Pivotal Relationship between Service Delivery Automation and Job Losses: A Case of the South African Banking Industry

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Abstract

Service delivery automation is seen as the new norm that uses automated service delivery channels and advanced technologies to provide services to customers. In recent years, the integration of advanced technology-based practices to deliver services in the banking industry has grown exponentially and is currently having a significant impact on customer perceptions and, subsequently, on the productivity of the entire financial sector. This paper looks at the influence and impact of adopting service delivery automation on the potentiality of job losses or unemployment in the South African banking industry, with a focus on the five prominent banking institutions in the country. An analysis of the employees' perceptions of the phenomenon at hand was conducted to determine whether service delivery automation brings along unemployment through job losses. A conceptual framework was developed to lay the ground for hypotheses to test the model developed for this paper. Through the hypothesis testing, it was found that there is a significant relationship between service delivery automation and the generation of job losses, whereby the more banking institutions integrate automation into their structural business model, the more certain category of job opportunities are lost or displaced.

Keywords
Service delivery automation, digitalisation, job losses, unemployment and banking industry.

1. Introduction
In recent years, the integration of technologically based practices to deliver services has taken an exponential turn in the banking industry. It is currently impacting customers' perceptions and, ultimately, financial services' productivity (Malik et al. 2016). According to Makarand (2018), service delivery automation is an umbrella concept where a series of human activities are automated through advanced technologies in the service delivery chain. Service delivery automation is simply the capacity to complement innovative technologies that can simplify business processes and reduce disruption. Correspondingly, not all technologies provide automation and replace a single human action with technology.

Notably, the hot and most common topic today is the implication of smart technologies, which have automation as the ramification. With the adoption of service delivery automation within the banking industry, banking institutions have revolutionised the way of interacting with customers. Banks have several proven automation adoption strategies at their disposal, from increasing cross-functional collaboration and execution to achieving "quick wins" via the automation of small tasks. What is critical to moving forward is an understanding that automation is not a silver bullet. Instead, banks view automation as a vital component of an overall digital business strategy that, over time, will include cognitive computing, human-centric design, the Internet of Things (IoT) and blockchain. To that, human interaction in service delivery has been significantly redefined, meaning that the integration of machines seems to exponentially takes over human-intensive activities. Also, automation innovation in the banking industry brings both efficiency and disruption and radically new ways of engaging and doing business. For countries and organisations that are ready for the integration of smart technologies and have a well-trained workforce and are prepared to adapt to the machine-run, service delivery automation has the potential to uncover new value, create and redesign more jobs than those being lost and boost growth significantly (Accenture 2018). However, in the banking industry, such as the South African one, which is averagely less prepared and basically young, service delivery automation may bring more job losses

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than gains—which can negatively impact the socio-economic well-being of individuals and likely the entire economy. Hence, the integration of service delivery automation requires a preliminary analysis to evaluate the negative impact or advert effects of new technologies on the employees.

1.1 Objectives
The main objective of this paper is to investigate the pivotal relationship between service delivery automation through the adoption of bank automation and job losses. The researcher would further establish whether the new job opportunities that are potentially created by service delivery automation compensate for job losses at all functional levels.

1.2 Framework
The concept of service delivery automation is broad and tends to encompass multiple aspects; however, the scope of this paper is streamlined based on the below proposed conceptual framework. Service delivery automation through the adoption of bank automation is portrayed as the primary driver of the generation of job losses (creation of unemployment). In other words, the adoption of bank automation is considered the independent variable and the generation of job losses as the model's dependent variable. Accordingly, the skill-biased technical change variable was included in the framework to illustrate and support the findings of the relationship between the adoption of bank automation and the generation of job losses because the items describing the skill-biased technical can also explain the logic occurring in the generation of job losses (Figure 1).
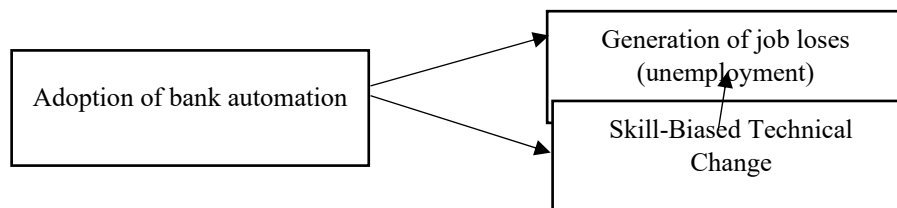

