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Technology Enhanced Single View of Customers as a Predictor for Effective Performance of the Modern Banking Institutions

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Abstract

While using confirmatory factor analysis, this paper examines the pivotal factors and values associated with the use of the technology enhanced single view of customers as a predictor for effective performance of the contemporary banking institutions. It is posited in the overriding hypothesis that the effectiveness of the technology enhanced single view of customers and the ability to achieve all its associated business values are significantly moderated by variables encompassing technological compatibility, structural philosophy, executives' commitment and employee education. Testing and validating this underpinning hypothesis was undertaken according to four main steps; model specification, sample size estimation, data collection, and the calculation of estimates and interpretation of indices. RMSEA (Root Mean Square Error of Approximation) and Chi-squared (x^2) analysis did not indicate good model fitness. However, the overall interpretation of the findings revealed most of the incremental fit indices, and the standardised regression weights (factor loadings) and squared multiple correlations co-efficient ***(r^2) to*** strongly support the overriding hypothesis that the effectiveness of the technology enhanced single view of customers and its ability to influence improvement of the performance of the contemporary banking institutions are predicted by certain four pivotal factors (technological compatibility, structural philosophy, executives' commitment and employee education). The study concludes with a conceptual framework highlighting critical steps and pivotal factors that banking executives can adopt in the endeavour to ensure the successful development and utilisation of technology enhanced single view of customers.

Keywords: banking institutions; performance; single view of a customer

1. Introduction

In today's value driven financial markets, the adoption of technology enhanced single view of customers is a prerequisite for improving the overall operational efficiency and quality of customer services offered by a banking institution (CRM) (Dawson, 2013:333). Through technology enhanced single view of customers, banking executives and staffs are able to gain easy access to seamless integrated sets of customer data on a variety of products and services consumed by various financial consumers. This titillates a bank's ability to accurately analyse and track changes in customers' needs for relevant modifications and inventions of new financial products and services to be tailored to perfectly match such needs. The alluring positive effects of all these may tend to be latent in the improvement of customer satisfaction, customer attraction, retention and loyalty (Dawson, 2013:333). A single customer view also edifies maximisation of customer lifetime values and improvement of the competitiveness of a banking institution. Some critics express doubt about the measurability of the positive financial effects of technology enhanced single view of customers (Hakanen & Jaakkola, 2012:593; Ku, 2010:108). However, it is widely acknowledged that if well managed, all its positive financial effects are usually reflected in the increment of a bank's sales, revenues and its overall financial bottom-line (Experian, 2011:672).

Unfortunately, recent trends indicate that most of the banks are still grappling to effectively integrate the use of a single view of customers as a predictor for attainment of superior performance in the contemporary volatile financial markets (Campbell, 2007:56; Accenture, 2013:18). Most of the modern banking information systems were translated from paper-based systems modeled along traditional banking structures based on silos and aligned to array of different financial products and services (Campbell, 2007:56). This undermines synchronisation and integration of different product and service offerings into a coherent seamless whole to spawn the overall effectiveness of a single view of customers (PricewaterhouseCoopers-PwC, 2011:14). The executives in most financial institutions recognise that the existing legacy systems are not supportive of the banks' initiative to foster the notion of a single view of customers (Pricewaterhousecoopers-Pwc, 2011:14). However, hefty costs required for necessary review, adjustments and alignment, or even replacement of the existing obsolete banking information systems may seem deterring (Campbell, 2007:56). In effect, most of the bank's executives opt to continue using legacy systems rather than adopt newer more integrated versions of banking information systems (Escudero & Pujari, 2009:536).

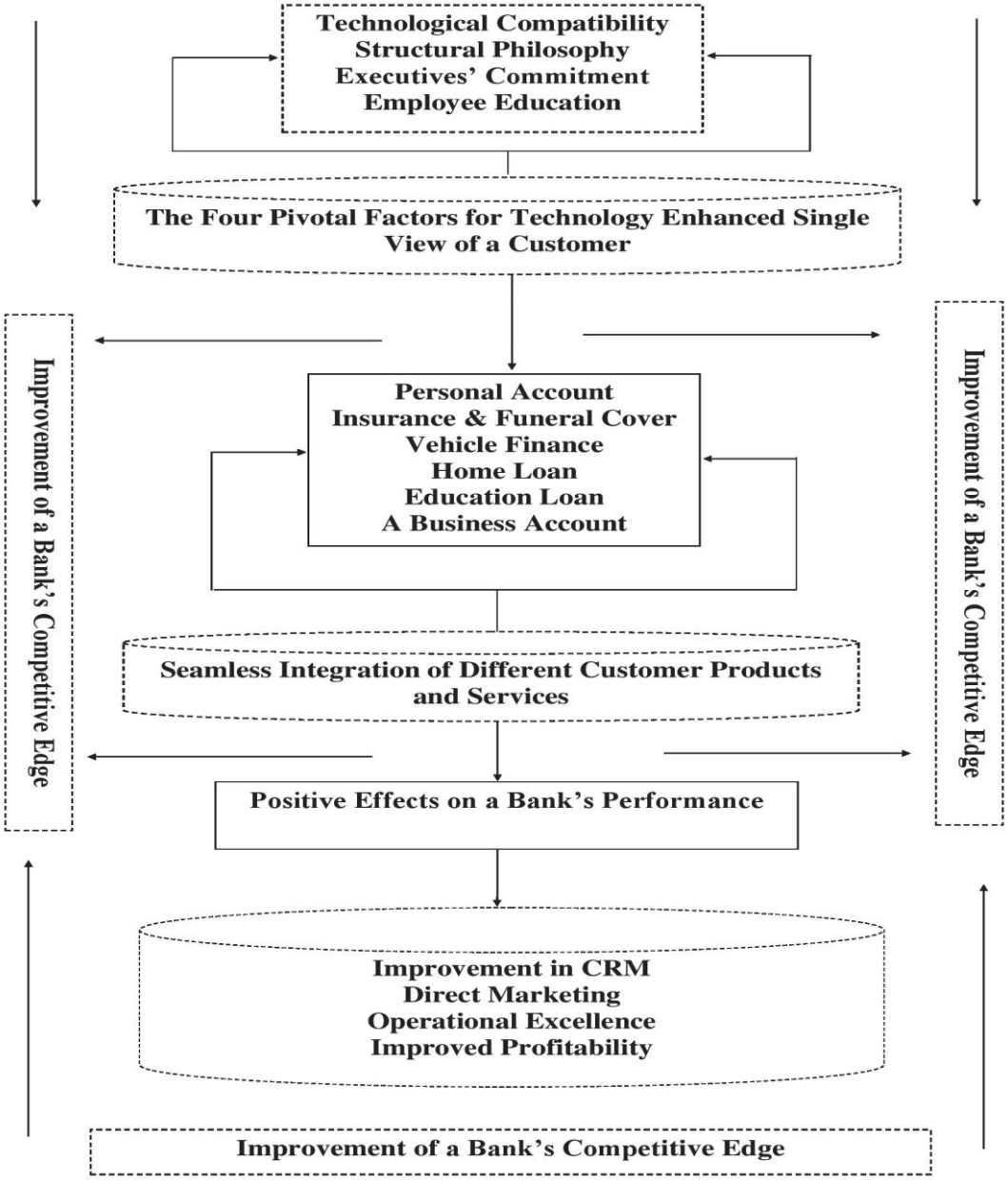
Some of the executives just do not believe that the adoption of technology enhanced single view of customers can unlock enormous business opportunities to generate enormous returns on capital invested on review and alignment of banking information systems (Escudero & Pujari, 2009:536). Without the banking executives' buy-in, it is often not reasonably practicable for the proponents of technology enhanced single view of customers to get their banks to invest in the necessary review, upgrade and replacement of the obsolete silo based systems with modern new technologies (Ahearne, Hughes & Schillewaert, 2007:336). Such drawbacks limit a bank's initiative to effectively adopt appropriate banking information systems to facilitate the integration of the technology enhanced single view of customers as part of its operational strategies (Ahearne et al. 2007:336). The notion of a single view of a customer is a phenomenon that emerged from the limitations that most banking operation practitioners identified from the inability of the existing banking information systems to support their operational initiatives to improve efficiency and quality of banking services offered to customers (Vater &Sidebottom, 2012:6). In effect, it is more popular among banking operation practitioners than with academics. This limit the amount of research undertaken to assess prerequisites that banks must watch when implementing technology enhanced single view of customers. In a bid to resolve this conceptual limitation, the entire process of this research is preoccupied with testing and validating the postulation in the overriding hypothesis in Figure 1 that the effectiveness of the technology enhanced single view of customers and its ability to influence improvement of the performance of the contemporary South African banking institutions is predicted by certain four pivotal factors.

