.5% to 3.7% purely based on the new PD rating model.
  - Since the inherent risk in the portfolio has not changed, the only driver of the increased coverage is the new ratings model which as assigned higher PDs to stage a sub-set of stage 1 advances and has subsequently caused these advances to trigger a PD based SICR rule

- Desirability from shareholder perspective
  - Adoption of this model will reduce earnings in the adoption period, which is a negative
  - Considering there has not been any change in inherent portfolio risk this reduction in earnings is purely driven by the risk measurement approach
  - The extent to which regulatory capital is reduced by the increased balance sheet impairments is shareholder positive
  - It is unlikely that the full increase in impairment will be off set to regulatory capital and in aggregate still shareholder negative
  - Adoption of this model will impact disclosure by reducing earnings in current period and likely drag income statement as the portfolio grows
  - With a higher ROE possibly disclosed depending on the balance of regulatory reduction and earnings drag
  - More accurate assessment of risk = better prepared for future losses from a coverage perspective.
  - Early identification of accounts subject to increase in credit risk can drive management actions, potentially improving final loss outcomes
  - Earlier recognition of expected losses could lead to better CLR stability later. May need to consider this.

END OF REPORT