Figure 1. Research conceptual framework

1.3 Problem statement
The literature analysis revealed that banking institutions adopt smart technologies to improve business operations and increase the convenience and speed of delivering services to customers as they need them and when they need them. However, the intriguing facet emerges when labour economists, industry leaders and policymakers still debate the importance of the place of employees along the service delivery chain. The confusion comes along with whether adopting bank automation brings more job opportunities than job losses within the banking industry in South Africa.

1.4 Significance
This paper is an awareness guide to bring some sort of consideration to the adverse effects of adopting automation within the banking industry. The influence of smart technologies in the banking system is exponentially increasing. Banking institutions' top management is called to create an environment where enhancing operations is the primary objective, but attenuating the adverse influence of smart or advanced technologies on the generation of new opportunities should be a priority too. This study thrives on providing adequate indications on how service delivery automation through the adoption of bank automation could be seen as the predominant predictor for the generation of job losses.

2. Literature review
2.1 Automation will have a profound impact on the workforce
A report published by Frey and Osborne (2015) from Oxford University demonstrated that approximately 47% of jobs in the U.S. would be 'automatable over some unspecified number of years, perhaps a decade, two or probably less'. In the same perspective, Ernst and Young (2018) recently reported that, in the upcoming two to three years, machines would have the capability to execute approximately 30% of the work currently done at banks. The truth is that machines are tremendously efficient at amassing and sifting through enormous fodders of information to make informed decisions.

As the integration of automation is still at the early stage, thus, some bank institutions have not yet experienced significant changes in workforce levels or, subsequently, improvements towards efficiency (Ford 2018). Yet many economy scholars predict an exponential increase in the adoption of automation into business processes, and its upcoming impact is inevitable. Banks have long adopted technology to automate selected channels of their operation lines. Still, today machines or bots can observe how employees work and learn from them, often enabling computers to fully automate job functions in a matter of weeks or months–the phenomenon is known as machine learning (ML). Integrating automation into certain banks' operations has already started rolling the ball (Noonan 2018). For instance, New Zealand and Australia Banking Group have recently released a report depicting their annual cost savings of over 30% (for selected banking functions) and over 40 banking processes automated since 2015 (Ernst and Young 2018). Hence, this banking group can make huge cost savings by using advanced technologies through the adoption of enabling applications, including the full automation of key processes. That means specific jobs could be lost or displaced in the process of automation integration.

The debate around human work being replaced by the integration of computers is reshaping the thinking of bank employees day by day. According to the World Economic Forum Report (2017), the use of advanced robotic assistance for advisory and advanced teller machines is raising concerns about the prospects of human employment in general and specifically in the emerging market such as the banking industry, which has the ability to replace unskilled labour today (Ernst and Young 2018). Since the banking industry is seeking, by all means, to adapt to technological innovations, the use of virtual assistance looks to be the predictable step in the use of algorithm-based technology. Banks are forced to be on guard to ensure that customers' assistance is efficiently performed by such a service delivery channel (Mok and Saha 2017). It will redefine the nature of the interaction between banks and their different customers. This, in turn, has real implications for both the size of the staff and the number of physical branches managed by humans. In addition, the cutting-edge target for many bank institutions to adopt an automation delivery system is to significantly cut costs, enhance efficiency, and, more importantly, display convenience for customers' transactions.