These four pivotal factors include technological compatibility, structural philosophy, executives' commitment and employee education. This research will contribute not only towards the enriching of theories on technology enhanced single views of customers, but also highlighting key success factors and business values associated with technology enhanced single view of customers. As it is illustrated in the conceptual framework in Figure 1, it is argued that through such four pivotal factors, banking institutions can be able to use their information systems to undertake seamless integration of different financial products and services in accord with categories aligned to various sets of products and services consumed by each of their customers. Further fundamental arguments in the conceptual framework in Figure 1 indicates that when banks are able to have single views of their customers according to the individual customers and not products or services, then, they can be able to achieve the desired state of operational efficiency. Such level of operational efficiency spawns a bank's ability to undertake the necessary measures to improve their customer relationship management, direct marketing, operational excellence and profitability. The analysis of the views of different authors in the next section implies that the articulation in the overriding hypothesis in Figure 1 is strongly supported by theories and literature on the notion of a single view of customers in the contemporary banking institutions.

2. Literature Review

The concept of a single customer view is one of the techniques that predict the overall effectiveness of a bank's customer relationship management (CRM) (Experian, 2011:672). CRM refers to the process of planning and implementing a galaxy of strategies and techniques aimed at improving not only relationships and partnerships with customers, but also maximisation of customer lifetime values (Experian, 2011:672; Tanksale, Makhija & Diwani, 2014:10). Encouragement of effective communication and interaction between staffs and customers as well as the use of CRM information system are some of the techniques for improving the overall effectiveness of CRM in the contemporary enterprises. Unfortunately, sole reliance on CRM information system without creating a single view of customer undermines the extent to which the contemporary banking institutions are able to effectively utilise opportunities linked to advancement in CRM information technology (Tanksale et al. 2014:10). Effective management of CRM information system is turning to be more difficult for banking institutions seeking to become competitive through improvement of accessibility to real time data integrity across systems and processes connecting different departments and spanning different applications to resolve uncoordinated activities and improve customer experience (Vater & Sidebottom, 2012:6).

Figure 1: A Conceptual Framework for a Technology enhanced Single View of a Customer as a Predictor for Effective Performance of the Modern Banking Institutions



Source: Researcher's own construct as derived from the views of authors such as Tanksale et al. (2014:10), PricewaterhouseCoopers-PwC (2011:14), Vater and Sidebottom (2012:6), Trillium (2013:1) and Accenture (2013:18).

Technology enhanced single view of customers provides solutions to such problems to thereby enhance the overall effectiveness of CRM information system. Technology enhanced single view of customers is a process of harnessing and creating a readily accessible summary of different services and products consumed by a particular customer to enable easy storage and retrieval of customer information using unique customer identification number (PIN) (Vater & Sidebottom, 2012:6; Iriana & Buttle, 2006:23). This improves the quality of customer services. If a customer seeks for a variety of financial products or services at the same time, consulting several different personnel is not required because a single bank staff can be able to resolve customer queries across all different categories of products or services (PricewaterhouseCoopers-PwC, 2011:14). Although such a view signifies that the overall structural compatibility and skillfulness of the frontline banking staffs are prerequisites, most of the studies and models that have been postulated for developing a technologically enhanced single view of customers have often only focused on the technological aspect without considering the business supportive factors of such a system. Trillium's (2013:1) model provides the framework and standards

for building and maintaining a single customer view that can be shared across multiple systems and business functions. It also provides critical criteria for assessing the effectiveness of the technology enhanced single customer view.

2.1 Trillium's (2013) Model for Building a Single Customer View

As it is illustrated in Figure 2, Trillium's (2013:1) model posits that for banking executives to create effective technology enhanced single view of customers, the four critical skills that are prerequisites include analysis of all relevant data sources, correction and standardisation, consolidation, and monitoring and evaluation. Analysis of relevant data sources is undertaken prior to the integration of business and IT related activities. This is accomplished by intense evaluation of the often larger volumes of profiled data sets so as to facilitate identification and elimination of errors, inconsistencies and anomalies in data profiles (Trillium, 2013:1). Further initiatives involve thorough analysis through consultation with relevant parties in order to reach conclusion on the data to migrate and plan on how to correct and standardise such data.

After understanding the required ETL transformations, the next step involves correction and standardisation that are often accomplished using automated rules-based processes (Trillium, 2013:1). It also entails thorough interpretation of available product data and unstructured text data within its appropriate context for format (syntax) and meaning (semantics). The completion of this data analysis and interpretation is accompanied by correction of the misfielded and inconsistent data, supplying of missing values and standardised values, and correction to conform to specific business values (Trillium, 2013:1). Correction and standardisation is followed by data consolidation that requires integrating data from disparate systems to identify duplicates and redundancies that must be eliminated to facilitate the creation of higher levels of synchronisation and coherency.