2.2 Automation and the changing nature of work

A report published by Accenture (2018) claims that not only does the integration of the automation system has the potential to change the headcount and types of human being employed by banking institutions, but the changing nature is also felt at the banking career levels. Years ago, bankers used to operate following a straight line up through one business or hierarchy. Today, as reported by Ernst and Young (2018) in a recent report, a participant said, "We fully expect people to have four or five 'careers' within the same bank." Jobs or job opportunities are becoming increasingly dynamic. Most analysts expect tenure to decline further within any single firm. For example, in the United States, the mean tenure for workers aged 25–34 in 2016 was less than three years, compared to more than ten years for workers in the 55–64 age bracket. In Europe, there are differences in the tenure of jobs by region, but between 2000 and 2014, the tenure of jobs for millennia trended downward. According to Vermeulen et al. (2018), in the coming years, those with the ability to work across different functions and business environments will be increasingly valuable, and firms will need to adjust how they view their employees as a result. A participant said banks need to "focus on people, not on roles, shift to thinking about capabilities. That is much harder."

According to Berruti et al. (2017), there is going to be a much more significant impact of automation on this emerging market in the next few years, where advanced machines will be able to perform up to 20 to 30 percent of work across banks' functions. This increases capacity and frees employees to focus on higher-value tasks and projects. Therefore, banks are forced to take a strategic approach to significantly benefit from the opportunities generated by automation. In some cases, they will need to design new processes that are optimised for automated work rather than for people and a couple of specialised domain expertise from vendors with in-house capabilities to automate and bolt in a new way of working (Ponczek 2017; Word bank group 2019).

In short, an "end of work" scenario may be observable (Ford 2015). In this case, intelligence technology will become so advanced that any job, including those newly created, will be rapidly taken over by technology again. Therefore, it seems to end up in this scenario ("end of work") if the rate at which the workforce can be re-educated, upskilled and reskilled for employment is lower than the rate of technological or automation advancement (Autor and Salomons 2018). This serves as one of the important dimensions of this study. Moreover, in the "structurally lower" scenario, some jobs are destroyed by the integration of the automation system, but the displaced workforce can be re-educated in order to be assigned to new job activities, including (possibly) newly created ones. One explicit narration in favour

of this scenario is that technological advances in the sectors such as banking promote the prior reshaping of workforce skills. Vermeulen et al. (2018) endorsed that education subsequently moderates the pace of technological progress.

3. Methods

The study strives to measure the extent to which service delivery automation influences and impacts job losses in the banking industry in South Africa. Hence, the five most powerful banking institutions, known as the "big five", were used as a case study. These banks are Absa, Capitec bank, First National Bank (FNB), Nedbank and Standard bank. The reason for considering these banking institutions is that they account for total banking assets of more than 70 percent in the country (Writer 2021; Fin24 2016). They once used a conventional operating system and are now transcending from that system to an automated one to serve customers with few resources.

A double-quantitative methodology was used in this study to appraise the employees' perceptions of the phenomenon at hand. The first quantitative method consisted of a questionnaire instrument. The social media platform, LinkedIn, was used to administer the questionnaires to 223 employees, who were selected using the quota sampling technique across the five banking institutions–Primary data collection. The structural equation modeling (SEM) technique was deployed in this study to evaluate the extent of the relationship between service delivery automation and job losses. Hence, two hypotheses were formulated based on the constructing items shown in the annexure, which also displays descriptive and frequency statistics or response patterns for each construct item. The second facet of the method was secondary, whereby statistical information about the number of employees was extracted from the banks' fact sheets and annual integrated reports to complement the primary data analysis.

4. Results and discussion

4.1 Primary data

The relationship between service delivery automation through the adoption of bank automation and Job losses (JLOSS) was tested using path analysis. To get more insights into the relationship, the hypothesised path between the adoption of bank automation (ABA) and skill-biased technical change (SKILL) was also considered to enrich the discussion further, as displayed in Table 1 below.

Table 1. Hypotheses testing

Proposed hypotheses		Paths	SEM Output: Proposed Model				Results*
			Standardised (β)	S.E	t-value (t)	p-value	
H₁	The more banks automate processes; the more low-skilled jobs are lost/displaced.	ABA → JLOSS	0.279	0.960	4.08	0.000	Supported
H₂	Adopting the automation system in the bank creates unbalanced demand for staff skills.	ABA → SKILL	0.449	0.893	6.50	0.000	Supported

Note: ABA: Adoption of bank automation; JLOSS: Job losses; SKILL: Skill-biased technical change. The output summary was generated by IBM SPSS 28.

The regression coefficient of the direct path between the adoption of bank automation (ABA) and the generation of job losses (JLOSS) (estimated standardised β value of 0.28 with a p-value of 0.000 and a t-value of 4.08) in the model provides strong significant support for hypothesis 1. This finding indicates that the higher degree of relative automation deployed by the banks directly affects the level of job loss generation. Specifically, the more processes are automated in banking institutions; the more certain jobs are lost or potentially displaced within or outside the banking institution. This further assert that the deployment of automation technologies is a potential source of job disruption within the banking industry.

Through this finding, the study consents support to a series of theoretical assertions as well as conceptual assertions. However, this comes up with state-of-the-art of empirical evidence. It is congruous with the theoretical argument that technology possibilities could strategically lead to digital disruption in banking. Thousands of bank employees may also be subjected to paying the heavy price–Job losses (Kreger and Daukste 2020). Also, the finding validates the framed conceptual argument that Nedbank Group's chief executive officer puts forward by stating that customers' needs and competitive pressure have forced banks to digitise their business operations rapidly. Consequently, that has resulted in certain positions or processes being lost (generation of job losses) as well as branch closures across the country (Writer 2020). This assertion resonates with the extent to which service delivery automation has a significant role in the degree of unemployment within each banking institution of interest across the country.

In addition, hypothesis 1 states that "the more banks automate processes, the more low-skilled jobs are lost/displaced". The related finding also speaks to the argument that the direct effect of the adoption of bank automation on the generation of job losses tends to concern mainly employees with a low level of skills (Kreger and Daukste 2020). In other words, the less skilled the employees are, the greater their positions/activities are subject to being lost or displaced when banking processes are automated (Henderson 2020). This is where hypothesis 2 (H_2) comes in. The Path analysis indicates that there is a strong relationship between the adoption of bank automation and skill-biased technical change. Therefore, the adoption of the automation system in the bank creates unbalanced demand for employees' skills. In other words, the employee's current skills are becoming increasingly obsolete because of new technologically based processes and activities introduced by the banking institutions under consideration. Hence, employees with low-skilled are subject to losing their jobs, unlike those with technology-related skills. Employees with skills aligned with the automation requirements will most likely reap the benefits of implementing service delivery automation.

The discussion of the secondary data sheds lighter on the direct effect of the adoption of bank automation and the generation of job losses to understand the potential implications.