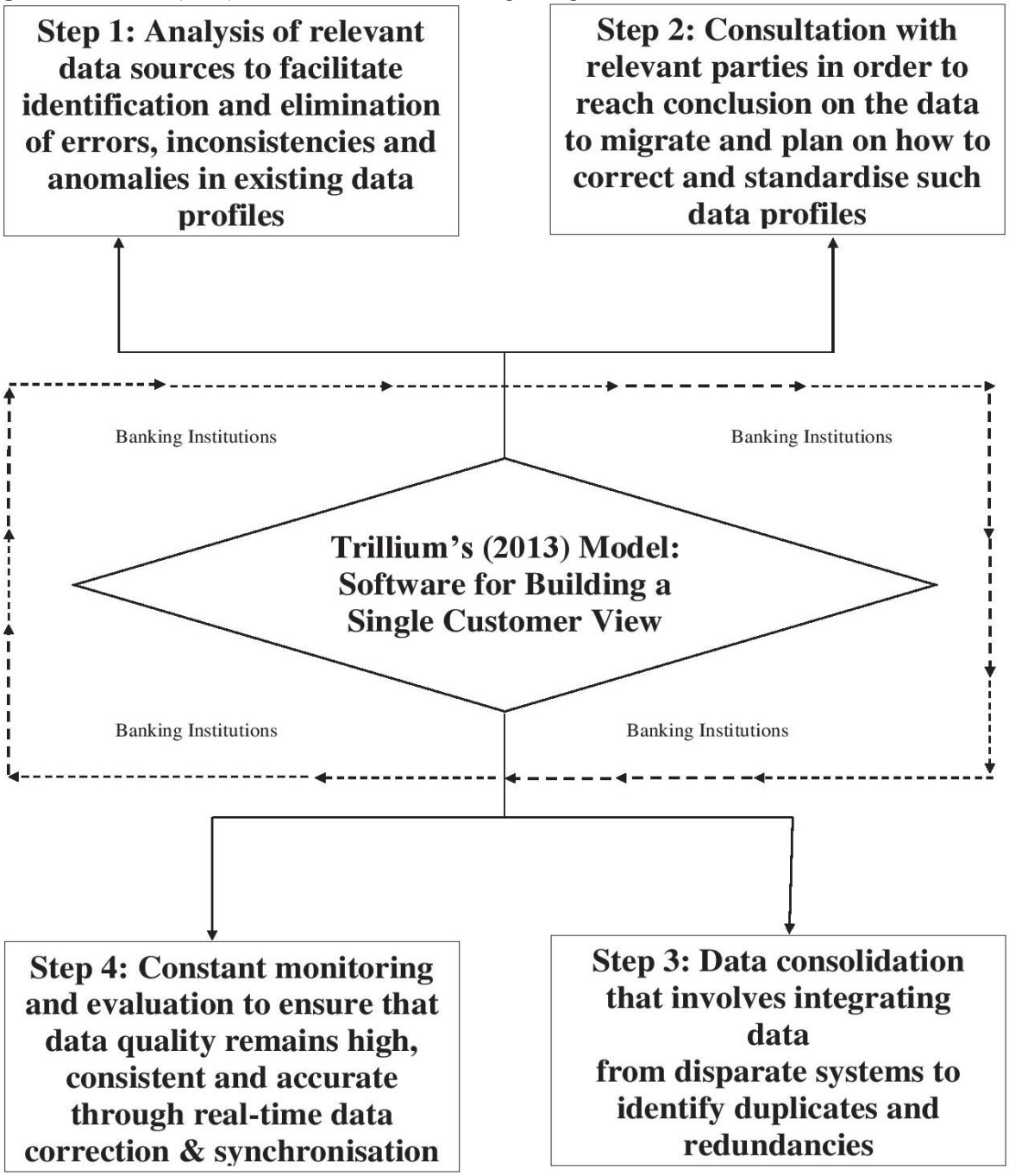
Consolidation also deals with linking of corporate records from various business units, subsidiaries and related companies as well as defining households for consumers and creating single records that can be traced back to original sources (Trillium, 2013:1). Constant monitoring and evaluation are undertaken to ensure that data quality remains high, consistent and accurate through real-time data correction and synchronisation, alerts to specific events in source systems, tracking trends over time and regularly scheduled data audits. It also entails ensuring prevention at the source, avoiding degrading sources, warehouses, marts and data hubs (Trillium, 2013:1). Through this system, most banking institutions are able to understand customers' histories, lifetime values, risk, potential exposure to debt, and their propensity to buy new goods and services.

Unfortunately when examined in the context of the argument in Figure 1, it can be noted that although Trillium's (2013:1) model would facilitate seamless integration of different financial products and services, issues of structural compatibility, management philosophy and employee skillfulness would still arise. Trillium's (2013:1) model undermines the importance of factors such as technological compatibility, structural philosophy, executives' commitment and employee education and skillfulness which have emerged as critical pivotal predictors for the implementation of effective technology enhanced single view in most of the contemporary banking institutions. Poor integration of these pivotal factors undermines the extent to which banking institutions are able to gain from enormous business values that are often linked to the overall effectiveness of the technology enhanced single customer view.

2.2 Business Values: Technology Enhanced Single View of Customers

A single view of customers not only integrates products and services consumed by a particular client, but also logs that facilitate recording and tracking of changes in customer's lifestyle, behaviours and preferences (Vater & Sidebottom, 2012:6). Having all such information under a single view bolsters ability of banking staffs to understand customers' histories, lifetime value, risk, potential exposure to debt and how many products they hold and even their propensity to buy new goods and services (Tanksale et al. 2014:10; PricewaterhouseCoopers-PwC, 2011:14). All these edify the overall effectiveness of a bank's credit risk management. As banking institutions focus on creating links between individual customer's products and financial services like lending, savings and insurance, staffs in loan departments are able to discern the relationship between a customer's savings to borrowing as well as other relevant behaviours to improve the overall quality of decisions undertaken during credit risk analysis (PricewaterhouseCoopers-PwC, 2011:14).

Figure 2: Trillium's (2013) Model: Software for Building a Single Customer View



Source: Trillium (2013:5)

The fact that staffs are exposed to easily accessible quality data also implies that banks are able to reduce their risk exposure while at the same time also providing efficient lending services to clients. This impacts positively on the improvement of the quality of customer services and subsequently the rate of customer satisfaction and retention. With detailed knowledge that a bank has about its customers, it can be able to set pricing based on customer values accompanied with incentives and offers tailored to different customers (PricewaterhouseCoopers-PwC, 2011:14). Single view of customers amplifies ability of banks to maximise values from the existing pool of customer relationship by facilitating identification and increment of lending to lower risk customers and reduction of exposure to higher risk customers.

Banks are also often able to use technology enhanced single view of customers to identify gaps in customer portfolio and target them with specific and appropriate promotions (PricewaterhouseCoopers-PwC, 2011:14). In dire contrast to the traditional systems that encouraged dividing financial products and services according to silos

of different categories, when successfully implemented, the concept of a single view of customer can enormously contribute to significant reduction of labour costs (Iriana & Buttle, 2006:23). As the technology enhanced single view of customers facilitates merging and combining of different financial service and product lines into coherent whole, financial institutions can multitask using only a few bank staffs, and thus require less labour (Iriana & Buttle, 2006:23). The reduction in the number of people that a bank employees means that a bank only spends a minimal amount of its revenues on employees' wages and salaries.

Despite the enlargement of the overall profitability margins resulting from enormous labour cost savings, the effects of the technology enhanced single view of customers on the improvement of customer service quality are also most likely to be abhorrently impressive (Moreno & Lockett, 2010:29). With seamlessly integrated financial products and services, lead time that comprises of the time that the customer seeks for services or products and the duration that he/she takes to have such services or products delivered may also reduce quite significantly (Moreno & Lockett, 2010:29). This can have an overall positive implication on customer satisfaction that in turn induces improvement in customer retention and loyalty (Chien & Chen, 2010:185). Besides the fact that all these can contribute to increment in sales, revenue and a bank's overall profitability, the other values may also arise from the overall improvement in a bank's competitiveness (Chien & Chen, 2010:185). Sadly, empirical facts imply that initiatives to create effective technology enhanced single view of customers in the contemporary banking institutions is still constrained by a number of factors (Finnegan & Currie, 2010:153; Hakanen & Jaakkola, 2012:593).

2.2 Inhibitors: Technology Enhanced Single View of Customers

Implementation of technology enhanced single view of customers in banking institutions that could have extensively grown through mergers and acquisitions can be constrained by legacy infrastructure, multiple databases and diverse IT platforms (Finnegan & Currie, 2010:153). Banking institutions with multiple structures and diverse IT platforms may face cost related challenges and difficulty of integrating and synchronising processes in different systems to facilitate the overall effectiveness of the technology enhanced single view of customers. In contrast, smaller and newer enterprises with limited product range may tend to find it easy to manipulate and adopt their information systems to enhance single view of customers (Finnegan & Currie, 2010:153; Kohli & Gover, 2008:23). This implies that the implementation of a technology enhanced single view of customers in enterprises with multiple and diverse structures may tend to be costly and disruptive to the smooth flow of banking operations in the short-run (Hakanen & Jaakkola, 2012:593).