4.2 Secondary data
Figure 2 below depicts the statistical information about the number of employees of the five banking institutions (Absa, Capitec, FNB, Nedbank and Standard bank) over 4 years–from 2018 to 2021.
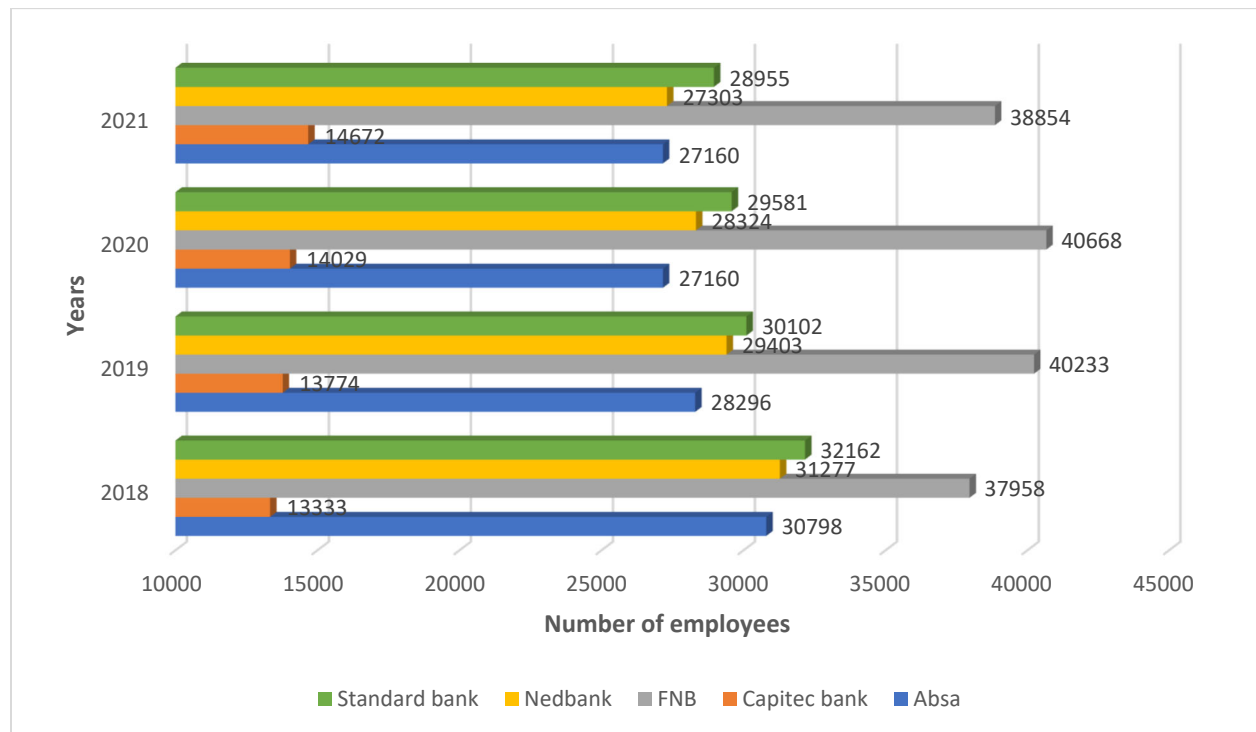

Figure 2. Trending numbers of employees per year of the five banking institutions

The researcher followed an inferential approach to provide interpretive arguments from figure 2. That is to say, the findings displayed could be interpreted and discussed from different perspectives depending on the purpose of the study. It is also necessary to note that the generation of job losses can be seen as the unemployment dimension emanating from adopting bank automation. From 2018 to 2021, Absa, Nedbank and Standard bank recorded significant levels of lay-off across the five banking institutions. Alternatively, the level of job losses was significant in the three banks. There were also some pivotal fluctuations in the number of FNB employees over the four years, especially a substantial decrease in the number of employees between 2020 and December 2021. On the other hand, Capitec bank showed a steady increase in the number of employees across the four years. This could be justified by the fact that the bank is a novice and still has to establish its footprint across the country and make itself known to customers despite being part of the big five.

Overall, by the end of December 2021, there was a total of 136944 employees against 145528 employees in 2018. That is a decrease of 6 percent in employees across the five banks countrywide. Accordingly, Nedbank (2021) unveiled that self-service options for functions previously available only in branches or through employee-assisted channels were now digitally accessible. This has taken the total digital self-service functions to 171 (compared with 114 in 2019). Besides, this demonstrates that most of these banks are moving towards an automated environment which tends to negatively affect the physical footprint of these banks. This finding is in line with the results reported under primary data, whereby the adoption of bank automation impacts the generation of job losses within banking institutions. In addition, in line with changing customer behaviour, banks are forced to make use of automation to respond to customers' preferences accordingly. Due to the closure of certain branches, many impacted employees were successfully redeployed to other roles in the banking environment, while some opted for voluntary retrenchment and others were formally retrenched (Standard bank group 2019). This shows the level of impact that the adoption of bank automation has on the generations of job losses.

5. Conclusion

Service delivery automation through the adoption of bank automation displayed a strong relationship with the generation of job losses, which is also referred to as a dimension of unemployment orchestrated by implementing technology-based practices. The path analysis based on the primary data indicated that the more Absa, Capitec bank, FNB, Nedbank and Standard bank restructure their business models to integrate automation, the greater the number of job losses observed throughout the service delivery chain. Therefore, this seems to influence and impact low-skilled employees, unlike employees with technology-related skills, who are privileged and reap a large portion of the benefits of adopting automation. In addition, the inferential interpretation of the secondary data also supported the primary data's results. The implementation of service delivery automation creates new types of jobs or job opportunities which are not beneficial nor within reach of all employees at all levels because they require advanced skills.

6. Recommendation for future research

The influence of service delivery automation on job losses was examined using the five largest banking institutions in South Africa as a case study. For more rigorous results, it would be commended to conduct a study that will examine the relationship between service delivery automation and the generation of job losses from the entire financial services institutions' perspective in South Africa. This would provide additional robustness in generalising the results.

References
Accenture, Future Workforce Survey-Banking: Realising the Full value of AI, 2018, Available: https://www.accenture.com/_acnmedia/pdf-77/accenture-workforce-banking-survey-report.

Autor, D. and Salomons, A., Is automation labour-displacing? Productivity growth, employment, and the labour share. In Proceedings of the BPEA Conference Drafts, Detroit, MI, USA, 8–9 March 2018, Available: https://www.brookings.edu/wp-content/uploads/2018/03/1_autorsalomons.pdf.

Berruti, F., Ross, E. and Weinberg, A., The transformative power of automation in banking, McKinsey, 2017, Available: https://www.mckinsey.com/industries/financial-services/our-insights/the-transformative-power-of-automation-in-banking, accessed January 28, 2020.

Ernst and Young, The future of talent in banking: workforce evolution in the digital era. Bank Governance Leadership Network, Tapestry Networks, April, pp. 1-18, 2018.

Fin24, Big five SA banks losing market share, 2016, Available: https://www.fin24.com/Companies/Financial-Services/big-five-sa-banks-losing-market-share-20160525.

Ford, M., The Rise of the Robots: Technology and the Threat of Mass Unemployment; One world Publications: Oxford, UK, 2015.

Ford, M., The Rise of the Robots: Technology and the Threat of Mass Unemployment. Kindle Edition, 2018.

Frey, C.B. and Osborne, M.A., The future of employment: How susceptible are jobs to computerisation? Oxford Martin School Oxford Martin Programme on Technology and Employment working paper 1314, University of Oxford, 2015.

Henderson, R., Hundreds of jobs at risk as Bank A revamps retail bank. News24, 2020. Available: https://www.news24.com/fin24/companies/financial-services/hundreds-of-jobs-at-risk-as-Bank A-revamps-retail-bank-20190307.

Kreger, A. and Daukste, L. Z., Banking Industry Cuts Millions of Jobs Forced by AI and Digitization in Banking, UX Design Agency, 2020. Available: https://www.uxdesignagency.com/blog/banks-will-cut-millions-of-jobs-in-the-next-decade.

Makarand, P., financial-services-automation-taking-off-the-training-wheels, Digital Operations, vol. 76, no. 2, pp. 223-226, 2018.

Malik, S. S., Amer, K.U.R. and Tanzeem, S., Combine Effect of Automated Services and Traditional Services Quality on Customer Satisfaction: Evidence from Banking industry of Pakistan, International Journal of Economics & Management sciences, vol. 5, no. 3, pp. 1-8, 2016.

Mok, A. and Saha, R., Strategic risk management in banking, Deloitte Inside Magazine, 2017, Available: https://www2.deloitte.com/content/dam/Deloitte/lu/Documents/financial-services/Banking/lu_inside_issue14_strategic_risk_management.pdf, accessed March 6, 2020.

Nedbank, Integrated Report for the year ended 31 December 2021, Available: https://www.nedbank.co.za/content/dam/nedbank/site-assets/AboutUs/Information%20Hub/Integrated%20Report/2022/2021%20BankD%20Group%20Integrated%20Report%20(1A).pdf.