It is on that basis that it is argued in the underpinning hypothesis in Figure 1 that attempt to undertake seamless integration of different financial products and services without taking cognisance of pivotal factors such as structural compatibility can limit the overall effectiveness of technology enhanced single view of customers. Most of structures and operational models in older banking institutions are often product centric rather than customer centric (Kohli & Gover, 2008:23). Technology enhanced single view of customers is enhanced by operational culture that fosters customer centricity. This implies that unless the implementation of technology enhanced single view of customers is accompanied by measures for changing practices and cultures from product centric approach to customer centricity, its overall positive effects may tend to be only minimal (Kohli & Gover, 2008:23).

Although most banks strive to create a single customer view, most of them have still often failed to achieve what they expected due to the complexities of handling customer data from multiple sources that tend to turn to be a lot harder (Ku, 2010:108). In the process, it is not only the quality of customer data that may be affected, but also the quality of customer services. It is often not easy to maintain data quality as executives seek to forge a single customer view from multiple systems, complex work flows and functional activities such as sales, marketing and services (Ku, 2010:108). Such a view therefore signifies that technology enhanced single view of customers requires greater level of collaboration and partnership between IT and business users as well as effective communication for it to be successful (Hakanen & Jaakkola, 2012:593). However, trends in South Africa indicates that despite initiatives by certain banks to use technology to enhance single view of customers, most of the banks have still been largely unsuccessful either due to only partial transformations undertaken by banking executives or poor level of integration of activities and skillfulness of staffs. This can impact negatively on the quality of customer services after integrations have been undertaken (PricewaterhouseCoopers-PwC, 2011:14; Accenture, 2013:18).

It is therefore on that basis that the entire process of this research is preoccupied with testing and validating the postulation in the overriding hypothesis in Figure 1 so as to highlight not only the key success factors, but also enormous business values associated with the adoption of the technology enhanced single view of a customer.

Implicitly, theoretical views seem to strongly support the overriding hypothesis in Figure 1 that considering certain four pivotal factors (technological compatibility, structural philosophy, executives' commitment and employee education) would significantly influence effectiveness of the technology enhanced single view of customers and subsequently the improvement of the performance of the contemporary South African banking institutions. However, further evaluation was undertaken through confirmatory factor analysis as a principal quantitative research technique to test and validate the fitness of the model in Figure 1. The details are as elucidated in the methodology section.

3. Methodology

Confirmatory factor analysis was undertaken according to the four main steps that include; model specification, determining the sample population, questionnaire design and data collection, and the calculation of estimates and interpretation of indices (Hair, Black, Babin & Anderson, 2010:94). With the model already specified in Figure 1, the next step involved the determining of the appropriate and valid sample population. Although the target population refers to all the banks in South Africa, the study was limited to the analysis of the use of the technology enhanced single view of customers by the banking institutions in the South Africa's Gauteng Province. In line with Hair et al.'s (2010:94) prescription, and while also taking cognisance of the number of parameters and the overall complexity of the model in Figure 1, 436 respondents comprising of bank managers, supervisors and ordinary employees of the branches of the banking institutions in Gauteng Province were used in the study. After determining the valid sample population, the design of the questionnaire and the actual data collection were undertaken.

The questionnaire was designed in line with the three main constructs and the associated measuring variables in Figure 1. Section A of the questionnaire examined the four pivotal variables encompassing; technological compatibility, structural philosophy, executives' commitment and employee education. Section B assessed the seamless integration of different financial services and products that include; personal account, insurance account, company signatory, vehicle finance account, home loan, funeral cover, education loan, business account, and personal loan account. Section C of the questionnaire analysed the effects of the technology enhanced single view of customers by examining its impacts on the improvement in CRM, direct marketing, operational efficiency and improvement in profitability. A Likert's (1932) Scale was used for designing the questionnaire according to the five scales encompassing Strongly Disagree-1, Disagree-2, Unsure 3, Agree-4 and Strongly Agree-5. The completion of the questionnaire design was followed by the testing of the validity and the reliability of the questionnaire using Cronbach's (1951) alpha formula; $a = \frac{rk}{(1 + (k - 1)r)}$. In this formula, k is the number of items considered and r is the mean of the inter-item correlations the size of alpha which is determined by both the number of items in the scale and inter-item correlations.

Despite the fact that a Cronbach's (1951) alpha of 0.8 indicated validity and reliability of the questionnaire, a pilot testing was also conducted on five respondents so as to ensure that the words, sentences and instructions in the questionnaire could easily be understood by the respondents. Thereafter, actual data collection was accomplished through personal administration with the aid of the selected bank officials across the different randomly selected branches of the banking institutions in Gauteng Province. The obtained data was analysed using Amos Version 22 of the Statistical Programme for Social Sciences (SPSS). While drawing from Hair et al.'s (2010:94) interpretation, the calculation of estimates was undertaken with the motive of assessing the overall fitness of the priori conceptual framework in Figure 1. Although Chi-squared (x^2) in conjunction with the analysis of the degree of freedom (df), probability value (P-value) and CMIN/DF were used in the assessment of whether the observed sample covariance matrix matches the SEM estimated covariance matrix, the incremental fit index and parsimony-adjusted measures were also applied to check the susceptibility of Chi-squared (x^2) to sample size variations (O'Boyle & Williams, 2011:8; Wheaton, 1987:29). The incremental fit indices used included CFI (Comparative Fit Index), NFI (Bentler-Bonnett Normed Fit Index-Delta 1), TLI (Tucker-Lewis Index) and RFI (Relative Fit Index-RHO1). The RMSEA (Root Mean Square Error of Approximation) with its associated PClose was also used as the Parsimony-Adjusted Measures (Hu & Bentler, 2006:144). David's (2014:75) interpretation was used in determining whether the results of GFI, PNFI, TLI and CFI were within acceptable limits of 0 and 1.

As cited in Bollen and Davis (2009:523), Wheaton's (1987:2), and Carmnines and McLver's (1981:1) arguments were applied in assessing whether the RMSEA (Root Mean Square Error of Approximation) fell in the

acceptable limit of 0.05 and 0.08. In addition to the application of Chi-Square (x^2) value and these modification indices, standardized regression weights (Factor Loadings) were used for evaluating how each of the hypothesised variables significantly load onto the hypothesised constructs in Figure 1. Within context of Bollen and Davis' (2009:536) criterion of $\pm.30\ to\ \pm.40$, a loading was considered to be significant if it fell at $\pm.30\ to\ \pm.40$ or above. The Squared Multiple Correlation Coefficient (R^2) was used to assess the extent to which the variance in the common factor is explained by the existence of each of the measured variable. In line with Bollen and Davis's (2009:536) prescription, a score of 30% was considered significant. The details of the findings are as presented and discussed in the next section.

4. Results

The presentation of the findings and discussions in this section are accomplished according to the three subsections that include: chi-squared (x^2) (DF, P-value and CMIN/DF), incremental fit indices and parsimony-adjusted measures, and standardised regression weights and squared multiple correlations coefficient.

4.1 Chi-squared (x^2) (DF, P-value and CMIN/DF)

The articulation in the overriding hypothesis in Figure 1 that considering certain four pivotal factors influences the successful implementation of technology enhanced single view of customers is not supported in the results of Chi-squared (x^2). In the context of the illustration in Table 1, this is accentuated in the fact that a Chi-squared (x^2) (DF=123, N = 436) =2645 is too large to render it possible for a logical conclusion about the fitness of the conceptual framework in Figure 1 to be reached. Coupled with a probability value (p-value = .000 $<$ .05) which is less than .05, the interpretation is that the observed sample covariance matrix represented in the conceptual framework in Figure 1 does not match the SEM estimated covariance matrix. The basis of this argument resides in Bentler and Bonett's (1980) prescribed decision rule that a model can only be construed fit if a chi-squared (x^2) p-value is greater than .05(p-value $>$ .05).

In this context, it can be construed that chi-squared (x^2) (DF=123, N = 436) =2645 does not only indicate lack of model fitness, but also implies that basing the development of the technology enhanced single view of customers on the four pivotal factors may not induce the desired positive effects. When interpreted in conjunction with a CMIN/df (Chi-squared (x^2) (2645) / df - Degree of Freedom (123) = 21.5 that falls outside the range of 2 to 1 or 3 to 1, the overall interpretation of the results of chi-squared (x^2) analysis would still not support the fundamental argument in the conceptual framework in Figure 1 that the effectiveness of the technology enhanced single view of customers and the ability to achieve all its associated business values are predicted by variables encompassing technological compatibility, structural philosophy, executives' commitment and employee education. Amos' (2011) Guideline for model fitness prescribes that CMIN/df (Chi-squared (x^2) / degree of freedom falling outside the ratio of 2 to 1 or 3 to 1 does not signify good model fitness. The implications associated with fact that the results of chi-squared (x^2) contradict the ideals in this hypothesis in Figure 1 can be linked to the fact that perhaps in addition to these four pivotal factors, banking executives may also need to pay cognisance to certain other additional factors.

Table 1: Chi-squared (x^2) (DF, P-value and CMIN/DF) & Incremental Fit Indices and Parsimony-Adjusted Measures

Model (Figure 1) Fitness: Techniques	**Significance (Value)** **CMIN/Chi-squared (x^2) = (N-1) (Observed Sample Covariance Matrix – SEM Estimated Covariance Matrix)**		**Interpretation**
Chi-squared (x^2) (Using Wegner's (2011:345): **Decision rule:** reject the proposed model if Chi-squared p-value< .05, and Accept the proposed model if Chi-squared p-value > .05.	Chi-squared (x^2)= 2645 (df - degree of freedom=123; probability value (p-value)= .000):		Reject the model (Figure 1), Chi-Squared (x^2) p-value =.000 < .05 & CMIN/DF = 21.5 > ratio of 2 to 1 or 3 to 1 (Coupled with a probability value (p-value = .000 < .05) which is less than .05, the interpretation is that the observed sample covariance matrix represented in the conceptual framework in Figure 1 does not match the SEM estimated covariance matrix)
	CMIN/DF = Chi-squared (x^2) (2645) / df - degree of freedom (123)=21.5		
	(Summary: x^2 (DF=123, N = 436) =2645, p-value = .000 < .05)		
Modification Indices (Alternative Fit Statistical Techniques) (Hu and Bentler's (2006:22) interpretation, CFI, TLI & RFI acceptable, if falls in the limit of 0 and 1, and using Wheaton (1987:2), a RMSEA falling between 0.05 and 0.08 with a higher PClose is acceptable)	**Incremental Fit Indices: Comparative Fit Indices (Hu and Bentler, 2006:22: Bollen and Davis, 2009:536)**	**Significance (Value)**	**Interpretation**
	CFI (Comparative Fit Index):Accept if close or = or > 0.9	.82	Acceptable
	NFI (Bentler-Bonnett Normed Fit Index-Delta 1): Accept if it falls in between .90 and .95	.63	Not Significant
	TLI (Tucker-Lewis Index): Accept if it falls in between 0 and 1	.78	Acceptable
	RFI (Relative Fit Index-RHO1): Accept if it falls in between 0 and 1	.80	Acceptable
	Parsimony-Adjusted Measures (O'Boyle & Williams, 2011:8; Wheaton, 1987:29)	**Significance (Value)**	**Interpretation**
	RMSEA (Root Mean Square Error of Approximation): Less than .05 indicates good fit, = 0.0 indicates exact fit, falls in the range of .08 to .10 indicates mediocre fit, and greater than .10 indicates poor fit	.217	**Decision rule:** reject the proposed model RMSEA = .217 > .10 with a PClose = .000 < .05 (the observed sample covariance matrix represented in the conceptual framework in Figure 1 does not match the SEM estimated covariance matrix)
	PClose for RMSEA: Reject if < .05	.000	

Source: Replicated from the results of the analysis of Chi-squared (x^2) and Modification Indices using Amos Version 22 of the Statistical Programme for Social Sciences (SPSS)

The basis of such argument is latent in Hair et al.'s (2010:94) reasoning that whether it is in exploratory or confirmatory factor analysis, the main objective of factor analysis is only to provide a conceptual model that can be further modified to ensure that it is suitable for practical industry usage. This signifies that even if a Chi-squared (x^2) (DF=123, N = 436) =2645 could be indicating lack of model fitness; conceptually the model can be modified to suit the initiative of developing a technology enhanced single view of customers.

In any case, a Chi-squared (x^2) may indicate complete lack of fitness, but it may not necessarily imply that the conceptual framework in Figure 1 is inappropriate and must be rejected. Such a view resonates in Bollen and Davis's (2009:536) assertion that although a Chi-squared (x^2) is a commonly used technique in structural equation modeling, its susceptibility to the overall complexity of a model and variations in sample sizes can lead to larger figures and the rejection of a sound model that could have been accepted. In other words, the fact that sole reliance on Chi-squared (x^2) can lead to a statistical Type 11 error which is associated with the rejection of a true or a sound hypothesised model warranted the use of the incremental fit indices and parsimony-adjusted measures to avoid the unnecessary rejection of the a priori conceptual framework in Figure 1. In contrast to the results of Chi-squared (x^2) analysis, the results of most of the incremental fit indices in Table 2 imply good fitness of the model in Figure 1 with the SEM estimated covariance matrix.

4.2 Incremental Fit Indices and Parsimony-Adjusted Measures

Using Hu and Bentler's (2006:22) prescription that CFI (Comparative Fit Index) indicates good model fitness if it is close or equal or greater 0.9 (close or $= or > 0.9$), it can be noted that when the CFI = .082 is examined in that context, it is closer to 0.9. This finding supports the overriding hypothesis in Figure 1 that considering certain four pivotal factors influences the successful implementation of the technology enhanced single view of customers. Despite the fact that the NFI (Bentler-Bonnett Normed Fit Index-Delta 1) = 0.63 does not fall within Bollen and Davis' (2009:536) criterion of .90 and .95, TLI (Tucker-Lewis Index)= .78 that falls within the acceptable range of 0 and 1 supports the CFI = .082 that imply the overall fitness of the conceptual framework in Figure 1. At the same time, the notion that certain four pivotal factors influences the successful implementation of the technology enhanced single view of customers is further echoed in RFI (Relative Fit Index-RHO1) =.80 that meets Hu and Bentler's (2006:22) acceptable criterion of 0 and 1.