Noonan, L., AI in banking: the reality behind the hype, Online Financial Times, April, 2018, Available: https://www.ft.com/content/b497a134-2d21-11e8-a34a-7e7563b0b0f4.

Ponczek, S., Machines Poised to Take Over 30% of Work at Banks, McKinsey Says, Bloomberg African Edition, 2017, Available: https://www.bloomberg.com/news/articles/2017-07-20/machines-poised-to-take-over-30-of-work-at-banks-mckinsey-says.

Vermeulen, B., Kesselhut, J., Pyka, A. and Saviotti, P. P., The Impact of Automation on Employment: Just the Usual Structural Change? Sustainability MDPI, 10, 1661, pp. 1-27, 2018.

Word bank group, The Changing Nature of Work: A word bank group flagship report, International Bank for Reconstruction and Development, Washington DC, 2019, Available: https://documents1.worldbank.org/curated/en/816281518818814423/2019-WDR-Report.pdf.

World Economic Forum, The Global Competitiveness Report 2017–2018, WEF, Cologny, Switzerland, 2017.

Writer, S., South African banks face a battle against Covid-19 fallout – and each other, says an analyst. BusinessTech, 2020, Available: https://businesstech.co.za/news/banking/403789/south-african-banks-face-a-battle-against-covid-19-fallout-and-each-other-says-analyst/.

Writer, S., How South Africa's 5 biggest banks continue to dominate, Businesstech, 2021, Available: https://businesstech.co.za/news/banking/506740/how-south-africas-5-biggest-banks-continue-to-dominate/#:~:text=The%20five%20biggest%20banks%20in%20South%20Africa%20continue,in%20the%20country%2C%20valued%20at%20approximately%20R5.8%20trillion. /.

Standard bank group, Report to Society 2019, Available: https://thevault.exchange/?get_group_doc=18/1587064817-SBG2019ReportToSociety.pdf.

Biography

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Annexure: Descriptive and frequency statistics along with the items making up each construct

Construct: **Generation of job losses** (JLOSS)		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
B28 Employees are aware of the potential job losses in this bank, because of the smart/advanced technologies.	Count	9	32	44	72	66	223
	Row N %	4.0%	14.3%	19.7%	32.3%	29.6%	100.0%
B29 The restructuring of our banking system can significantly increase job losses.	Count	9	36	38	73	67	223
	Row N %	4.0%	16.1%	17.0%	32.7%	30.0%	100.0%
B30 In this bank, I know an employee who has lost/may/will lose his/her job as a result of innovative changes.	Count	22	42	27	68	64	223
	Row N %	9.9%	18.8%	12.1%	30.5%	28.7%	100.0%
B31 Job losses affect mainly low-skilled or less educated employees of this bank.	Count	14	30	43	72	64	223
	Row N %	6.3%	13.5%	19.3%	32.3%	28.7%	100.0%
B32 At the current time, there seem to be more job losses than job opportunities.	Count	18	39	48	63	55	223
	Row N %	8.1%	17.5%	21.5%	28.3%	24.7%	100.0%

Construct: **Skill-biased technical change** (SKILL)		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
B45 With the new technological changes implemented in this bank, the labour demand for routine tasks tends to decrease.	Count	9	18	46	86	64	223
	Row N %	4.0%	8.1%	20.6%	38.6%	28.7%	100.0%
B46 The current era requires employees to possess high and new skills to remain relevant in this bank	Count	9	12	32	96	74	223
	Row N %	4.0%	5.4%	14.3%	43.0%	33.2%	100.0%
B47 Employees with high skills are more likely to absorb the benefits generated by digitalising the banking system.	Count	7	17	36	85	78	223
	Row N %	3.1%	7.6%	16.1%	38.1%	35.0%	100.0%
B48 The skill-biased technical change caused by recent innovative changes is not well-perceived by low-skilled staff in this bank.	Count	13	25	52	71	62	223
	Row N %	5.8%	11.2%	23.3%	31.8%	27.8%	100.0%

Source: Extracted from IBM SPSS 28