In other words, most of the incremental fit indices in Table 2 do not only confirm the fitness of the model in Figure 1, but also signify that if the executives in the modern banking world are to use technology enhanced single view of customers to improve their performance, the integration of four pivotal variables encompassing technological compatibility, structural philosophy, executives' commitment and employee education is a prerequisite. In line with the overriding hypothesis in Figure 1, such pivotal factors would create the foundation that renders it possible for the banking executives to foster a seamless integration of different financial services and products that include; personal account, insurance account, company signatory, vehicle finance account, home loan, funeral cover, education loan, business account, and personal loan account.

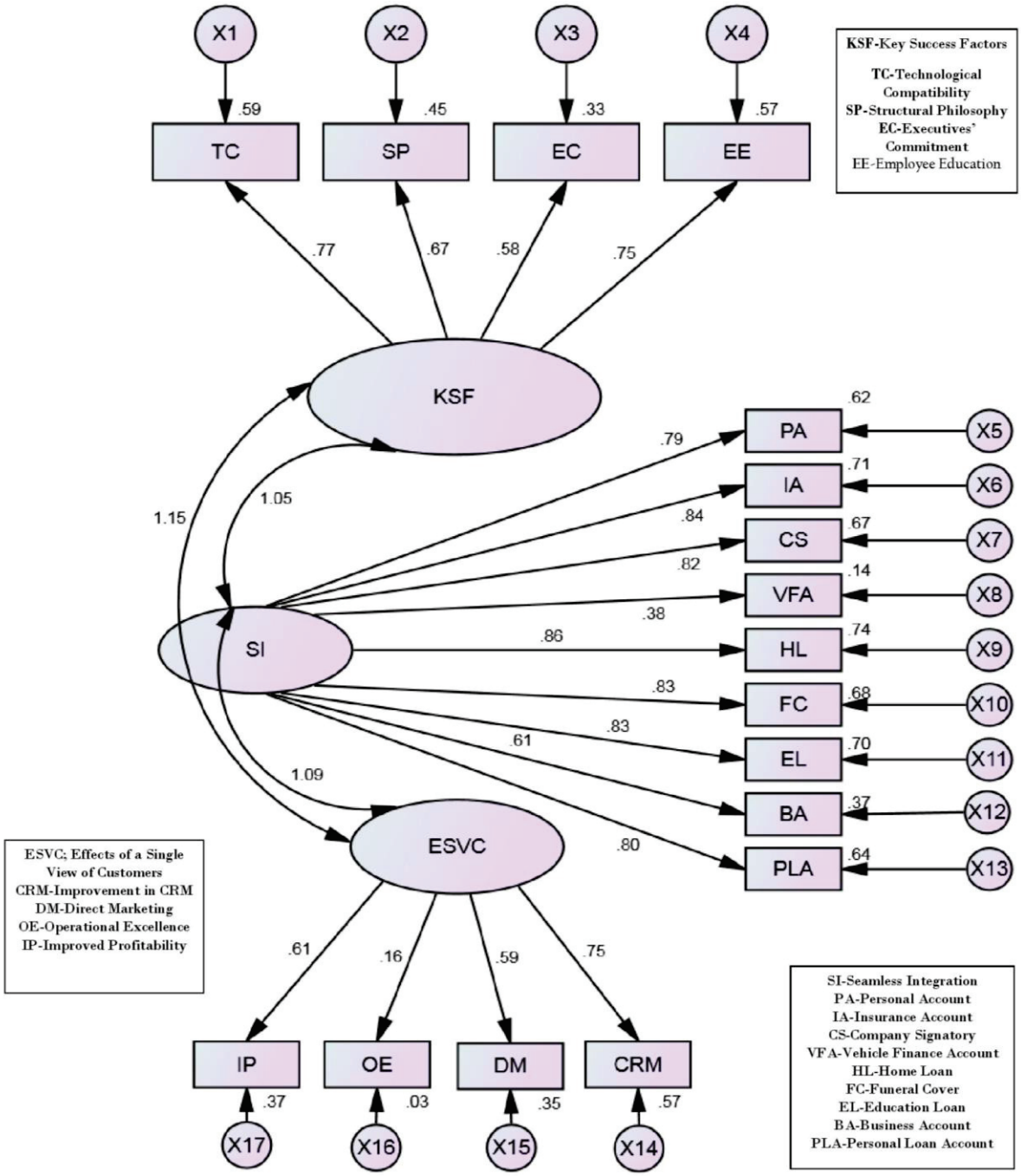
Through the power provided by the seamless integration of these different financial products and services, financial institutions are able to realise business values associated with the improvement in CRM, direct marketing, operational efficiency and improvement in profitability. In terms of the results of the parsimony-adjusted measures, the RMSEA (Root Mean Square Error of Approximation) = .217 with a PClose =.000 indicates the contrary. O'Boyle and Williams (2011:8) argue that the RMSEA (Root Mean Squared Error of Approximation) falling between 0.05 and 0.08 with a higher PClose can be considered as acceptable. In this case, RMSEA= .217 falls outside the range, and can be construed to imply lack of model fitness. Such a finding supports the results of Chi-squared (x^2) analysis that the integration of certain four pivotal factors would not significantly influence the successful implementation of the technology enhanced single view of customers. As much as RMSEA and Chi-squared (x^2) analysis do not indicate good model fitness, the results of standardised regression weights (factor loadings) and squared multiple correlations coefficient ***(r^2) in Figure 3 and Table 2*** do not only support the results of CFI, TLI and RFI on the overall fitness of the model in Figure 1, but also highlight that most of the variables load significantly onto the three respective common constructs indicated in Figure 1.

4.3 Standardised Regression Weights (Factor Loadings) & Squared Multiple Correlations Coefficient

Findings in Figure 3 directly confirm the view in the overriding hypothesis in Figure 1 that the successful implementation of the technology enhanced single view of customers is predicted by a set of four pivotal variables (technological compatibility, structural philosophy, executives' commitment and employee education). Regarding the first construct that deals with the considering of certain four pivotal variables, the standardised regression weights (factor loadings) in Figure 3 indicate that technological compatibility loads significantly at .77 and explained by 59% of the variance in the common factor. It is further highlighted that structural

philosophy loads significantly at .67 with a variance of 45%, executives' commitment .58 with a variance of 33% and employee education loads significantly at .75 with a variance of 57%. Despite the fact that executives' commitment is only explained by a variance of 33% in the common factor, all these factor loadings and the associated percentages in variances still meet Bollen and Davis's (2009:536) postulation that loadings of at least .50 or higher confirm that the indicators are strongly related to their associated constructs or common factors.

Figure 3: A Conceptual Framework for a Technologically Enhanced Single View of a Customer: Results of Standardised Regression Weights and Squared Multiple Correlations Coefficient



Source: Replicated from the results of analysis of Standardised Regression Weights and Squared Multiple Correlations Coefficient using Amos Version 22 of the Statistical Programme for Social Sciences (SPSS)

Hair et al. (2011:463) emphasise that a Squared Multiple Correlation Coefficient (R^2) for a variable is significant if it falls at 30% or above. All these confirm the view in the overriding hypothesis in Figure 1 that

the four pivotal variables encompassing technological compatibility, structural philosophy, executives' commitment and employee education are critical predictors for the successful implementation of the technology enhanced single view of customers. The extent to which these four pivotal factors create the foundation for effective seamless integration of different financial services and products to enhance effectiveness of the single view of customers is illustrated in co-relationship between a set of these four pivotal factors and seamless integration which is indicated in Figure 3 to load significantly at .1. Such interpretation falls within realm of Jasper's (2010:104) postulation that a relationship between two variables or sets of variables is significant if the result falls in between the range of $\pm\ 0\ and\ 1$. Such a result signifies that whereas the four pivotal factors create the foundation for effective seamless integration of different financial services and products to enhance the effectiveness of the single view of customers, it is also likewise not possible to attempt to accomplish seamless integration without considering the four pivotal factors.

In other words, the undertaking of seamless integration forces the need for considering the four pivotal factors even if the need for the four pivotal factors was not previously anticipated. The argument in the overriding hypothesis in Figure 1 that the effectiveness of seamless integration is measured by the extent to which different financial services and products are morphed into a coherent whole under each individual customer is further confirmed in the factor loadings and the Squared Multiple Correlation Coefficient (R^2) in Figure 3 and Table 2. Except for vehicle finance account whose factor loading of .38 with a variance of 14% fell below Bollen and Davis's (2009:536) criteria of at least .50 or higher, all the other financial services and products loaded quite significantly onto the seamless integration of different financial services and products as a main construct in the overriding hypothesis in Figure 1. It is highlighted in Figure 3 and Table 2 that personal account loaded significantly at .79 with a variance of 62%, insurance account (.84 with a variance of 71%), company signatory (.82 with a variance of 67%), home loan (.86 with a variance of 74%), funeral cover (.83 with a variance of 68%), education loan (.83 with a variance of 70%), business account (.61 with a variance of 37%), and personal loan account (.80 with a variance of 64%). With this seamless integration of different financial services and products in place, the overall findings in Figure 3 and Table 2 support the hypothesis that banking institutions can be able to engage in activities that enhance their customer relationship management, direct marketing, operational efficiency and improvement in profitability. Drawing from Jasper's (2010:104) postulation that a relationship between two variables or sets of variables is significant if the result falls in between the range of $\pm\ 0\ and\ 1$, this view is confirmed in the co-relationship between seamless integration and the overall positive effects of the technology enhanced single view of customers which is noted in Figure 3 to be significant at 1.

It implies that as much as seamless integration enhances the effectiveness of the technology enhanced single view of customers to impact positively on the improvement of the performance of banking institutions, likewise the impetus for the improvement in the performance of the banking institutions also creates the need for banking executives to invest in the technology enhanced single view of customers. This view is at tandem with the theoretical findings in which it is noted that it is the need to improve customer services, drive down operational costs and improve competitiveness in the modern volatile banking industry that lure most of the banking executives to invest in the technology enhanced single view of customers.

As much as these findings confirm the null hypothesis in Figure 1, it is noted in Figure 3 and Table 2 that improvement in operational excellence is not one of the business values that banking institutions are most likely to gain from the implementation of the technology enhanced single view of customers. This is demonstrated in the fact that the improvement of operational excellence had lower factor loading of .16 and explained by only 3% of the variance in common factor. Operational excellence is a multidimensional construct. Unlike reduction in costs which may transcend directly from the emphasis of a single view of customers, operational excellence may tend to be influenced by the overall management philosophy and the initiative to undertake continuous improvement. Nonetheless, all the other expected positive effects of a single view of a customer loaded quite significantly with CRM loading at .75 (a variance of 57%), direct marketing (.59 with a variance of 35%), and improvement in profitability (.61 with a variance of 37%).

It is further confirmed in Figure 3 that the improvement in the organisational performance does not only flow through seamless integration, but also that when the four pivotal factors are considered, the positive effects can be felt even before seamless integration is completed. This is demonstrated in the fact that Figure 3 highlights that the co-relationship between the four pivotal factors and the improvement in the performance of banking institutions is significant at 1. Such a finding suggests that although technological compatibility and employee education can lead to the improvement in efficiency and cost minimisation that impact on the increment in the profitability margin, likewise, the need to improve market performance can also drive banks to ensure

technological compatibility that leads to successful implementation of technology enhanced single view of customers. Subsequently, it also contributes to the improvement in performance. In other words, the findings presented in Figure 3 imply that the effects of the four pivotal factors can be achieved either after seamless integration or directly even before the seamless integration is completed. In whole, as much as RMSEA and Chi-squared (x^2) analysis did not indicate good model fitness, the results of most of the incremental fit indices and the standardised regression weights (factor loadings) and squared multiple correlations coefficient ***(r^2) in Figure 3 and Table 2*** strongly support the overriding hypothesis in Figure 1 that the integration of certain four pivotal factors would influence the successful implementation of the technology enhanced single view of customers and subsequently the improvement of the performance of the modern banking institutions.

Table 2: ***The Standardised Regression Weights (Factor Loadings) and Squared Multiple Correlation Coefficients (R^2)***

Constructs and Measuring Variables	Factor Loadings (Significant if falls at .50 or above)	Squared Multiple Correlation Coefficients (r^2) (Significant if it falls at 30% or above)		
KSF - Key Success Factors: Technology Enhanced Single View of Customers	**Loading**	**Interpretation**	**r^2**	**Interpretation**
TC-Technological Compatibility	.77		59%	
SP-Structural Philosophy	.69		45%	
EC-Executives' Commitment	.58		33%	
EE-Employee Education	.75		57%	
SI- Seamless Integration of Different Financial Products and Services				
PA-Personal Account	.79		62%	
IA-Insurance Account	.84		71%	
CS-Company Signatory	.82		67%	
VFA-Vehicle Finance Account	.38	Not Significant	14%	Not Significant
HL-Home Loan	.86		74%	
FC-Funeral Cover	.83		68%	
EL-Education Loan	.83		70%	
BA-Business Account	.61		37%	
PLA-Personal Loan Account	.80		64%	
ESVC-Effects of a Single View of Customers				
CRM-Improvement in CRM	.75		57%	
DM-Direct Marketing	.59		35%	
OE-Operational Excellence	.16	Not Significant	3%	Not Significant
IP-Improved Profitability	.61		37%	

Source: Replicated from the results of analysis of Standardised Regression Weights and Squared Multiple Correlations Coefficient using Amos Version 22 of the Statistical Programme for Social Sciences (SPSS)

5. Managerial Implications

In line with the conceptual framework in Figure 4, findings imply that banking executives will need to align the process for the development of their technology enhanced single view of customers in accord with the three main constructs in Figure 4. Such initiative will enhance effectiveness of their technology enhanced single view of customers and the ability to achieve all its associated business values. For the banking institutions willing to effectively implement their technology enhanced single view of customers, considering four pivotal factors including technological compatibility, structural philosophy, executives' commitment and employee education is a prerequisite. Ensuring technological compatibility will facilitate the assessment of the effectiveness of the existing banking information systems to support its initiative to develop a single view of customers. This is attributable to the fact that findings indicate that most of the initiative for a single view of customers are unable to start successfully due to technological obsolesce and incompatibility of the existing technologies. By ensuring technological compatibility, the management of most of the banking institutions will be able to review, upgrade and align, or even purchase new information systems to support the development of the technology enhanced single view of customers.

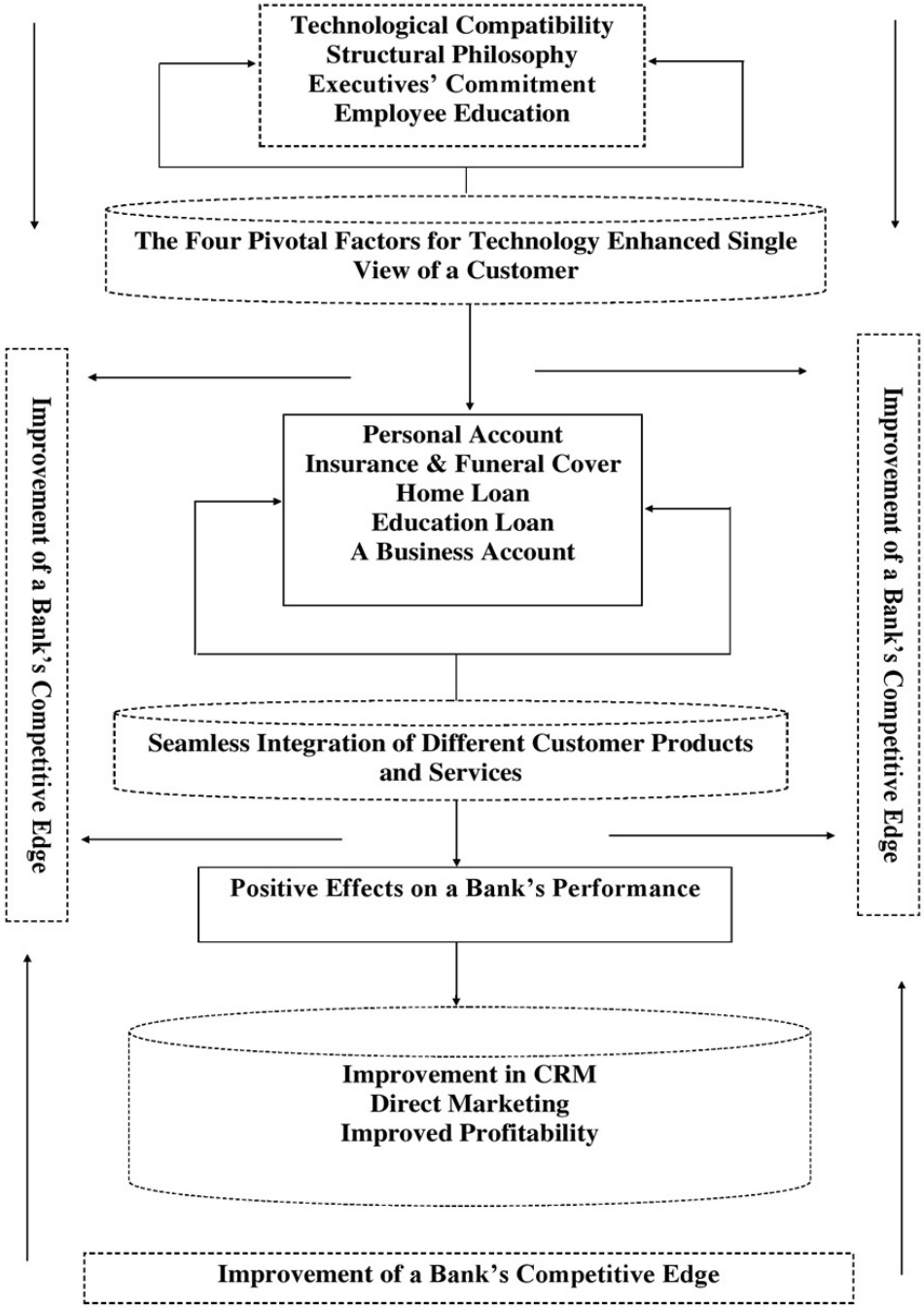
However, for such a measure to be effective, the overall structural philosophy will also need to be reviewed. As the findings indicate, having structures that encourage rather than erode operations in silos may not render the fostering of the technology enhanced single view of customers. This implies that the executives in these banking institutions may need to review their existing structures to ensure that the structures facilitate process synchronisation, coordination and integration of activities in a more coherent whole. The approval of the senior executives is a prerequisite for that the review and sometimes the investment in new banking information technologies may require a lot of funds and the fact that structural reviews may lead to the complete change in the way the modern banking institutions accomplish their activities. It explains why it is emphasised in Figure 4 that the executives' commitment is the third pivotal factor that the proponents of the technology enhanced single view of customers must ensure exists. At the same time, the employees will need to be prepared through education and training programmes for that changes resulting from the implementation of the technology enhanced single view of customers can require new competencies and skills.

Some of the changes that may arise may be linked to the fact that the employees may be required to accomplish tasks differently. As compared to the past where employees specialised only on certain financial products or services, the introduction of the notion of the technology enhanced single view of customers implies that the employees must be prepared to multitask by dealing with more of the integrated coherent, but different financial products and services. In such cases, new employees' education and training programmes are necessary if the employees are to perform more effectively. With all these four pivotal factors considered, the management of the banking institutions will have created the appropriate foundation for the undertaking of the seamless integration of different financial services and products into a coherent whole. In this endeavour, the management of the banking institutions should consider ensuring the seamless integration of different financial services and products that include; personal account, insurance account, company signatory, vehicle finance account, home loan, funeral cover, education loan, business account, and personal loan account.

Seamless integration of different financial services and products will enhance the extent to which the financial institutions are able to improve the quality of their customer services, conduct analysis and ensure that all service and product offerings perfectly match customer needs and expectations. The other positive effects are also most likely to be latent in the reduction of the overall operational costs, efficiency improvement, and subsequently the improvement in competitiveness. In a bid to ensure that the implementation of the technology enhanced single view of customers is effective and contributing towards the achievement of the desired positive effects, the financial institutions will need to constantly conduct analysis and monitor whether such positive effects are being achieved.

Any notion of the technology enhanced single view of customers that does not impact positively on the improvement of the performance of the modern financial institutions would certainly imply that there is a limitation or a failure somewhere. This explains why, it is important that constant monitoring and evaluation is conducted to ensure that the ongoing usage of the technology enhanced single view of customers is contributing towards the achievement of the desired strategic objectives and goals. If well implemented, the positive results of the technology enhanced single view of customers are most likely to be latent in the improvement in CRM, direct marketing, operational efficiency and improvement in profitability. This suggests that banking institutions must also conduct analysis and evaluation along such key attributes. Through this, the financial institutions will be able to identify challenges and apply the appropriate remedial and improvement measures that can render it possible for effective performance of their technology enhanced single view of customers to be sustainable.

Figure 4: A Conceptual Framework for a Technologically Enhanced Single View of Customers as a Predictor for Effective Performance of the Modern Banking Institutions



Source: Researcher's own construct as derived from the views of authors such as Tanksale et al. (2014:10), PricewaterhouseCoopers-PwC (2011:14), Vater and Sidebottom (2012:6) and Accenture (2013:18)

6. Suggestion for Further Research

Certainly, this paper provides all the key constructs that can be used in the process for the implementation of the technology enhanced single view of customers and its associated values on performance improvement. However, the limitations are latent in the fact that it did not examine the resultant drawbacks of using the concept of the technology enhanced single view of customers. This view is derived from the fact that ergonomically, limiting staffs to one place with less movement as before can easily precipitate boredom, fatigue and render work less interesting. All these can affect the overall rate of the employees' job satisfaction and motivation to impact negatively on the overall quality of customer services and customer satisfaction. In effect, it is suggested in this paper that further studies can examine the drawbacks associated with the use of the technology enhanced single

view of customers on the performance of the banking staff in the long run. Such studies will render it possible for relevant modifications to be undertaken to improve the overall effectiveness of the process for operationalisation of the conceptual framework in Figure 4.

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